(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 2 897 232 A1

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

(43) Date of publication:
**22.07.2015 Bulletin 2015/30**

(21) Application number: **13837772.6**

(22) Date of filing: **20.08.2013**

(51) Int Cl.:
***H01R 13/502*** *(2006.01)* ***H01R 13/46*** *(2006.01)*
***H01R 13/512*** *(2006.01)*

(86) International application number:
**PCT/JP2013/004918**

(87) International publication number:
**WO 2014/041747 (20.03.2014 Gazette 2014/12)**

(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**

(30) Priority: **14.09.2012 JP 2012203328**

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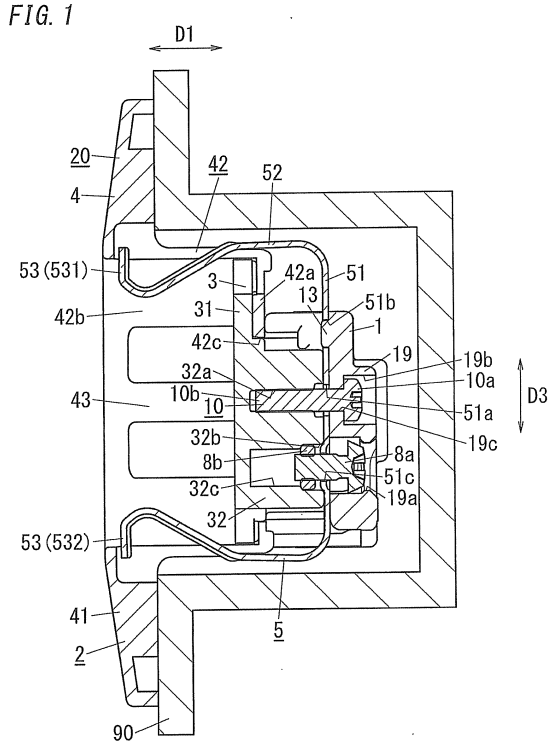
# (54) ELECTRIC OUTLET

(57) The electric outlet includes: a body having a box shape and including a front face having an opening; a cover covering the front face of the body; and an assembling screw coupling the body and the cover. The cover is constituted by a first cover of thermosetting resin and a second cover of thermoplastic resin. The first cover includes a body part having a plate shape and including a pair of pin insertion holes individually allowing insertion of a pair of pins of a plug. The second cover includes an accommodation part having a hollow cylindrical shape with a bottom and accommodating the body part. The bottom of the accommodation part is held between the body part and the body, and the bottom includes a window hole which allows insertion of the pair of pins and is larger in size than each of the pair of pin insertion holes. The body accommodates a pair of blade receivers to individually receive the pair of pins. The assembling screw includes a head on a rear face side of a bottom wall of the body and a shank inserted in an insertion hole of the bottom wall, and the shank includes an end screwed in a screw hole in a rear face side of the body part.

FIG. 1




EP 2 897 232 A1

## Description

### Technical Field

**[0001]** The present invention relates to electric outlets.

### Background Art

**[0002]** In the past, there has been proposed an embedded electric outlet which is installed so that a rear part of a housing thereof is situated inside a hole (embedding hole) provided in a building part (e.g., a wall) (e.g., see JP 2003-249298 A).

**[0003]** As shown in FIG. 10, this embedded electric outlet includes: a cover 100 which is a molded product of synthetic resin and has a shape of a hollow cylinder with a bottom and includes an outer flange 100a; and a body 101 which is a molded product of synthetic resin. The cover 100 includes at its front face a screw insertion hole 100b and a pair of pin insertion holes 100c for allowing insertion of a pair of pins of a plug (not shown). The cover 100 is coupled with the body 101 by inserting a screw 102 into the screw insertion hole 100b from a front side of the cover 100 and screwing the screw 102 into a nut 103a of a rivet 103 fitted in a rivet-attachment hole 101a of the body 101.

**[0004]** In the aforementioned embedded electric outlet, to ensure safety such as fire prevention, the cover 100 is assumed to be of thermosetting resin. Therefore, time necessary for forming the cover 100 of the aforementioned embedded electric outlet is likely to be longer than that for a cover 100 of thermoplastic resin.

**[0005]** Further, in the aforementioned embedded electric outlet, the head of the screw 102 is exposed on the front face side of the cover 100. Therefore, the screw 102 is likely to be detached erroneously, and this may cause separation of the cover **100** and the body 101.

### Summary of Invention

**[0006]** In view of the above insufficiency, the present invention has aimed to propose an electric outlet which includes the cover with improved formability and can prevent careless detachment of the assembling screw.

**[0007]** The electric outlet of the present invention includes: a body which has a box shape and includes a front face having an opening; a cover which covers the front face of the body; and an assembling screw which couples the body and the cover with each other. The cover is constituted by a first cover made of thermosetting resin, and a second cover made of thermoplastic resin. The first cover includes a body part which has a plate shape and includes a pair of pin insertion holes individually allowing insertion of a pair of pins of a plug. The second cover includes an accommodation part which has a hollow cylindrical shape with a bottom and which accommodates the body part. The bottom of the accommodation part is held between the body part and the body, and the bottom includes a window hole which allows insertion of the pair of pins and is larger in size than each of the pair of pin insertion holes. The body accommodates a pair of blade receivers configured to individually receive the pair of pins. The assembling screw includes a head positioned on a rear face side of a bottom wall of the body and a shank passing through an insertion hole of the bottom wall, and the shank includes an end screwed in a screw hole in a rear face side of the body part.

**[0008]** In this regard, it is optional that the second cover is made of thermoplastic resin.

**[0009]** According to the electric outlet of the present invention, it is possible to improve the formability of the cover and to prevent careless detachment of the assembling screw.

### Brief Description of the Drawings

**[0010]**

FIG. 1 is a section illustrating an electric outlet of the present embodiment.

FIG. 2A is a perspective view illustrating a front side of the electric outlet of the present embodiment.

**FIG. 2B** is a perspective view illustrating a rear side of the electric outlet of the present embodiment.

**FIG. 3** is an exploded perspective view illustrating the electric outlet of the present embodiment.

**FIG. 4A** is a top view illustrating the electric outlet of the present embodiment.

**FIG. 4B** is a front view illustrating the electric outlet of the present embodiment.

**FIG. 4C** is a bottom view illustrating the electric outlet of the present embodiment.

**FIG. 5A** is a side view illustrating the electric outlet of the present embodiment.

**FIG. 5B** is a rear view illustrating the electric outlet of the present embodiment.

**FIG. 6** is a perspective view illustrating a plug to be connected to the electric outlet of the present embodiment.

**FIG. 7** is a section illustrating an electric outlet of a comparative example.

**FIG. 8A** is a perspective view illustrating a front side of the electric outlet of the comparative example.

**FIG. 8B** is a perspective view illustrating a rear side of the electric outlet of the comparative example.

**FIG. 9** is an exploded perspective view illustrating the electric outlet of the comparative example.

**FIG. 10** is an exploded perspective view illustrating an embedded electric outlet of background art.

### Description of Embodiments

**[0011]** Hereinafter, an electric outlet of the present embodiment is described with reference to **FIG. 1** to **FIG. 5.**

**[0012]** The electric outlet 20 of the present embodiment is to be fixed to an embedded box 90 which is sit-

uated inside a hole (embedded hole) (not shown) which is preliminarily formed in a building part such as a wall (not shown), for example.

**[0013]** The electric outlet 20 includes a pair of pin insertion holes 31a and 31a at its first face (front face). The pair of pin insertion holes 31a and 31a individually allow insertion of a pair of pins of a plug. By moving the plug towards a first side in a direction (first direction **D1**) perpendicular to the first face, the pins of the plug are pulled out from the pin insertion holes **31a** and **31a.** By moving the plug towards a second side in the first direction **D1**, the pins of the plug are inserted into the pin insertion holes 31a and 31a. Hereinafter, to simplify the following description, the first side in the first direction **D1** is also referred to as "front side", and the second side in the first direction **D1** is also referred to as "rear side".

**[0014]** The electric outlet 20 includes a pair of blade receivers **6** and **7** to be connected to a first electric wire and a second electric wire (respectively corresponding to a line (hot) wire and a neutral wire) included in an electric cable. The blade receivers 6 and 7 are respectively provided on a first side and a second side of a second direction D2 perpendicular to the first direction **D1**. Hereinafter, to simplify the following description, the first side in the second direction **D2** is also referred to as "left side", and the second side in the second direction **D2** is also referred to as "right side".

**[0015]** Further, the electric outlet **20** of the embodiment includes a grounded member **5** to be connected to a third wire (grounding wire) corresponding to an earth (ground) wire of the electric cable, as an optional part. The grounded member **5** includes contact pieces **53 (531)** and **53 (532),** which extend forward, on a first side and a second side in a third direction **D3** perpendicular to each of the first direction **D1** and the second direction **D2.** Hereinafter, the first side in the third direction **D3** is also referred to as "upper side", and the second side in the third direction **D3** is also referred to as "lower side".

**[0016]** The electric outlet **20** includes: a body **1** which has a box shape (a rectangular box shape in the present embodiment) and includes a front face having an opening **1a** (see **FIG. 3**); a cover **2** which covers the front face of the body **1;** and an assembling screw 10 which couples the body **1** and the cover **2** with each other.

**[0017]** The body **1** is made of thermosetting resin. Further, the body **1** includes two partition walls **11a** and **11b** (a first partition wall **11a** provided on a left side, and a second partition **wall 11b** provided on a right side) which are protruded from an inner bottom face of the body **1** and are arranged side by side, and thus an inside space of the body **1** is separated into three compartments. In other words, three accommodation rooms **12** are formed inside the body **1.** Hereinafter, in the present embodiment, for convenience in the following description, the three accommodation rooms **12** on the center, left, and right sides are referred to as a first accommodation room **12a,** a second accommodation room **12b,** and a third accommodation room 12c, respectively.

**[0018]** The first accommodation room **12a** is provided as a space between the two partition walls **11a** and **11b.** The first accommodation room **12a** accommodates partially the grounded member **5** which is to be in contact with a pair of grounding electrodes **94** and **94** provided to a plug body **92** of a plug **91** (see **FIG. 6).** Note that, **FIG. 6** shows one grounding electrode **94** of the pair of grounding electrodes **94** and **94.**

**[0019]** Further, there is a rib **13** (see **FIG. 1**) protruded from an inner bottom face of the first accommodation room **12a,** and the rib **13** is used for positioning the grounded member 5.

**[0020]** There is a first protrusion **19** protruding rearward from a rear surface (right surface in **FIG. 1**) of a bottom wall of the first accommodation room **12a.** The first protrusion **19** has a cuboidal shape, for example.

**[0021]** There is a first through hole **19a** provided on a first end side (a lower end side in **FIG. 1**) of the first protrusion **19.** The first through hole **19a** allows insertion of a tool (driver) for rotating a first terminal screw 8a for electrically and mechanically connecting a grounding wire (the third electric wire; not shown) to the grounded member **5.**

**[0022]** Further, there is a first recess **19b** on a second end side (an upper end side in **FIG. 1)** of the first protrusion **19.** The first recess **19b** accommodates a head **10a** of the assembling screw **10.** There is a first insertion hole **19c** penetrating through a bottom of the first recess **19b.** The first insertion hole **19c** allows insertion of a shank 10b of the assembling screw **10.**

**[0023]** The second accommodation room **12b** is provided as a space between a side wall (first side wall) **27a** on a left side of the body **1** (see **FIG. 3)** and the first partition wall **11a.** The second accommodation room **12b** accommodates a first blade reception spring **60** including the first blade receiver **6** for receiving a first pin **93** of a pair of pins **93** and **93** extending outside from the plug body **92.**

**[0024]** The second accommodation room **12b** is connected to two electric wire insertion holes **14a** and **14b.** These electric wire insertion holes **14a** and **14b** are formed in a side wall (lower side wall) **28a** on one side in a perpendicular direction perpendicular to a direction in which the two partition walls **11a** and **11b** are arranged side by side (the second side in the third direction **D3).** In the present embodiment, by inserting a first electric wire of an electric cable (first electric cable) into any one of the two electric wire insertion holes **14a** and **14b,** this first electric wire can be electrically connected to the first blade reception spring **60** on the inner side of the hole. The first electric wire is corresponding to a neutral wire, for example. Further, in the present embodiment, by inserting a first electric wire of a second electric cable for interconnection into the other the two electric wire insertion holes **14a** and **14b,** this first electric wire can be electrically connected to the first blade reception spring 60.

**[0025]** Note that, the body **1** includes a side wall (an upper side wall) **29a** which protrudes forward and is on

another side (the first side in the third direction **D3)** in the perpendicular direction regarding the second accommodation room **12b.**

**[0026]** There is a second protrusion **15** (see **FIG. 2B)** protruding rearward from a center of a bottom wall of the second accommodation room **12b.** The second protrusion **15** includes a first depressed part (not shown) for receiving an end of the first pin 93 of the pair of pins **93** and **93.**

**[0027]** There is a second through hole **16** provided on a side (a lower side in **FIG. 2B)** of the bottom wall of the second accommodation room **12b** close to the electric wire insertion holes **14a** and **14b.** The second through hole **16** allows insertion of a tool (driver) for rotating a second terminal screw 8c for electrically and mechanically connecting an electric wire (the first electric wire of the first electrical cable or the first electric wire of the second electrical cable) to the first blade reception spring **60.**

**[0028]** Further, the third accommodation room **12c** is provided as a space between a further side wall (second side wall) **27b** on a right side of the body 1 (see **FIG. 3)** and the second partition wall **11b**. The third accommodation room **12c** accommodates a second blade reception spring 70 including the second blade receiver **7** for receiving a second pin **93** of a pair of pins **93** and **93** extending outside from the plug body **92.**

**[0029]** The third accommodation room **12c** is connected to two electric wire insertion holes 14c and **14d.** These electric wire insertion holes **14c** and **14d** are formed in a side wall (lower side wall) **28b** on one side in the perpendicular direction. In the present embodiment, by inserting a second electric wire of the electric cable (first electric cable) into any one of the two electric wire insertion holes **14c** and **14d,** this second electric wire can be electrically connected to the second blade reception spring **70** on the inner side of the hole. The second electric wire is corresponding to a line (hot) wire, for example. Further, in the present embodiment, by inserting a second electric wire of the second electric cable for interconnection into the other of the two electric wire insertion holes **14c** and **14d,** this second electric wire can be electrically connected to the second blade reception spring **70.**

**[0030]** Note that, the body **1** includes a side wall (an upper side wall) **29b** which protrudes forward and is on a further side (the first side in the third direction **D3)** in the perpendicular direction regarding the third accommodation room **12c.**

**[0031]** There is a third protrusion **17** (see **FIG. 2B)** protruding rearward from a center of a bottom wall of the third accommodation room **12c.** The third protrusion 17 includes a second depressed part (not shown) for receiving an end of the second pin **93** of the pair of pins **93** and **93.**

**[0032]** There is a third through hole **18** provided on a side (the lower side in **FIG. 2B)** of the bottom wall of the third accommodation room **12c** close to the electric wire insertion holes **14c** and **14d.** The third through hole **18** allows insertion of a tool (driver) for rotating a third terminal screw 8e for electrically and mechanically connecting an electric wire (the second electric wire of the first electrical cable or the second electric wire of the second electrical cable) to the second blade reception spring **70.**

**[0033]** The grounded member **5** has an inverted Ω shape, as shown in **FIG. 3.** The grounded member **5** is made of metal.

**[0034]** The grounded member **5** includes: a base end piece **51** with a plate shape; a pair of leg pieces **52** and **52** extending upright from opposite ends of the base end piece **51**; and the contact pieces **53** provided to fore ends of the leg pieces **52** to be in contact with the grounding electrodes **94** of the plug **91** individually.

**[0035]** The base end piece **51** includes at its center a second insertion hole **51a** allowing insertion of the shank **10b** of the assembling screw **10**. The base end piece **51** includes at its one end (upper right end in **FIG. 3)** a rib insertion hole **51b** allowing insertion of the rib **13** protruded from the inner bottom surface of first accommodation room **12a.** The base end piece **51** includes at its further end (lower left end in **FIG. 3)** a first screw insertion hole **51c** allowing insertion of a shank of the first terminal screw **8a.** There is a first nut **8b** situated on a front face side (upper face side in **FIG. 3)** of the further end of the base end piece **51.** The first nut **8b** is to be engaged with the first terminal screw **8a.** Note that, in the present embodiment, the first terminal screw **8a** and the first nut **8b** constitute a first screw terminal.

**[0036]** The grounded member 5 (especially, the opposite ends thereof) is flexible, and the pair of contact pieces **53** and **53** are bent so that the foremost ends (front ends) thereof come close to each other. In more detail, a distance between the contact pieces **53** and **53** is shorter than a distance between the pair of grounding electrodes **94** and **94** of the plug **91.** Therefore, when the plug **91** is connected to the electric outlet **20,** the top ends of the contact pieces **53** and **53** are biased to come close to each other by elastic force of the grounded member **5.** Each contact piece **53** is smaller in width than the base end piece **51** and each leg **52.**

**[0037]** The first blade reception spring **60** is made of metal.

**[0038]** The first blade reception spring **60** includes: a first terminal piece **61** with a plate shape (rectangular plate shape in the present embodiment) to be connected to one of the first electric wire of the first electric cable and the first electric wire of the second electric cable; a pair of side plates **62** and **62** protruding upright from opposite ends of the first terminal piece **61**; and first spring pieces **64** and **64** extending from one ends (upper right ends in **FIG. 3)** of the pair of side plates **62** and **62** individually. In the present embodiment, the first spring pieces **64** and **64** constitute the first blade receiver 6 described above.

**[0039]** The first terminal piece **61** includes a second screw insertion hole **61a** allowing insertion of a shank of

the second terminal screw **8c.** There is a second nut 8d situated on a front face side (upper face side in **FIG. 3)** of the first terminal piece **61.** The second nut **8d** is to be engaged with the second terminal screw **8c.** Note that, in the present embodiment, the second terminal screw **8c** and the second nut 8d constitute a second screw terminal.

**[0040]** There is a first stopper **63** protruding upright on a side (upper right side in **FIG. 3)** of the first terminal piece **61** close to the first blade receiver **6.** The first stopper **63** prevents excess insertion of one of the first electric wire of the first electric cable and the first electric wire of the second electric cable. Consequently, the electric outlet 20 of the present embodiment can prevent excess insertion of the electric wire, and therefore an insulation sheath (not shown) of the electric wire can be prevented from being caught in the second screw terminal. Thus, it is possible to avoid bad electrical connection between the first terminal piece **61** and a conductor (not shown) of the electric wire. Further, the electric outlet **20** of the present embodiment can prevent excess insertion of the electric wire, and therefore it is possible to prevent insertion of the electric wire into the first blade receiver **6.** Thus, it is possible to avoid bad electrical connection between the pin **93** of the plug **91** and the first blade receiver **6.**

**[0041]** The second blade reception spring **70** is made of metal.

**[0042]** The second blade reception spring **70** includes: a second terminal piece **71** with a plate shape (rectangular plate shape in the present embodiment) to be connected to one of the second electric wire of the first electric cable and the second electric wire of the second electric cable; a pair of side plates **72** and **72** protruding upright from opposite ends of the second terminal piece **71;** and second spring pieces **74** and **74** extending from one ends (upper right ends in **FIG. 3)** of the pair of side plates **72** and **72** individually. In the present embodiment, the second spring pieces **74** and **74** constitute the second blade receiver **7** described above.

**[0043]** The second terminal piece **71** includes a third screw insertion hole **71a** allowing insertion of a shank of the third terminal screw 8e. There is a third nut 8f situated on a front face side (upper face side in **FIG. 3)** of the second terminal piece **71.** The third nut **8f** is to be engaged with the third terminal screw **8e.** Note that, in the present embodiment, the third terminal screw **8e** and the third nut **8f** constitute a third screw terminal.

**[0044]** There is a second stopper **73** protruding upright on a side (upper right side in **FIG. 3)** of the second terminal piece **71** close to the second blade receiver **7.** The second stopper **73** prevents excess insertion of one of the second electric wire of the first electric cable and the second electric wire of the second electric cable. Consequently, the electric outlet **20** of the present embodiment can prevent excess insertion of the electric wire, and therefore an insulation sheath (not shown) of the electric wire can be prevented from being caught in the third screw terminal. Thus, it is possible to avoid bad electrical connection between the second terminal piece **71** and a conductor (not shown) of the electric wire. Further, the electric outlet **20** of the present embodiment can prevent excess insertion of the electric wire, and therefore it is possible to prevent insertion of the electric wire into the second blade receiver **7.** Thus, it is possible to avoid bad electrical connection between the pin **93** of the plug **91** and the second blade receiver **7.**

**[0045]** The cover **2** is constituted by a first cover **3** made of thermosetting resin and a second cover **4** made of thermoplastic resin.

**[0046]** The first cover **3** includes a body part **31** having a plate shape. A shape of the body part **31** in a plan view is an ellipsoidal shape. This body part 31 covers the front face of the body **1.**

**[0047]** The body part **31** includes the pair of pin insertion holes **31a** and **31a** individually allowing insertion of the pair of pins **93** and **93** of the plug **91.** The pair of pin insertion holes **31a** and **31a** are arranged in a width direction (the second direction **D2)** of the body part **31** and are positioned in a center in a length direction (the third direction **D3)** of the body part **31.**

**[0048]** There are two exposing cuts **31b** and **31b** at opposite ends in the length direction of the body part **31.** The two exposing cuts **31b** and **31b** expose the two contact pieces **53** and **53** of the grounded member **5** on the front face (upper face in **FIG. 3)** of the body part **31** individually.

**[0049]** Further, there is a fourth protrusion 32 protruding rearward from a rear face (lower face in **FIG. 3)** of the body part **31** between the pair of pin insertion holes **31a** and **31a.** The fourth protrusion **32** is accommodated in the first accommodation room **12a** of the body **1** so as to be in contact with the base end piece **51** of the grounded member **5** (see

**FIG. 1).**

**[0050]** The fourth protrusion **32** includes, at a portion facing the second insertion hole **51a** of the grounded member **5,** a screw hole **32a** to receive the assembling screw **10.** The screw hole **32a** is formed in the rear face side of the first cover **3.** Further, the fourth protrusion **32** includes, at a portion facing the first screw insertion hole **51c** of the grounded member **5,** a second recess **32b** for accommodating the first nut **8b.** There is a third depressed part **32c** formed in a bottom of the second recess **32b.** The third depressed part **32c** receives an end of the shank of the first terminal screw **8a.**

**[0051]** The second cover **4** includes an accommodation part **42** and a plate **41** in the form of a frame. The accommodation part **42** protrudes rearward from a rear side face of the second cover **4** to form a cylindrical recess with a bottom **42a** which includes a hole (window hole **42c).** The first cover **3** is accommodated in the accommodation part **42** so that the body part **31** covers the hole of the bottom **42a.** The plate **41** extends laterally from a

side part **42b** close to an opening of the accommodation part **42.** Note that, an outer peripheral shape of the plate **41** is a rectangular shape as shown in **FIG. 3,** but is not limited particularly.

**[0052]** The accommodation part **42** has a shape of a hollow cylinder with a bottom, for example. Further, a shape of the opening of the accommodation part **42** is a circular shape but is not limited particularly, and may be preferably suitable for the shape of the plug body **92** in a plan view. In this regard, in the present embodiment, the shape of the plug body **92** in a plan view is a circular shape. The bottom **42a** (see **FIG. 1**) of the accommodation part **42** is held between the body part **31** of the first cover 3 and the body **1.** This bottom **42a** includes the window hole **42c** which allows insertion of part of the body part **31** around the pair of pin insertion holes **31a** and **31a** and is larger in size than each of the pin insertion holes **31a** and **31a.**

**[0053]** There are a pair of guide grooves **43** and **43** formed in an inner face of the side part **42b** of the accommodation part **42.** The pair of guide grooves **43** and **43** individually guide a pair of elongated parts **95** and **95** (see **FIG. 6)** formed on the plug body **92.** Note that, **FIG. 6** shows only one elongated part **95** of the pair of elongated parts **95** and **95.**

**[0054]** Further, there are a pair of slits **44** and **44** (see **FIG. 3)** provided to the side part **42b** of the accommodation part **42.** The pair of slits **44** and **44** allow drawing the pair of contact pieces **53** and **53** of the grounded member **5** into an inside of the accommodation part **42** from the rear side (right side in **FIG. 1**) of the second cover **4.** Each slit **44** has an L shape to extending across the bottom **42a** and the side part **42b** of the accommodation part **42** (see **FIG. 2A**). Therefore, in the electric outlet 20 of the present embodiment, the pair of contact pieces **53** and **53** can be drawn into the inside of the accommodation part **42** via the pair of slits **44** and **44.** Consequently, the electric outlet **20** of the present embodiment allows the pair of contact pieces **53** and **53** to be in contact with the pair of grounding electrodes **94** and **94** of the plug body **92** individually when the plug body **92** of the plug **91** is fitted into the accommodation part **42.**

**[0055]** Hereinafter, the procedure of assembling the electric outlet 20 of the present embodiment is described.

**[0056]** First, the first terminal screw 8a is inserted into the first screw insertion hole 51c of the base end piece **51** of the grounded member **5** from the rear face side (right side in **FIG. 1)** of the base end piece **51,** and then the first nut **8b** is screwed on this first terminal screw **8a.** After that, the grounded member **5** is accommodated in the first accommodation room **12a** of the body **1** so that the rib **13** of the body **1** is inserted in the rib insertion hole **51b** of the grounded member **5** and the head of the first terminal screw **8a** is situated in front (in **FIG. 1,** at the left) of the first through hole **19a** of the body **1.**

**[0057]** Additionally, the second terminal screw **8c** is inserted into the second screw insertion hole 61a of the first terminal piece **61** of the first blade reception spring **60** from the rear face side (lower side in **FIG. 3)** of the first terminal piece **61,** and the second nut **8d** is screwed on this second terminal screw **8c.** Thereafter, the first blade reception spring **60** is accommodated in the second accommodation room **12b** of the body 1 so that the head of the second terminal screw **8c** is positioned in front of the second through hole **16** of the body **1.**

**[0058]** Further, the third terminal screw **8e** is inserted into the third screw insertion hole **71a** of the second terminal piece **71** of the second blade reception spring **70** from the rear face side (lower side in **FIG. 3)** of the second terminal piece **71,** and the third nut **8f** is screwed on this third terminal screw **8e.** Thereafter, the second blade reception spring **70** is accommodated in the third accommodation room **12c** of the body **1** so that the head of the third terminal screw **8e** is positioned in front of the third through hole 18 of the body **1.**

**[0059]** Subsequently, the pair of contact pieces **53** and **53** of the grounded member **5** are drawn into the inside of the accommodation part **42** via the pair of slits **44** and **44** of the second cover **4,** and the second cover **4** is situated on the front face of the body **1.**

**[0060]** Thereafter, the first cover **3** is accommodated in the accommodation part **42** of the second cover **4** so that the pair of contact pieces **53** and **53** which are drawn into the inside of the accommodation part **42** of the second cover **4** are exposed through the pair of exposing cuts **31b** and **31b** of the first cover **3.** And then, the fourth protrusion **32** of the first cover **3** is made to protrude rearward (to the right in **FIG. 1)** through the window hole **42c** of the second cover **4.**

**[0061]** At last, the assembling screw **10** is inserted into the first insertion hole **19c** of the body **1** and the second insertion hole **51a** of the grounded member 5 from the rear surface of the body **1,** and then is screwed into the screw hole **32a** of the fourth protrusion **32** of the first cover **3.**

**[0062]** According to the above procedure, in the electric outlet **20** of the present embodiment, the bottom **42a** of the accommodation part **42** of the second cover **4** is held between the body part **31** of the first cover **3** and the body **1,** and thereby the electric outlet **20** can be assembled.

**[0063]** Further, multiple (two in the present embodiment) attachment metal parts **80** (see **FIG. 3)** for attaching the electric outlet **20** to the embedded box **90** are fixed to the plate **41** of the present embodiment. In more detail, the plate **41** includes multiple (two in the present embodiment) first attachment screw insertion holes **41b** allowing insertion of attachment screws **9a** for attaching the attachment metal parts **80** to the plate **41.**

**[0064]** The attachment metal part **80** includes: a base end piece **81** in the form of a plate shape; a pair of leg pieces **82** and **82** protruding upright from opposite ends of the base end piece **81;** and claws **83** formed on fore ends of the leg pieces **82.**

**[0065]** The base end piece **81** includes at its center a second attachment screw insertion hole 81a allowing in-

sertion of the attachment screw **9a.** In this regard, there are multiple (two in the present embodiment) fourth accommodation rooms **45** outside the side part 42b of the accommodation part **42** of the second cover **4** (see **FIG. 4A** and **FIG. 5B),** and the fourth accommodation rooms **45** individually accommodate the base end pieces **81** of the attachment metal parts **80.** Further, there are fourth nuts **9b** individually situated on the rear face sides (lower face side in **FIG. 3)** of the base end pieces **81,** and the fourth nuts **9b** are individually screwed on the attachment screws **9a.**

**[0066]** Hereinafter, the procedure for attaching the electric outlet **20** of the present embodiment to the embedded box **90** is described. Note that, in the following description of the present embodiment, the embedded box **90** is assumed to have a shape of a rectangular box having a front face including an opening. Further, in the following description of the present embodiment, the embedded box **90** is assumed to be made of synthetic resin (e.g., thermosetting resin), for example.

**[0067]** First, each attachment screw **9a** is inserted into the first attachment screw insertion hole **41b** and the second attachment screw insertion hole **81a** of the attachment metal part **80** from the front side (upper side in **FIG. 3)** of the second cover **4,** and is temporarily fixed to the fourth nut **9b.**

**[0068]** Thereafter, the electric outlet **20** is placed inside the embedded box **90** under a condition where each attachment metal part **80** is temporarily fixed to the second cover 4.

**[0069]** Subsequently, the attachment screws **9a** are tightened with the fourth nuts **9b** individually. Thus, the claws **83** of each of the attachment metal parts **80** can bite in the inner surface of the embedded box **90,** and thereby the electric outlet **20** can be attached to the embedded box **90.**

**[0070]** **FIG. 7** to **FIG. 9** show a configuration of an electric outlet of a comparative example. As with the electric outlet **20** of the present embodiment, the electric outlet **21** of this comparative example includes a body **1,** a grounded member **5,** a first blade reception spring **60,** and a second blade reception spring **70.** Further, the electric outlet **21** of the comparative example includes a cover **22** which covers a front face (upper face in **FIG. 9)** of the body **1.** In the following description, to avoid redundant explanations, components of the electric outlet **21** of the comparative example which are the same as the components of the electric outlet **20** of the present embodiment are designated by the same reference signs as the electric outlet **20** of the present embodiment.

**[0071]** The cover **22** is made of thermosetting resin. Further, the cover **22** includes a cover body **23** having a shape of a hollow cylinder with a bottom, and a flange **24** which is square in a plan view and extends laterally from a side part of the cover body **23** close to an opening of the cover body **23.**

**[0072]** The cover body **23** includes a bottom **23a** (see **FIG. 8A),** and a pair of pin insertion holes **23b** and **23b** individually allowing insertion of the pair of pins **93** and **93** of the plug **91** are formed in the bottom **23a.**

**[0073]** Further, an accommodation recessed part **26** for accommodating a head **10a** of an assembling screw **10** for coupling the cover **22** and the body 1 is provided to a center of a bottom **23a** of the cover body **23.** A third insertion hole **26b** (see **FIG. 7)** allowing insertion of a shank **10b** of the assembling screw **10** is formed to penetrate the bottom of the accommodation recessed part **26.** In this regard, a screw hole **25** for being screwed on the assembling screw **10** is formed in a part of the bottom wall of a first accommodation room **12a** of the body **1** facing the third insertion hole 26b of the accommodation recessed part **26** of the cover body **23.**

**[0074]** As with the plate **41** of the electric outlet **20** of the present embodiment, multiple (two in the illustrated example) attachment metal parts **80** are provided to the flange **24.**

**[0075]** In the electric outlet **21** of the comparative example, the assembling screw **10** is inserted into the third insertion hole **26b** of the accommodation recessed part **26** of the cover body **23** and a second insertion hole **51a** of a grounded member **5** from the front face side (upper side in **FIG. 9)** of the cover **22,** and is screwed into the screw hole **25** of the first accommodation room **12a** of the body **1.** Thereby, the electric outlet **21** can be assembled.

**[0076]** In the electric outlet **21** of the aforementioned comparative example, the cover **22** is made of thermosetting resin. Therefore, compared with a case where the cover **22** is made of thermoplastic resin, it may take more time to form the cover **22.**

**[0077]** In contrast, in the electric outlet **20** of the present embodiment, the cover **2** is constituted by the first cover **3** and the second cover **4,** and the second cover **4** is made of thermoplastic resin which is higher in formability than thermosetting resin. Therefore, compared with the electric outlet **21** of the comparative example, it makes possible to improve the formability of the cover **2.**

**[0078]** Additionally, in the electric outlet **21** of the comparative example, the assembling screw **10** is exposed on the front face side of the cover **22.** Therefore, when a person erroneously detaches the assembling screw **10** while the electric outlet **21** is attached to the embedded box **90,** the cover **22** and the body **1** may be separated from each other.

**[0079]** In contrast, in the electric outlet **20** of the present embodiment, the head **10a** of the assembling screw **10** is situated on the rear face side of the bottom wall of the body **1,** and therefore the assembling screw **10** is not exposed on the front face side of the cover **2.** Thus, it is possible to prevent a person from erroneously detaching the assembling screw **10** in a situation where the electric outlet **20** is attached to the embedded box **90.** Further, in the electric outlet **20** of the present embodiment, the assembling screw **10** is not exposed on the front face side of the cover **2,** and therefore designability can be improved compared with the electric outlet **21** of the com-

parative example.

**[0080]** The electric outlet **20** of the aforementioned present embodiment includes: the body **1** which has a box shape and includes the front face having the opening **1a;** the cover **2** which covers the front face of the body **1;** and the assembling screw **10** which couples the body **1** and the cover **2** with each other. Further, in the electric outlet **20** of the aforementioned present embodiment, the cover **2** is constituted by the first cover **3** made of thermosetting resin, and the second cover **4** made of thermoplastic resin. Moreover, in the electric outlet **20** of the aforementioned present embodiment, the first cover **3** includes the body part **31** which has a plate shape and includes a pair of pin insertion holes **31a** and **31a** individually allowing insertion of the pair of pins **93** and **93** of the plug **91.** Moreover, in the electric outlet **20** of the aforementioned present embodiment, the second cover **4** includes the accommodation part **42** which has a hollow cylindrical shape with a bottom and accommodates the body part **31.** Additionally, in the electric outlet **20** of the aforementioned present embodiment, the bottom **42a** of the accommodation part **42** is held between the body part **31** and the body **1** and the bottom **42a** includes the window hole **42c** which allows insertion of the pair of pins **93** and **93** and is larger in size than each of the pair of pin insertion holes **31a.** In addition, in the electric outlet **20** of the aforementioned present embodiment, the body **1** accommodates the pair of blade receivers **6** and **7** configured to individually receive the pair of pins **93** and **93.** Additionally, in the electric outlet **20** of the aforementioned present embodiment, the assembling screw **10** includes the head **10a** positioned on the rear face side of the bottom wall of the body **1** and the shank **10b** inserted in the insertion hole (the first insertion hole) **19c** of the bottom wall of the body **1,** and the shank **10b** includes the end screwed in the screw hole **32a** in the rear face side of the body part **31.**

**[0081]** According to the electric outlet **20** of the present embodiment, in contrast to the conventional embedded electric outlet having the configuration shown in **FIG. 10** and the electric outlet **21** of the comparative example, the formability of the cover **2** can be improved, and it is possible to avoid careless detachment of the assembling screw **10.**

**[0082]** Further, in the electric outlet **20** of the present embodiment, the assembling screw **10** is not exposed on the front face side of the cover **2.** Therefore, in contrast to the conventional embedded electric outlet having the configuration shown in **FIG. 10** and the electric outlet **21** of the comparative example, the designability can be improved.

**[0083]** As described above, according to the electric outlet **20** of the present embodiment, the through hole (the first insertion hole **19c)** for insertion of the assembling screw **10** is provided to the body **1** accommodating the blade receivers **6** and **7.** Further, the screw hole **32a** for being screwed on the assembling screw **10** is provided to the rear face of the first cover **3** (the cover **2)** so as not to penetrate through the first cover **3.**

**[0084]** Further, in the electric outlet **20** of the present embodiment, the second cover **4** includes the accommodation part **42** which is hollow cylindrical and includes the bottom provided with the hole (the window hole **42c).** The first cover **3** includes the body part **31** having a plate shape, and the body part **31** is accommodated in the accommodation part **42** so as to close the hole (the window hole **42c)** of the accommodation part **42.** The first cover **3** includes the protrusion (the fourth protrusion **32)** protruding rearward, and the screw hole **32a** is formed in the rear face side of this protrusion. The body **1** includes the side walls **(27a, 27b, 28a, 28b, 29a,** and **29b)** protruding forward. The bottom **42a** of the accommodation part **42** is held between the body part **31** of the first cover 3 and at least one of these side walls. Note that, in the electric outlet **20** of the present embodiment, the blade receivers (the first blade receiver **6,** the second blade receiver **7)** are accommodated in the accommodation room (the second accommodation room **12b,** the third accommodation room 12c) surrounded by the multiple side walls.

**[0085]** Note that, it is optional that the second cover **4** is made of thermosetting resin. Hence, the second cover **4** may be made of thermoplastic resin. Also in this case, in contrast to a case where a whole of a cover having a shape of a hollow cylinder with a bottom and a flange (e.g., see the above comparative example) is integrally made of thermosetting resin, the formability of the cover can be improved.

**[0086]** The present invention is described with reference to preferable embodiments. Such embodiments can be subjected to changes and modifications by the skilled person unless such changes and modifications do not depart from the original spirit and scope of the present invention, that is, the scope of the claimed subject-matter.

**[0087]** For example, in the above embodiment, as with the CEE7/4 plug, the plug **91** includes, as first and second male connectors, two pins **93** and **93** corresponding to line (hot) and neutral wires individually. However, a plug suitable for the electric outlet of the present invention is not limited to including the aforementioned ones. In other words, a plug suitable for the electric outlet of the present invention is not limited to a plug with two round pins such as the BS4573 plug, the CEE7/4 plug, the CEE7/5 plug, the CEE7/17 plug, the 107-2-D1 plug, the CEI23-16/VII plug, the SEV1011 plug, the IEC60906-1 plug, and the TIS166-2549 plug. For example, a plug suitable for the electric outlet of the present invention may include, as first and second male connectors, two blades having thickness directions parallel to the second direction **D2** as with the JIS C 8303 plug, the NEMA1-15 plug, or the NEMA5-15 plug, or two blades having thickness directions parallel to the third direction **D3** as with the BS1363 plug, or two V-shaped or inverted V-shaped blades as with the CPCS-CCC plug or the AS/NZS3112 plug.

**[0088]** In the above embodiment, the plug **91** includes

the grounding electrodes **94** and **94** as a ground connector (option). However, a plug suitable for the electric outlet of the present invention is not limited to including the aforementioned ones. For example, a plug suitable for the electric outlet of the present invention may include, as a ground connector, a grounding pin which has a U-shaped section or has a hollow cylindrical shape, or a grounding blade as with the AS/NZS3112 plug or the BS1363 plug, or a half-round grounding pin as with the 107-2-D1 plug, or a round grounding pin as with the CEI23-16/VII plug, the SEV1011 plug, the NEMA5-15 plug, or the TIS166-2549 plug.

**[0089]** Accordingly, the electric outlet of the present invention may be an electric outlet configured to be connected to any of various types of plugs described above.

## Claims

**1.** An electric outlet comprising:

a body which has a box shape and includes a front face having an opening;
a cover which covers the front face of the body; and
an assembling screw which couples the body and the cover with each other, wherein
the cover being constituted by a first cover made of thermosetting resin, and a second cover made of thermoplastic resin,
the first cover including a body part which has a plate shape and includes a pair of pin insertion holes individually allowing insertion of a pair of pins of a plug,
the second cover including an accommodation part which has a hollow cylindrical shape with a bottom and accommodates the body part,
the bottom of the accommodation part being held between the body part and the body, the bottom including a window hole which allows insertion of the pair of pins and is larger in size than each of the pair of pin insertion holes,
the body accommodating a pair of blade receivers to individually receive the pair of pins,
the assembling screw including a head positioned on a rear face side of a bottom wall of the body, and a shank inserted in an insertion hole of the bottom wall, and the shank including an end screwed in a screw hole in a rear face side of the body part.

FIG. 1

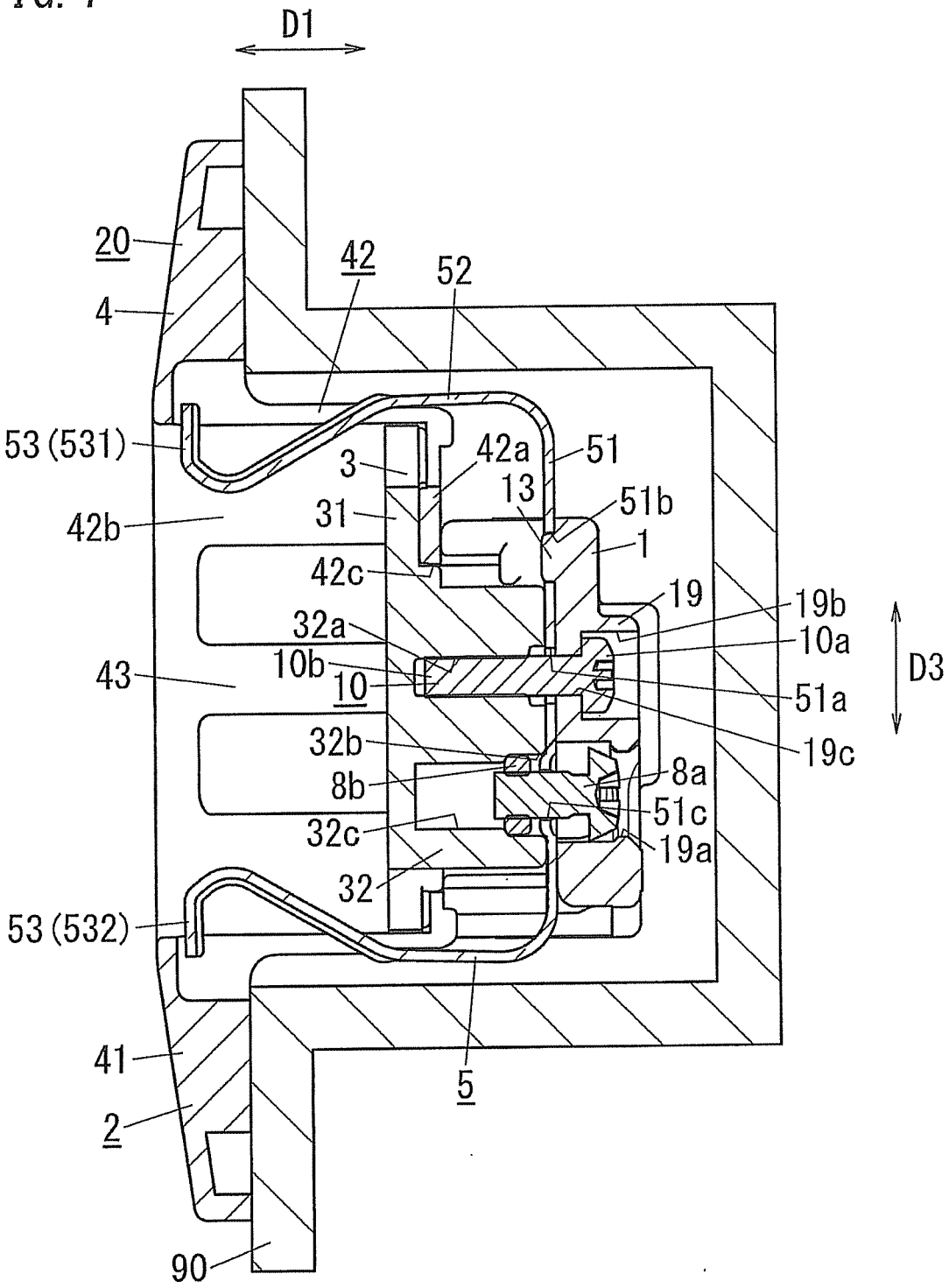

D1
20
42
52
4
53 (531)
3
42a
51
13
51b
42b
31
1
42c
19
19b
32a
10a
43
10b
10
D3
51a
32b
19c
8b
8a
51c
32c
19a
32
53 (532)
41
5
2
90

FIG. 2A

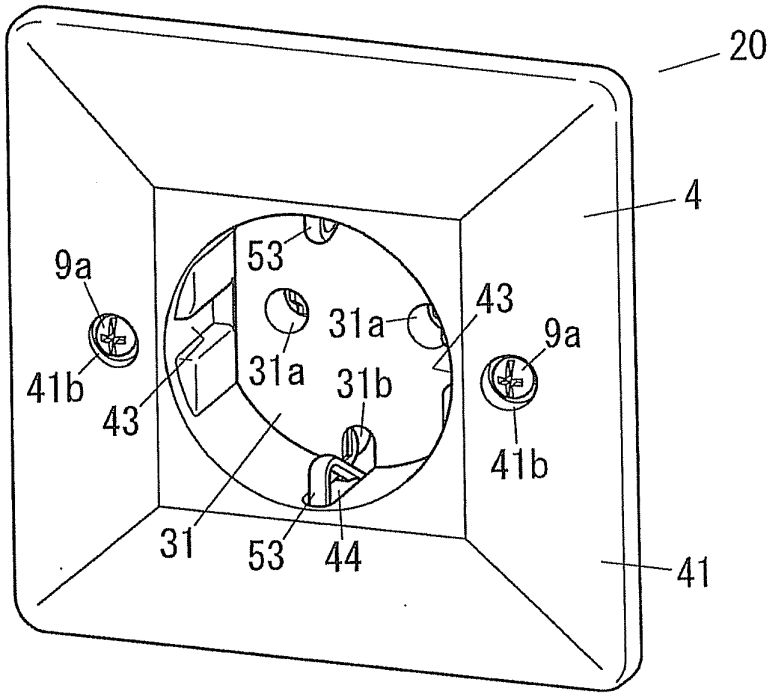
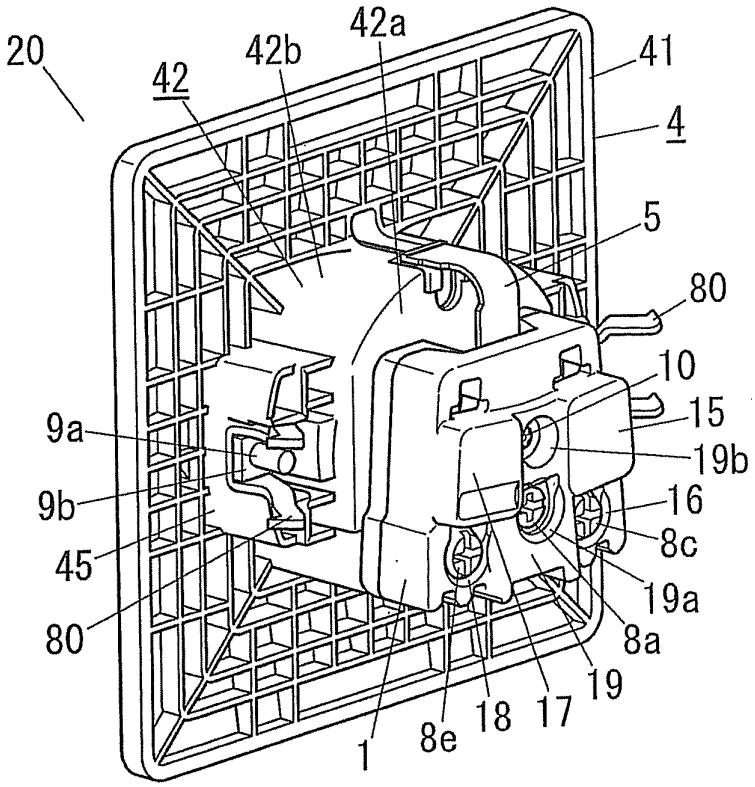

20
4
9a
53
43
31a
9a
41b
31a
31b
43
41b
31
53
44
41

FIG. 2B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42
42b
42a
41
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16
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19a
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8a
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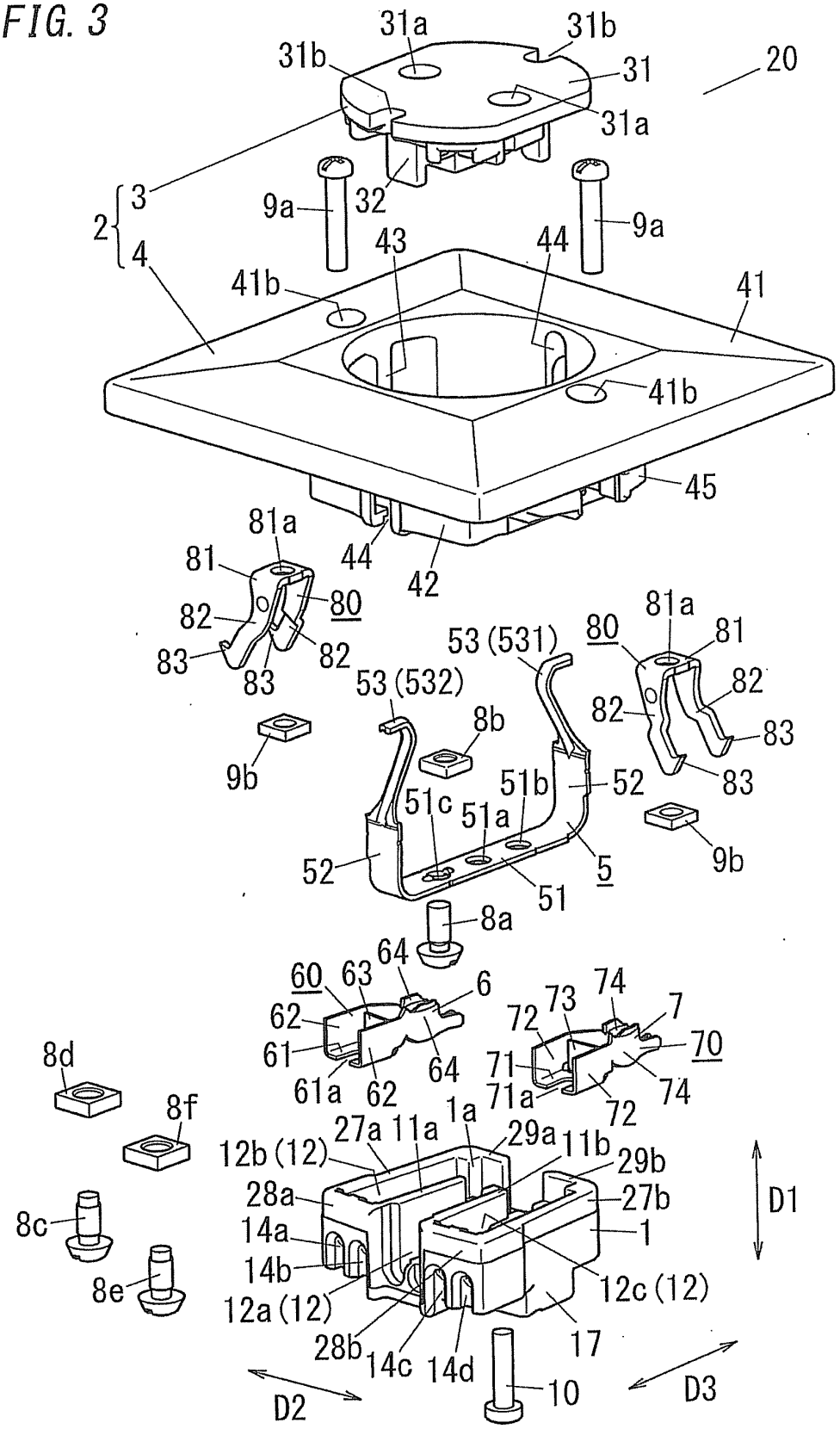
1
8e

FIG. 3


31a
31b
31b
31
20
31a
3
2
4
9a
32
9a
43
44
41b
41
41b
45
81a
81
44
42
80
82
83
82
83
53 (531)
80
81a
81
82
82
83
53 (532)
8b
9b
51b
52
83
51c
51a
9b
52
5
51
8a
64
60
63
6
74
62
73
7
72
61
64
71
70
61a
62
71a
74
72
8d
8f
27a
11a
1a
29a
11b
12b (12)
29b
28a
27b
D1
8c
14a
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28b
14c
14d
17
10
D2
D3

FIG. 4A

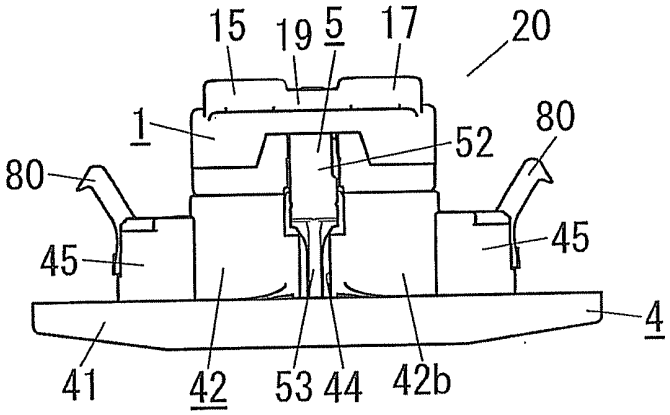



FIG. 4B

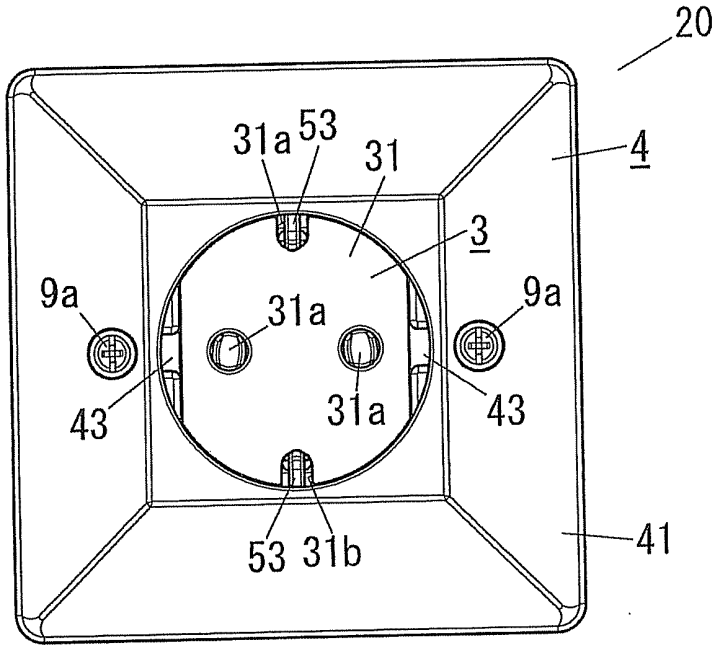



FIG. 4C

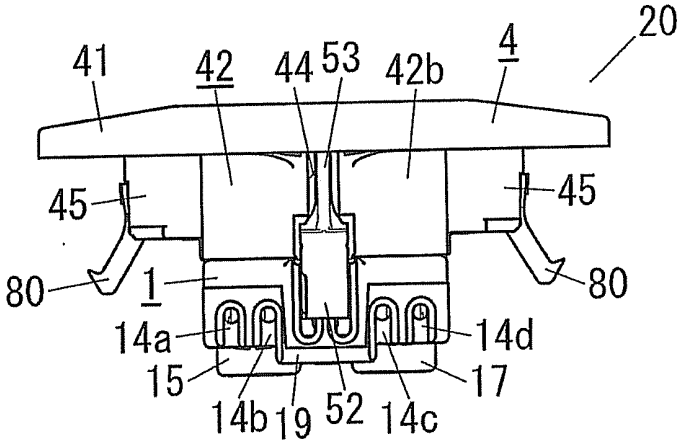
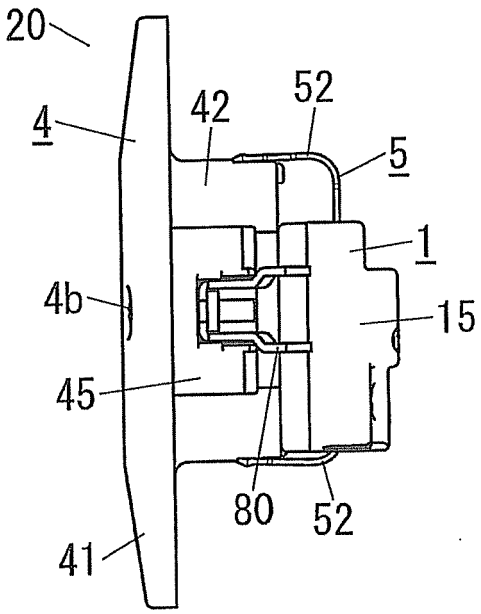


FIG. 5A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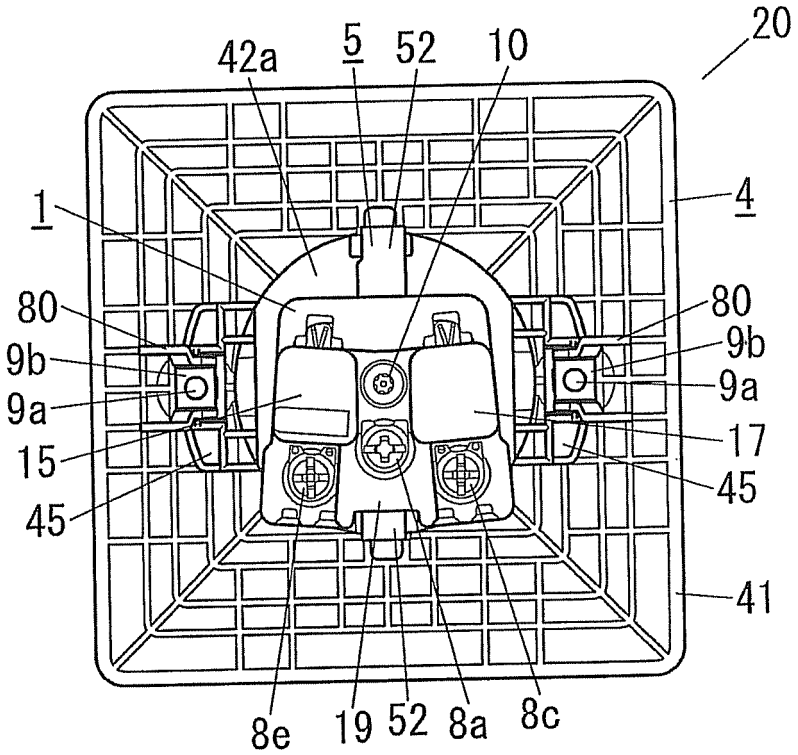
52
41

FIG. 5B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42a
5
52
10
1
4
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45
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9a
17
45
41
8e
19
52
8a
8c

FIG. 6

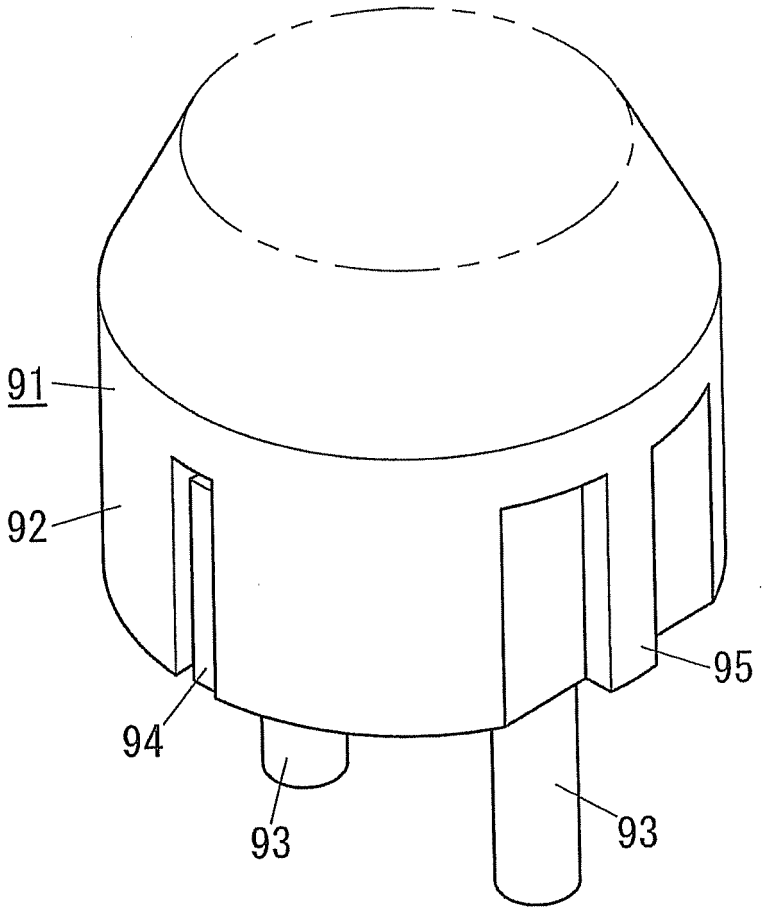


FIG. 7

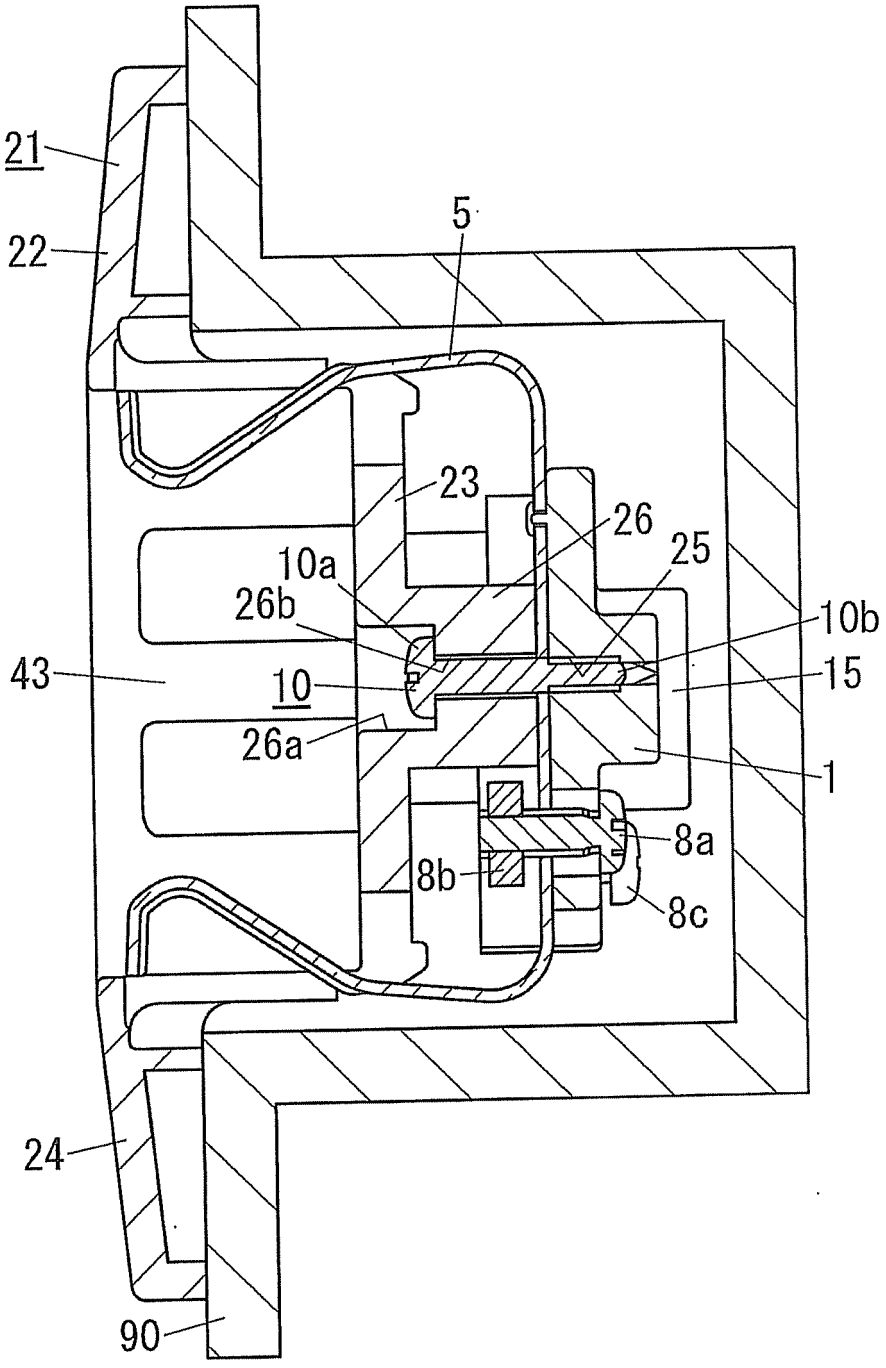
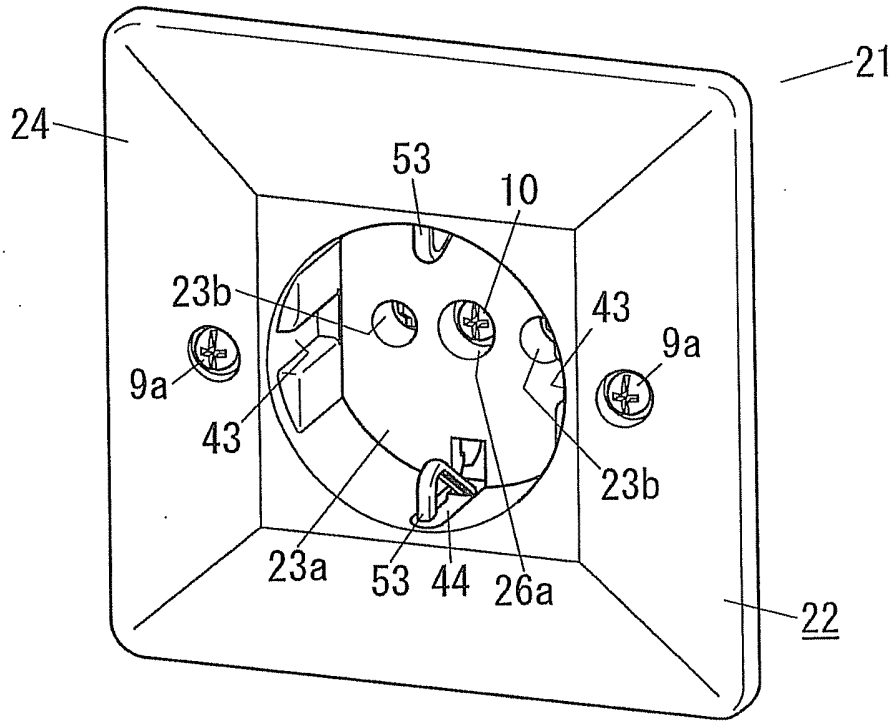


FIG. 8A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24
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10
23b
43
9a
9a
43
23b
23a
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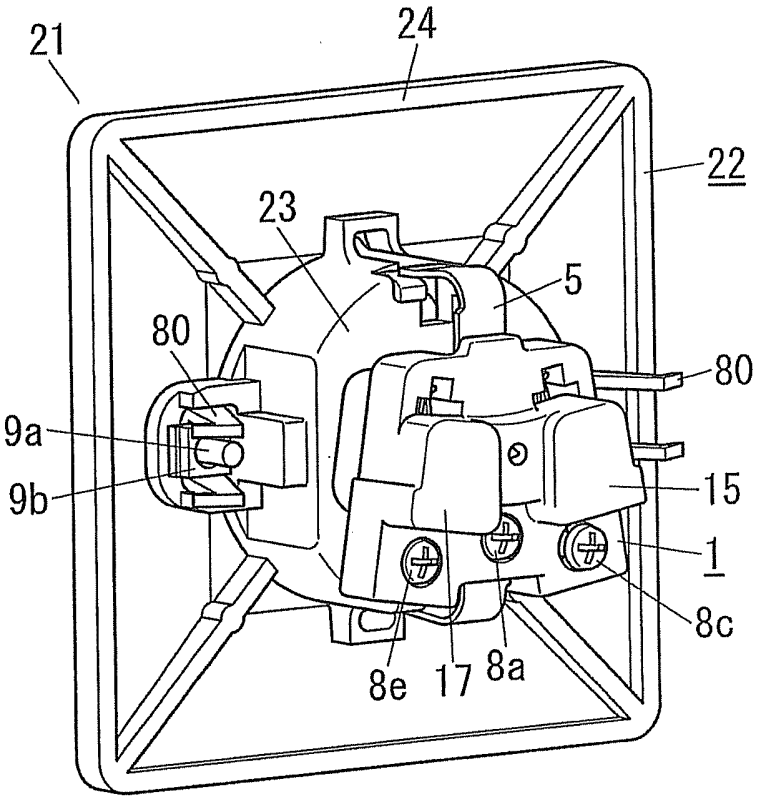
44
26a
22

FIG. 8B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9a
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8c
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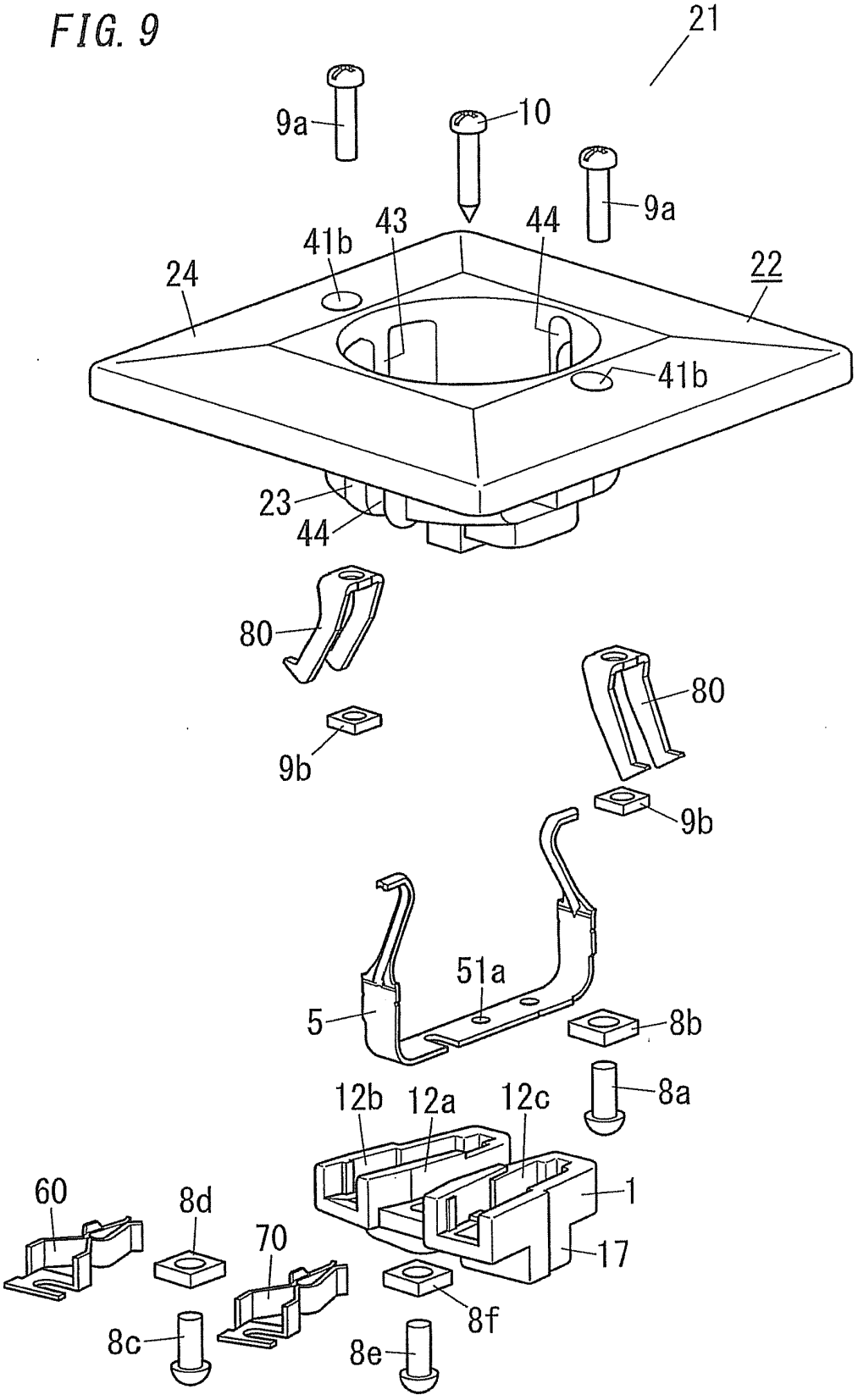
17
8a

FIG. 9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41b
43
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24
22
41b
23
44
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80
9b
9b
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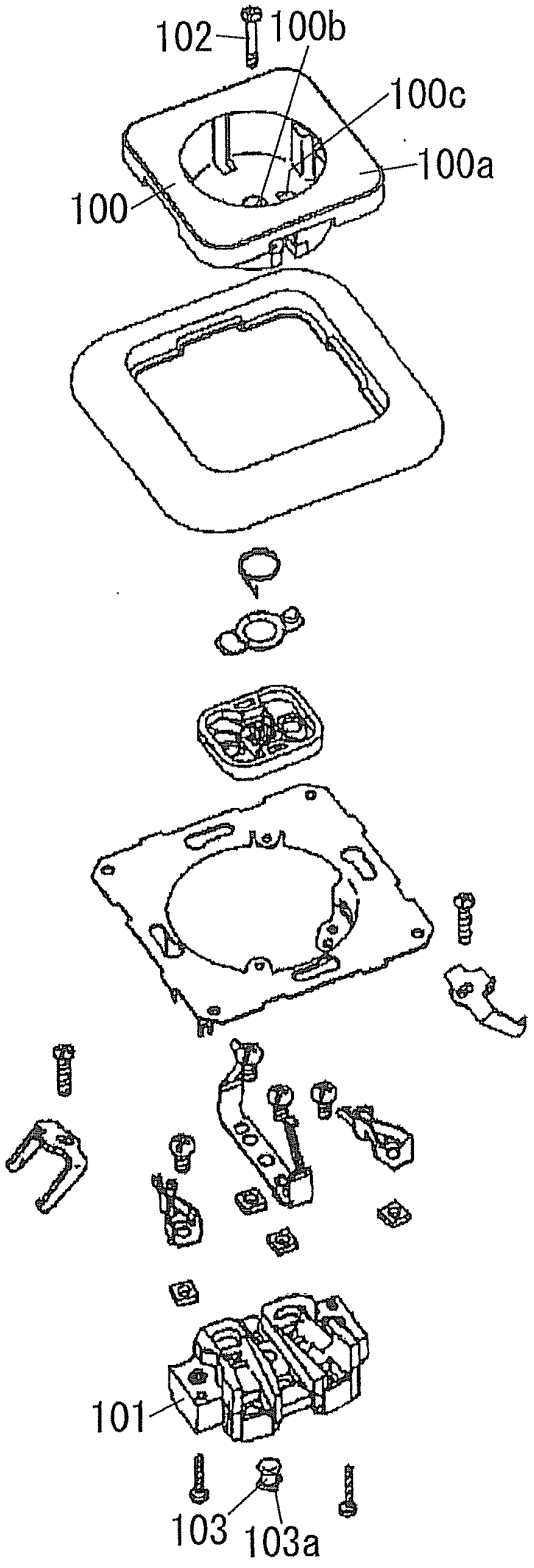
12b
12a
12c
1
60
8d
70
17
8f
8c
8e

FIG. 10



**INTERNATIONAL SEARCH REPORT**

International application No.
PCT/JP2013/004918

A. CLASSIFICATION OF SUBJECT MATTER
*H01R13/502*(2006.01)i, *H01R13/46*(2006.01)i, *H01R13/512*(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)
H01R13/502, H01R13/46, H01R13/512

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. |
|---|---|---|
| Y | JP 2010-225456 A (Panasonic Electric Works Co., Ltd.), 07 October 2010 (07.10.2010), paragraphs [0022] to [0036]; fig. 1 (Family: none) | 1 |
| Y | JP 11-185844 A (Matsushita Electric Works, Ltd.), 09 July 1999 (09.07.1999), paragraph [0011]; fig. 5 (Family: none) | 1 |

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

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"&" document member of the same patent family

| Date of the actual completion of the international search | Date of mailing of the international search report |
|---|---|
| 07 November, 2013 (07.11.13) | 19 November, 2013 (19.11.13) |
| Name and mailing address of the ISA/ Japanese Patent Office<br>Facsimile No. | Authorized officer<br>Telephone No. |

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## REFERENCES CITED IN THE DESCRIPTION

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### Patent documents cited in the description


- JP 2003249298 A **[0002]**