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TITLE OF THE INVENTION

Mounting Plate Assembly for Electrical Wiring Accessory

BACKGROUND OF THE INVENTION

1. Field of the Invention

5 The present invention relates to a mounting plate assembly and, more particularly, to a mounting plate assembly for covering an electrical wiring accessory received in a hole formed in a support surface such as a wall surface.

2. Description of the Related Art

10 There has heretofore been provided an electrical accessory plate assembly fitted to a support box such as, for example, a switch box which is accommodated in a hole formed in a support surface such as a wall surface. This plate assembly includes a plate frame to which a wiring accessory such as a switch, a socket or receptacle is removably
15 attached and which is fitted to the support box from front of the hole, and a make-up plate attached to a front surface of the plate frame to thereby cover up the electrical accessory except for a region of the accessory that requires access by a user or an operator. Thus, the electrical wiring accessory installed in the support surface can have an aesthetically-
20 appealing appearance.

In the above conventional construction, however, the surfaces of the plate frame and make-up plate, which are mated with each other, are disposed forwardly of the wall surface, and therefore, a problem has been encountered that the line of joint between the two plate is
25 viewable from side thereof, or the two plates are often miss-registered with each other to such an extent as to detract the appearance of the switch assembly.

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SUMMARY OF THE INVENTION

The present invention seeks to overcome the above described problems, and a primary object of the present invention is to provide an improved mounting plate assembly which enables an electrical wiring accessory to be mounted in a hole, formed in a mounting surface, in an aesthetically-appealing manner.

In order to achieve the aforementioned objects, one aspect of the present invention provides a mounting plate assembly for electrical wiring accessory including a plate frame for covering the hole formed in a mounting surface. The plate frame has an opening through which a functional surface of an electrical wiring accessory is exposed, a fixed beam portion which has retaining grooves for respectively retaining pawls of said wiring accessory, and provided at a peripheral edge of said opening, and a movable beam portion which has retaining grooves for respectively retaining pawls of said wiring accessory, and provided at said peripheral edge. The mounting plate assembly also includes a make-up plate which is attached to a front side of the plate frame and has a main portion which covers the front side of the plate frame, and also has an open window through which the functional surface of the wiring accessory is exposed. A side wall projects from the main portion over a substantially entire periphery thereof. The dimension of the make-up plate between opposite longitudinal portions of the side wall is larger than a width of said plate frame, and the dimension of the make-up plate between opposite widthwise portions of said side wall is larger than a length of said plate frame.

Advantageously, ribs are formed on an inner surface of the make-up plate and are abutted against a side surface of the plate frame.

An abutment portion may be formed on the side wall of the

make-up plate over a substantially entire periphery thereof, and is abutted against a side surface of the plate frame. In this case, it is preferred that an extension portion is formed at least part of a peripheral edge of the plate frame, and the ribs abut against the extension portion from the front side.

5 It is preferred that the plate frame has insertion holes through which box screws for securing the plate frame to a support box accommodated in the hole formed in the mounting surface are adapted to pass, and the extension portion is provided at other portion than those portions near to the insertion holes.

10 Conveniently, a slanting surface for guiding the make-up plate in a mounting direction is formed at a peripheral edge portion of the plate frame. In addition therewith or separately therefrom, a slanting surface for guiding the plate frame in a direction of mounting of the make-up plate on the plate frame may be formed at a peripheral edge portion of
15 the make-up plate.

 It is preferred that the mounting plate assembly includes retaining projections formed on a reverse side of the make-up plate, retaining holes formed in a front side of the plate frame, and a notch for inserting a make-up plate-removing jig thereinto, such notch being formed
20 in the side wall of the make-up plate. The retaining projections are retained in the retaining holes, respectively. In this case, a relief portion for passing the make-up plate-removing jig is preferably formed in the plate frame corresponding to the notch.

 It is also preferred that the mounting plate assembly has a
25 rib extending from one end of the relief portion. The rib is disposed remote from the front side of the plate frame and is of a size that does not project outwardly from the notch in the make-up plate.

Advantageously, the mounting plate assembly further includes connection portions provided respectively at opposite ends of the movable beam portion. The connection portions connect the movable beam portion to one of the frame pieces of the plate frame in such a manner
5 that the movable beam portion can be flexed. Both end portions of a slit formed between the movable beam portion and one of the side frame pieces are turned toward the connecting portions, respectively.

It is preferred that the retaining grooves in the fixed beam portion and the retaining grooves in the movable beam portion are arranged
10 at equal intervals.

It is also preferred that the mounting plate assembly further includes partition ribs formed on the fixed beam portion and said movable beam portion. Predetermined positions on which the wiring accessory is mounted relative to the opening are separated from each other by the
15 partition ribs, and the wiring accessory is fixedly retained to the fixed beam portion and the movable beam portion, with the functional surface exposed to the outside through the opening. In this case, elongate projections are preferably formed on a reverse side of the make-up plate, and are fitted in the slit formed between the movable beam portion and side frame piece.

Advantageously, the plate frame is provided with means for
20 abutting against at least part of a side surface of the wiring accessory to suppress a shaking of the wiring accessory when the wiring accessory is attached to the plate frame, with the pawls retained respectively in the beam portion.

Those portions of said plate frame, disposed at peripheral
25 edge portions of the retaining holes, may have a reduced thickness.

Conveniently, the mounting plate assembly further includes

removal holes formed in the fixed beam portion, and extending from a front side of a side frame piece of said plate frame. The accessory removal hole is disposed between any two adjacent retaining grooves.

In another aspect of the resent invention, a mounting plate
5 assembly for electrical wiring accessory including a plate frame for covering an open side of a hole formed in a mounting surface. The plate frame has a pair of openings each for exposing functional surface of an embedding-type wiring accessory therethrough, a fixed beam portion which has retaining grooves for respectively retaining pawls of the wiring
10 accessory, and is provided between the pair of openings, and movable beam portions which have retaining grooves for respectively retaining pawls of the wiring accessory, and are provided respectively at peripheral edges of said openings. The mounting plate assembly also includes a make-up plate which is attached to a front side of the plate frame, a main portion which
15 covers said front side of said plate frame, a pair of open windows each for exposing a functional surface of the wiring accessory therethrough, and a side wall projecting from the main portion over a substantially entire periphery thereof. In this structure, the dimension of the make-up plate between opposite longitudinal portions of the wall is larger than the length
20 of the plate frame, and the dimension of the make-up plate between opposite widthwise portions of the side wall is larger than the width of the plate frame.

Advantageously, the mounting plate assembly further includes a metal plate covering the make-up plate and having an opening
25 formed therethrough to expose the functional surface of the wiring accessory. In this case, it is preferred that the metal plate has an engaging projection at widthwise end portion thereof and an engaging pieces for

engaging to the engaging projection is formed with said make-up plate.

BRIEF DESCRIPTION OF THE DRAWINGS

These and other objects and features of the present invention will become clear from the following description taken in conjunction with the preferred embodiments thereof and the accompanying drawings throughout which like parts are designated by like reference numerals, and in which:

Fig. 1 is a perspective view of a first embodiment as seen from a front side;

10 Fig. 2 is a perspective view of the above embodiment as seen from a reverse side;

Fig. 3 is a perspective view of an important portion of a plate frame of the above embodiment;

15 Fig. 4A is a front-elevational view showing a condition in which a make-up plate is attached to the plate frame;

Fig. 4B is a fragmentary side elevational view showing the condition in which the make-up plate is attached to the plate frame;

Fig. 4C is a side sectional view showing the condition in which the make-up plate is attached to the plate frame;

20 Fig. 5 is a perspective view showing one example of an electrical wiring accessory;

Fig. 6A is a view explanatory of the manner of mounting the electrical wiring accessory on the plate frame;

25 Fig. 6B is a view explanatory of the manner of mounting the electrical wiring accessory on the plate frame;

Fig. 7A is a front-elevational view showing a modified make-up plate;

Fig. 7B is a side sectional view showing the modified make-up plate;

Fig. 7C is a rear view showing the modified make-up plate;

Fig. 7D is a side sectional view showing the modified make-up plate;

Fig. 8A is a front-elevational view showing another modified make-up plate;

Fig. 8B is a side sectional view showing another modified make-up plate;

Fig. 8C is a rear view showing another modified make-up plate;

Fig. 8D is a side sectional view showing another modified make-up plate;

Fig. 9A is a front-elevational view showing the further modified make-up plate;

Fig. 9B is a side sectional view showing the further modified make-up plate;

Fig. 9C is a rear view showing the further modified make-up plate;

Fig. 9D is a side sectional view showing the further modified make-up plate;

Fig. 10A is a front-elevational view showing a plate frame of a second embodiment;

Fig. 10B is a side sectional view as seen from the left side showing the plate frame of the second embodiment;

Fig. 10C is a side sectional view as seen from the right side showing the plate frame of the second embodiment;

Fig. 10D is a side sectional view as seen from lower side showing the plate frame of the second embodiment;

Fig. 10E is a side sectional view as seen from lower side showing the plate frame of the second embodiment;

5 Fig. 10F is a rear view showing the plate frame of a second embodiment;

Fig. 11 is a sectional view of an important portion of the plate frame;

10 Fig. 12 is a side sectional view of the important portion of the plate frame;

Fig. 13A is a front-elevational view showing a plate frame of a third embodiment;

Fig. 13B is a side sectional view as seen from the left side showing the plate frame of the third embodiment;

15 Fig. 13C is a side sectional view as seen from the right side showing the plate frame of the third embodiment;

Fig. 13D is a rear view showing the plate frame of the third embodiment;

20 Fig. 13E is a side sectional view as seen from lower side showing the plate frame of the third embodiment;

Fig. 14 is a side sectional view of an important portion of the plate frame;

Fig. 15 is a side sectional view of an important portion of the plate frame;

25 Fig. 16A is a front-elevational view showing a make-up plate of the third embodiment;

Fig. 16B is a side sectional view as seen from the left side

showing the make-up plate of the third embodiment;

Fig. 16C is a rear view showing the make-up plate of the third embodiment;

Fig. 16D is a side sectional view as seen from lower side
5 showing the make-up plate of the third embodiment;

Fig. 17 is a side sectional view of an important portion of the make-up plate;.

Fig. 18 is a side sectional view of an important portion of the make-up plate;.

10 Fig. 19 is a perspective view of a fourth embodiment as seen from a front side;

Fig. 20 is a perspective view of the above embodiment as seen from a reverse side;

Fig. 21A is a front-elevational view showing a make-up
15 plate;

Fig. 21B is a side sectional view showing the make-up plate;

Fig. 21C is a side sectional view showing the make-up plate;

20 Fig. 21 is a rear view showing the make-up plate;

Fig. 22 is a partially sectional view of the make-up plate;

Fig. 23 is a cross-sectional view showing the details of the make-up plate;

Fig. 24A is a front-elevational view of a metal plate;

25 Fig. 24B is a fragmentary side elevational view of the metal plate;

Fig. 24C is a side sectional view of the metal plate;

Fig. 25 is a partially sectional view of the metal plate;

Fig. 26A is a front-elevational view showing a condition in which the metal plate is attached to the make-up plate;

Fig. 26B is a side sectional view showing the condition in which the metal plate is attached to the make-up plate;

Fig. 26C is a side sectional view showing the condition in which the metal plate is attached to the make-up plate;

Fig. 27 is a rear view showing the condition in which the metal plate is attached to the make-up plate;

Fig. 28 is a cross-sectional view showing the detailed condition in which the metal plate is attached to the make-up plate;

Fig. 29 is a cross-sectional view showing the detailed condition in which the metal plate is attached to the make-up plate;

Fig. 30A is a front-elevational view showing a condition in which the make-up plate is attached to the plate frame;

Fig. 30B is a fragmentary side elevational view showing the condition in which the make-up plate is attached to the plate frame;

Fig. 30C is a side sectional view showing the condition in which the make-up plate is attached to the plate frame;

Fig. 31A is a front-elevational view showing a another modified make-up plate;

Fig. 31B is a side sectional view showing the another modified make-up plate;

Fig. 31C is a side sectional view showing the another modified make-up plate;

Fig. 31 is a front-elevational view showing another modified make-up plate;

Fig. 32 is a rear view showing the make-up plate;

Fig. 33A is a front-elevational view of another metal plate;

Fig. 33B is a fragmentary side elevational view of the metal plate;

5 Fig. 33C is a side sectional view of the metal plate;

Fig. 34A is a front-elevational view showing a condition in which another metal plate is attached to another make-up plate;

Fig. 34B is a side sectional view showing the condition in which the metal plate is attached to the make-up plate;

10 Fig. 34C is a side sectional view showing the condition in which the metal plate is attached to the make-up plate; and

Fig. 35 is a rear view showing the condition in which the metal plate is attached to the make-up plate.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

15 The first embodiment according to the present invention is described below in conjunction with Figs. 1 to 9.

A mounting plate assembly for electrical wiring accessory of the invention includes a plate frame A and a make-up plate B. A plate frame body 1 having various portions is in the form of a rectangular frame, and is formed of an integral construction, using an insulative synthetic resin, e.g., a thermoplastic resin such as an ABS resin, or a thermosetting resin having elasticity. The plate frame body 1 has a rectangular opening 2 formed therein at a central portion, and a functional surface, at which an operating lever of a switch or slots in a receptacle are provided, of an accessory body 60 of an electrical wiring accessory C as shown in Fig. 5, such as a switch or a receptacle, is exposed to the front side through the opening 2. A fixed beam portion 4 and a movable beam portion 5, both of

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which have a band-like shape, are formed at a peripheral edge portion of the opening 2 at a reverse side of the plate frame body 1 in opposed relation to each other, and extend in a direction of the length of the opening 2. The movable beam portion 5 is spaced from a side frame piece 3b. Each
5 ends of the movable beam portion are integrally connected to each ends of the side frame piece 3b through a connecting portion 6. The synthetic resin, forming the plate frame body 1 including the movable beam portion 5 and the connecting portion 6, is an elastic material, and the movable beam portion 5 and the connecting portions 6 can be flexed relative to the
10 plate frame body 1.

As shown in Fig. 1, the movable beam portion 5 is supported by a pair of narrow ribs 7 formed integrally with and extending from the side frame piece 3b. A gap formed between the movable beam portion 5 and the side frame piece 3b is divided by the ribs 7 into slits 8a to
15 8c respectively. One end of each slits 8a and 8c are turned toward the connecting portions 6, respectively. A pair of slots 9 are formed respectively through those portions of the side frame piece 3b, disposed near respectively to the rib 7, so as to allow the movable beam portion 5 to be easily flexed.

20 Three pairs of retaining grooves 4a are formed at equal intervals in a surface of the fixed beam portion 4 facing the opening 2, and three pairs of retaining grooves 5a are formed at equal intervals in a surface of the movable beam portion 5 facing the opening 2. As shown in Fig. 5, a pair of pawls 61, formed on each side surface of the accessory body 60 of
25 the electrical wiring accessory C, can be retained respectively in the corresponding retaining grooves 4a and 5a. Therefore, the accessory body 60 can be mounted on the plate frame body 1 with the functional

surface of the accessory body 60 exposed through the opening 2 when the retaining pawls 61 are engaged in the corresponding retaining grooves 4a and 5a respectively. Guide portions 4b guide the pawls 61 respectively to the retaining grooves 4a when engaged with the retaining pawls 61 of the wiring accessory C in the respective retaining grooves 4a from the reverse side of the plate frame body 1. Similarly, guide portion 5b each having an outwardly-slanting surface are formed at a distal end portion of the movable beam portion 5, and the guide portions 5b guide the retaining pawls 61 respectively to the retaining grooves 5a when engaged in the retaining grooves 5a from the reverse side of the plate frame body 1. Namely, when the wiring accessory C is to be attached to the plate frame A as shown in Figs. 6A and 6B, the pawls 61 are held respectively against the slanting surfaces of the associated guide portions 4b and 5b. In this condition the accessory body 60 is pushed into the plate frame body 1 from the reverse side thereof toward the front side thereof, so that the pawls 61 can slide respectively along the slanting surfaces of the guide portions 4b and 5b until they can be brought into engagement with the respective retaining grooves 4a and 5a while they are smoothly guided by guide portions 4b and 5b.

An abutment portion 4d is formed between a proximal end of the fixed beam portion 4 and the edge of the opening 2 in the plate frame body 1, and also an abutment portion 5d is formed between a proximal end of the movable beam portion 5 and the edge of the opening 2. Those abutment portions 4d and 5d abut against part of the front side of the accessory 60 of the wiring accessory C when the pawls 61 are retained in the respective retaining grooves 4a and 5a. Therefore, when a force is applied to the accessory body 60, attached to the plate frame A, to urge

toward the front side of the plate frame A, the abutment portions 4d and 5d prevent that the accessory body 60 from moving toward the front side. When a force is applied to the accessory body 60 to urge toward the reverse surface of the plate frame A, the movement of the accessory body 60 is prevented since the pawls 61 are engaged in the respective retaining grooves 4a and 5a. The connecting portions 6, interconnecting the movable beam portion 5 and a side frame piece 3 of the plate frame body 1 together, are reduced in thickness since the outer end portions of the slits 8a and 8c are turned. As a result, when a large pushing force is applied to the accessory body 60 from the front side toward the reverse side, the movable beam portion 5 is flexed to tilt toward the opening 2 and therefore, the pawls 61 on the accessory body 60 will not be disengaged from the retaining grooves 5a of the movable beam portion 5, thereby preventing the wiring accessory C from being disengaged from the plate frame A.

Accessory removal holes 4c are formed in the fixed beam portion 4, and extend from the front side of the plate frame body 1, the accessory removal hole 4c being disposed between any two adjacent retaining grooves 4a. Where a distal end portion of a screw driver or a removal jig is inserted into the accessory removal hole 4c, the accessory body 60 is pushed toward the movable beam portion 5. By so doing, the movable beam portion 5 can be flexed with a small force because of leverage, and therefore, the engagement of the retaining pawls 61 with the respective retaining grooves 4a is released so that the accessory body 60 can be detached from the plate frame body 1.

The opening 2 has a size so determined that three wiring accessories C each having a reference size (hereinafter referred to as "one-module size") can be arranged in the opening 2 in such a manner that the

longitudinal axes of these wiring accessories C are disposed substantially perpendicular to the longitudinal axis of the opening 2 and therefore, the size of the opening 2 will hereinafter be referred to as "three-module size". The pitch of the retaining grooves 4a in the fixed beam portion 4 of the plate frame body 1, as well as the pitch of the retaining grooves 5a in the movable beam 5, is substantially equal to the pitch of the pawls 61 on each side surface of the accessory body 60 of the wiring accessory C of a one-module size. The above one-module size can be set to a suitable value, and any wiring accessories, having such module size, can be attached to the plate frame A.

The six retaining grooves 4a are provided at substantially equal intervals in the fixed beam portion 4, and the six retaining grooves 5a are provided at substantially equal intervals in the movable beam portion 5. Therefore, when the wiring accessory C of a one-module size is to be attached to the plate frame body 1, the pair of pawls 61 on each side surface of the accessory body 61 can be retained in a desired one of the pairs of the retaining grooves 4a and 5a. The desired position of mounting the wiring accessory C relative to the opening 2 can be selected from five mounting positions. In the case where the wiring accessory has a two-module size, the position can be selected from three mounting positions.

A recess 11 is formed at each of opposite side pieces 10 of the plate frame body 1 opposed to each other in the longitudinal direction. Each of the recess 11 has a slot 12 through which a box screw passes so as to secure the plate frame A to an embedding box (not shown), screw insertion holes 13 each for passing a screw therethrough so as to mount the plate frame A directly on a mounting surface such as a wall surface, and metal holder-retaining holes 14 for retaining metal holders (not shown)

used when the plate frame A is mounted on a wall panel or the like forming the mounting surface.

Make-up plate-retaining holes 15 for respectively retaining projections 53 projecting from a reverse side of a plate body 50 of the make-up plate B are formed respectively in four corner of the plate frame body 1. The retaining projections 53 are inserted and retained respectively in the make-up plate-retaining holes 15, and by so doing, the make-up plate B can be removably attached to the front side of the plate frame A.

The plate body 50 of the make-up plate B is formed of an integral construction of a generally box-shape, using an insulative synthetic resin such as a thermoplastic resin, for example, an ABS resin, or a thermosetting resin having elasticity, and has a main portion 51 of a rectangular shape for covering the front side or face of the plate frame A, and side wall 52 formed on and projecting from an entire peripheral edge of the main portion 51 away from the front side thereof. The retaining projections 53 are formed respectively at four corners of the reverse side of the main portion 51. An open window 51a is formed through a generally central portion of the main portion 51, and the functional surface of the wiring accessory C, attached to the plate frame A, is exposed through this open window 51a. The dimension of the plate body 50 between the opposite longitudinal side walls 52 is larger than the length of the plate frame body 1, and the dimension between the opposite widthwise side walls 52 is larger than the width of the plate frame body 1. Therefore, when the make-up plate B is attached to the front side of the plate frame A mounted on the mounting surface, the plate frame body 1 is received within the make-up plate B, with the edges of the side walls 52 of the plate body

50 substantially held against the mounting surface. As a result, no situation will be encountered in which the surface of the plate frame A and the make-up plate B, which are mated together, are disposed forwardly of the mounting surface as in the conventional construction and, therefore, the
5 line of mating between the two plates is hardly viewed from the side, so that the good appearance is provided.

A slanting surface 52a is formed on an edge of each side wall 52 of the plate body 50, and is slanting from the edge to be held against the mounting surface toward the main portion 51. A plurality of
10 limitation ribs 54 are formed on each side wall 52, and contact the peripheral surface of the plate frame body 1 in a direction parallel to the mounting surface, thereby limiting the movement of the make-up plate B. More specifically, when the make-up plate B is attached to the front side of the plate frame A, the limitation ribs 54 contact the peripheral surface of
15 the plate frame body 1, thereby preventing the make-up plate B from shaking relative to the plate frame body 1.

As shown in Fig. 3, each of the opposite side frame pieces 3a and 3b of the plate frame body 1 has a slanting surface 3c slanting outwardly toward the reverse side, and an extension portion 3d extending
20 outwardly from the slanting surface 3c. Ribs 55 are formed on the inner surface of each of the longitudinal side walls 52 of the plate body 50, and these ribs 55 rest on the front sides of the extension portions 3d to prevent the shaking of the make-up plate B. When the make-up plate B is to be attached to the plate frame A, the limitation ribs 54 of the make-up plate B
25 are guided by the slanting surface 3c formed respectively on the side frame pieces 3a and 3b of the plate frame body 1 and, therefore, there is an advantage that this attaching operation can be effected easily.

Instead of the limitation ribs 54 and the shaking prevention ribs 55, an abutment portion 57 for abutment against the extension portions 3d of the plate frame body 1 may be formed at the side walls 52 over the entire periphery, as shown in Figs. 7A to 7D. Even in this case, the shaking of the make-up plate B relative to the plate frame A can be prevented.

A pair of notches 56 are formed in one of longitudinal side walls 52 of the plate body 50. Where a distal end portion of a jig such as a screw driver is inserted into this notch 56, the plate body 50 is forced away from the plate frame A by the distal end of this jig, and by so doing, the engagement of the retaining projections 53, formed on the plate body 50, in the make-up plate-retaining holes 15 in the plate frame body 1 can be released so as to detach the make-up plate B from the plate frame A. Relief portions 16, recessed inwardly of the slanting surface 3c, are provided respectively at those portions of the side frame piece 3b of the plate frame body 1 corresponding respectively to the notches 56, and with this arrangement, the jig, inserted through the notches 56 can pass to be inserted deeper so that a removal force can be easily applied to the make-up plate B so as to remove the same.

A rib 17, thinner than the extension portion 3d, extends from one end of each relief portion 16, disposed remote from the front side of the plate frame body 1, to such an extent that it does not project outwardly from the notch 56 in the make-up plate B. Without the rib 17, when the jig inserted into the notch 56 is turned, with its distal end held against the mounting surface, the mounting surface would take a scratch. However, thanks to the provision of the rib 17, the jig inserted into the notch 56 is held against the rib 17, and when the make-up plate B is to be

removed from the plate frame A, a scratch will not be formed on the mounting surface by the jig.

Elongate projections 58a to 58c are formed on the reverse side of the plate body 50. When the make-up plate B is attached to the plate frame A, these elongate projections 58a to 58c are fitted respectively in the three slits 8a to 8c formed in the plate body 1. The elongate projections 58a to 58c have such dimensions that when they are fitted respectively in the slits 8a to 8c in the plate frame body 1, only a slight gap is formed between each elongate projection 58a, 58b, 58c and an inner peripheral surface of the associated slit 8a, 8b, 8c. Namely, when the make-up plate B is attached to the plate frame A to which the wiring accessory C is attached, the three elongate projections 58a to 58c are fitted respectively in the slits 8a to 8c in the plate frame body 1, and only a slight gap is formed between the inner peripheral surface of each slit 8a, 8b, 8c and the associated elongate projection 58a, 58b, 58c and, therefore, the movement or flexing of the movable beam portion 5 of the plate frame body 1 is limited. As a result, even if a plug, inserted in a receptacle (wiring accessory C), is withdrawn with an unduly large force, the pawls 61 of the wiring accessory C will hardly be disengaged respectively from the retaining grooves 5a and 4a in the movable beam portion 5 and fixed beam portion 4 since the movement of the movable beam portion 5 is limited as described above.

The extension portions 3d, on which the limitation ribs 54 and shaking prevention ribs 55 rest, may be provided over the entire periphery of the plate frame body 1. In this case, however, when the box screws are tightened so as to attach the plate frame body 1 to the embedding box, the plate frame body 1 is slightly deformed, and as a result

the make-up plate B and the plate frame body 1 interfere with each other at those portions in the vicinity of the slots 12 through which the box screws are passed respectively. Therefore there is a possibility that the make-up plate B can not be attached in an aesthetically-appealing manner. In this
5 embodiment, the extension portions 3d are provided at other portions than those portions, that is, the four corners of the plate frame body 1 in the vicinity of the slots 12, and with this arrangement even if the plate frame body 1 is deformed when the box screws are tightened, the plate frame body 1 will not interfere with the make-up plate B and, therefore, the make-
10 up plate B can be attached in an aesthetically-appealing fashion.

In this embodiment, the wiring accessory C of a one-module size is attached to the generally central portion of the plate frame A and, therefore, the open window 51a, through which the functional surface of the wiring accessory C is exposed, is formed through the generally central
15 portion of the make-up plate B. However, when a wiring accessory (not shown) of a two-module size is to be attached, or when two wiring accessories C of one-module size are to be attached, or when two wiring accessories C of a one-module size are to be attached in side-by-side fashion, there is used the make-up plate B having an opening window 51a
20 corresponding to a two-module size as shown in Fig. 7. When two wiring accessories C of one-module size are to be attached in spaced relation to each other, the make-up plate B having two open windows 51a and 51a as shown in Fig. 8A to 8D are utilized. When three wiring accessories of a one-module size are to be attached in side-by-side fashion, or a wiring
25 accessory of three-module size is to be attached, or a wiring accessory of a two-module size and the wiring accessory C of a one-module size are to be attached in side-by-side fashion, the decorative plate B having an open

window 51a corresponding to a three-module size as shown in Figs 9A to 9D is utilized.

A second embodiment of the present invention will be described with reference to Figs. 10 to 12. A basic construction of this
5 embodiment is identical to that of the first embodiment, and numerals, respectively, and explanation thereof will be omitted.

In the first embodiment described above, the six retaining grooves 4a are provided at equal intervals in the fixed beam portion 4, and the six retaining grooves 5a are provided at equal intervals in the movable
10 beam portion 5, and with this arrangement, a desired one of the several mounting positions of the wiring accessory C relative to the opening 2 in the plate frame body 1 can be selected. However, with the increased number of the mounting positions of the wiring accessory C relative to the plate frame A, there is a disadvantage that the make-up plates B, having the
15 open window 51a corresponding to these mounting positions, must be prepared.

Therefore, in this second embodiment, partition ribs 20 are provided near respectively to retaining grooves 4a in a fixed beam portion 4, and other partition ribs 20 are provided near respectively to retaining
20 grooves 5a in a movable beam portion 5, and with this arrangement, the mounting position is so limited that three wiring accessories C of one-module size can be mounted in an opening 2 of a three-module size, formed through a plate frame A, in side-by-side fashion. Three retaining grooves 4a are formed in an inner surface of the fixed beam portion 4, and
25 three retaining grooves 5a are formed in an inner surface of the movable beam portion 5, and three pair of partition ribs 20 are provided respectively on opposite sides of each pair of retaining 4a and 5a. The partition ribs 20

are integrally formed on and project from a plate frame body 1. Namely, even when trying to mount the wiring accessory C at other position than the mounting position where there wiring accessories C can be mounted in juxtaposed manner, the partition ribs 20, projecting between the adjacent
5 pairs of retaining grooves 4a, 5a, interfere with an accessory body 60 and, therefore, the wiring accessory C can not be mounted. In this embodiment, when the accessory body 60 of the wiring accessory C is mounted at the above mounting position, the mounting ribs 20 contact at least part of the side surface of the accessory body 60. Namely, the
10 partition ribs 20 also serve as means for suppressing the shaking of the accessory body 60 of the wiring accessory C attached to the plate frame A. The shaking of the accessory body 60 in its mounted condition is thus suppressed and, therefore, even when an unnecessary force is applied to the accessory body 60, a trouble such as damage to retaining pawls 61 can be
15 prevented.

A Third embodiment of the present invention will be described with reference to Figs. 13 to 18.

Although the above first and second embodiments are directed to the so-called single-type in which only one opening 2 of a three-
20 module size is formed through the generally central portion of the plate frame body, this embodiment is directed to a so-called double-type in which openings 2 of a three-module size are juxtaposed in a direction perpendicular to a longitudinal direction. A basic construction of this embodiment is identical to that of the first and second embodiments, and
25 identical portions will be designated by identical reference numerals, respectively, and explanation thereof will be omitted.

In this embodiment, as shown in Figs. 13A to 13E, a plate

frame body 1' of a plate frame A' has a construction much like a construction in which two plate frame bodies 1 of the first embodiment are juxtaposed in a direction perpendicular to the longitudinal direction, and are integrally connected together. Two openings 2₁ and 2₂ of a three-
5 module size are formed through a generally central portion of the plate frame body 1', and are juxtaposed in a direction perpendicular to the longitudinal direction. A fixed beam portion 4' is provided at a central frame piece of the plate frame body 1' separating the two openings 2₁ and 2₂. Three pairs of retaining grooves 4a (see Figs. 13A to 13E and 14) are
10 formed in each of opposite surfaces of the fixed beam portion 4', and the retaining grooves 4a are spaced at equal intervals. Partition ribs 20 are provided in a projected manner respectively on opposite sides of each pair of retaining grooves 4a.

A movable beam portion 5 connected by connecting
15 portions 6, slits 8a to 8c and grooves 9 are provided at each of opposite side frame pieces 3a and 3b of the plate frame body 1'. Three pairs of retaining grooves 5a are formed in each of the movable beam portions 5. A recess 11, a slot 12, screw insertion holes 13 and metal holder-retaining holes 14 are provided each of opposite side pieces 10 provided respectively
20 on opposite sides of each of the openings 2₁ and 2₂. Make-up plate retaining holes 15, in which retaining projections 53 on a make-up plate B' are retained, are formed respectively in four corners of the plate frame body 1'.

In this embodiment, a plate body 50' of the make-up plate B'
25 includes a main portion 51' having side walls 52' formed over an entire periphery thereof, and a pair of open windows 51a' are formed through a generally central portion of the main portion 51', and are juxtaposed in a

direction perpendicular to the longitudinal direction. The open window 51a' has a size corresponding to a three-module size, when three wiring accessories C of a one-module size is mounted in side-by-side fashion on the plate frame A', or a wiring accessory C of a three-module size is mounted on the plate frame A', the functional surface of each wiring accessory is exposed through the open window 51a'. In this embodiment, also, the dimension of the plate body 50' between the opposite longitudinal side walls 52' is larger than the length of the plate frame body 1, and the dimension of the plate body 50' between the opposite widthwise side walls 52' is larger than the width of the plate frame body 1. Therefore, when the make-up plate B' is attached to the front side of the plate frame A', the plate frame body 1' is received within the plate body 50' and, therefore, the line of mating between the plate frame A' and the make-up plate B' is hardly viewed from the side, so that the good appearance is provided.

The retaining projections 53 for retaining respectively in the make-up plate-retaining holes 15 in the plate frame body 1', and elongate projections 58a to 58c for fitting respectively in the slits 8a to 8c in each of the side frame pieces 3a and 3b are formed on the reverse side of the main portion 51'. Limitation ribs 54 for abutting against the side surface of the plate frame body 1' to prevent the shaking of the make-up plate B' relative to the plate frame body 1', ribs 55 for resting on front sides of extension portions 3d of the plate frame body 1' to prevent the shaking of the make-up plate B', and notches 56 for the insertion of a jig therethrough to detach the make-up plate B' from the plate frame A' are provided at the side walls 52'.

In this embodiment, in comparison with the case where the wiring accessories are mounted using two pairs of the plate frame A and

the make-up plate B, the wiring accessories can be mounted using only one pair of the plate frame A' and the make-up plate B', and there is achieved an advantage that the number of the component parts is reduced. And besides, the number of the wiring accessories that can be mounted, as well as patterns of combination of the wiring accessories, is increased and, therefore, enhanced versatility can be achieved.

A fourth embodiment of the present invention will be described with reference to Figs. 19 to 30. A basic construction of this embodiment is identical to that of the first embodiment, and numerals, respectively, and explanation thereof will be omitted.

In this embodiment, as shown in Fig. 19, a metal plate D is affixed to a front surface of make-up plate B so as to advance an aesthetical-appearance and fireproof efficiency. A plate body 30 of the metal plate D is in the form of a rectangular plate, and has a three-module size rectangular opening 31 formed therethrough at central portion, thereby exposing each functional surfaces of three accessory body 60. Each widthwise end portion of the plate body 30 is roundly yield in the direction of reverse side thereof as side plates 30a.

Four attaching pieces 32 extend from each side plates 30a in direction of reverse side of the metal plate D at equal intervals. An engaging projection 33 is formed on an inner surface of the side plate 30a so as to protrude therefrom. As shown in Fig. 25, a slope 33a is formed on the engaging projection 33, thereby slanting from a top of the side plates 30a to the inside.

As shown in Fig. 21a, the plate body 50 is provided with a recess 50a at a front surface of the plate body 50 to attach the plate body 30. An insertion ditch 59 in which top of the side plate 30a is inserted is

defined at each widthwise end portion of the side wall 52 as shown in Figs. 28 and 29. The plate body 50 is provided with holes 70 at positions according to the attaching pieces 32 so that the attaching pieces 32 can be inserted into the holes 70 as shown in Figs. 21 to 23. Engaging pieces 71
5 for engaging to the engaging projection 33 is integrally formed with the plate body 50. The engaging pieces 71 have elasticity and each top of the engaging pieces face to the hole 70.

Each widthwise end of the side plates 30a are inserted into the respective insertion ditch 59, and the attaching pieces 32 are deeply
10 inserted into the respective holes 70 as shown in Figs. 28 and 29. Then the slope 33a is brought into abutment with the engaging pieces 71. As the attaching pieces 32 are inserted into the respective holes 70, the engaging pieces 71 pressed by the engaging projection 33 is bent, then the engaging projection 33 is engaged with the top of the engaging pieces 71 as
15 shown in Fig. 28, and the plate body 30 is mounted on the recess 50a with connecting the engaging projection 33 with the engaging pieces 71, thereby fixing to the plate body 50.

In this embodiment, metal plate D is fixed to make-up plate B with connecting the engaging projection 33 with the engaging pieces 71,
20 but metal plate D may be fixed to make-up plate B with the top of the side plate 30a press-fitting into the insertion ditch 59. The plate body 30 may be connected with the plate body 50 by the use of a bonding agent like a double spread cellophane tape, or may be melted to bond to the plate body 50. The plate body 30 may be connected with the plate body 50 with the
25 top of the side plate 30a being inserted into a slit (not shown) formed in the plate body 50 and folding back.

However, if metal plate D is fixed to make-up plate B with

connecting the engaging projection 33 with the engaging pieces 71, metal plate D is easily fixed to make-up plate B without a particular step like press-fitting, folding back or the like and the bonding agent like a double spread cellophane tape, thereby advancing a work efficiency and being
5 desirable.

In this embodiment, three wiring accessory C of a one-module size are attached to the generally central portion of the plate frame A and, therefore, the open window 51a and the opening 31 corresponding to a three-module size, through which the functional surface of the wiring
10 accessories C are exposed, is formed through the generally central portion of the make-up plate B and the metal plate D. However, when a wiring accessory (not shown) of a one-module size is to be attached, the make-up plate B having an opening window 51a corresponding to a one-module size and the metal plate D having an opening 31 corresponding to a one-module
15 size are utilized. When a wiring accessory of a two-module size is to be attached, or when two wiring accessories C of a one-module size are to be attached in side-by-side fashion, the make-up plate B having an opening window 51a corresponding to a two-module size and the metal plate D having an opening 31 corresponding to a two-module size are utilized.
20 When two wiring accessories C of a one-module size are to be attached with predetermined interval, there is used the make-up plate B having two opening window 51a corresponding to a one-module size and the metal plate D having two opening 31 corresponding to a one-module size.

A fifth embodiment of the present invention will be
25 described with reference to Figs. 31 to 12. A basic construction of this embodiment is identical to that of the first embodiment, and numerals, respectively, and explanation thereof will be omitted.

In this embodiment, a metal plate D' is affixed to a front surface of make-up plate B' so as to advance an aesthetical-appeal and fireproof efficiency. As shown in Fig. 31A to 31C, the plate body 50' is provided with a recess 50a' at a front surface of the plate body 50 to attach
5 the plate body 30'. An insertion ditch 59 in which top of the side plate 30a' is inserted is defined at each widthwise end portion of the side wall 52' as shown in Figs. 31C and 34C. The plate body 50 is provided with holes 70 at positions according to the attaching pieces 32 so that the attaching pieces 32 can be inserted into the holes 70 as shown in Figs. 34A to 34C.
10 Engaging pieces 71 for engaging to the engaging projection 33 is integrally formed with the plate body 50. The engaging pieces 71 have elasticity and each top of the engaging pieces 71 face to corresponding to the hole 70.

A plate body 30' of the metal plate D is in the form of a rectangular plate, and has two three-module size rectangular openings 31₁
15 and 31₂ formed therethrough in a direction perpendicular to the longitudinal direction of the openings 31₁ and 31₂. Four attaching pieces 32 extend from each side plates 30a' in direction of reverse side of the metal plate D' at equal intervals. An engaging projection 33 is formed on an inner surface of the side plate 30a so as to protrude therefrom. As shown in Fig.
20 25, a slope 33a is formed on the engaging projection 33, thereby slanting from a top of the side plates 30a to the inside.

Each widthwise end of the side plates 30a' are inserted into the respective insertion ditch 59, and the attaching pieces 32 are deeply inserted into the respective holes 70. Then the slope 33a is brought into
25 abutment with the engaging pieces 71. As the attaching pieces 32 are inserted into the respective holes 70, the engaging pieces 71 pressed by the engaging projection 33 is bent, then the engaging projection 33 is engaged

with the top of the engaging pieces 71, and the plate body 30' is mounted on the recess 50a with connecting the engaging projection 33 with the engaging pieces 71, thereby fixing to the plate body 50.

Although the present invention has been fully described in
5 connection with the preferred embodiments thereof and the accompanying drawings, it is to be noted that various changes and modifications are apparent to those skilled in the art. Such changes and modifications are to be understood as included within the scope of the present invention as defined by the appended claims unless they depart therefrom.

10 In this embodiment, in comparison with the case where the wiring accessories are mounted using two sets of the plate frame A, the make-up plate B and the metal plate D, the wiring accessories can be mounted using only one set of the plate frame A', the make-up plate B' and the metal plate D', and there is achieved an advantage that the number of
15 the component parts is reduced. And besides, the number of the wiring accessories that can be mounted, as well as patterns of combination of the wiring accessories, is increased, therefore enhanced versatility can be achieved.



WHAT IS CLAIMED IS:

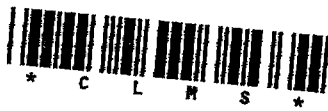
1. A mounting plate assembly for electrical wiring accessory comprising:

a plate frame for covering an open side of a hole formed in a
5 mounting surface, said plate frame having an opening through which a functional surface of an electrical wiring accessory is exposed, a fixed beam portion which has retaining grooves for respectively retaining retaining pawls of said wiring accessory, and is provided at a peripheral edge of said opening, and a movable beam portion which has retaining
10 grooves for respectively retaining retaining pawls of said wiring accessory, and is provided at said peripheral edge; and

a make-up plate which is attached to a front side of said plate frame, and has a main portion which covers said front side of said plate frame, and has an open window through which said functional surface
15 of said wiring accessory is exposed, and a side wall projecting from said main portion over a substantially entire periphery thereof,

wherein a dimension of said make-up plate between opposite longitudinal portions of said side wall is larger than a width of said plate frame, and a dimension of said make-up plate between opposite
20 widthwise portions of said side wall is larger than a length of said plate frame.
2. A mounting plate assembly for electrical wiring accessory as defined in claim 1, wherein ribs are formed on an inner surface of said make-up plate, and are abutted against a side surface of said plate frame.
- 25 3. A mounting plate assembly for electrical wiring accessory as defined in claim 1, wherein an abutment portion is formed on said side wall of said make-up plate over a substantially entire periphery thereof, and





is abutted against a side surface of said plate frame.

4. A mounting plate assembly for electrical wiring accessory as defined in claim 2, wherein an extension portion is formed at least part of a peripheral edge of said plate frame, and said ribs abut against said
5 extension portion from said front side.

5. A mounting plate assembly for electrical wiring accessory as defined in claim 4 wherein said plate frame has insertion holes through which box screws for securing said plate frame to an embedding box accommodated in said hole formed in said mounting surface are adapted to
10 pass, and said extension portion is provided at other portion than those portions near to said insertion holes.

6. A mounting plate assembly for electrical wiring accessory as defined in claim 1 wherein a slanting surface for guiding said make-up plate in a mounting direction is formed at a peripheral edge portion of said
15 plate frame.

7. A mounting plate assembly for electrical wiring accessory as defined in claim 1 wherein a slanting surface for guiding said plate frame in a direction of mounting of said make-up plate on said plate frame is formed at a peripheral edge portion of said make-up plate.

20 8. A mounting plate assembly for electrical wiring accessory as defined in claim 1 wherein retaining projections are formed on a reverse side of said make-up plate, and retaining holes, in which said retaining projections are retained, respectively, are formed in a front side of said plate frame, and a notch for inserting a make-up plate-removing jig
25 thereinto is formed in said side wall of said make-up plate.

9. A mounting plate assembly for electrical wiring accessory as defined in claim 8 wherein a relief portion for passing said make-up



plate-removing jig is formed in said plate frame corresponding to said notch.

10. A mounting plate assembly for electrical wiring accessory as defined in claim 9 wherein a rib extends from one end of said relief
5 portion, disposed remote from said front side of said plate frame, to such an extent that it does not project outwardly from said notch in said make-up plate.

11. A mounting plate assembly for electrical wiring accessory as defined in claim 1 wherein connection portions are provided respectively
10 at opposite ends of said movable beam portion, and connect said movable beam portion to one of said frame pieces of said plate frame in such a manner that said movable beam portion can be flexed, and both end portions of a slit, formed between said movable beam portion and said one side frame piece, are turned toward said connecting portions, respectively.

15 12. A mounting plate assembly for electrical wiring accessory as defined in claim 1 wherein said retaining grooves in said fixed beam portion, as well as said retaining grooves in said movable beam portion, are arranged at equal intervals.

13. A mounting plate assembly for electrical wiring accessory
20 as defined in claim 1 wherein partition ribs are formed on said fixed beam portion and said movable beam portion, and predetermined positions on which said wiring accessory relative to said opening is mounted are separated from each other by said partition ribs, and said wiring accessory is retainingly fixed to said fixed beam portion and said movable beam
25 portion, with said functional surface exposed through said opening.

14. A mounting plate assembly for electrical wiring accessory as defined in claim 11 wherein elongate projections are formed on a reverse



side of said make-up plate, and are fitted in said slit formed between said movable beam portion and side frame piece.

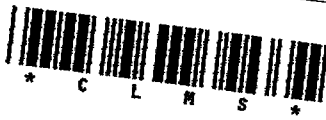
15. A mounting plate assembly for electrical wiring accessory as defined in claim 1 wherein said plate frame is provided with means for
5 abutting against at least part of a side surface of said wiring accessory to suppress a shaking of said wiring accessory when said wiring accessory is attached to said plate frame, with said retaining pawls retained respectively in said beam portion.

16. A mounting plate assembly for electrical wiring accessory
10 as defined in claim 8 wherein those portions of said plate frame, disposed at peripheral edge portions of said retaining holes, are reduced in thickness.

17. A mounting plate assembly for electrical wiring accessory as defined in claim 1 wherein accessory removal holes are formed through
15 said fixed beam portion, and extend from a front side of a side frame piece of said plate frame, said accessory removal hole being disposed between any two adjacent retaining grooves.

18. A mounting plate assembly for electrical wiring accessory comprising:

a plate frame for covering an open side of a hole formed in a
20 mounting surface, said plate frame having a pair of openings each for exposing functional surface of an embedding-type wiring accessory therethrough, a fixed beam portion which has retaining grooves for respectively retaining retaining pawls of said wiring accessory, and is provided between said pair of openings, and movable beam portions which
25 have retaining grooves for respectively retaining retaining pawls of said wiring accessory, and are provided respectively at peripheral edges of said openings; and



a make-up plate which is attached to a front side of said plate frame, and has a main portion which covers said front side of said plate frame, a pair of open windows each for exposing a functional surface of said wiring accessory therethrough, and a side wall projecting from said
5 main portion over a substantially entire periphery thereof,

wherein a dimension of said make-up plate between opposite longitudinal portions of said wall is larger than a length of said plate frame, and a dimension of said make-up plate between opposite
10 widthwise portions of said side wall is larger than a width of said plate frame.

19. A mounting plate assembly for electrical wiring accessory as defined in any one of claims 1 to 18 further comprising a metal plate covering said make-up plate and having an opening formed therethrough to expose said functional surface of said wiring accessory.

15 20. A mounting plate assembly for electrical wiring accessory as defined in claim 19 wherein said metal plate has an engaging projection at widthwise end portion thereof, and an engaging pieces for engaging to said engaging projection is formed with said make-up plate.

