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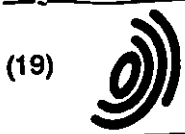
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[54] SUSPENSION APPARATUS 懸掛裝置



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(54) Suspension apparatus

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Dispositif de suspension

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Description

The present invention relates to a suspension apparatus of a circuit breaker which serves for suspending a truck-type circuit breaker or the like when the circuit breaker is put on or taken off from a truck of a switchboard frame.

A conventional suspension apparatus, which is to be used for suspending a truck-type circuit breaker 1 or the like, is described referring to FIGs. 6 and 7. FIG.6 is a perspective view showing the truck-type circuit breaker 1 or the like which is suspended by the conventional suspension apparatus. FIG.7 is a sectional side view showing a constitution of a hook part.

As is obvious from the figures, a pair of hollows 2 are provided on both side face of the truck-type circuit breaker 1. As shown in FIG.7, each hollow 2 is opening toward the bottom of the circuit breaker. A pair of suspension adapters 3, which have substantially J-shaped section, are respectively engaged with the hollows 2 from below. Each suspension adapter 3 has a hole 4 and a rope or wire 5 is tied to the adapter 3 through the hole 4.

During suspension of the circuit breaker 1 by the conventional suspension apparatus, when the circuit breaker 1 is once put on a truck of a switchboard frame or a floor, the rope or wire 5 is loosened, and thereby, the suspension adapters 3 are disengaged from the hollows 2 of the circuit breaker 1. Therefore, the disengaged suspension adapters 3 are to be re-engaged with the hollows 2 for suspending the circuit breaker 1 again.

US-A-4427228 discloses a sheet pile hoist device comprising a pair of first hollows respectively provided on both side faces of the sheet pile to be suspended, a pair of suspension adapters each having a hook to be engaged with said first hollow and provided at an end thereof and means for hoisting the suspension adapter, and a pair of stoppers respectively provided on said suspension adapter and being adapted for engaging with the inside of the side wall of the open top side of the sheet pile. Each stopper is a L-shaped hook lever which is rotatively held on said suspension adapter and has a hook part to be engaged with the inner side wall.

The purpose of the present invention is to solve the above-mentioned problems and to provide an improved suspension apparatus wherein the suspension adapters may not inadvertently be disengaged from the hollows of the circuit breaker even when the rope or wire which is tied to the suspension adapters is loosened.

The suspension apparatus in accordance with the present invention comprises the features mentioned in the claim.

When the suspension adapters are engaged with the first hollows of the circuit breaker to be suspended, the stoppers are respectively engaged with the second hollows. Therefore, even when the rope or wire is loosened, the suspension adapters are firmly coupled to the circuit breaker.

The invention, both as to organization and content,

will be better understood and appreciated, along with other objects and features thereof, from the following detailed description taken in conjunction with the drawings.

FIG.1 is a perspective view showing a suspension of a circuit breaker by using a first embodiment of a suspension apparatus in accordance with the present invention.

FIG.2 is a sectional side view showing a constitution of the first embodiment of the suspension apparatus.

FIG.3 is a front view of the first embodiment of the suspension apparatus.

FIG.4 is a perspective view showing a suspension of a circuit breaker by using a second embodiment of a suspension apparatus in accordance with the present invention.

FIG.5 is a sectional side view showing a constitution of the second embodiment of the suspension apparatus.

FIG.6 is a perspective view showing the suspension of a circuit breaker by a conventional suspension apparatus.

FIG.7 is the sectional side view showing the constitution of the conventional suspension apparatus.

It will be recognized that some or all of the Figures are schematic representations for purposes of illustration and do not necessarily depict the actual relative sizes or locations of the elements shown.

A first preferred embodiment of a suspension apparatus in accordance with the present invention is described referring to FIGs. 1, 2 and 3. FIG.1 is a perspective view showing a suspension of a circuit breaker 1 by using the first embodiment of the suspension apparatus in accordance with the present invention. FIG.2 is a sectional side view showing a section of the first embodiment of the suspension apparatus shown in FIG.1. FIG.3 is a front view of the first embodiment of the suspension apparatus. Elements designated by the same numerals as those of the conventional suspension apparatus are substantially the same.

As is obvious from FIG.1, a pair of first hollows 2 are provided on both side face 1a of the truck-type circuit breaker 1. As shown in FIG.2, each first hollow 2 is formed overhanging from a side face over the bottom of the circuit breaker. A pair of suspension adapters 3, which have substantially J-shaped section, are respectively engaged with the hollows 2 from below. As shown in FIG.3, each suspension adapter 3 has a hole 4 and a rope or wire 5 is tied to the adapter 3 through the hole 4. As is also obvious from FIG.1, a pair of second hollows 6 are provided on an upper face 1b in the vicinity of the boundaries between the side faces 1a and the upper face (top face) 1b of the circuit breaker 1. A stopper 7, which is substantially a hook lever, is rotatively held so as to cradle around a pivot 8 on each suspension adapter 3. The stopper 7 has a hook 7a which is to be engaged with the second hollow 6 of the circuit breaker 1. Furthermore, the stopper 7 has another hook 7c

which is to be engaged with the suspension adapter 3 and a flat part 7b.

As shown in FIGs. 1, 2 and 3, when the suspension adapter 3 is engaged with the first hollow 2 and the hook 7a of the stopper 7 is also engaged with the second hollow 6 of the circuit breaker 1, the suspension adapter 3 is firmly coupled with the circuit breaker 1. Therefore, even when the rope or wire 5 is loosened, the suspension adapter 3 is not detachable from the circuit breaker 1.

For detaching the suspension adapter 3 from the circuit breaker 1, the stopper 7 is manually rotated, for example, in counterclockwise direction in FIG.3, and thereby, the hook 7a is disengaged from the hollow 6 of the circuit breaker. The suspension adapter 3 can fall down due to the gravity when the rope or wire 5 is loosened, similarly to the conventional suspension apparatus.

A second preferred embodiment of a suspension apparatus in accordance with the present invention is described referring to FIGs. 4 and 5. FIG.4 is a perspective view showing a suspension of a circuit breaker 1 by using the second embodiment of the suspension apparatus in accordance with the present invention. FIG.5 is a sectional side view showing a constitution of the second embodiment. Elements designated by the same numerals as that of the above-mentioned first embodiment of the suspension apparatus are substantially the same, and thereby, the explanation of them are omitted.

As shown in FIGs. 4 and 5, a stopper 9, which is made of a resilient material and has a substantially L-shaped section, is provided on the suspension adapter 3 in such a manner that a protrusion 9a of the stopper 9 can be engaged with the second hollow 6 of the circuit breaker 1.

As shown in FIG.5, when the suspension adapter 3 is engaged with the first hollow 2 and the protrusion 9a of the stopper 9 is also engaged with the second hollow 6 of the circuit breaker 1, the suspension adapter 3 is firmly coupled with the circuit breaker 1. Therefore, even when the rope or wire 5 is loosened, the suspension adapter 3 will not be detached from the circuit breaker 1. For detaching the suspension adapter 3 from the circuit breaker 1, the suspension adapter 3 with stopper 9 is forcibly rotated, for example, in clockwise direction in FIG.5, and thereby, the protrusion 9a of the stopper 9 is disengaged from the hollow 6 of the circuit breaker. The suspension adapter 3 falls down due to the gravity when the rope or wire 5 is loosened, similarly to the above-mentioned first embodiment.

Claims

1. A combination of a circuit breaker (1) and a suspension apparatus therefor,
said circuit breaker comprising:

a pair of first hollows (2) respectively provided on its opposite side faces (1a); and said sus-

pension apparatus comprising

a pair of suspension adapters (3) each having a J-shaped section and a hook to be engaged with said first hollows (2) of said circuit breaker (1) and being provided at an end thereof, as well as means (4) for tying a rope or wire (5) in the vicinity of said end characterized in that said circuit breaker further comprises:

a pair of second hollows (6) respectively provided on an upper face of said circuit breaker (1) in the vicinity of the boundaries between said upper face (1b) and said side faces (1a), and in that said suspension apparatus further comprises a pair of stoppers (7) respectively provided on said suspension adapters (3), for engaging with the second hollows (6) of said circuit breaker (1), wherein each stopper (7) either being a hook lever which is rotatively held on said suspension adapter (3) and has a hook part (7a) to be engaged with said second hollow (6), as well as a further hook part (7c) for engagement with said suspension adapter (3), or is made of resilient material and has substantially L-letter shape and has a protrusion (9a) in the vicinity of an end thereof to be engaged with said second hollow (6) in such a manner that the engagement between said protrusion (9a) and said second hollow (6) can be overcome by forcibly rotating said suspension adapter (3).

Patentansprüche

1. Kombination eines Leistungsschalters (1) und einer Aufhängevorrichtung für diesen, wobei der Leistungsschalter aufweist:

ein Paar von ersten Ausnehmungen (2), die jeweils an seinen gegenüberliegenden Seitenflächen (1a) vorgesehen sind; und die Aufhängevorrichtung sowohl ein Paar von Aufhängeanschlüssen (3), von denen jeder einen J-förmigen Abschnitt und einen Hacken, die mit der ersten Ausnehmung (2) des Leistungsschalters (1) in Eingriff bringen sind aufweist und an einem Ende davon vorgesehen sind, als auch eine Einrichtung (4) zum Verbinden eines Seils oder Drahts (5) in der Nähe des Endes aufweist,

dadurch gekennzeichnet, daß der Leistungsschalter weiterhin aufweist:

ein Paar von zweiten Ausnehmungen (6), die jeweils an einer oberen Fläche des Leistungsschalters (1) in der Nähe der Grenzen zwischen der oberen Fläche (1b) und der Seitenflächen (1a) vorgesehen sind; 5
und dadurch, daß die Aufhängevorrichtung weiterhin aufweist:

ein Paar von Stopperrn (7), die jeweils an den Aufhängeanschlüssen (3) vorgesehen sind, zum in Eingriff bringen mit den zweiten Ausnehmungen (6) des Leistungsschalters (1), wobei jeder Stopper (7) entweder ein Hakenhebel, welcher drehbar an dem Aufhängeanschluß (3) gehalten wird und sowohl ein Hackenteil (7a) das in Eingriff zu bringen ist mit der zweiten Ausnehmung (6) als auch ein weiteres Hackenteil (7c) aufweist, das mit dem Aufhängeanschluß (3) in Eingriff bringen ist, 10

oder aus einem federnden Material besteht und im wesentlichen eine Form des Buchstaben L aufweist, und einen Vorsprung (9a) in der Nähe seines Endes aufweist, der auf eine derartige Weise mit der zweiten Ausnehmung (6) in Eingriff zu bringen ist, daß der Eingriff zwischen dem Vorsprung (9a) und der zweiten Ausnehmung (6) durch Drehen des Aufhängeanschlusses (3) unter Kraftaufwendung überwunden werden kann. 15
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Revendications

1. Combinaison d'un coupe-circuit (1) et d'un appareil de suspension pour celui-ci, ledit coupe-circuit comportant : 40

une paire de premiers creux (2) prévus respectivement sur ses faces latérales opposées (1a) ; et ledit appareil de suspension comportant une paire d'adaptateurs de suspension (3) présentant chacun une section en forme de J et un crochet devant être engagé dans lesdits premiers creux (2) dudit coupe-circuit (1) et étant réalisée à une extrémité de celui-ci, ainsi qu'un moyen (4) pour nouer une corde ou fil (5) au voisinage de ladite extrémité, caractérisée en ce que ledit coupe-circuit comporte en outre : une paire de deuxièmes creux (6) prévus respectivement sur une face supérieure dudit coupe-circuit (1) au voisinage des limites entre ladite face supérieure (1b) et lesdites faces latérales (1a), et en ce que ledit appareil de suspension comporte en outre une paire de 45
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butées d'arrêt (7) prévues respectivement sur lesdits adaptateurs de suspension (3) pour s'engager dans les deuxièmes creux (6) dudit coupe-circuit (1), où chaque butée d'arrêt (7) étant soit un levier à crochet qui est retenu à rotation sur ledit adaptateur de suspension (3) et qui comporte une partie de crochet (7a) devant s'engager dans ledit deuxième creux (6), ainsi qu'une partie de crochet supplémentaire (7c) pour une mise en prise avec ledit adaptateur de suspension (3),

soit étant réalisée en une matière élastique et ayant une forme sensiblement en L et présentant une saillie (9a) au voisinage d'une extrémité de celle-ci pour s'engager dans ledit deuxième creux (6) de manière que l'engagement entre ladite saillie (9a) et ledit deuxième creux (6) peut être surmonté en faisant tourner de force ledit adaptateur de suspension (3).

FIG. 1

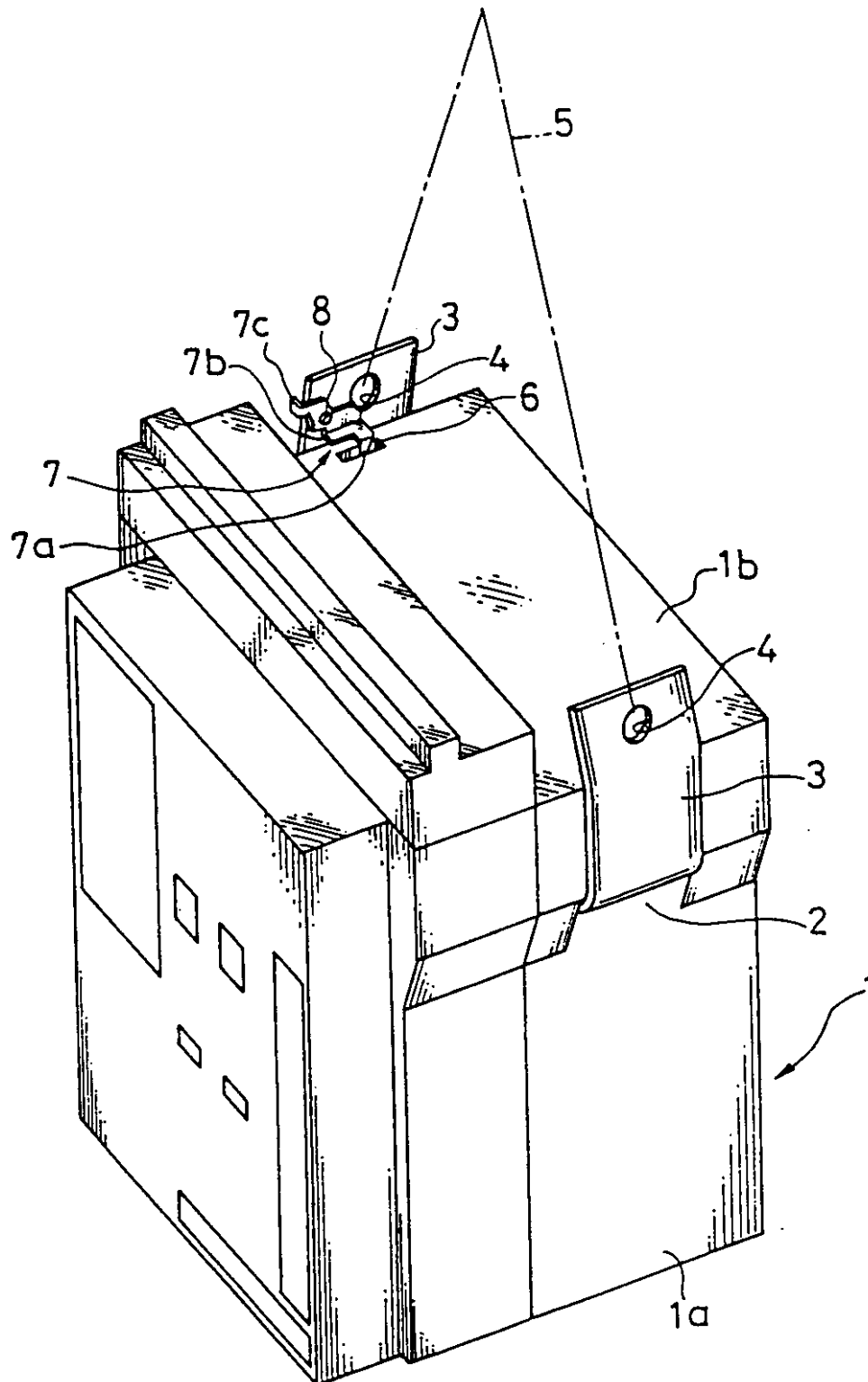


FIG. 3

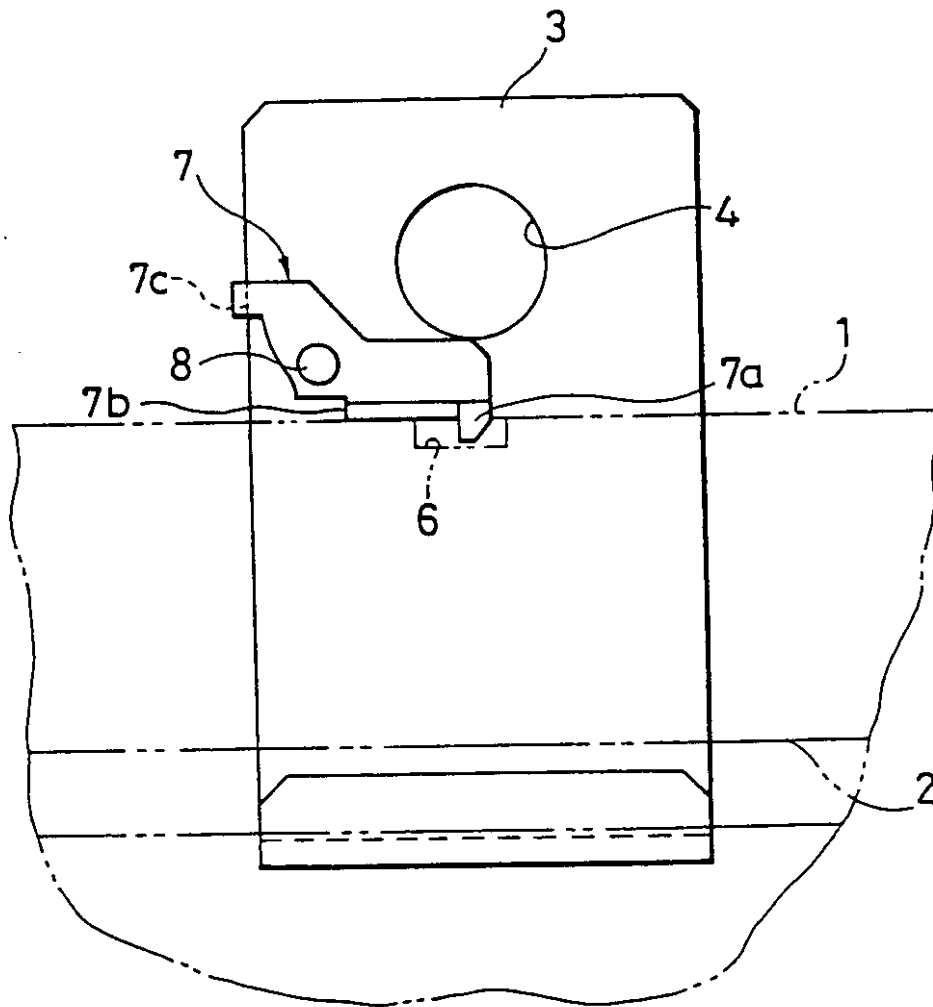


FIG. 4

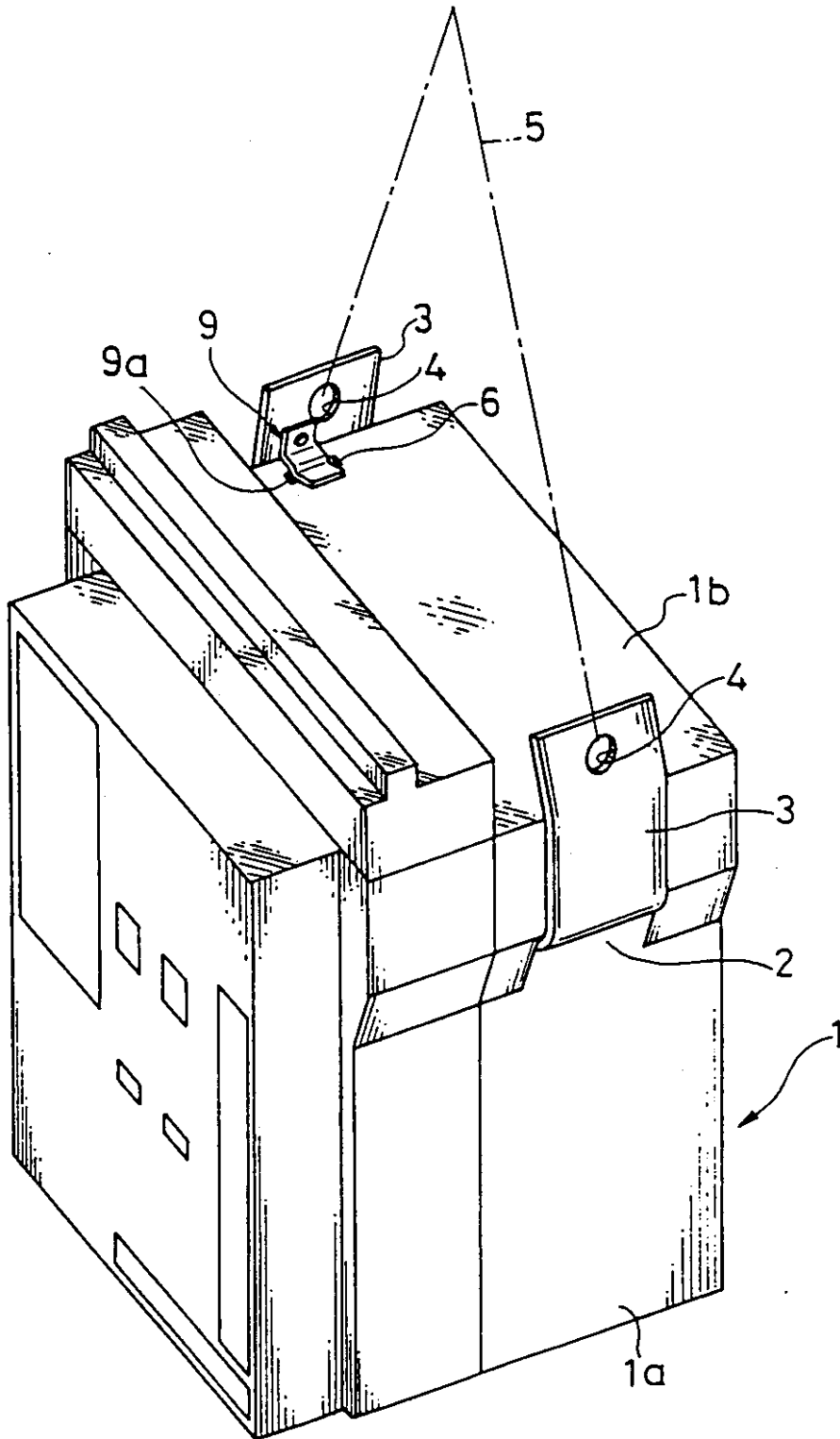


FIG. 5

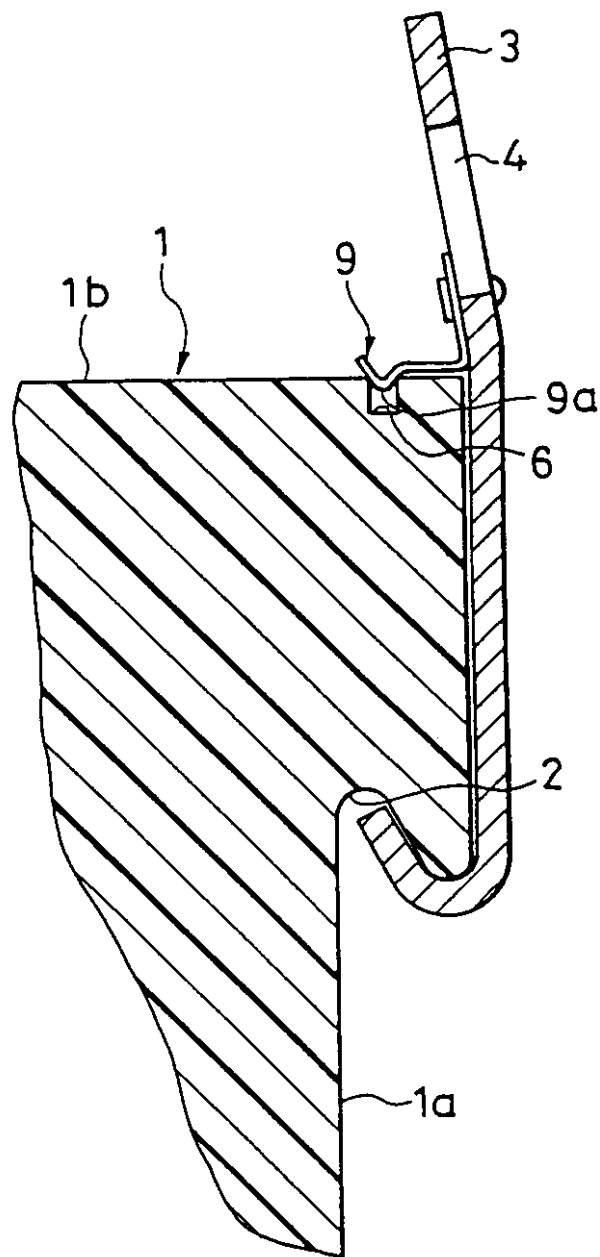


FIG. 6

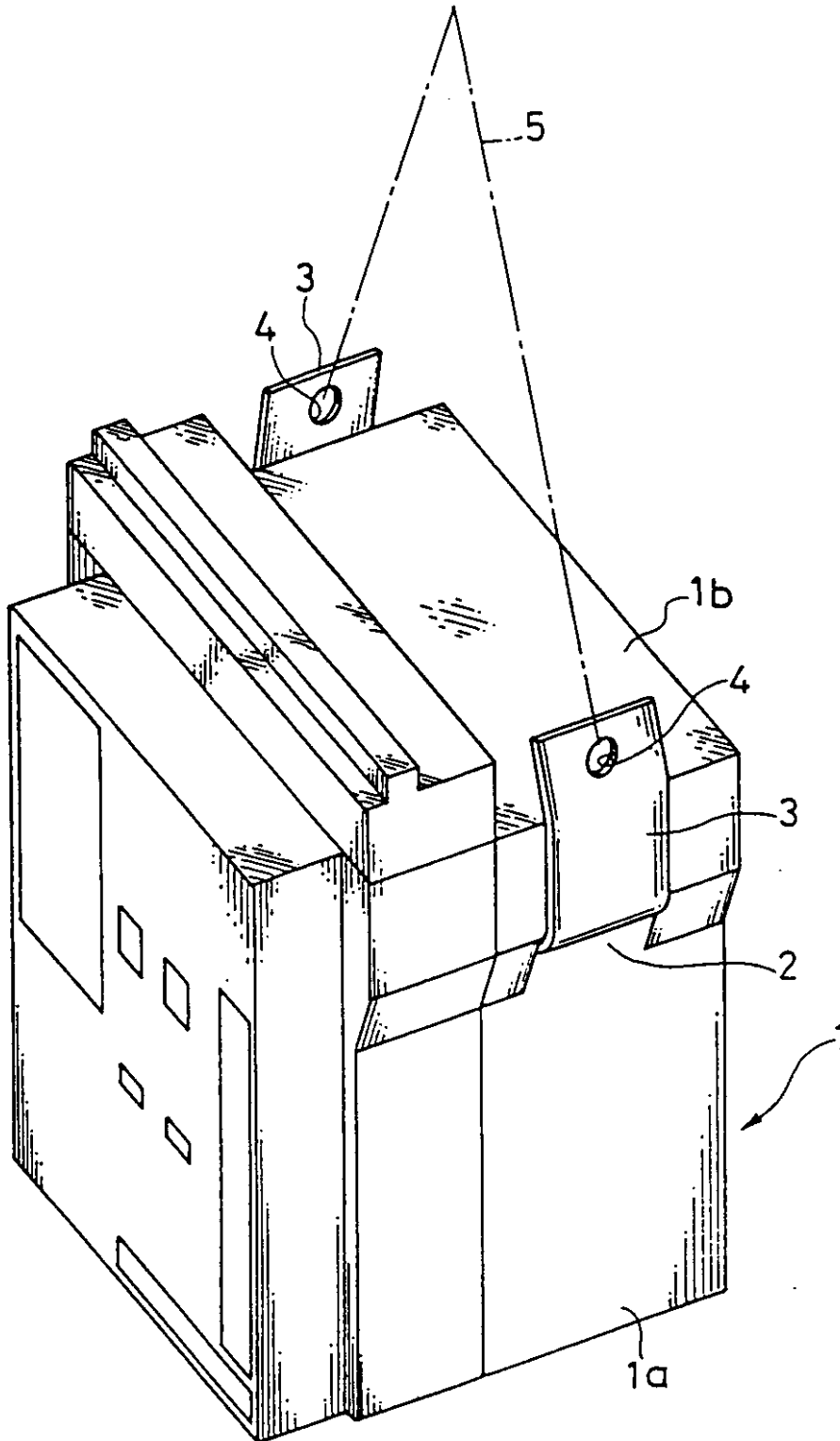


FIG. 7

