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(54) **Bar bus structure, electric connection box provided with same, and bus bar-forming method**

Stromschienenstruktur, elektrisches Verbindungsgehäuse mit einer solchen Struktur und  
Stromschienenenerzeugungsverfahren

Structure de barre omnibus, boîte de connexion électrique avec une telle structure et procédé de  
formation de barre omnibus

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## Description

**[0001]** This invention relates to a bus bar structure in which different kinds of bus bars, having a fuse, can be easily formed, and also relates to an electric connection box provided with this bus bar structure and a bus bar-forming method.

**[0002]** Figs. 7A and 7B show one form of bus bar structure provided within a conventional electric connection box.

**[0003]** In this structure, of Figs. 7A and 7B as shown in Unexamined Japanese Patent Publication Hei. 5-83828, common bus bars 71 and 72 are used in the bus bar arrangements of Figs. 7A and 7B, and by selectively using different kinds of relay terminals 73 to 78 and also by changing the connecting positions thereof, a circuit arrangement of connection between the bus bars 71 and 72 and fuses 79 is changed.

**[0004]** In each of the circuit arrangements of Figs. 7A and 7B, the bus bars 71 and 72 are mounted on a horizontal insulating board 80, and the relay terminal 73 is connected to a tab terminal formed at one end of one bus bar 71, and a tab terminal of a lower-layer bus bar projects upwardly through the insulating board 80, and is disposed between the two bus bars 71 and 72, and the relay terminal 75 is connected to this tab terminal.

**[0005]** In the connection arrangement of Fig. 7A, one tab terminal on a lower-layer bus bar projects upwardly through the insulating board 80, and is disposed adjacent to the relay terminal 73 at the one end of the bus bar 71, and the relay terminal 74 is connected to this tab terminal. An external contact piece portion 76a of the joint relay terminal 76 is connected to an intermediate tab terminal 81 of the other bus bar 72, and the joint relay terminal 76 is connected to a tab terminal projecting upwardly through the insulating board 80 in opposed relation to the intermediate tab terminal 81. One fuse 79 is inserted into the pair of relay terminals 73 and 74 to be connected thereto, while the other fuse 79 is inserted into the pair of relay terminals 75 and 76 to be connected thereto.

**[0006]** In the connection arrangement of Fig. 7B, the joint relay terminal 76 in the connection arrangement of Fig. 7A is replaced by the relay terminal 78 of the ordinary type, thereby canceling the connection of the joint relay terminal to the intermediate tab terminal 81, while a tab terminal 82 at one end of the other bus bar 72 is connected to the one tab terminal on the lower-layer bus bar by the joint relay terminal 77. One fuse 79 is connected to the pair of relay terminals 73 and 77, while the other fuse 79 is connected to the pair of relay terminals 75 and 78.

**[0007]** By thus selectively using the two kinds of relay terminals 73 to 78, the two kinds of circuit arrangements can be obtained without cutting the bus bars 71 and 72. The electric connection box, provided with this bus bar structure, is mounted mainly on an automobile.

**[0008]** However, the use of the relay terminals 73 to 78 of different forms is a prerequisite for the above con-

ventional structure, and besides the fuses 79 which are separate from the bus bars 71 and 72 must be used, and therefore there have been encountered problems that much time and labor are required for the connecting operation and that the cost of the parts is high.

**[0009]** Furthermore, for example, when it is required to provide two kinds of electric connection boxes designed respectively for a gasoline engine car and a diesel engine car, the provision of fuses is necessary for the circuit for the gasoline engine car, while the provision of fuses is not necessary for the circuit for the diesel engine car. In this case, also, it has been earnestly desired to easily produce bus bars at a low cost.

**[0010]** DE19963268A discloses a fuse strip which is formed by punching a blank from a sheet of material and folding the blank to form the fuse strip. The fuse strip has rail-like opposing elements each provided with a series of contact elements. An integral series of fuse elements provides connection between pairs of contact elements from the opposing rails. If a fuse element should melt, a flat fuse is engageable with the appropriate pair of contact elements as a backup.

**[0011]** With the foregoing in view, it is an object of this invention to provide a bus bar structure in which different forms of circuits, including a fuse, can be easily formed at a low cost, using bus bars, and also to provide an electric connection box provided with the bus bar structure and a bus bar-forming method.

**[0012]** The first object has been achieved by a bus bar structure characterised by a plate-like bus bar body, said plate-like bus bar body including:

- a central plate portion; and
- left and right plate-like portions arranged in a plane on respective opposite sides of the central plate portion;
- connecting portions provided on the left portion of said plate-like bus bar body and the right portion of said plate-like bus bar body, respectively, and configured to be disposed in the plane in which both of the left and right plate-like portions are arranged; and
- a fusible portion and an interconnecting portion formed in the central plate portion,
- wherein said fusible portion and said interconnecting portion each respectively interconnect said left portion and said right portion of said bus bar body.

**[0013]** With this construction, electric current flows from the connection portions of one plate-like portion of the bus bar body to the connection portions of the other plate-like portion thereof via the intermediate interconnecting portion, and the fusible portion does not particularly function as a fuse, and the electric current flows from one plate-like portion of the bus bar body to the other plate-like portion thereof mainly via the interconnecting portion. The interconnecting portion serves also as a reinforcing portion for the bus bar body and as a fusible portion-protecting portion. The bus bar structure of this

construction is used, for example, for a diesel engine car. By removing the interconnecting portion by cutting, the bus bar can be used as another type of bus bar.

**[0014]** According to a second aspect of the present invention depending from the first aspect of the present invention, the interconnecting portion is larger in width than the fusible portion.

**[0015]** With this construction, electric current concentrates on the interconnecting portion of a lower resistance, thereby preventing the fusible portion from being melted.

**[0016]** According to a third object of the present invention depending from the first or second aspect of the present invention, the interconnecting portions are formed respectively at opposite sides of the fusible portion spaced from each other in a direction generally perpendicular to a direction of spacing of said left and right portions of said bus bar body from each other.

**[0017]** With this construction, the fusible portion is safely protected from interference with the exterior by the interconnecting portions provided respectively at the opposite sides of the fusible portion. When the bus bar is used in a vertical posture, preferably, the fusible portion is disposed generally horizontally, and the interconnecting portions are disposed respectively at the upper and lower sides of the fusible portion in generally closely spaced relation thereto.

**[0018]** According to a fourth aspect of the present invention depending from the first, second or third aspect of the present invention, the interconnecting portions are formed respectively at opposite side portions of the bus bar body spaced from each other in a direction generally perpendicular to a direction of spacing of the left and right portions of the bus bar body from each other.

**[0019]** With this construction, the rigidity of the bus bar body is increased by the interconnecting portions, and therefore the bus bar body is prevented from bending, deformation and the like, and also the mounting ability of the bus bar is enhanced. One of the interconnecting portions, disposed respectively at the opposite sides of the fusible portion, may be defined by one of the interconnecting portions formed respectively at the opposite side portions of the bus bar body.

**[0020]** According to a fifth aspect of the present invention, an electric connection box is provided with a bus bar structure as defined in any one of the first to fourth aspects of the present invention.

**[0021]** With this construction, the bus bar is received within the electric connection box, and a power-side circuit is connected to the connection portions of the one side portion of the bus bar body, and electric power is fed from the connection portions of the other side portion to electrical parts (such as fuses), another bus bar, another circuit and so on via the fusible portion or the interconnecting portion.

**[0022]** According to a sixth aspect of the present invention, a method for forming a bus bar comprises the steps of:

blanking from an electrically-conductive metal sheet a first bus bar which includes a bus bar body having a central plate portion and left and right plate-like portions arranged in a plane on respective opposites sides of the central plate portion, the left and right portions each having respective connection portions disposed in the plane in which both of the left and right plate-like portions are arranged, forming a fusible portion and an interconnecting portion in the central plate portion of the bus bar body to produce the first bus bar, so that said fusible portion and said interconnecting portion each respectively interconnect said left portion and said right portion of said bus bar body; and cutting the interconnecting portion off from the first bus bar to provide a second bus bar having the fusible portion.

**[0023]** With this construction, electric current flows from the connection portions of one plate-like portion of the bus bar body to the connection portions of the other plate-like portion thereof via the intermediate interconnecting portion, and the fusible portion does not particularly function as a fuse, and the electric current flows from one plate-like portion to the other plate-like portion of the bus bar body mainly via the interconnecting portion. The interconnecting portion also serves as a reinforcing portion for the bus bar body and as a fusible portion-protecting portion. The first bus bar is used, for example, for a diesel engine car. By removing the interconnecting portion by cutting, this bus bar can be used as the second bus bar. In the second bus bar, electric current flows from the connection portions of one plate-like portion of the bus bar body to the connection portions of the other plate-like portion thereof via the intermediate fusible portion, and when an excess current flows, the fusible portion, serving as a fuse, is heated and melted, thereby interrupting the supply of the electric current to the connection portions of the other plate-like portion. An insert piece for forming the fusible portion and an insert piece for cutting the interconnecting portion are attached to and detached from a die, and by doing so, the first bus bar and the second bus bar can be formed, using the same die.

**[0024]** According to the first aspect of the present invention, the interconnecting portion is used as the current-flowing portion of the bus bar body, and by doing so, one form of bus bar can be formed. By cutting and removing the interconnecting portion, another form of bus bar can be easily formed at a low cost.

**[0025]** According to the second aspect of the present invention, there is provided the bus bar structure in which the fusible portion does not need to function as a fuse, and the melting of the fusible portion is prevented, thereby eliminating the production of the melting residue or the like.

**[0026]** According to the third aspect of the present invention, the fusible portion is safely protected from interference with the exterior by the interconnecting portions

provided respectively at the opposite sides of the fusible portion, and therefore the transport and handling of the bus bar can be effected easily.

**[0027]** According to the fourth aspect of the present invention, the rigidity of the bus bar body is increased by the interconnecting portions, and therefore the bus bar body is prevented from bending, deformation and the like, and besides the ability of the bus bar to be mounted in the electric connection box is enhanced.

**[0028]** According to the fifth aspect of the present invention, the electric connection boxes, respectively incorporating different kinds of bus bars, can be easily provided at a low cost.

**[0029]** According to the sixth aspect of the present invention, the interconnecting portion is used as the current-flowing portion of the bus bar body, and by doing so, the first bus bar can be formed, and merely by effecting the simple operation for cutting the interconnecting portion off from the bus bar body, the second bus bar of the different type can be easily formed at a low cost.

**[0030]** In the accompanying drawings:-

Fig. 1 is front-elevational view of a bus bar according to a comparative example to the present invention.

Fig. 2 a perspective view of the bus bar combined with another bus bar.

Fig. 3 is a front-elevational view of an embodiment of a bus bar of the invention.

Fig. 4 is a front-elevational view of a bus bar according to a further comparative example to the invention.

Fig. 5 is a perspective view showing the other bus bar in Fig. 2.

Fig. 6 is an exploded, perspective view of one example of an electric connection box incorporating a bus bar assembly.

Figs. 7A and 7B are an exploded, perspective view showing one form of conventional bus bar structure.

**[0031]** Fig. 1 shows a comparative example to a bus bar according to the present invention, and Fig. 2 is a bus bar assembly formed by combining this bus bar with another bus bar in a unitary manner.

**[0032]** The bus bar (second bus bar) 1, shown in Fig. 1, is mounted within an electric connection box 20 (Fig. 6) for a gasoline engine car, and serves as a power supply bus bar for supplying electric power to a relay within the electric connection box and a wire harness extending from the electric connection box 20. This bus bar 1 includes a notch 4 formed in a central plate portion 3 of a flat plate-like bus bar body 2 and extending in a direction of a width of this plate portion. A fusible portion 5 (serving as a fuse or a breaking portion) is formed integrally with the plate portion 3, and extends across the notch 4, and is disposed in a plane in which the plate portion 3 is disposed.

**[0033]** The bus bar body 2 is divided into two sections, that is, a right half portion and a left half portion, by the notch 4, and the right and left half portions are intercon-

nected only by the fusible portion 5. The fusible portion 5 has a narrow width, and is provided at a lower half portion of the central plate portion 3, and extends obliquely downwardly. Opposite end portions of the fusible portion 5 are integrally connected respectively to opposed edges 4a of the notch 4 in generally perpendicular relation thereto, and are disposed in the plane in which the plate portion 3 lies. The notch 4 has a lower half portion serving as a medium-width portion 4a', a central portion serving as a larger-width portion 4b, and an upper portion serving as a smaller-width portion 4c. The notch 4 can be formed into any other suitable shape. The bus bar body 2, including terminal portions 10, 12, 16 and 19, the notch 4 and the fusible portion 5, is formed from a single electrically-conductive metal sheet by blanking such as punching.

**[0034]** In this comparative example, holes 6 for the connection of an external (post-mounting) fuse (not shown) are provided respectively at opposite sides of the larger-width central portion 4b. These holes 6 for the external fuse are provided so that the fuse can be mounted on the bus bar 1 without exchanging the bus bar 1 after the fusible portion 5 is melted. The holes 6, serving as the connection portions for the external fuse, function also as connection portions for power wires from an alternator (not shown) and for wire-connected terminals for external connection purposes.

**[0035]** As shown in Fig. 2, the central plate portion 3 of the bus bar 1 of this comparative example is bulged outwardly from the remainder of the bus bar portion 2 via stepped portions 7, and nuts 8 (Fig. 6) can be received in an internal space of this bulged plate portion 3 so as to cooperate with bolts to fasten the external fuse. In Fig. 1, reference numerals 9 denote projected piece portions for retaining the external connection-purpose wire-connected terminals (eyelet terminals) against rotation.

**[0036]** The plurality of wide tab terminals (connection portions) 10 are integrally formed in a projected manner at an upper portion of the right half portion of the bus bar 1, and a perpendicularly-bent portion 11 is formed at a right end of the bus bar 1, and the wide tab terminal (connection portion) 12 is integrally formed at a distal end of the bent portion 11. For example, a terminal, connected to a wire extending from a positive electrode of a battery, is connected to the right end wide terminal 12 through a connector, and the upper tab terminals 10 are connected respectively to tab terminals 34 of the other bus bar 14 (Fig. 2) via respective fusible links 13 (Fig. 6). The projecting tab terminals 10 are disposed in a plane in which the flat plate portion of the bus bar body 2 lies, and also the projecting tab terminals 34 are disposed in a plane in which a flat plate portion of a bus bar body of the bus bar 14 lies. In Fig. 1, holes 29 are provided for fixing the bus bar 1 to the other bus bar 14.

**[0037]** The plurality of tuning fork-like gripping terminals (connection portions) 16 are formed in a projected manner at an upper portion of the left half portion of the bus bar 1, and are arranged at equal intervals. A plate

portion 17 at the left end portion of the bus bar body 2 is disposed inwardly of the base plate portion through a stepped portion 18, and the tab terminal (connection portion) 19 and a hole (connection portion) 21 for the connection of a wire-connected wire are provided at this plate portion 17. The projecting terminals 16 are disposed in the plane in which the bus bar body 2 lies, and also the projecting terminal 19 is disposed in a plane in which the plate portion 17 lies. In Fig. 1, reference numeral 22 denotes a projecting piece portion for retaining the wire-connected terminal against rotation.

**[0038]** Fig. 3 shows an embodiment of a bus bar of the invention which serves as a power supply bus bar 23 for being mounted within an electric connection box for a diesel engine car. This bus bar (first bus bar) 23 is identical to the bus bar 1 of Fig. 1 for a gasoline engine car which is at a stage before the central notch 4 is formed in the bus bar 1 in the process of producing this bus bar 1, and therefore the bus bar 23 of this embodiment is formed midway during the same producing process.

**[0039]** A fusible portion 5 is already formed in a central plate portion 3 of the bus bar 23, and left and right half portions of the bus bar 23 are integrally connected together by interconnecting portions 24 and 25 (disposed near respectively to upper and lower ends of the fusible portion 5) and an interconnecting portion 26 disposed at an upper end portion of the plate portion 3. The fusible portion 5 is disposed within a vertically-elongate rectangular hole 27, and a larger-width hole 28 is disposed above the hole 27, and a smaller-width hole 28a extends from an upper edge of the larger-width hole 28. The upper and lower sides (or edges) of the hole 27 are defined respectively by the horizontal interconnecting portions 24 and 25, while the upper and lower sides (or edges) of the hole 28 is defined by the horizontal interconnecting portions 26 and 24. The interconnecting portion 25 at the lower end of the fusible portion 5 serves also as an interconnecting portion at the lower end portion of the plate portion 3. The interconnecting portions 24 to 26 are larger in width than the fusible portion 5, and allow an electric current to flow therethrough in a concentrated manner with a lower resistance than through the fusible portion 5.

**[0040]** During the transport of the bus bar 23 and during the mounting of the bus bar 23 in the electric connection box, the interconnecting portions 24 and 25, provided respectively at the upper and lower sides of the fusible portion 5, protect the fusible portion 5 from interfering with the exterior. And besides, the rigidity of a bus bar body 2 is increased by the interconnecting portions 25 and 26 provided respectively at the upper and lower ends of the plate portion 3, thereby preventing the bus bar 23 from bending, deformation and the like.

**[0041]** With respect to the bus bar 1 (Fig. 1) for the gasoline engine car, it is preferred that the interconnecting portions 24 to 26 be removed by cutting immediately before the bus bar 1 is incorporated into the electric connection box so that the fusible portion 5 can be prevented from interfering with the exterior. Preferably, the cutting

of the interconnecting portions 24 to 26 is effected by a punch and a die. Cutting lengths of the interconnecting portions 24 to 26 can be suitably determined, and for example, the cutting lengths of the interconnecting portions 24 to 26 are equal to or smaller than the widths of the holes 27 and 28. The bus bar 23 of this embodiment is identical in construction to the above bus bar 1 for the gasoline engine car except that the interconnecting portions 24 to 26 are provided, and therefore identical constituent portions are designated by identical reference numerals, respectively, and explanation thereof is omitted here.

**[0042]** Fig. 4 shows a bus bar 30 which is identical to the bus bar 23 of Fig. 3 which is at a stage before the fusible portion 5 is formed at the bus bar 23. Instead of the bus bar 23 of Fig. 3, this bus bar 30 can be used as a bus bar for a diesel engine car.

**[0043]** With respect to the bus bar 23 of Fig. 3, the fusible portion 5 is formed by a punch simultaneously when the hole 27 is formed, and by omitting the use of this punch (that is, an insert piece), the bus bar 30 of Fig. 4 can be formed. However, it is cumbersome to remove the insert piece, and therefore preferably, the bus bar 23 of Fig. 3, having the fusible portion 5 formed integrally therewith, is used for a diesel engine car, and the bus bar 1 of Fig. 1 for a gasoline engine car is obtained merely by cutting the interconnecting portions 24 to 26 off from the bus bar 23 of Fig. 3. The fusible portion 5 of Fig. 3 does not function as a fuse since the interconnecting portions 24 to 26 flow electric current therethrough.

**[0044]** The bus bar 30 of Fig. 4 is identical in construction to the bus bar 23 of Fig. 3 except that the bus bar 30 is not provided with the fusible portion 5, and therefore identical constituent portions are designated by identical reference numerals, respectively, and explanation thereof is omitted here. the constructions, shown in Figs. 1, 3 and 4, are also effective as a bus bar-forming method.

**[0045]** Each of the power supply bus bars 1, 23, 30 of the above comparative examples and embodiment according to the invention is joined to the insulating array bus bar 14 in opposed relation thereto to provide the bus bar assembly 31 as shown in Fig. 2 (The bus bar 1 is shown as a representative example in Fig. 2), and this bus bar assembly 31 is used.

**[0046]** As shown in Fig. 5, the insulating array bus bar 14 comprises a plurality of strip-like bus bar bodies 32, and an insulative resin portion 33 covering the bus bar bodies 32. Terminal portions 34 to 40 of the bus bar bodies 32 project upwardly and downwardly from the resin portion 33, and the upper terminal portions 34 to 36 are disposed in opposed relation to the upper terminal portions 10, 16 and 19 of the power supply bus bar 1 (Fig. 2), respectively, and the lower terminal portions 37 to 40 project downwardly beyond the power supply bus bar 1.

**[0047]** In Fig. 5, the terminal portions 34 are tab terminals are for fusible link connecting purposes, and the terminal portions 35 are gripping terminals for fuse connecting purposes, and the terminal portions 37 to 40 are

tab terminals for connector connecting purposes. In Fig. 2, projections 41 (Fig. 5) on the insulative resin portion 33 are engaged at their distal ends respectively in the holes 29 in the bus bar body 2 of the power supply bus bar 1, and are thermally fastened thereto, thereby fixing the bus bar 1 to the bus bar 14.

**[0048]** The power supply bus bar 1 is used in integrally connected relation to the insulating array bus bar 14, but this is merely one example, and the power supply bus bar 1 can be used alone or can be mounted within an electric connection box in parallel relation to another bus bar.

**[0049]** As shown in Fig. 6, the bus bar assembly 31 is joined to a connector block (under cover) 42 disposed at the lower side of this bus bar assembly 31, and the lower terminal portions 37 to 40 of the insulating array bus bar 14 are inserted through respective holes 44 to 47 in the connector block 42 into respective connector housings 48 to 51 to thereby form connectors. The connector housings 48 to 51 are formed integrally on a longitudinally-extending horizontal base wall 52 of the connector block 42. The bus bar assembly 31, together with the connector block 42, is mounted within a main cover (connection box body) 53, and is disposed in a vertical posture.

**[0050]** The wide tab terminals 10 (formed at the upper portion of the right half portion of the bus bar 1), the wide tab terminals 34 (formed at the upper portion of the right half portion of the bus bar 14), the wide tab terminal 19 (formed at the left end portion of the bus bar 1) and the wide tab terminal 36 (formed at the left end portion of the bus bar 14) are disposed within housing mounting (fusible link mounting) portions 54 provided at an upper portion of the main cover 53. The gripping terminals 16 (formed at the upper portion of the left half portion of the bus bar 1) and the gripping terminals 35 (formed at the upper portion of the left half portion of the bus bar 14) are disposed within housing mounting (fuse mounting) portions 55. The large-current fusible links 13 are mounted in the fusible link mounting portions 54, respectively, and small-current fuses 56 are mounted in the fuse mounting portions 55, respectively.

**[0051]** The wide tab terminal 12, formed at the right end of the power supply bus bar 1, is received in a connector housing 57 within the main cover 53 to form a connector, and for example, the power wire from the battery is connected to this connector via a connector. The central plate portion 3 of the power supply bus bar 1 is located in an opening 60 formed in a central portion of the front side of the main cover 53. A relay 58, together with a relay holder 59, is also mounted in the main cover 53.

**[0052]** Connectors of the wire harness are connected to the connector block 42 from the lower side thereof, and the wire harness is led out to the exterior through an opening in a lower cover (not shown). An upper cover (not shown) is attached to the upper side of the main cover 53. The main cover 53, the bus bar assembly 31, the connector block 42, the electric parts including the

fuses 13 and 56 and the relay 58, the upper cover and the lower cover jointly form the electric connection box 20. The electric connection box 20, shown in Fig. 6, is given merely as one example, and the bus bar 1, 23, 30 can be used alone or in combination with any other suitable bus bar so as to provide an electric connection box having a suitable circuit arrangement.

## 10 Claims

### 1. A bus bar structure (23) comprising:

a plate-like bus bar body (2), said plate-like bus bar body including:

a central plate portion (3); and  
left and right plate-like portions arranged in a plane on respective opposite sides of the central plate portion;  
connecting portions (10; 16) provided on the left portion of said plate-like bus bar body and the right portion of said plate-like bus bar body, respectively, and disposed in the plane in which both of the left and right plate-like portions are arranged; and  
a fusible portion (5) and an interconnecting portion (24, 25, 26) formed in the central plate portion,  
wherein said fusible portion (5) and said interconnecting portion (24, 25, 26) each respectively interconnect said left portion and said right portion of said bus bar body (2).

2. A bus bar structure (23) according to claim 1, wherein said interconnecting portion (24, 25, 26) is larger in width than said fusible portion (5).

3. A bus bar structure (23) according to claim 1 or claim 2, wherein said interconnecting portions (24, 25, 26) are formed respectively at opposite sides of said fusible portion (5) spaced from each other in a direction generally perpendicular to a direction of spacing of said left and right portions of said bus bar body (2) from each other.

4. A bus bar structure (23) according to any one of claims 1, 2 and 3, wherein said interconnecting portions (24, 25, 26) are formed respectively at opposite side portions of said bus bar body (2) spaced from each other in a direction generally perpendicular to a direction of spacing of said left and right portions of said bus bar body (2) from each other.

5. An electric connection box comprising:

a bus bar structure (23) as defined in any one of claims 1 to 4.

6. A method for forming a bus-bar (23) comprising the steps of:

blanking from an electrically-conductive metal sheet a first bus bar which includes a bus bar body having a central plate portion and left and right plate-like portions arranged in a plane on respective opposite sides of the central plate portion, the left and right portions each having respective connection portions disposed in the plane in which both of the left and right plate-like portions are arranged;  
forming a fusible portion and an interconnecting portion in the central plate portion of said bus bar body to produce the first bus bar, so that said fusible portion and said interconnecting portion each respectively interconnect said left portion and said right portion of said bus bar body; and  
cutting said interconnecting portion off from said first bus bar to provide a second bus bar having said fusible portion.

#### Patentansprüche

1. Sammelschienenstruktur (23), die umfasst:

einen plattenartigen Sammelschienen-Körper (2), wobei der plattenartige Sammelschienen-Körper enthält:

einen mittleren Plattenabschnitt (3); und  
einen linken sowie einen rechten plattenartigen Abschnitt, die in einer Ebene an jeweils einander gegenüberliegenden Seiten des mittleren Plattenabschnitts angeordnet sind;

Verbindungsabschnitte (10; 16), die an dem linken Abschnitt des plattenartigen Sammelschienen-Körpers bzw. dem rechten Abschnitt des plattenartigen Sammelschienen-Körpers vorhanden sind und sich in der Ebene befinden, in der sowohl der linke als auch der rechte Abschnitt des plattenartigen Abschnitts angeordnet sind; und  
einen Schmelzabschnitt (5) sowie einen Verbindungsabschnitt (24, 25, 26), die in dem mittleren Plattenabschnitt ausgebildet sind,

wobei der Schmelzabschnitt (5) und der Verbindungsabschnitt (24, 25, 26) jeweils den linken Abschnitt und den rechten Abschnitt des Sammelschienen-Körpers (2) miteinander verbinden.

2. Sammelschienenstruktur (23) nach Anspruch 1, wobei der Verbindungsabschnitt (24, 25, 26) breiter ist

als der Schmelzabschnitt (5).

3. Sammelschienenstruktur (23) nach Anspruch 1 oder Anspruch 2, wobei die Verbindungsabschnitte (24, 25, 26) jeweils an einander gegenüberliegenden Seiten des Schmelzabschnitts (5), voneinander in einer Richtung im Allgemeinen senkrecht zu einer Richtung beabstandet, ausgebildet sind, in der der linke und der rechte Abschnitt des Sammelschienen-Körpers (2) voneinander beabstandet sind.

4. Sammelschienenstruktur (23) nach einem der Ansprüche 1, 2 und 3, wobei die Verbindungsabschnitte (24, 25, 26) jeweils an einander gegenüberliegenden Seitenabschnitten des Sammelschienen-Körpers (2), voneinander in einer Richtung im Allgemeinen senkrecht zu einer Richtung beabstandet, ausgebildet sind, in der der linke und der rechte Abschnitt des Sammelschienen-Körpers (2) voneinander beabstandet sind.

5. Elektrischer Anschlusskasten, der umfasst:

eine Sammelschienenstruktur (23) nach einem der Ansprüche 1 bis 4.

6. Verfahren zum Herstellen einer Sammelschiene (23), das die folgenden Schritte umfasst:

Ausstanzen einer ersten Sammelschiene aus einem elektrisch leitenden Blech, die einen Sammelschienen-Körper enthält, der einen mittleren Plattenabschnitt sowie einen linken und einen rechten plattenartigen Abschnitt enthält, die in einer Ebene jeweils an einander gegenüberliegenden Seiten des mittleren Plattenabschnitts angeordnet sind, wobei der linke und der rechte Abschnitt jeweils entsprechende Verbindungsabschnitte aufweisen, die sich in der Ebene befinden, in der sowohl der linke als auch der rechte plattenartige Abschnitt angeordnet sind;

Ausbilden eines Schmelzabschnitts sowie eines Verbindungsabschnitts in dem mittleren Plattenteil des Sammelschienen-Körpers, um die erste Sammelschiene herzustellen, so dass der Schmelzabschnitt und der Verbindungsabschnitt jeweils den linken Abschnitt und den rechten Abschnitt des Sammelschienen-Körpers miteinander verbinden; und

Abschneiden des Verbindungsabschnitts von der ersten Sammelschiene, um eine zweite Sammelschiene mit dem Schmelzabschnitt zu schaffen.

## Revendications

### 1. Structure de barre omnibus (23) comportant:

un corps de barre omnibus de type plat (2), ce corps de barre omnibus de type plat comprenant:

une partie plate centrale (3); et des parties plates de gauche et de droite disposées dans un même plan sur des côtés opposés respectifs de la partie plate centrale;

des parties servant au raccordement (10, 16) qui sont prévues respectivement sur la partie gauche du corps de barre omnibus de type plat et sur la partie droite du corps de barre omnibus de type plat, et qui sont disposées dans le plan où se trouvent les parties plates de gauche et de droite; et une partie fusible (5) ainsi qu'une partie d'interconnexion (24, 25, 26) formée dans la partie plate centrale,

**caractérisée en ce que** la partie fusible (5) et la partie d'interconnexion (24, 25, 26) servent à interconnecter chacune respectivement la partie gauche et la partie droite du corps de barre omnibus (2).

### 2. Structure de barre omnibus (23) selon la revendication 1, **caractérisée en ce que** la partie d'interconnexion (24, 25, 26) est d'une largeur qui dépasse celle de la partie fusible (5).

### 3. Structure de barre omnibus (23) selon la revendication 1 ou la revendication 2, **caractérisée en ce que** les parties d'interconnexion (24, 25, 26) sont formées respectivement sur des côtés opposés respectifs de la partie fusible (5) et écartées les unes des autres dans un sens qui est généralement perpendiculaire au sens d'écartement entre les parties de gauche et de droite du corps de barre omnibus (2).

### 4. Structure de barre omnibus (23) selon l'une quelconque des revendications 1, 2 et 3, **caractérisée en ce que** les parties d'interconnexion (24, 25, 26) sont formées respectivement sur des parties latérales opposées du corps de barre omnibus (2) et écartées les unes des autres dans un sens qui est généralement perpendiculaire au sens d'écartement entre les parties de gauche et de droite du corps de barre omnibus (2).

### 5. Boîte de connexion électrique comprenant:

une structure de barre omnibus (23) telle que définie dans l'une quelconque des revendications 1 à 4.

### 6. Procédé de formation de barre omnibus (23) comportant les étapes qui consistent:

à découper une première barre omnibus à partir d'une tôle métallique électriquement conductrice, qui comporte un corps de barre omnibus ayant une partie plate centrale et des parties plates de gauche et de droite disposées dans un même plan sur des côtés opposés respectifs de la partie plate centrale, ces parties de gauche et de droite ayant chacune des parties respectives de raccordement qui se trouvent dans le plan où sont disposées les parties plates de gauche et de droite;

à former une partie fusible et une partie d'interconnexion dans la partie plate centrale du corps de la barre omnibus afin de produire la première barre omnibus, de sorte que la partie fusible et la partie d'interconnexion servent chacune à interconnecter respectivement la partie de gauche et la partie de droite du corps de barre omnibus; et

à séparer en la coupant la partie d'interconnexion de la première barre omnibus afin de créer une deuxième barre omnibus dotée d'une partie fusible,



FIG. 1

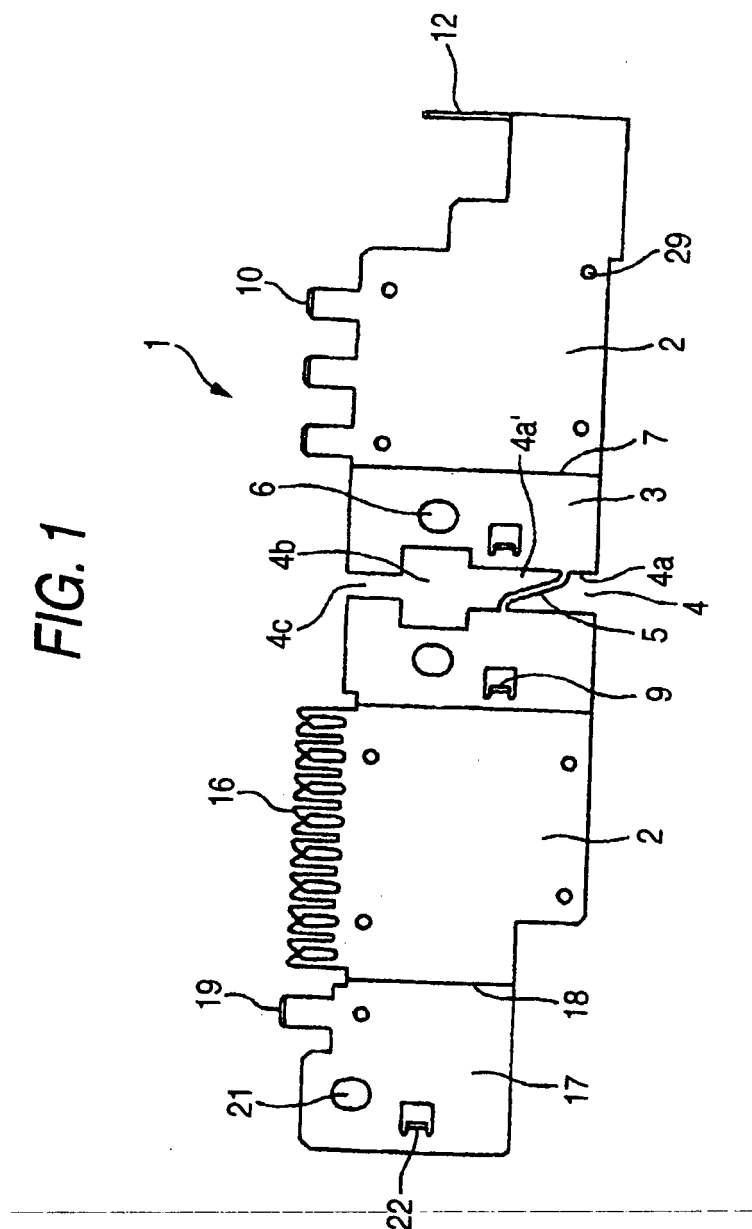


FIG. 2

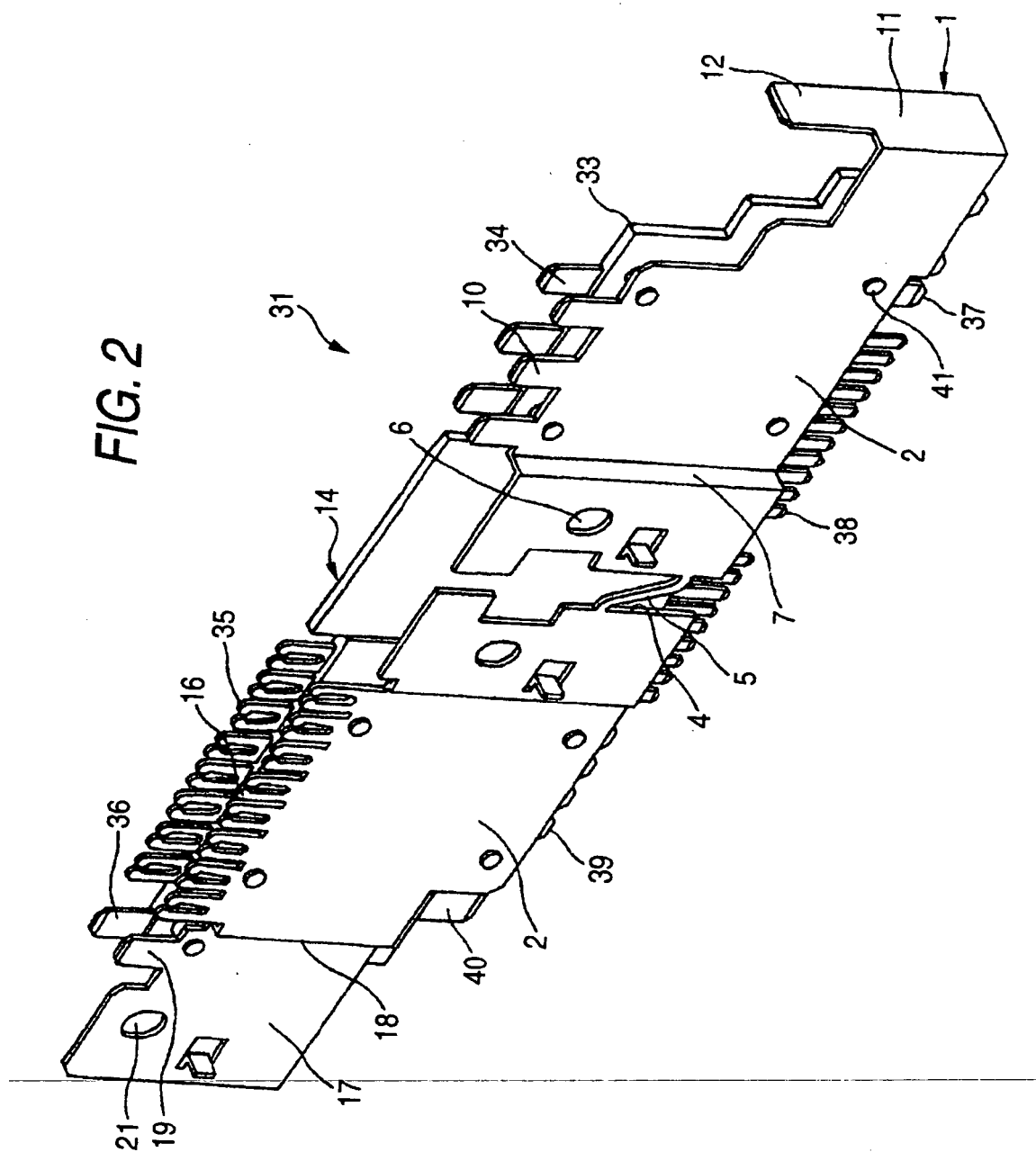


FIG. 3

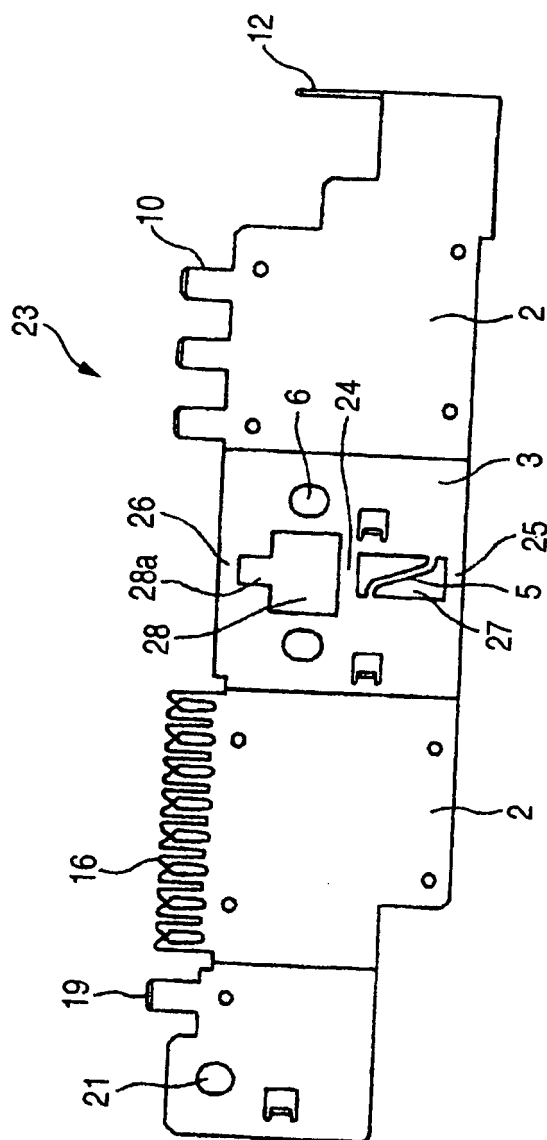
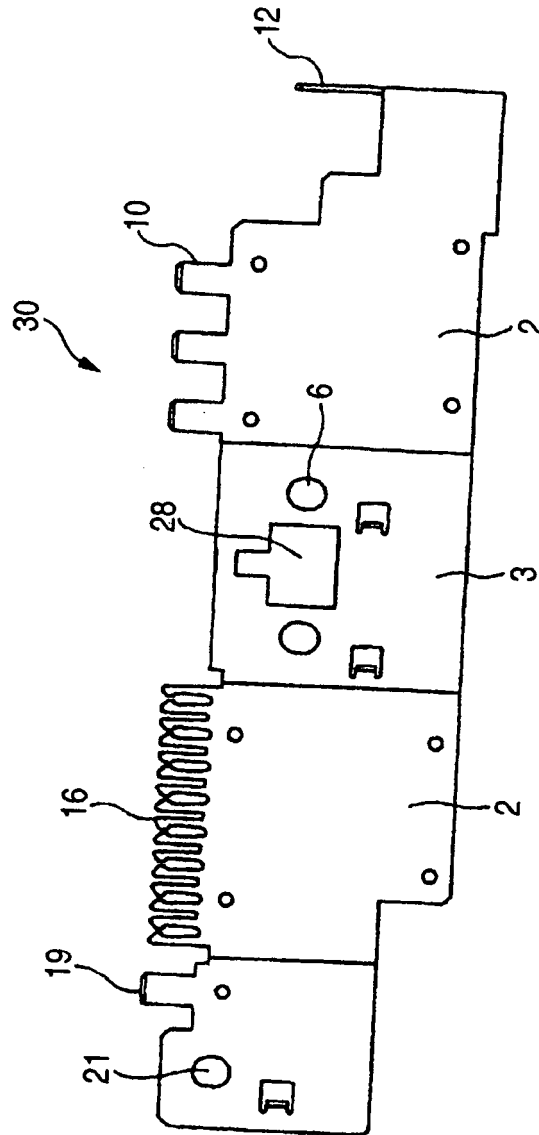


FIG. 4



**FIG. 5**

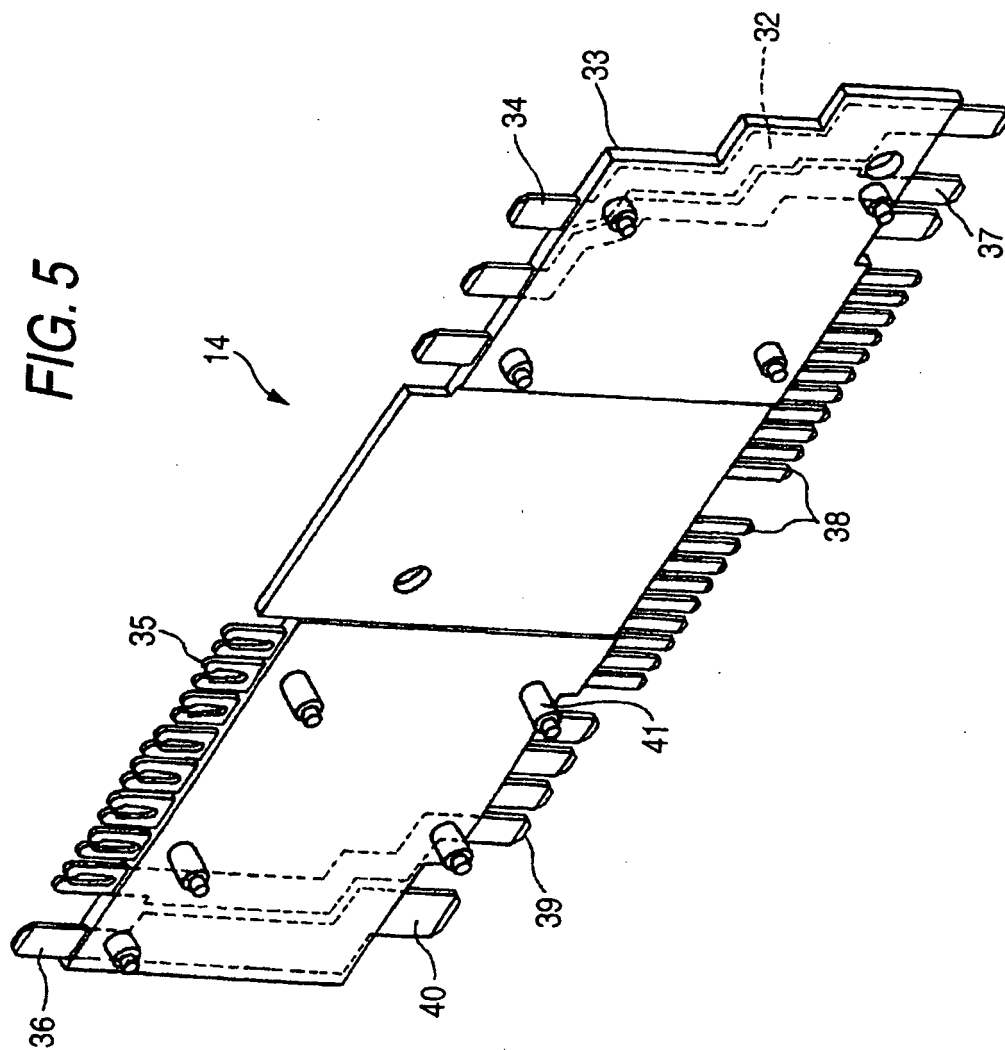


FIG. 6

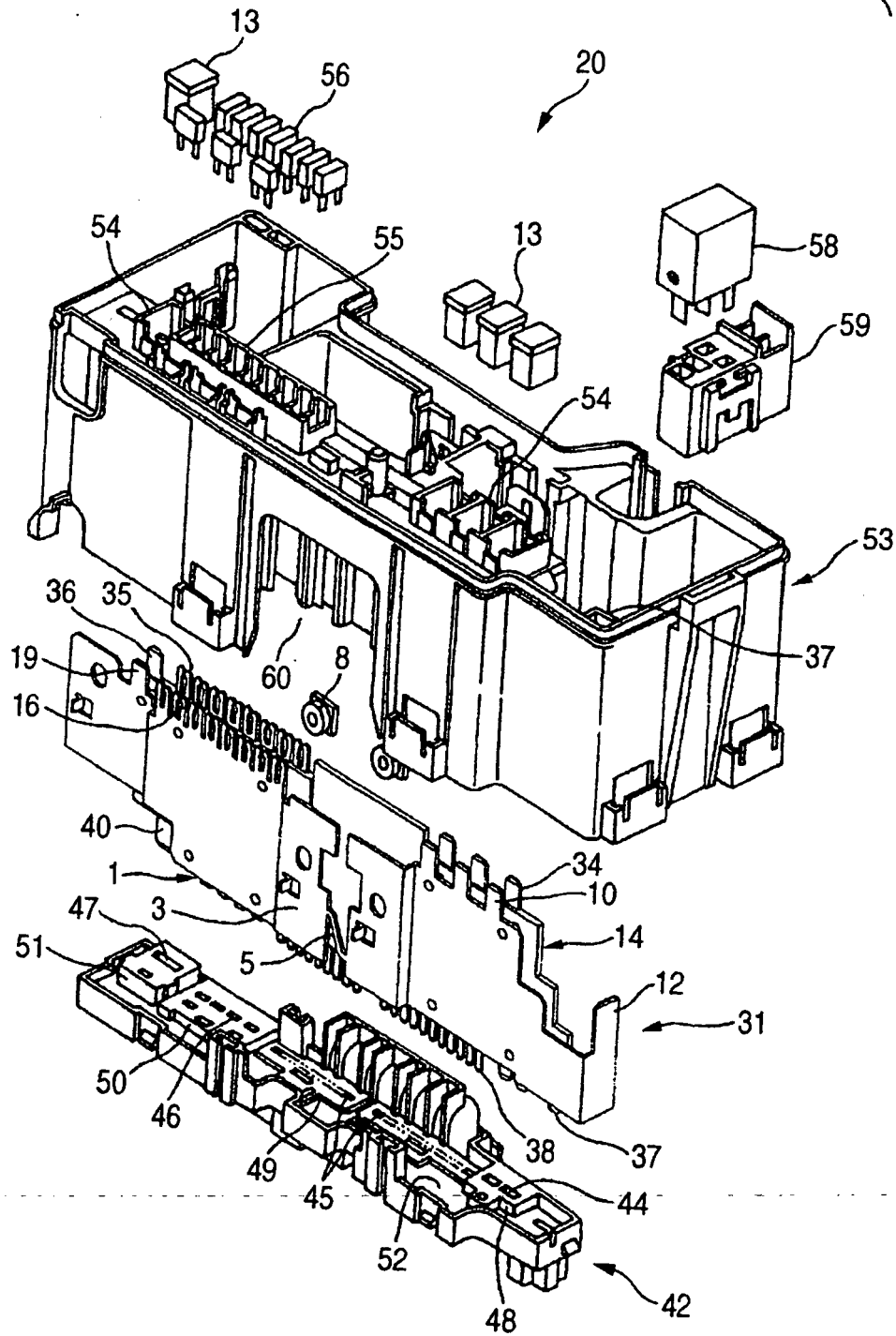


FIG. 7 (a)

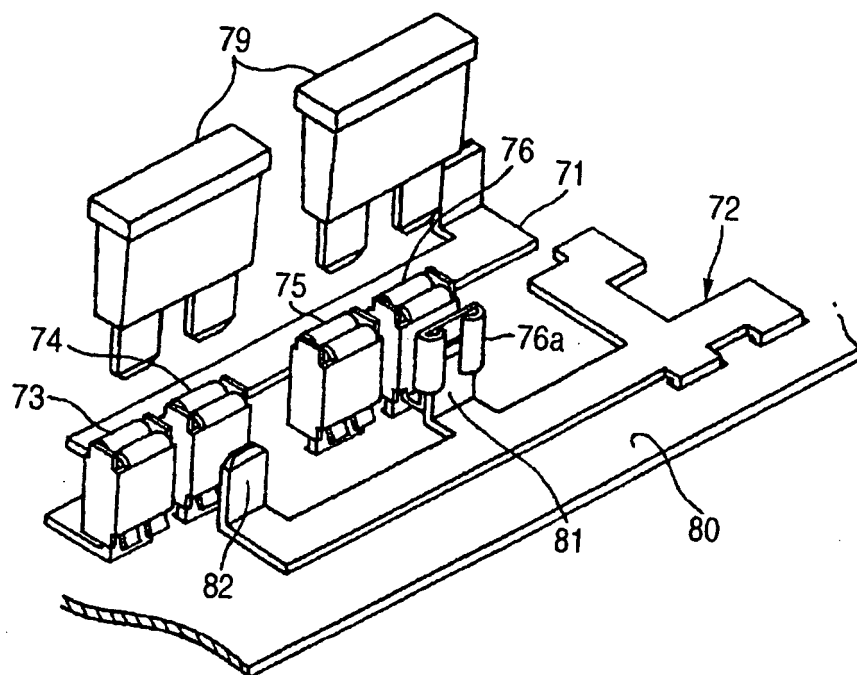
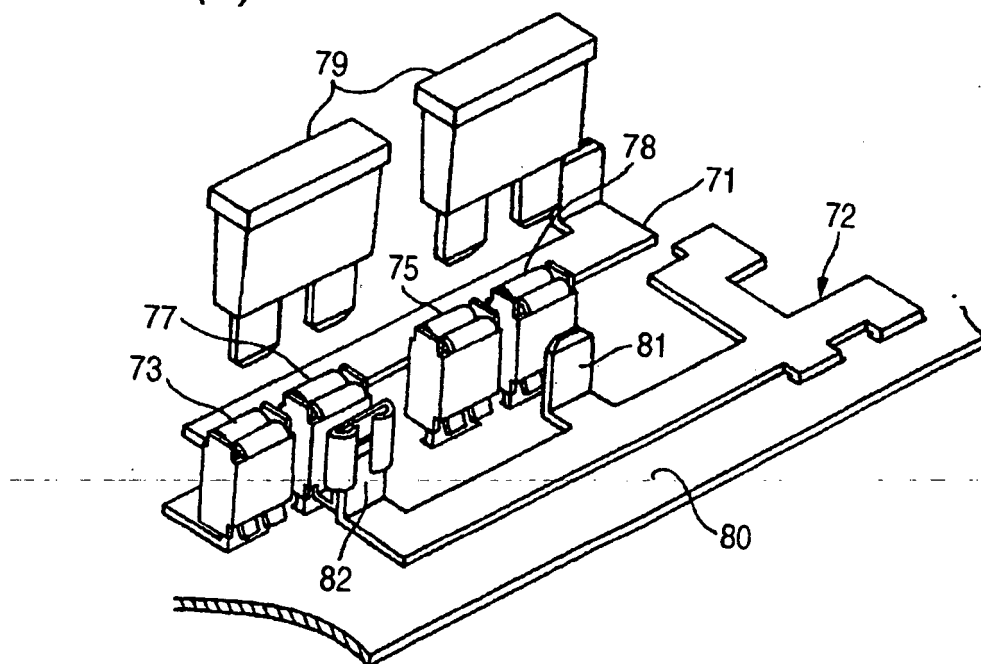


FIG. 7 (b)



**REFERENCES CITED IN THE DESCRIPTION**

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