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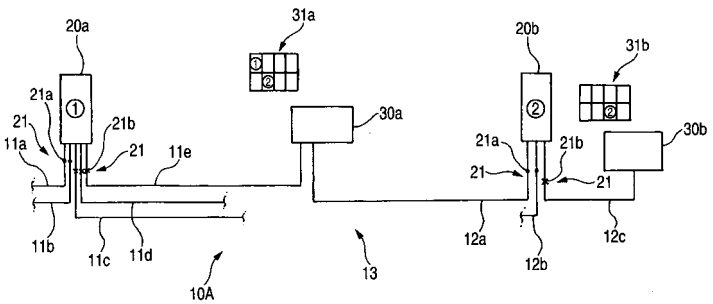
(54) **WIRE HARNESS MANUFACTURING METHOD AND WIRE HARNESS**

(57) When a plurality of wires 11, which have the same basic appearance, and extend from a common proximal end terminal, are to be installed in respective directions, each of the wires 11 is installed according to an installation marking 21 provided on that portion thereof disposed adjacent to the proximal end terminal 20, and therefore the wire can be prevented from being installed in a wrong direction. And besides, the wire is connected to a predetermined section of a connection terminal 30 according to a proximal end terminal-indicating marking 31 provided on at least one of an installation board 13 and the connection terminal 30, and therefore a connection error can be prevented. Alternatively, the wire 11 is connected to the connection terminal 30 according to a wire-indicating marking 33 (provided on at least one of the installation board 13 and the connection terminal 30) corresponding to an identification marking 32 provided on that portion of the wire 11 disposed adjacent to an open distal end 14 thereof. Therefore, a connection error can be prevented.

FIG. 1



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Description

[Technical Field]

[0001] This invention relates to a method of producing a wire harness and also to a wire harness.

[Background Art]

[0002] In a conventional wire harness producing method, fork-like support members 102 for holding wires 101 in a predetermined shape are mounted on an installation board 100 as shown in Fig. 6. Therefore, the wires 11 are installed in such a manner that these wires are supported by the support members 102, thereby forming a wire harness 110 of a predetermined shape.

[0003] There is disclosed a technique in which at this time, those wires to be inserted later into the same connector 103 are bundled together by a colored tape, a colored rubber band or the like so that the connectors to which the wires are to be inserted later can be distinguished from one another, thereby preventing a mistake (see, for example, JP-A-11-25781 (Page 3, Fig. 1)).

[0004] Incidentally, there are cases where there are provided a plurality of earth wires for connection to a car body of an automobile to obtain body earthing. In such a case, ordinary wires, having the same appearance, are used as the earth wires 101a as shown in Fig. 7, and a bonder 104, integrally joining proximal end portions of the earth wires together, is provided, and the earth wires are installed in various directions, and are incorporated in the wire harness 110.

[0005] Therefore, it is difficult to distinguish the earth wires 101a from one another from their appearance, and in the case where the earth wires are different in length, depending on the installation direction, the wire length becomes insufficient, or becomes too large and loose when the earth wire 101a is installed in a wrong direction, which invites a problem that the desired wire harness 110 can not be obtained. And besides, the classification of the earth wires 101a by color invites an increased cost.

[Disclosure of the Invention]

[0006] This invention has been made in view of the above problems, and an object of the invention is to provide a wire harness producing method as well as a wire harness, in which wires which have the same basic appearance, and are to be installed to extend in a plurality of directions from a common proximal end terminal can be installed in the proper directions, respectively.

(1) In order to achieve the above object, there is provided a wire harness producing method of the present invention wherein wires, having the same basic appearance, are installed over an installation board to extend in a plurality of directions from a common proximal end terminal, thereby producing a wire harness; and wherein installation markings, indicating the respective installation directions of the wires, are beforehand provided respectively on those portions of the wires disposed adjacent to the proximal end terminal; and each of the wires is installed in the desired direction from the proximal end terminal according to the installation marking.

With the above construction of the wire harness producing method as recited in the above Paragraph (1), when the plurality of the wires, which have the same basic appearance, and extend from the common proximal end terminal, are to be installed in their respective directions, each wire is installed according to the installation marking provided on the proximal end terminal-adjacent portion thereof, and therefore can be prevented from being installed in a wrong direction.

(2) Preferably, the wire harness producing method of the above Paragraph (1) further includes features that in the case where a plurality of the proximal end terminals are used, and the wires, extending from the proximal end terminals, are connected at their open distal ends to a connection terminal, a proximal end terminal-indicating marking, indicating which section of the connection terminal the wire from any of the proximal end terminals is to be connected to, is beforehand provided on at least one of the installation board and the connection terminal, and that the wire from the designated proximal end terminal is connected to the predetermined section of the connection terminal according to the proximal end terminal-indicating marking.

With the above construction of the wire harness producing method as recited in the above Paragraph (2), when the open distal end of any of the plurality of wires extending from each proximal end terminal is to be connected to any of the plurality of connection terminals, the open distal end is connected to the predetermined section of the connection terminal according to the proximal end terminal-indicating marking provided on at least one of the installation board and the connection terminal, and therefore a connection error can be prevented.

(3) Preferably, the wire harness producing method of the above Paragraph (1) or Paragraph (2) further includes features that in the case where the wires are connected at their open distal ends to a plurality of different connection terminals, respectively, individual identification markings are beforehand provided on the open distal ends, respectively, and wire-indicating markings, which correspond respectively to the identification markings, and each indicates which section of the corresponding connection terminal any of the wires is to be connected to, are beforehand provided on at least one of the installation board and the connection terminals, and that the open distal end of each of the wires is connected to the corresponding connection terminal according to the

wire-indicating marking.

With the above construction of the wire harness producing method as recited in the above Paragraph (3), when the open distal end of any of the plurality of wires extending from each proximal end terminal is to be connected to any of the plurality of connection terminals, the wire is connected to the connection terminal according to the wire-indicating marking (provided on at least one of the installation board and the connection terminal) corresponding to the identification marking provided on that portion of the wire disposed adjacent to the open distal end thereof. Therefore, a connection error can be prevented.

(4) In the wire harness producing method of any one of the above Paragraphs (1) to (3), preferably, the proximal end terminal is a bonder joining earth wires together.

With the above construction of the wire harness producing method as recited in the above Paragraph (4), the proximal end portions of the plurality of wires are beforehand integrally joined together to form the bonder, and then the connecting operation is effected, and therefore a labor-saving design can be achieved.

(5) In order to achieve the above object, the present invention also provides a wire harness produced by a wire harness producing method as defined in any one of the above Paragraphs (1) to (4).

[0007] In the wire harness of the above Paragraph (5), when the plurality of the wires, which have the same basic appearance, and extend from the common proximal end terminal, are to be installed in their respective directions, each wire is installed according to the installation marking provided on the proximal end terminal-adjacent portion thereof, and therefore can be prevented from being installed in a wrong direction.

[0008] And besides, in the wire harness of the above Paragraph (5), when the open distal end of any of the plurality of wires extending from each proximal end terminal is to be connected to any of the plurality of connection terminals, the open distal end is connected to the predetermined section of the connection terminal according to the proximal end terminal-indicating marking provided on at least one of the installation board and the connection terminal, and therefore a connection error can be prevented.

[0009] Furthermore, in the wire harness of the above Paragraph (5), when the open distal end of any of the plurality of wires extending from each proximal end terminal is to be connected to any of the plurality of connection terminals, the wire is connected to the connection terminal according to the wire-indicating marking (provided on at least one of the installation board and the connection terminal) corresponding to the identification marking provided on that portion of the wire disposed adjacent to the open distal end thereof. Therefore, a connection error can be prevented.

[Brief Description of the Drawings]

[0010]

Fig. 1 is a block diagram showing a wire harness producing method and a wire harness according to a first embodiment of the present invention,

Figs. 2(A) and 2(B) are enlarged views of a wire,

Fig. 3 is a block diagram showing a wire harness producing method and a wire harness according to a second embodiment of the present invention,

Fig. 4 is a block diagram showing a wire harness producing method and a wire harness according to a third embodiment of the present invention,

Figs. 5(A) and 5(B) are block diagrams showing a wire harness producing method and a wire harness according to a fourth embodiment of the present invention,

Fig. 6 is a perspective view showing a conventional ordinary installation method, and

Fig. 7 is an enlarged view of a proximal end terminal of wires.

[0011] Referring to reference numerals in the drawings, 10A to 10D denote wire harnesses, 11 and 12 denote wires, 13 denotes a installation board, 14 denotes an open distal end, 20 denotes a bonder (proximal end terminal), 21 denotes an installation marking, 30 denotes a connector (connection terminal), and 31 denotes a proximal end terminal-indicating marking.

[Best Mode for Carrying Out the Invention]

[0012] A wire harness producing method and a wire harness according to a first embodiment of the present invention, will now be described in detail with reference to the drawings. Fig. 1 is an explanatory view showing the first embodiment of the wire harness producing method of the present invention.

[0013] As shown in Fig. 1, a plurality of bonders 20a, 20b, serving as proximal end terminals, are mounted on an installation board 13. Installation markings 21 are provided respectively on those portions of a plurality of wires 11a, 11b, 11c, 11d, 11e (extending from the first bonder 20a) disposed adjacent to their proximal ends, the installation markings 21 indicating whether these wires are to be installed to the right or the left from the bonder 20a.

[0014] Similarly, Installation markings 21 are provided respectively on those portions of a plurality of wires 12a, 12b, 12c (extending from the second bonder 20b) disposed adjacent to their proximal ends, the installation markings 21 indicating whether these wires are to be installed to the right or the left from the bonder 20a.

[0015] With respect to the markings 21, for example, those wires to be installed to the left from the bonders 20a, 20b can bear a mark 21a of a circle as shown in Fig. 2(A), while those wires to be installed to the right from the bonders 20a, 20b can bear a mark 21b of X as shown

in Fig. 2(B).

[0016] Therefore, among the wires 11a to 11e extending from the first bonder 20a, the circle mark 21a is provided on that portion of each of the wires 11a, 11b (to be installed to the left) disposed adjacent to the proximal end terminal.

[0017] On the other hand, the X mark 21b is provided on that portion of each of the wires 11c, 11d, 11e (to be installed to the right) disposed adjacent to the proximal end terminal.

[0018] Connectors 30a, 30b, serving as connection terminals, are provided respectively in predetermined positions on the installation board 13, and open distal ends 14 (see Fig. 2(A) and 2(B)) of the wires 11, each having a terminal connected thereto, are connected to the connectors 30a, 30b (These terminals are not shown). Proximal end terminal-indicating markings 31a, 31b are provided on the installation board 13, and are disposed near to the connectors 30a, 30b, respectively, each of the proximal end terminal-indicating markings 31a, 31b indicating which section of the connector 30a, 30b the open distal end 14 of each wire 11 should be connected to.

[0019] Square sections, corresponding respectively to terminals of the connector 30a, are provided at the proximal end terminal-indicating marking 31a provided near to the connector 30a in Fig. 1, and the square sections indicate those wires 11 (extending respectively from the bonders 20) which should be connected to this connector.

[0020] Namely, there are indications that the wire 11e, extending from the first bonder 20a, should be connected to the terminal corresponding to the square section (1) of the proximal end terminal-indicating marking 31a and that the wire 12a, extending from the second bonder 20b, should be connected to the terminal corresponding to the square section (2).

[0021] Next, the wire harness producing method of the present invention will be described. For forming the wire harness 10A as shown in Fig. 1, the first bonder 20a and the second bonder 20b are mounted on the installation board 13 in such a manner that the two bonders are spaced a predetermined distance from each other. Also, the connectors 30a, 30b are mounted in the predetermined positions, respectively, and the proximal end terminal-indicating markings 31 are provided near to the connectors 30a, 30b, respectively.

[0022] Among the plurality of wires 11 extending from the first bonder 20a, the wires 11a, 11b, each bearing the circle mark 21a at its proximal end terminal-adjacent portion, are installed in the left direction. Also, the wires 11c, 11d, 11e, each bearing the X mark 21b at its proximal end terminal-adjacent portion, are installed in the right direction.

[0023] Although not shown, fork-like support members are provided at suitable intervals, and therefore the wires 11 are supported by the support members.

[0024] The wire 11e, installed to extend to the right from the first bonder 20a, is connected to the connector 30a. At this time, the wire 11e is connected to the terminal of the connector 30a which corresponds to the section of the proximal end terminal-indicating marking 31 a bearing the mark (1) indicative of the first bonder 20a.

[0025] Similarly, among the wires 12 extending from the second bonder 20b, the wires 12a and 12b, each bearing the circle mark 21a at its proximal end terminal-adjacent portion, are installed in the left direction, and the wire 12a is connected to the connector 30a.

[0026] This wire is connected to the terminal which corresponds to the section of the proximal end terminal-indicating marking 31a bearing the mark (2) indicative of the second bonder 20b.

[0027] In the manner described above, the wire harness 10A is produced.

[0028] In the above wire harness producing method and the above wire harness, when installing the plurality of wires 11 (which have the same basic appearance, and extend from the same bonder 20) in their respective predetermined directions, each wire 11 is installed in its predetermined direction according to the installation marking 20 (the circle mark 21a or the X mark 21b) provided on its proximal end terminal-adjacent portion, and therefore each wire can be prevented from being installed in a wrong direction.

[0029] And besides, when connecting the open distal ends 14 of the plurality of wires 11, 12, extending from the bonders 20a, 20b, to either of the plurality of connectors 30a, 30b, each of the open distal ends is connected to the corresponding terminal of the connector 30a, 30b in accordance with the proximal end terminal-indicating marking 31a, 31b provided on the installation board 13, and therefore a connection error can be prevented.

[0030] Next, the second embodiment will be described. Fig. 3 shows a wire harness producing method and a wire harness according to the second embodiment of the present invention.

[0031] The same portions as those of the above-mentioned embodiment will be designated by identical reference numerals, respectively, and repeated explanation thereof will be omitted.

[0032] As shown in Fig. 3, installation markings 21, for example as shown in Fig. 2, are provided respectively on those portions of a plurality of wires 11a, 11b, 11c, 11d (extending from a bonder 20 serving as a proximal end terminal) disposed adjacent to the proximal end terminal, the installation markings 21 indicating whether the wires are to be installed to the right or the left from the bonder 20.

[0033] Namely, a circle mark 21a is provided on the proximal end terminal-adjacent portion of each of the wires 11a, 11b to be installed to the left from the bonder 20, while an X mark 21b is provided on the proximal end terminal-adjacent portion of each of the wires 11c, 11d to be installed to the right from the bonder 20.

[0034] Further, an identification marking 32 for identifying the wire 11 is provided on that portion of each wire 11 disposed adjacent to its open distal end 14. With re-

spect to the identification marking 32, for example as shown in Fig. 2(8), a pattern of horizontal-line hatching 32b indicative of the wire 11c is provided on the wire 11c.

[0035] Also, as shown in Fig. 2(A), a pattern of oblique-line hatching 32a indicative of the wire 11d is provided on the wire 11d. With respect to the shape of the identification marking 32, the identification marking can be provided in a belt-like manner around the entire periphery as is the case with the identification marking 32a, or it can be provided in a predetermined shape as is the case with the identification marking 32b. The identification marking can be provided by printing or by winding a tape-like member on the wire.

[0036] Referring back to Fig. 3, connectors 30a, 30b, serving as connection terminals, are provided respectively in predetermined positions on an installation board 13, and the open distal ends 14 of the wires 11c, 11d are connected to the connectors 30a, 30b, respectively.

[0037] The connectors 30a, 30b are provided on the installation board 13. Wire-indicating markings 33a, 33b are disposed near to the connectors 30a, 30b, respectively, each of the wire-indicating markings 33a, 33b indicating which terminal of the connector 30a, 30b the open distal end 14 of each wire 11d, 11c should be connected to.

[0038] Square sections, corresponding respectively to the terminals of the connector 30a, are provided at the wire-indicating marking 33a provided near to the connector 30a in Fig. 3, and this wire-indicating marking indicates a square section to which the wire 11d should be connected. Namely, a mark 34a, having the same pattern as that of the identification marking 32a provided on the wire 11d, is provided on the square section corresponding to the terminal to which the wire 11d is to be connected.

[0039] For example, the mark 34a, having the same horizontal-line hatching pattern as the oblique-line hatching pattern of the identification marking 32, is provided on the square section corresponding to the terminal of the connector 30a to which the wire 11d (having the identification marking 32 of the oblique line-hatching pattern) is to be connected. Similarly, a mark 34b, having a horizontal-line hatching pattern, is provided on the square section corresponding to the terminal of the connector 30b to which the wire 11c (having the identification marking 32b of the horizontal line-hatching pattern) is to be connected.

[0040] Next, the wire harness producing method of the present invention will be described. For forming the wire harness 10B as shown in Fig. 3, the bonder 20 is provided on the installation board 13, and the connectors 30a, 30b are provided in the predetermined positions, respectively. The wire-indicating markings 33a, 33b are provided near to the connectors 30a, 30b, respectively.

[0041] Among the plurality of wires 11 extending from the bonder 20, the wires 11a, 11b, each bearing the circle mark 21a at its proximal end terminal-adjacent portion, are installed in the left direction. Also, the wires 11c, 11d, each bearing the X mark 21b at its proximal end terminal-adjacent portion, are installed in the right direction, and are supported by support members.

[0042] Each of the wires 11c, 11d, installed to the right from the bonder 20, is connected to either of the connectors 30a, 30b.

[0043] At this time, the wire 11c is connected to the terminal corresponding to the section of the wire-indicating marking 33b bearing the mark 34b of the horizontal-line hatching pattern since the identification marking 32b of the horizontal-line hatching pattern is provided on the wire 11c. Similarly, the wire 11d, having the identification marking 32 of the oblique-line hatching pattern, is connected to the terminal corresponding to the section of the wire-indicating marking 33a bearing the mark 34a of the oblique-line hatching pattern.

[0044] In the manner described above, the wire harness 10B is produced.

[0045] In the above wire harness producing method and the above wire harness, when connecting the open distal ends 14 of the plurality of wires 11, extending from the bonder 20, to either of the plurality of connectors 30a, 30b, each of the open distal ends is connected in accordance with the wire-indicating marking 33 (provided on the installation board 13) corresponding to the identification marking 32 provided on that portion of the wire 11 disposed adjacent to the open distal end 14 thereof. Therefore, a connection error can be prevented.

[0046] Next, a third embodiment will be described. Fig. 4 shows a wire harness producing method and a wire harness which are provided in accordance with the third embodiment of the present invention.

[0047] The same portions as those of the above-mentioned embodiments will be designated by identical reference numerals, respectively, and repeated explanation thereof will be omitted.

[0048] As shown in Fig. 4, a plurality of bonders 20a, 20b, serving as proximal end terminals, are mounted on an installation board 13 in such a manner that these bonders are spaced a predetermined distance from each other. Installation markings 21 are provided respectively on those portions of a plurality of wires 11a, 11b, 11c, 11d, 11e (extending from the first bonder 20a) disposed adjacent to the proximal end terminal. Similarly, installation markings 21 are provided respectively on those portions of a plurality of wires 12a, 12b, 12c (extending from the second bonder 20b) disposed adjacent to the proximal end terminal.

[0049] Connectors 30a, 30b, 30c, serving as connection terminals, are provided respectively in predetermined positions on the installation board 13, and open distal ends 14 of the wires 11e, 11d, 11c, 12a are connected to the connectors 30a, 30b, 30c. Indication markings 35a, 35b, 35c are provided on the installation board 13, and are disposed near to the connectors 30a, 30b, 30c, respectively, each of these indication markings indicating which section of the connector 30 the open distal end 14 of each wire 11, 12 should be connected to.

[0050] Namely, the indication markings 35a, 35b, 35c serve as the above-mentioned proximal end terminal-indicating markings 31 and also as the above-mentioned wire-indicating markings 33.

[0051] Therefore, square sections, corresponding respectively to terminals of each of the connectors 30a, 30b, 30c, are provided at a respective one of the indication markings 35a, 35b, 35c provided near respectively to the connectors 30a, 30b, 30c in Fig. 4, and marks 36a, 36b, 36c, 36d (which are identical in pattern to identification markings 32a, 32b, 32c, 32d, respedively) are provided respectively on the square sections corresponding respectively to the terminals to which the wires 11c, 11d, 11e, 12a are to be connected, respectively. At the same time, each mark 36 bears a numeral which indicates the wire 11a, 11b, 11c, extending from the first bonder 20a, or the wire 12a extending from the second bonder 20b.

[0052] Namely, the terminal position to which the wire is to be connected, the wire 11 to be connected, and the bonder 20 at the proximal end of this wire 11 can all be known from the indication marking 35.

[0053] Next, the third embodiment of the wire harness producing method of the present invention will be described.

[0054] For forming the wire harness 10C as shown in Fig. 4, the first bonder 20a and the second bonder 20b are mounted on the installation board 13 in such a manner that the two bonders are spaced a predetermined distance from each other. The connectors 30a, 30b, 30c are provided in the predetermined positions, respectively, and the indication markings 35a, 35b, 35c are provided near to the connectors 30a, 30b, 30c, respectively.

[0055] Among the plurality of wires 11 extending from the first bonder 20a, the wires 11a, 11b, each bearing a circle mark 21 a at its proximal end terminal-adjacent portion, are installed in the left direction. Also, the wires 11c, 11d, 11e, each bearing an X mark 21b at its proximal end terminal-adjacent portion, are installed in the right direction, and are supported by support members.

[0056] Each of the wires 11c, 11d, 11e, installed to the right from the first bonder 20a, is connected to any of the connectors 30a, 30b, 30c. At this time, each wire 11 is installed and connected in such a manner that the identification marking 32, provided on this wire 11, coincides with the pattern, numeral, etc., provided at the indication marking 35.

[0057] Similarly, among the plurality of wires 12 extending from the second bonder 20b, the wires 12a, 12b, each bearing a circle mark 21a at its proximal end terminal-adjacent portion, are installed in the left direction, and the wire 12a is connected to the connector 30c.

[0058] In the manner described above, the wire harness 10C is produced.

[0059] In the above wire harness producing method and the above wire harness, each wire 11 is installed in the predetermined direction according to the installation marking 21 provided at the proximal end terminal-adjacent portion of the wire 11, and therefore each wire can be prevented from being installed in a wrong direction.

[0060] And besides, information as to the position of the terminal of the connector 30 to which the wire is to be connected, the bonder 20 to be connected to the connector, the wire 11, 12 to be connected, etc., can be obtained from the indication marking 35 provided near to each connector 30 on the installation board 13, and therefore a connection error can be prevented.

[0061] Next, Figs. 5(a) and 5(b) show a wire harness producing method and a wire harness according to a fourth embodiment of the present invention.

[0062] The same portions as those of the above-mentioned embodiments will be designated by identical reference numerals, respectively, and repeated explanation thereof will be omitted.

[0063] As shown in Fig. 5(A), a connector 42, serving as a proximal end terminal, is provided at a car stereo sound system body 40, and four (front/rear and left/right) speakers 41a, 41b, 41c, 41d are provided as connection terminals.

[0064] In a wire harness 10D connecting the connector 42 to the four speakers 41a, 41b, 41c, 41d, installation markings 21 are provided respectively on those portions of wires 11 disposed adjacent to the proximal end terminal, as shown in Fig. 5(B).

[0065] Namely, for example, a circle mark 21a, serving as the installation marking 21, is provided on each of the wires 11a, 11b which are to be installed to the left from the car stereo sound system body 40, while for example, an X mark 21b, serving as the installation marking 21, is provided on each of the wires 11c, 11d which are to be installed to the right.

[0066] An indication marking 37a of right-upper oblique-line hatching indicative of the front-side speaker is provided on that portion of each of the wires 11b, 11c disposed adjacent to an open distal end thereof. Wire-indicating markings 33a, 33b of similar right-upper oblique-line hatching are provided respectively on connectors 30a, 30b of the front-side speakers 41a, 41b.

[0067] On the other hand, an indication marking 37b of left-upper oblique-line hatching indicative of the rear-side speaker is provided on that portion of each of the wires 11a, 11d disposed adjacent to an open distal end thereof. Wire-indicating markings 33c, 33d of similar left-upper oblique-line hatching are provided respectively on connectors 30c, 30d of the rear-side speakers 41c, 41d.

[0068] Therefore, among the wires 11 extending from the connector 42 of the car stereo sound system body 40, the wires 11a, 11b, each bearing the circle mark 21a as the installation marking 21, are installed to the left, while the wires 11c, 11d, each bearing the X mark 21b, are installed to the right. Each of the wires 11 is connected to the speaker 30 having the same marking as the identification marking 37 provided at that portion of this wire 11 disposed adjacent to the open distal end thereof.

[0069] In the above wire harness producing method and the above wire harness, the wires 11 are installed in

their respective predetermined directions in accordance with the installation markings 21 provided respectively on the proximal end terminal-adjacent portions thereof, and therefore each wire can be prevented from being installed in a wrong direction.

[0070] And besides, thanks to the provision of the wire-indicating marking 33 at the connector 30 of each speaker 41, the wire 11 to be connected thereto can be clearly identified, and therefore a connection error can be prevented.

[0071] The wire harness producing methods and wire harnesses of the present invention are not limited to the above embodiments, and suitable modifications, improvements and so on can be made.

[0072] For example, although the above first to third embodiments have been described for the case where the proximal end terminal-indicating markings 31, the wire-indicating markings 33 and the indication markings 35 are provided on the installation board 13, these markings can be provided on the connectors 30. As another alternative, these markings can be provided on both of the installation board 13 and the connectors 30.

[0073] Although the description has been made for the case where the wires 11, extending from the bonder 20, are directed to the left and right, the invention can be similarly applied to the case where the wires are directed in many directions, In this case, with respect to the installation markings 21, there are provided installation markings 21 of different kinds corresponding in number to the installation directions.

[0074] The circle marks 21a and the X marks 21b used as the installation markings 21, the horizontal-line hatching 34b and the oblique-line hatching 34a used as the wire-indicating markings 33, etc., are shown merely as examples, and the markings are not limited to these.

[0075] As described above, in the wire harness producing methods and the wire harnesses of the present invention, when the plurality of wires which have the same basic appearance, and extend from the common proximal end terminal are to be installed in their respective directions, each wire is installed according to the installation marking provided on the proximal end terminal-adjacent portion thereof, and therefore can be prevented from being installed in a wrong direction.

[0076] Although the present invention has been described in detail by way of the specific embodiments, it will be clear to those versed in the art that various changes and modifications can be added without departing from the spirits and scope of the present invention.

[0077] The present Application is based on a Japanese patent application (Japanese Patent Application No. 2003-123749), and contents of which are incorporated herein as a reference.

[Industrial Applicability]

[0078] The wire harness producing methods and the wire harnesses of the present invention are useful not only as wire harnesses used in a vehicle such as an automobile but also as wire harnesses used in various apparatuses.

Claims

1. A method of producing a wire harness, the wire harness being configured by wires having the same basic appearance, and the wires being installed over an installation board to extend in a plurality of directions from a common proximal end terminal, the method comprising:

providing installation markings on those portions of the wires disposed adjacent to the proximal end terminal respectively beforehand, the installation markings indicating respective installation directions of the wires; and

installing each of the wires in a desired direction from the proximal end terminal in accordance with each of the Installation markings.

2. The method of producing the wire harness according to claim 1, in the case where a plurality of the proximal end terminals are used, and open distal ends of the wires extended from the proximal end terminals are connected to a connection terminal,

wherein a proximal end terminal-indicating marking is beforehand provided on at least one of the installation board and the connection terminal, the proximal end terminal-indicating marking indicating which section of the connection terminal the wire from any of the proximal end terminals is to be connected to; and

wherein the wire from the designated proximal end terminal is connected to the predetermined section of the connection terminal in accordance with the proximal end terminal-indicating marking.

3. The method of producing the wire harness according to claim 1 or 2, in the case where open distal ends of the wires are respectively connected to a plurality of different connection terminals,

wherein individual identification markings are beforehand provided on the open distal ends respectively;

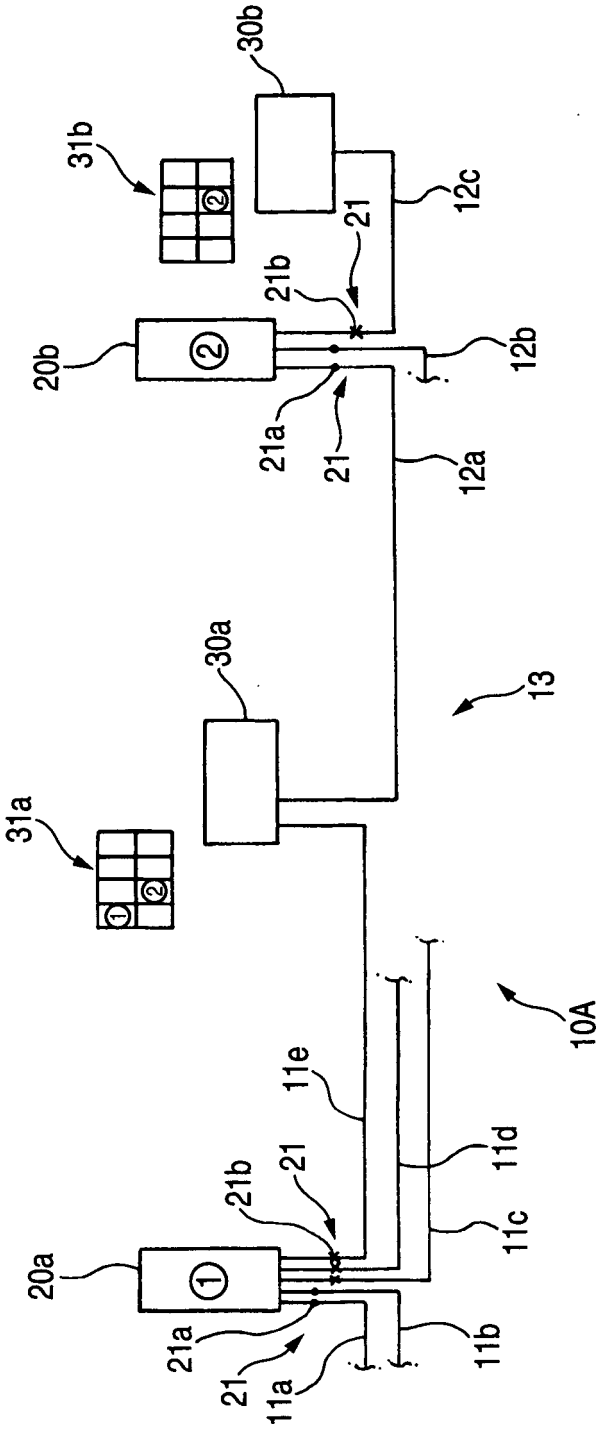
wherein wire-indicating markings are beforehand provided on at least one of the installation board and the connection terminals, the wire-indicating markings being correspond respectively to the identification markings, and each indicating which section of the corresponding connection terminal any of the wires is to be connected to; and

wherein the open distal end of each of the wires is connected to the corresponding connection terminal In accordance with the wire-indicating marking.

4. The method of producing the wire harness according to any one of claims 1 to 3, wherein the proximal end terminal is a bonder joining earth wires together.

5. A wire harness produced by the method of producing the wire harness as defined in any one of claims 1 to 4.

FIG. 1


30b
31b
12c
21
21b
20b
12b
21a
21
12a
30a
13
31a
10A
11e
11d
21b
21
11c
20a
21a
11b
21
11a

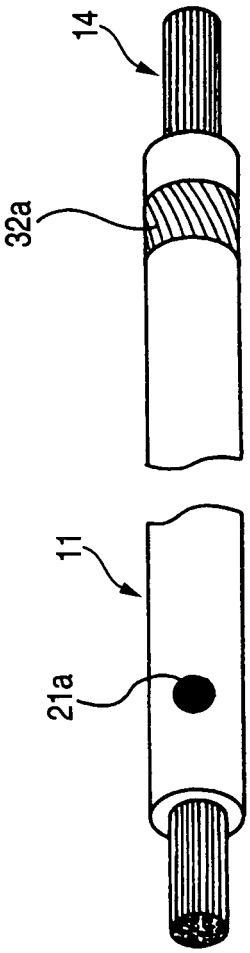


FIG. 2 (A)

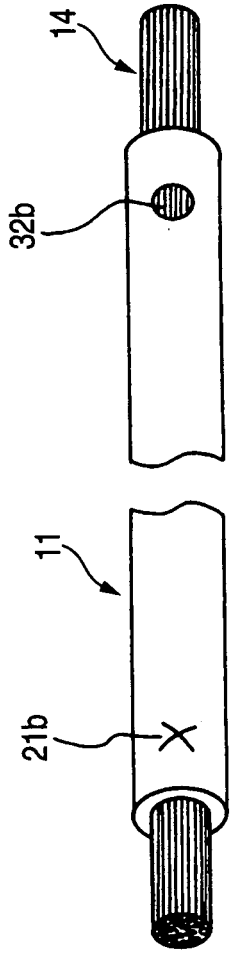


FIG. 2 (B)

FIG. 3

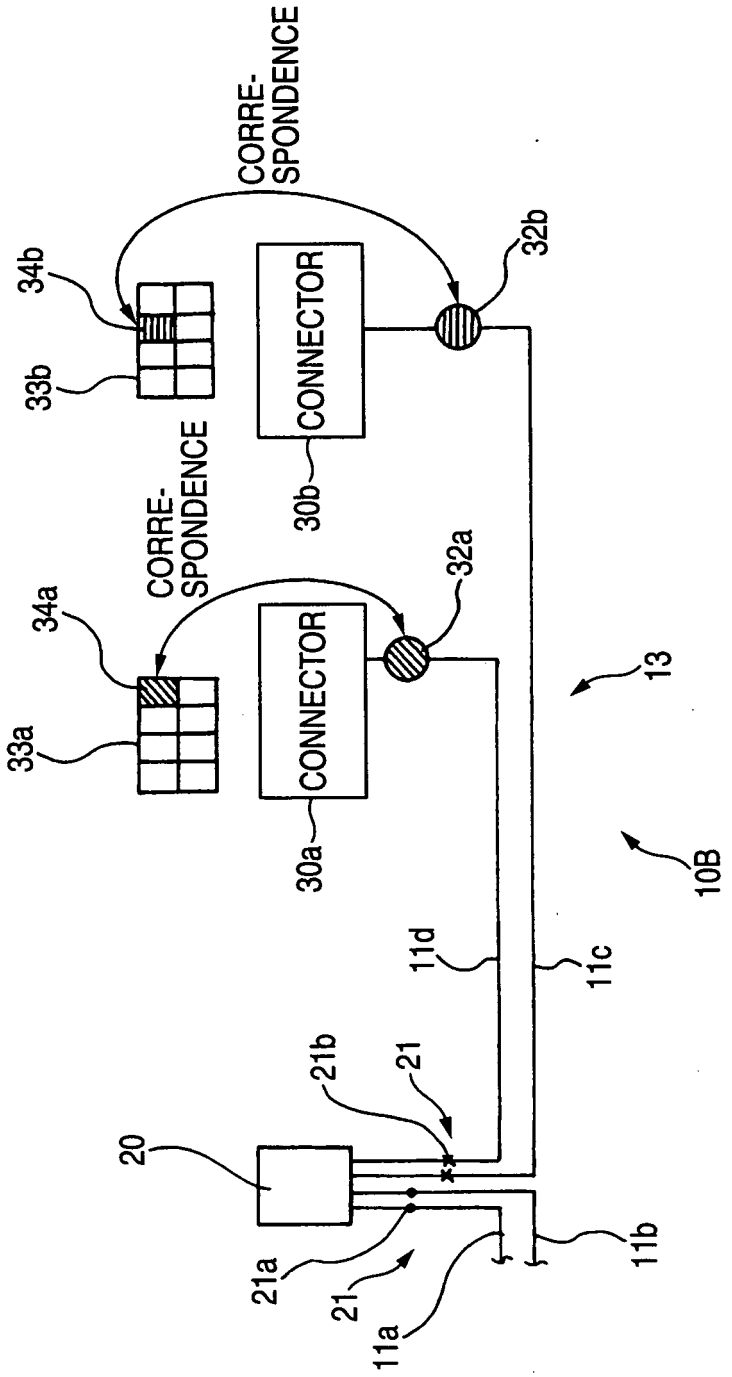

CORRE-
SPONDENCE
34b
33b
CONNECTOR
32b
30b
CORRE-
SPONDENCE
34a
33a
CONNECTOR
32a
30a
13
10B
11d
11c
21b
21
20
21a
21
11a
11b

FIG. 4

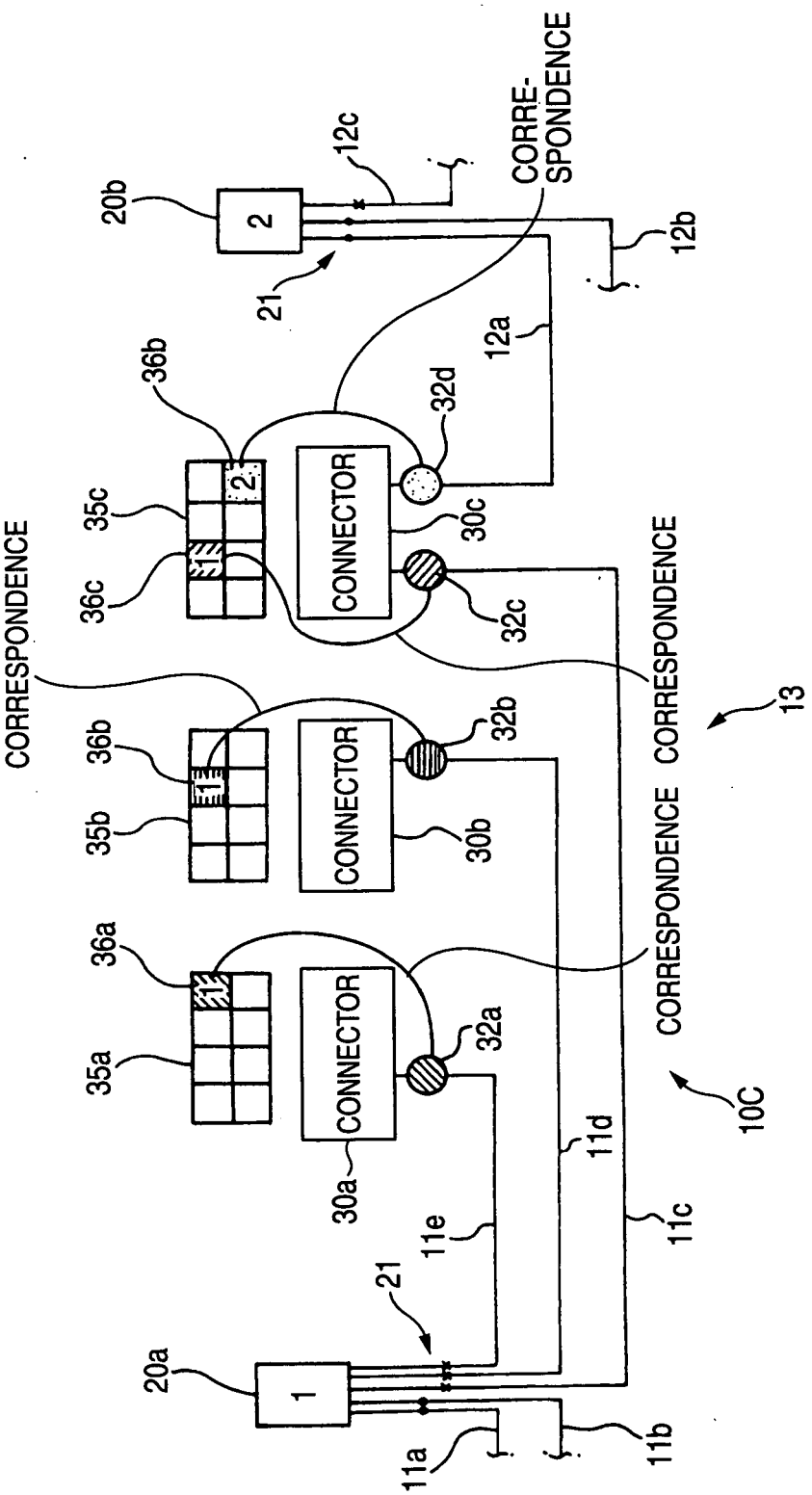

CORRE-
SPONDENCE
12c
20b
2
12b
21
12a
36b
32d
35c
2
CONNECTOR
30c
36c
32c
CORRESPONDENCE
CORRESPONDENCE
13
36b
1
32b
35b
CONNECTOR
30b
36a
1
35a
CONNECTOR
32a
CORRESPONDENCE
10C
30a
11d
11e
11c
21
20a
1
11a
11b

FIG. 5 (A)

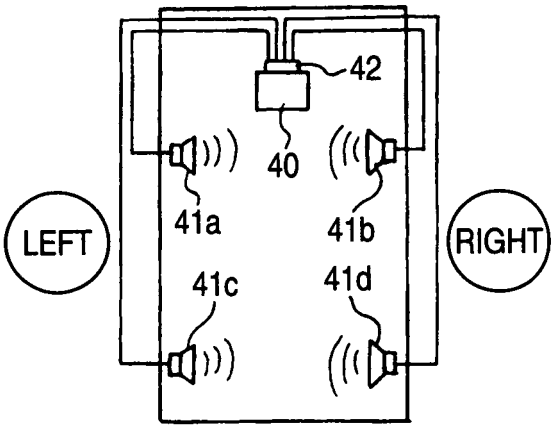

42
40
41a
41b
LEFT
RIGHT
41c
41d

FIG. 5 (B)

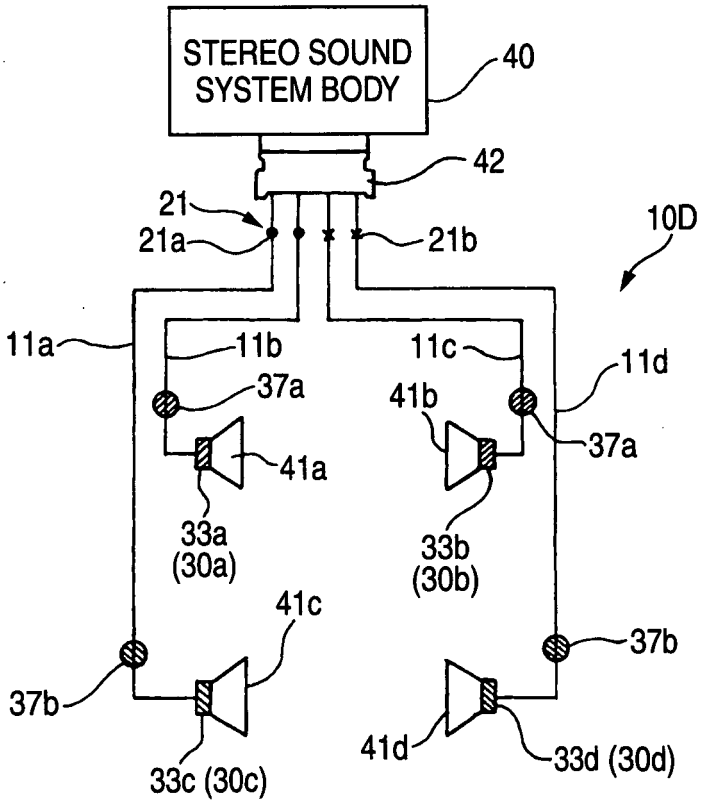

STEREO SOUND SYSTEM BODY
40
42
21
21a
21b
10D
11a
11b
11c
11d
37a
41b
37a
41a
33a (30a)
33b (30b)
41c
37b
37b
41d
33c (30c)
33d (30d)

FIG. 6

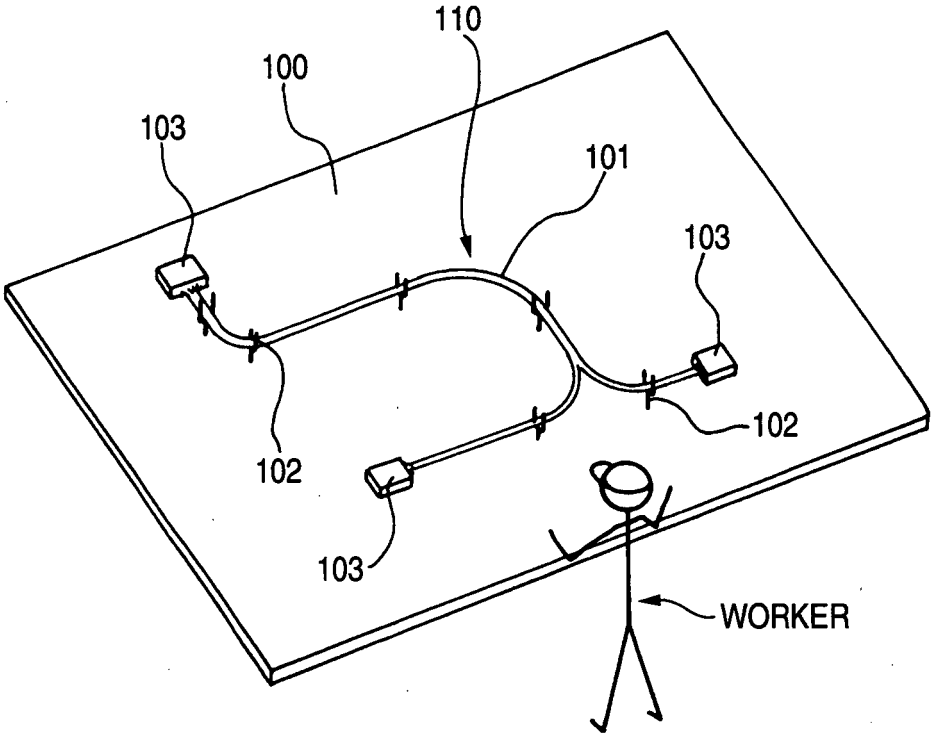
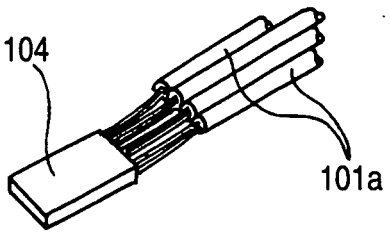


FIG. 7



INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2004/006068

A. CLASSIFICATION OF SUBJECT MATTER
Int.Cl[7] H01B13/012

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
Int.Cl[7] H01B7/00, 13/00, 13/012

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

Jitsuyo Shinan Koho	1926-1996	Jitsuyo Shinan Toroku Koho	1996-2004
Kokai Jitsuyo Shinan Koho	1971-2004	Toroku Jitsuyo Shinan Koho	1994-2004

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP 11-25781 A (Sumitomo Wiring Systems, Ltd.), 29 January, 1999 (29.01.99), (Family: none)	1-5
A	JP 2002-109975 A (Sumitomo Wiring Systems, Ltd.), 12 April, 2002 (12.04.02), (Family: none)	1-5
A	JP 2003-59353 A (Sumitomo Wiring Systems, Ltd.), 28 February, 2003 (28.02.03), (Family: none)	1-5
A	JP 2003-61234 A (Sumitomo Wiring Systems, Ltd.), 28 February, 2003 (28.02.03), (Family: none)	1-5

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

* Special categories of cited documents:
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"&" document member of the same patent family

Date of the actual completion of the international search 27 July, 2004 (27.07.04)	Date of mailing of the international search report 10 August, 2004 (10.08.04)
Name and mailing address of the ISA/ Japanese Patent Office Facsimile No.	Authorized officer Telephone No.

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