

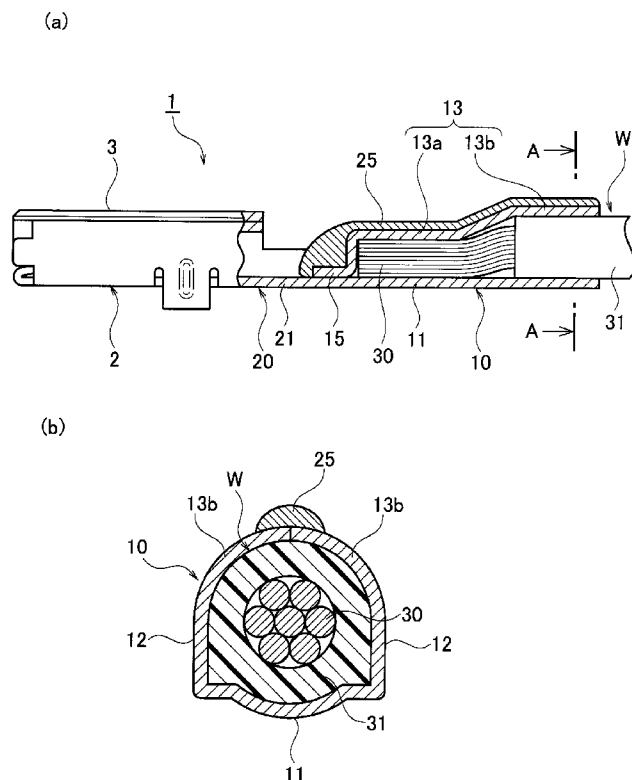


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[Continued on next page]

(54) Title: CONNECTION TERMINAL



(57) Abstract: A connection terminal (1) includes a terminal connection portion (2) to be connected with a mating terminal is connected, a wire connection portion (10) connected to the terminal connection portion (2) and a wire (W), an anti-corrosion material (25) provided to cover an area in the wire connection portion (10) where water may be poured to the wire (W), and an anticorrosion material holding portion (15) provided in the wire connection portion (10) towards the terminal connection portion (2).



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Description

Title of Invention: CONNECTION TERMINAL

Technical Field

[0001] The present invention relates to a connection terminal including a terminal connection portion and a wire connection portion, in which a part of a wire exposed on the outside of the wire connection portion is covered with an anticorrosion material.

Background Art

[0002] PTL 1 discloses a conventional connection terminal. As illustrated in Figs. 1 to 3, a conventional connection terminal 50 includes a terminal connection portion 51 to be connected with a mating terminal, a wire connection portion 52 connected to a wire W, and a neck portion 53 connecting the terminal connection portion 51 to the wire connection portion 52. The wire connection portion 52 includes a pair of crimping pieces 52a. The exposed part of a conductor 60 of the wire W and a part of an insulation sheath 61 are integrally crimped by the crimping pieces 52a. In the wire connection portion 52, an area where water may be poured to the wire W is covered with solder 55 as an anticorrosion material. In particular, the solder 55 is provided to cover an exposed part of the conductor 60 on an outside of the crimping pieces 52a, and cover a gap in a portion where the crimping pieces 52a face and come into contact with each other.

[0003] In the conventional connection terminal 50, it is possible to prevent pouring water to the conductor 60 even when the connection terminal 50 pours water. In particular, in a case where the conductor 60 is made of aluminum, galvanic corrosion can be prevented.

Citation List

Patent Literature

[0004] PTL 1: WO 2011/125626 A1

Summery of Invention

[0005] The solder 55 as the anticorrosion material is provided in a manner such that solder in a molten state is applied by use of a soldering iron, or soldering paste is applied and then heated.

[0006] In the conventional connection terminal 50, the wire connection portion 52 and the terminal connection portion 51 are connected via a bottom wall. Thus, the solder 55 in the molten state tends to flow out of the connection portion 52 towards the terminal connection portion 51. If the solder 55 flows out of the connection portion 52, the amount of coating of the solder 55 on the wire connection portion 52 decreases and a water cut-off performance of the solder 55 thus decreases. The decrease of the water

cut-off performance may cause a resistance increase of the wire connection portion 52 and a decrease of a wire fixing capacity.

- [0007] The present invention has been made in view of the above-described conventional problem. It is an object of the present invention to provide a connection terminal capable of preventing a resistance increase of a wire connection portion and a decrease of a wire fixing capacity derived from a decrease of a water cut-off performance of an anticorrosion material.
- [0008] A connection terminal according to a first aspect of the present invention includes a terminal connection portion to be connected with a mating terminal, and a wire connection portion connected to the terminal connection portion and a wire; an anti-corrosion material provided to cover an area in the wire connection portion where water may penetrate be poured to the wire; and an anticorrosion material holding portion provided in the wire connection portion towards the terminal connection portion.
- [0009] The anticorrosion holding portion may be formed in a manner such that a crimping piece of the wire connection portion is bent.
- [0010] The anticorrosion holding portion may be a recess provided on a bottom wall of the wire connection portion.
- [0011] The anticorrosion holding portion may be formed in a manner such that a bottom wall of the wire connection portion is cut and bent upward.
- [0012] In accordance with the connection terminal according to the first aspect of the present invention, at the point of covering the exposed part of the wire on the outside of the wire connection portion with the anticorrosion material, the anticorrosion material holding portion prevents the anticorrosion material in the molten state from flowing towards the terminal connection portion. Therefore, it is possible to prevent a resistance increase of the wire connection portion and a decrease of a wire fixing capacity derived from a decrease of a water cut-off performance of the anticorrosion material.

Brief Description of Drawings

- [0013] [fig.1]Fig. 1 is a perspective view of a main part of a connection terminal according to a conventional example before solder is applied thereto.
- [fig.2]Fig. 2 is a perspective view of the main part of the connection terminal according to the conventional example.
- [fig.3]Fig. 3 is a cross-sectional view of the main part of the connection terminal according to the conventional example.
- [fig.4]Fig. 4 is a perspective view of a connection terminal according to an embodiment.

[fig.5]Fig. 5(a) is a cross-sectional view of the connection terminal according to the embodiment, and Fig. 5(b) is a cross-sectional view along the line A-A in Fig. 5(a).

[fig.6]Fig. 6(a) is a plan view of the connection terminal according to the embodiment before solder is applied thereto, Fig. 6(b) is a cross-sectional view along the line B-B in Fig. 6(a), and Fig. 6(c) is a cross-sectional view along the line C-C in Fig. 6(a).

[fig.7]Fig. 7 is a cross-sectional view illustrating an anticorrosion material holding portion according to a first modified example of the embodiment.

[fig.8]Fig. 8 is a cross-sectional view illustrating an anticorrosion material holding portion according to a second modified example of the embodiment.

Description of Embodiments

[0014] Hereinafter, embodiments according to the present invention will be explained with reference to the drawings.

(Embodiment)

[0015] Figs. 4 to 6 illustrate an embodiment of the present invention.

[0016] A connection terminal 1 according to the embodiment includes a terminal connection portion 2 to be connected with a mating terminal (not illustrated), a wire connection portion 10 connected to a wire W, and a neck portion 20 connecting the terminal connection portion 2 to the wire connection portion 10. The terminal connection portion 2, the wire connection portion 10, and the neck portion 20 are formed in a manner such that a conductive metal plate made of a copper alloy having a predetermined shape is bent.

[0017] The terminal connection portion 2 includes a square cylindrical portion 3, and an elastic contact piece (not illustrated) disposed inside the cylindrical portion 3. When the mating terminal is inserted into the cylindrical portion 3, the mating terminal comes into close contact with the cylindrical portion 3 by an elastic restoring force of the elastic contact piece. As a result, the mating terminal is electrically connected to the terminal connection portion 2.

[0018] The wire connection portion 10 includes a wire connection portion bottom wall 11, a pair of wire connection portion side walls 12 extending from both side edges of the wire connection portion bottom wall 11, and a pair of crimping pieces 13 further extending from the respective wire connection portion side walls 12.

[0019] Each of the crimping pieces 13 includes a conductor crimping portion 13a located towards a front side, and a sheath crimping portion 13b connected to the conductor crimping portion 13a and located towards a rear side. In each of the crimping pieces 13, an extending height of the sheath crimping portion 13b is higher than that of the conductor crimping portion 13a. The crimping pieces 13 hold a conductor 30 of the wire W, which is made of aluminum or aluminum alloy, by crimping the conductor

crimping portions 13a, and hold an insulation sheath 31 of the wire W by crimping the sheath crimping portions 13b. Namely, the conductor 30 and the insulation sheath 31 are integrally crimped by the crimping pieces 13.

[0020] The pair of the crimping pieces 13 is crimped in a manner such that each edge of the crimping pieces 13 faces and comes into contact with each other. In the insulation sheath 31, the sheath crimping portions 13b are crimped in a manner illustrated in Figs. 5(b) and 6(c).

[0021] The wire connection portion 10 is provided with an anticorrosion material holding portion 15 on the terminal connection portion 2 side. The anticorrosion material holding portion 15 is formed in a manner such that edges of the crimping pieces 13 on the terminal connection portion 2 side are bent into an L-like shape. When solder 25 in a molten state is poured into the L-like shaped space in the anticorrosion material holding portion 15, the solder 25 in the molten state is held and stored therein due to the surface tension of the solder 25.

[0022] The neck portion 20 includes a neck portion bottom wall 21, and a pair of neck portion side walls 22 elongated upward from both edges of the neck portion bottom wall 21. The neck portion bottom wall 21 and the neck portion side walls 22 are integrated with the terminal connection portion 2 and with each wall of the wire connection portion 10.

[0023] An area in the wire connection portion 10 where water may be poured the wire W, is covered with the solder 25 as an anticorrosion material. In particular, the solder 25 is provided to cover the exposed part of the conductor 30 on an outside of the crimping pieces 13, and cover a gap between the pair of the crimping pieces 13. The solder 25 may be provided in a manner such that the solder in a molten state is applied by use of a soldering iron, or soldering paste is applied and then heated.

[0024] The solder 25 in the molten state tends to flow towards the terminal connection portion 2. However, the solder 25 is stored in the anticorrosion material holding portion 15 due to the surface tension of the solder 25, and is thus prevented from flowing towards the terminal connection portion 2. Since the wire connection portion 10 is covered with a preferred amount of the solder 25, a water cut-off performance is improved. Accordingly, it is possible to prevent a resistance increase of the wire connection portion 10 and a decrease of a wire fixing capacity, each derived from a decrease of the water cut-off performance. In particular, in the case where the conductor 30 is made of aluminum or an aluminum alloy, galvanic corrosion of the conductor 30 can surely be prevented.

[0025] Once heat caused by the solder 25 in the molten state is transmitted to the insulation sheath 31, an outer surface of the insulation sheath 31 is deformed to fill gaps "d" (see Fig. 6(c)) present between the outer surface of the insulation sheath 31 and the inner

surface of the wire connection portion 10. Such deformation can also improve the water cut-off performance and thereby prevent a resistance increase of the wire connection portion 10 and a decrease of the wire fixing capacity.

(Modified Examples)

- [0026] As illustrated in Fig. 7, a connection terminal 1A according to a first modified example of the embodiment is provided with an anticorrosion material holding portion 15A which is a recess provided on the wire connection portion bottom wall 11. The solder 25 in the molten state, which tends to flow towards the terminal connection portion 2, is stored in and held above the anticorrosion material holding portion 15A due to the surface tension of the solder 25 and thereby prevented from flowing towards the terminal connection portion 2.
- [0027] As illustrated in Fig. 8, a connection terminal 1B according to a second modified example of the embodiment is provided with an anticorrosion material holding portion 15B which is formed in a manner such that the neck portion bottom wall 21 is cut and bent upward. The solder 25 in the molten state, which tends to flow towards the terminal connection portion 2, is held by and stored in the anticorrosion material holding portion 15B and thereby prevented from flowing towards the terminal connection portion 2.
- [0028] The anticorrosion material holding portion is not limited to the configurations described in the embodiment, the first modified example and the second modified example as long as the anticorrosion material holding portion can hold and store the solder 25 in the molten state.
- [0029] Although the solder 25 is used as the anticorrosion material in the connection terminal 1 according to the embodiment, grease, a hot-melt adhesive, or the like may be used as the anticorrosion material.
- [0030] Although the conductor 30 in the connection terminal 1 according to the embodiment is made of aluminum or aluminum alloy, the conductor 30 may be made of copper or the like.

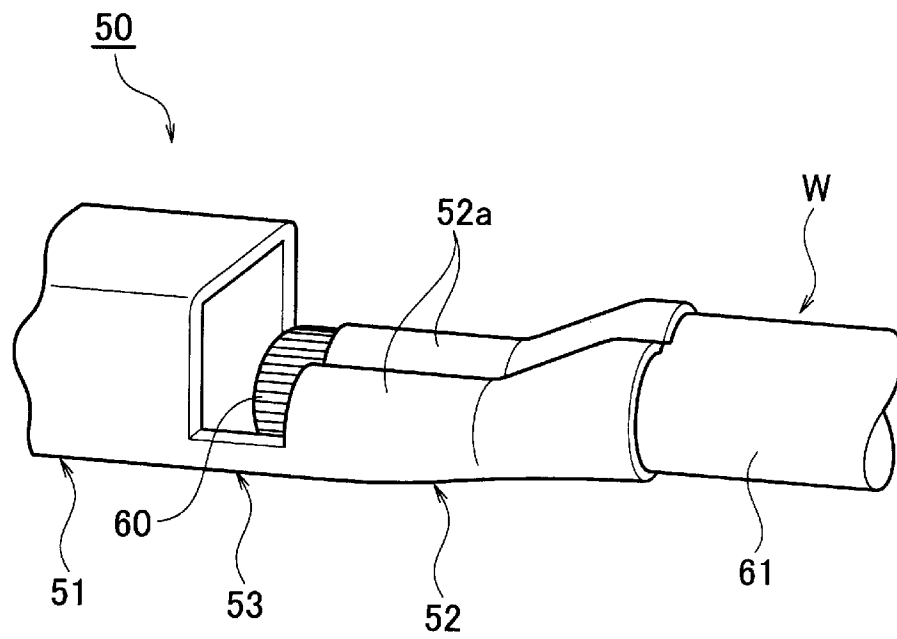
Industrial Applicability

- [0031] The present invention can provide a connection terminal capable of preventing a resistance increase of a wire connection portion and a decrease of a wire fixing capacity derived from a decrease of a water cut-off performance of an anticorrosion material.

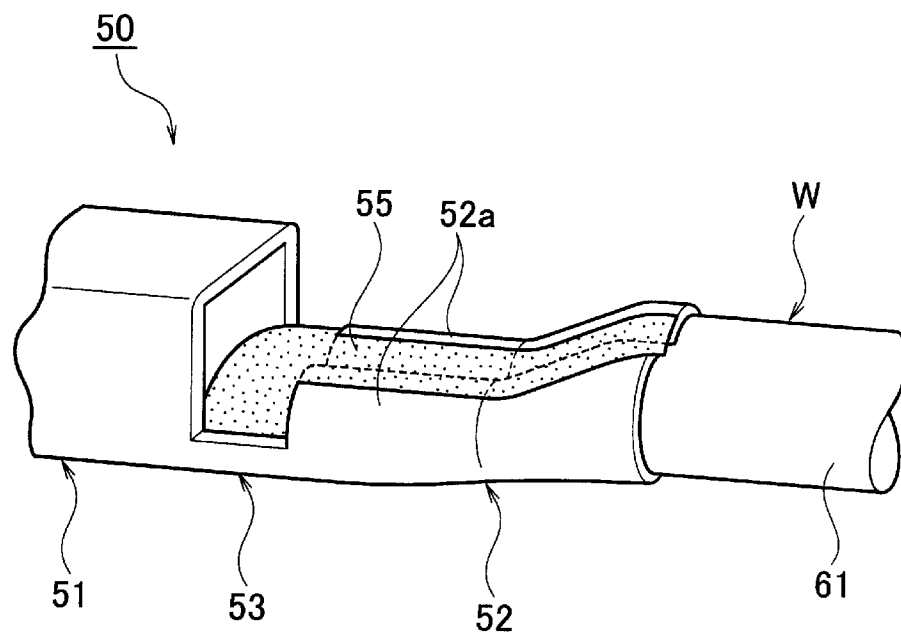
Claims

- [Claim 1] A connection terminal comprising:
a terminal connection portion to be connected with a mating terminal;
a wire connection portion connected to the terminal connection portion
and a wire;
an anticorrosion material provided to cover an area in the wire
connection portion where water may be poured to the wire; and
an anticorrosion material holding portion provided in the wire
connection portion towards the terminal connection portion.
- [Claim 2] The connection terminal according to claim 1, wherein the anti-
corrosion holding portion is formed in a manner such that a crimping
piece of the wire connection portion is bent.
- [Claim 3] The connection terminal according to claim 1, wherein the anti-
corrosion holding portion is a recess provided on a bottom wall of the
wire connection portion.
- [Claim 4] The connection terminal according to claim 1, wherein the anti-
corrosion holding portion is formed in a manner such that a bottom
wall of the wire connection portion is cut and bent upward.

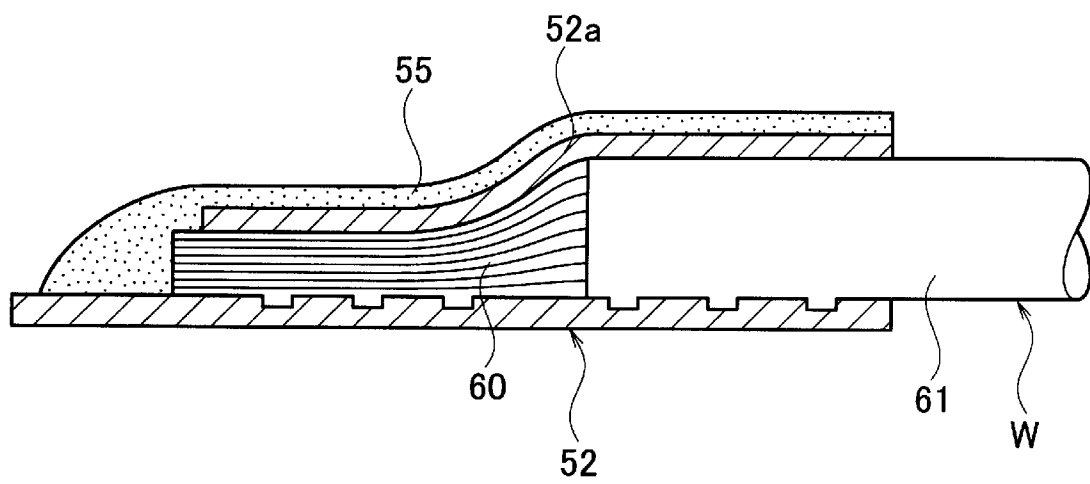
[Fig. 1]



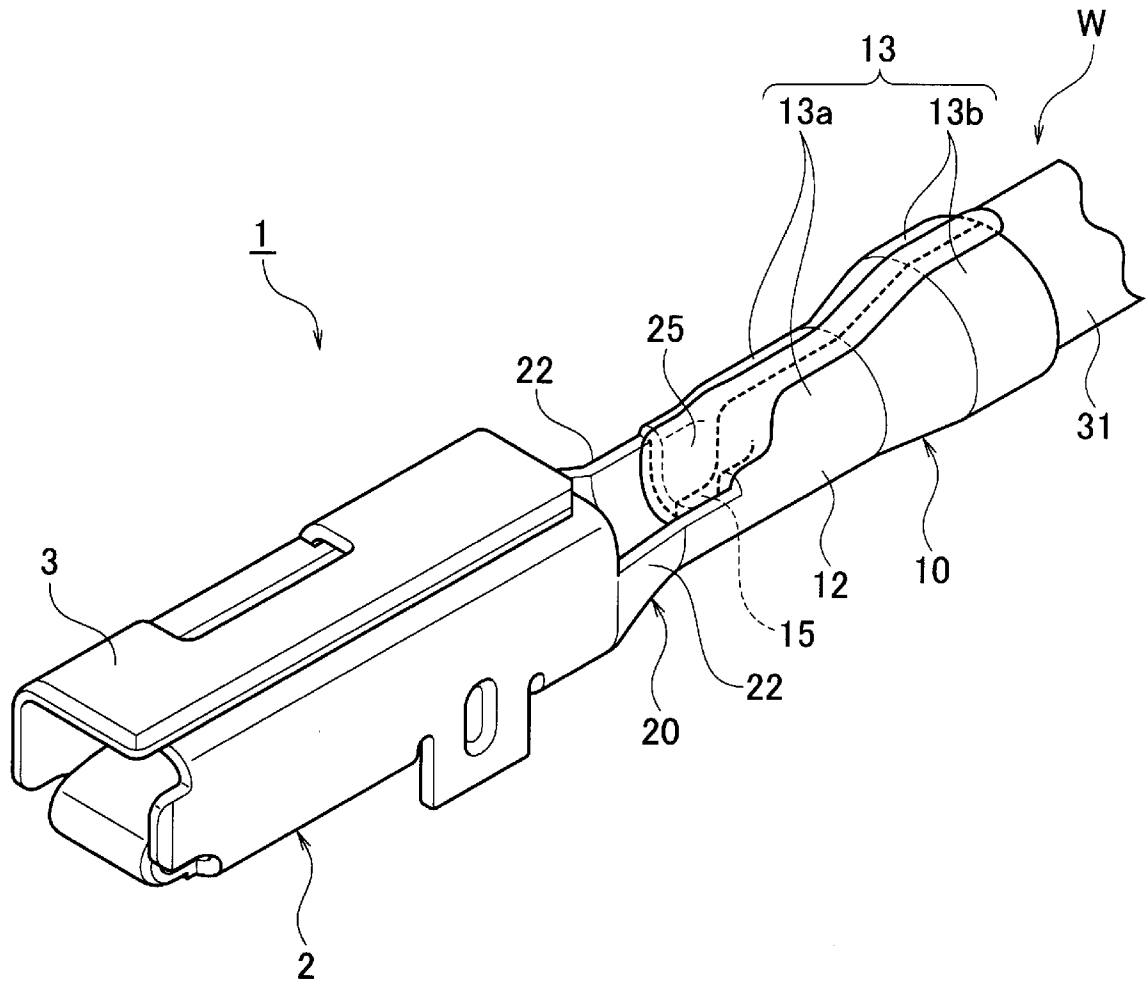
[Fig. 2]



[Fig. 3]

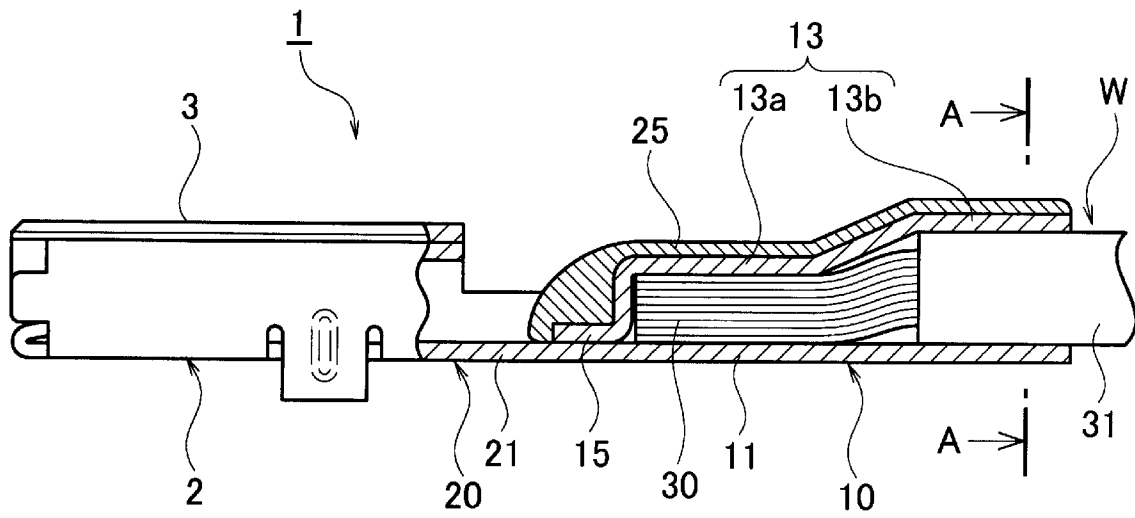


[Fig. 4]

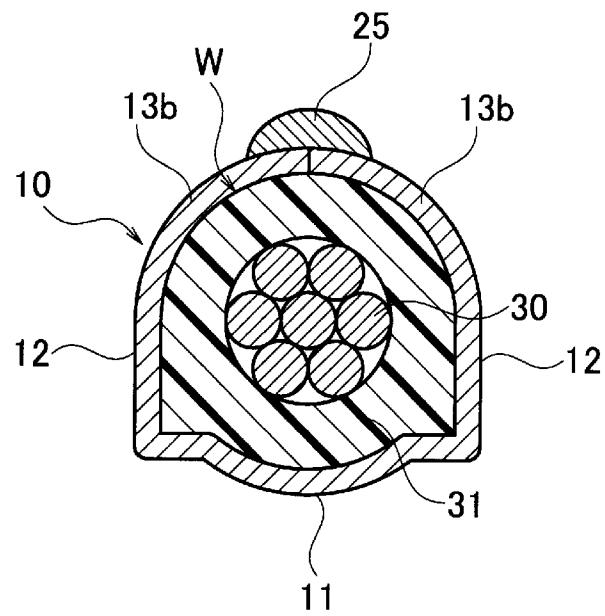


[Fig. 5]

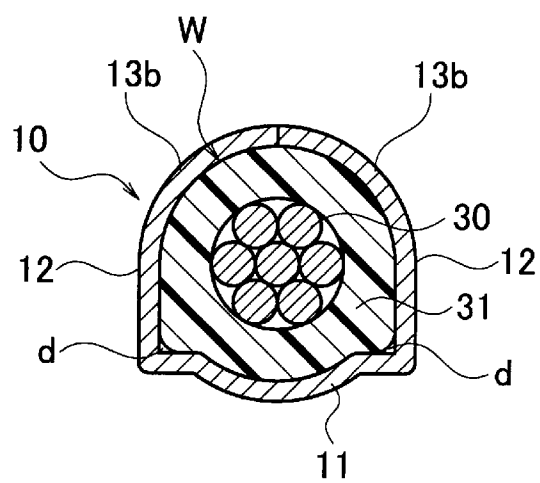
(a)



(b)



(a)



A cross-sectional view of a semiconductor device along line A-A. The device includes a substrate 10 with a base layer 30. On the left, there is a component 2 with a top layer 3 and a bottom layer 21. A central feature consists of a stack of layers 13a and 13b, which are part of a larger structure 13. This stack is supported by a base 25 and has a side wall 15A. To the right, there is another component 31 with a top layer W. Various other layers and interfaces are labeled with numbers like 20 and 2.

[illegible]

INTERNATIONAL SEARCH REPORT

International application No

PCT/JP2013/002004

A. CLASSIFICATION OF SUBJECT MATTER
INV. H01R4/18 H01R4/20
ADD.

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)
H01R

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

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

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2011/083324 A1 (MARTAUZ FRANCIS D [US] ET AL) 14 April 2011 (2011-04-14) paragraph [0023] - paragraph [0034]; figures 2-6	1-4
X	US 3 686 746 A (GWYN CHILDRESS B JR) 29 August 1972 (1972-08-29) column 1, line 53 - column 2, line 57; figures 1-4	1-4
X	WO 2009/156653 A1 (LEONI WIRING SYSTEMS FRANCE [FR]; MOLY JOSE [FR]; FERRIERES LAURENT [F] 30 December 2009 (2009-12-30) page 7, line 5 - page 8, line 24; figures 5,6 page 4, line 1 - line 18	1-4
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Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents :

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Date of the actual completion of the international search

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Bouhana, Emmanuel

INTERNATIONAL SEARCH REPORT

International application No

PCT/JP2013/002004

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2011/070770 A1 (SAKAI ATSUSHI [JP]) 24 March 2011 (2011-03-24) paragraph [0026] - paragraph [0032]; claim 8; figures 1-5 -----	1-4

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/JP2013/002004

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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