

[Document Name]Abstract

[Abstract]

[Purpose]To provide an electrical component member for a solar cell power generation device capable of safely performing connection work of a distribution line to a solar cell unit, preventing connection failure as much as possible, and preventing occurrence of a situation in which a power supply circuit as a whole is disconnected even if connection failure occurs.

[Constitution]From a trunk line 3 comprising a pair of electric wires L1, L2, a plurality of branch lines 4 connected in series with one of the electric wires L1 are taken out at predetermined intervals. A connection part 5 connected to a connection terminal 2 provided in the solar cell unit 1 is provided at the tip part of the branch line 4, and the plurality of solar cell units 1 are connected in series in the electrical component member for the solar cell power generation device.

[Selected drawing]Fig.1

Decision of Refusal

Application number: Application for patent Heisei 5-151711

Date of Drafting: Heisei 11(1999) June 14

Patent examiner: YAMASHITA, Takashi 8806 2K00

Title of the invention: To provide a solar battery power generator for electric member applicant manufactured by Kubota.

Representative: KITAMURA, Shuichiro (and 1 others)

For this application, the examiner's decision of refusal is made based on the reasons described in the notice of reasons for refusal dated February 9, 1999.

Section, Examination Length, Examiner, assistant examiner, Ministry of Civil
Property, Yamashita Certified , 8102 8806 , Yamashita

[Document Name]Description

[Title of the invention]A solar power generation apparatus for electrical components

[Claim(s)]

[Claim 1]A plurality of branch lines (4) connected in series with one of electric wires (L1) are taken out at predetermined intervals from a trunk line (3) comprising a pair of electric wires (L1) and (L2), and connecting parts (5) connected to connecting terminals (2) provided in a solar battery unit (1) are provided at tips of the branch lines (4). In the electrical equipment member for the solar cell power generation device in which a plurality of solar cell units (1) are connected in series, a bypass diode (D) is connected to a connection part (5) provided at the tip of the branch line (4).

[Detailed description of the invention]

[0001]

[Industrial Application Field]The present invention relates to the electrical component for solar cell power plants.

[0002]

[Prior art]Conventionally, as shown in FIG. 4, in an electrical component for a solar battery power generation apparatus, power generation electrodes 1a and 1b of a solar battery unit 1 and electrodes 12a and 12b attached to a distal end portion of a power distribution line 12 for external extraction are screwed inside a terminal box 11 disposed on a rear surface of the solar battery unit 1, and a bypass diode D is also screwed. As shown in FIG. 3, even when an arbitrary solar cell unit 1 becomes defective and is disconnected, the bypass diode D bypasses the solar cell unit 1 in order to prevent the power supply circuit as a whole from being disconnected.

[0003]

[Problem to be solved by the invention]However, in the above-described conventional electrical component for a solar cell power generation apparatus, when the bypass diode is screwed into the terminal box, a finger or the like comes into contact with the terminal portion. In particular, after the power distribution lines are connected to the plurality of solar cell units, the voltage is also high, resulting in dangerous work. Further, in a case where it is forgotten to connect a power distribution line to one of such solar cell units, or in a case where a wood screw for connecting the power distribution line is loosened Since the bypass diode is connected to the terminal box provided in the solar cell unit, the entire power supply circuit may be disconnected. It is an object of the present invention to provide an electrical component for a solar cell power generation apparatus, which is capable of safely connecting a power distribution line to a solar cell unit, improving the reliability of a connection portion, and preventing the occurrence of a situation in which a power supply circuit as a whole is disconnected even if connection is forgotten or connection failure occurs.

[0004]

[Means for solving the problem]In order to achieve this object, a characteristic configuration of an electrical component for a solar cell power generation apparatus according to the present invention is such that a plurality of branch lines connected in series to one of a pair of electric wires are taken out from a trunk line including the electric wires at predetermined intervals In the electrical component member for the solar cell power generation device in which a plurality of solar cell units are connected in series by providing a connection part connected to a connection terminal provided in the solar cell unit at the tip of the branch line, a bypass diode is connected to the connection part provided at the tip of the branch line.

[0005]

[Function]A trunk line is laid along the arrangement direction of the solar cell units, and connection terminals of branch lines taken out from the trunk line at predetermined intervals, that is, at intervals equal to the arrangement intervals of the solar cell units are connected to the corresponding solar cell units. To prevent an operator from forgetting to connect a solar cell unit and to prevent the operator from touching a connection terminal provided on the solar cell unit during connection work. The electromotive force of the single solar cell unit is only ten and several volts and there is no danger, and even when the terminal of the connection part of the tip part of the branch line is touched, since both electrodes of the connection part are short-circuited by the bypass diode provided in the connection part, there is no electric shock.

[0006]

[Effect of the invention]Therefore, according to the present invention, it is possible to provide an electrical component for a solar cell power generation apparatus in which the operation of connecting a power distribution line to a solar cell unit can be carried out safely, connection failure can be prevented as much as possible, and even if connection failure occurs, the occurrence of a situation in which a power supply circuit as a whole is disconnected can be prevented.

[0007]

[Examples]Examples will be described below. The electrical equipment member for the solar battery power generation device is for connecting a plurality of solar battery units 1 in series to take out a DC voltage of about 200V, and for connecting the DC voltage to a DC-AC conversion device (not shown) in order to obtain an AC voltage of about 100V. As shown in FIG. 1, a plurality of branch lines 4 connected in series to one of electric wires L1 are taken out at predetermined intervals from a main line 3 composed of a pair of electric wires L2 and L1, and connecting portions 5 to be connected to the connecting terminals 2 provided in the solar battery unit 1 are provided at the distal ends of the branch lines 4.

[0008]A bypass diode D is connected to a connection part 5 provided at the tip part of the branch line 4, and even if connection is forgotten, the occurrence of such a situation that a power supply circuit as a whole is disconnected is prevented, and even if a worker touches the terminal of the connection part 5 at the tip part of the branch line during connection work, an electric shock is prevented. That is, as shown in FIG. 3, when the solar cell unit 1 to which the connection portion 5 is connected is normal, the current in the reverse direction is blocked, and when the solar cell unit 1 is in failure or the connection portion 5 is not connected, the

current in the reverse direction is blocked. Since the bypass path in the forward direction is formed, after the solar cell unit 1 is connected to the plurality of connection portions 5, the terminals of the non-connected connection portions 5 are short-circuited by the bypass diodes D, so that an electric shock does not occur.

[0009]As shown in FIG. 1, the connection portion between the trunk line 3 and the branch line 4 is covered and protected by a resin mold 6, and the connection portion 5 on the tip end side of the branch line is configured by arranging a waterproof rubber 9 around a plug portion 8 to be fitted into a connection port 7 of a connection terminal 2 provided in the solar cell unit 1.

[0010]As shown in FIG. 2, when the solar cell unit 1 is used as a roof material, a holding member 16 made of a sheet metal is attached to an upper portion of a sheathing roof board 15, power distribution lines 3 and 4 as electrical components for a solar cell power generation apparatus are disposed on the holding member 16 from a ridge to an eaves, and a plurality of solar cell units 1 are sequentially attached thereon. At this time, the connection terminal 2 provided in the solar cell unit 1 is connected to the connection portion 5. In one solar battery unit 1, a plurality of solar battery cells 1b are arranged in series on a glass substrate 1a, a connection terminal 2 is provided on the rear surface of the glass substrate 1a, and an output of about 11V can be obtained at an optimum operating voltage. Twenty solar battery units 1 are connected in series by using the distribution lines 3 and 4 to generate a DC voltage of about 200V, and a plurality of sets of the solar battery units 1 are connected in parallel to be input to DC-AC converters.

[0011]The number and arrangement of the cells constituting the solar cell unit 1 or the type of the cells (crystalline type or amorphous type) are arbitrary and are not particularly limited.

[0012]The present invention will now be described in detail with reference to the accompanying drawings, wherein like reference numerals designate corresponding parts throughout the several views.

[Brief description of the drawings]

[FIG. 1] is a partially cutaway perspective view of an electrical component for a solar cell power generation apparatus.

FIG. 2 is a partially cut-away layout view of an electrical component for a solar cell power generation apparatus.

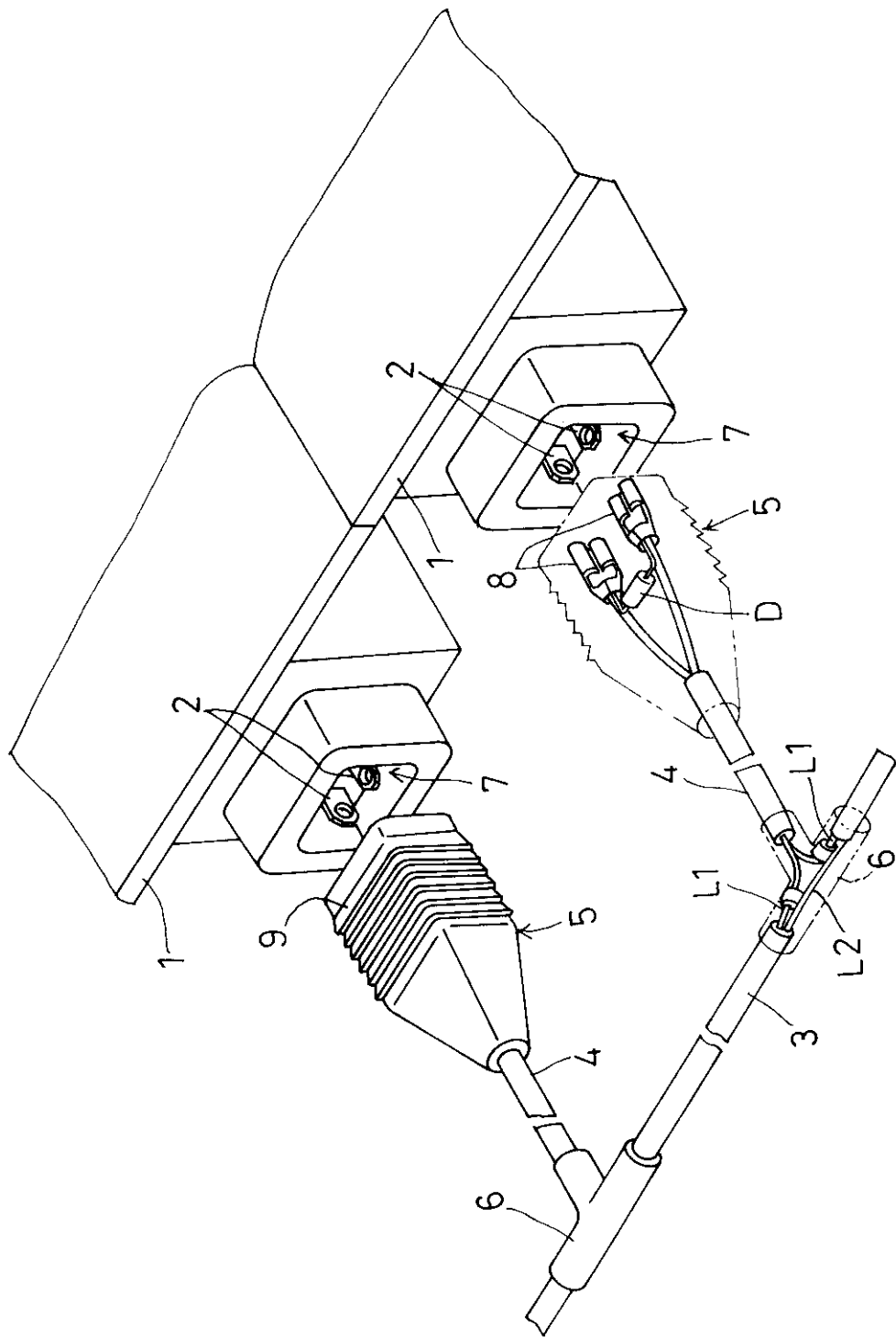
[Fig. 3] The circuit diagram of an essential part

[Fig. 4] The perspective view of an essential part showing a conventional case

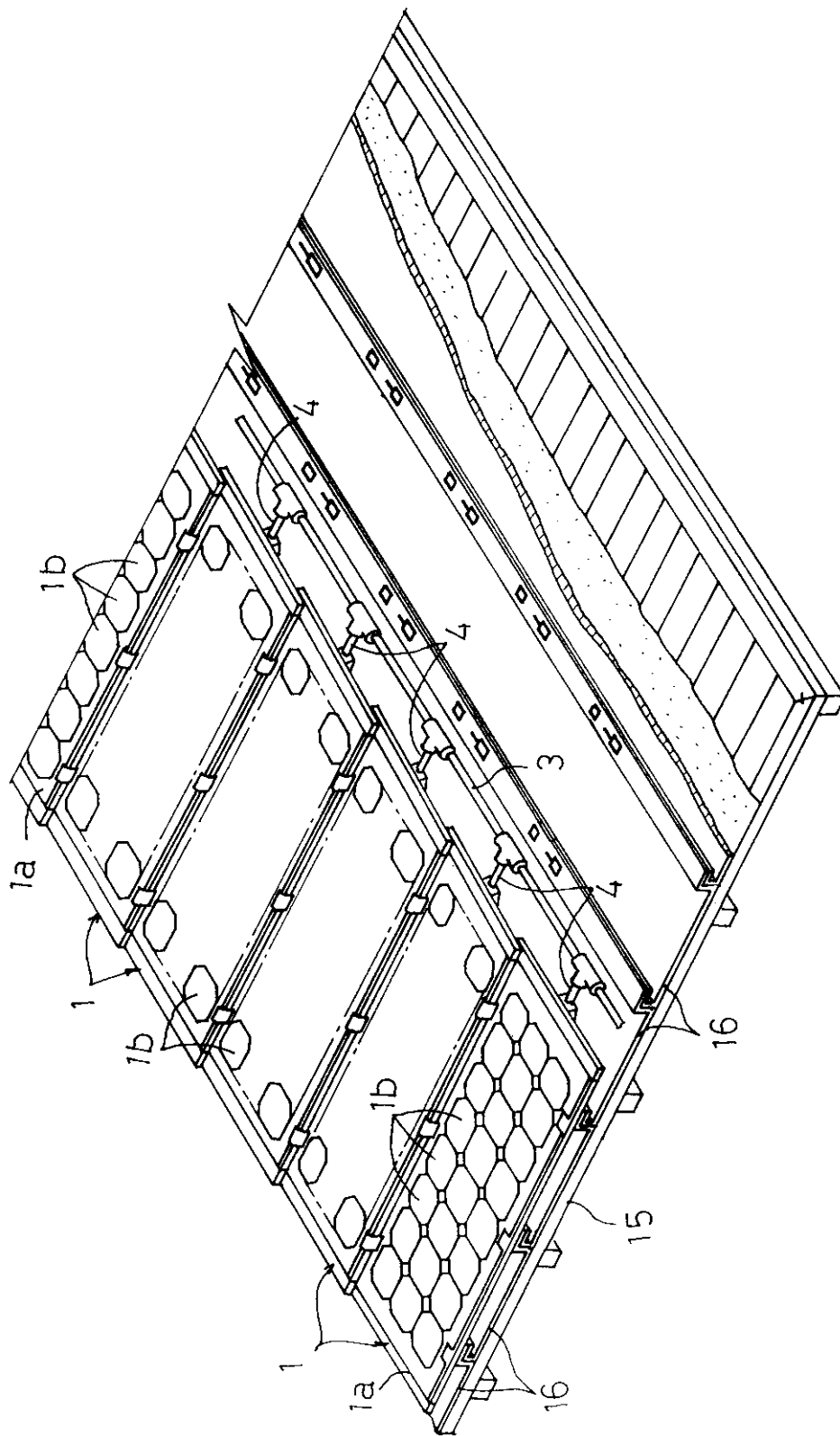
[Explanation of letters or numerals]

- 1. Solar Cell Unit
- 2 Connecting Terminal
- 3. Trunk
- 4 Branch Line
- 5. Connection Part
- D Bypass diode L1 L2 wire

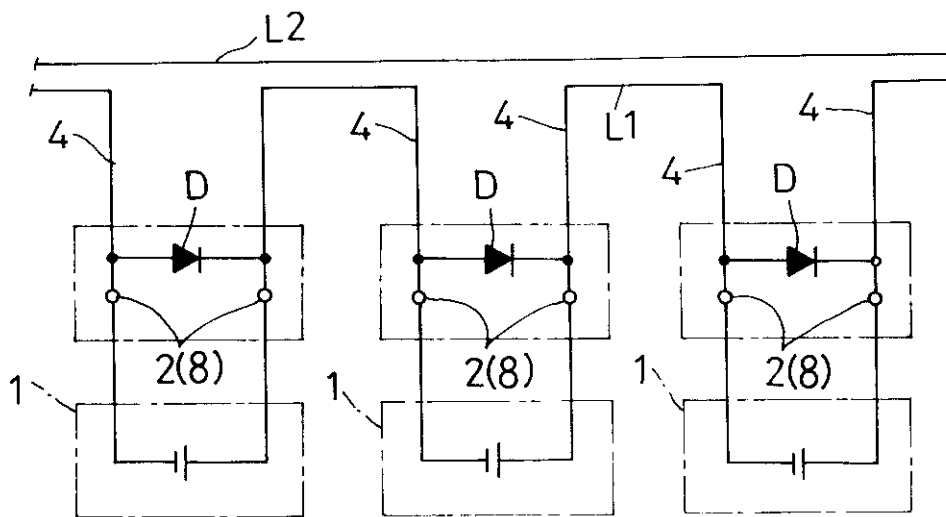
[Fig. 1]



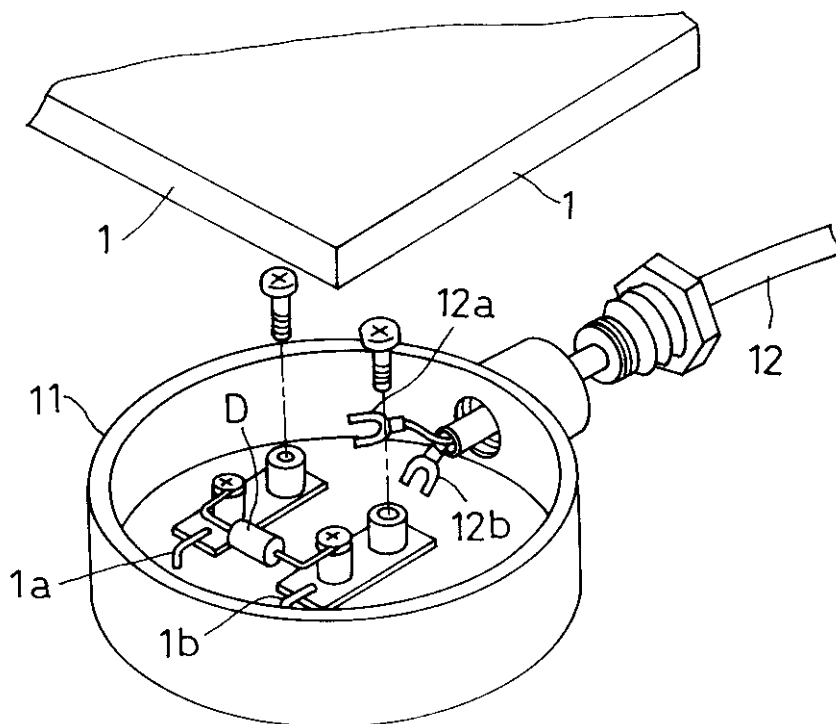
[Fig. 2]



[Fig. 3]



[Fig. 4]



Notice of Reasons for Refusal

Application number: Application for patent Heisei 5-151711

Date of Drafting: Heisei 11(1999) February 9

Patent examiner: YAMASHITA, Takashi 8806 2K00

Representative/Applicant: KITAMURA, Shuichiro (and 1 others)

Applied Provisions: Article 29(2)

This application should be refused for the reason mentioned below. If the applicant has any argument against the reason, please submit a written opinion within 60 days after the day of dispatch of this notification.

Reason

The claimed invention(s) in the each claim listed below of this patent application shall not be granted a patent under the provision of Patent Act Article 29 (2) for the reason that the claimed invention(s) could have easily been made by persons who have common knowledge in the technical field to which the claimed invention(s) pertains, on the basis of the invention(s) described in the distributed publication(s) listed below in Japan or other foreign countries prior to the filing of the patent application.

References (see the list of cited documents, etc. for the cited Documents, etc.)
Claims, etc.

1. Cited Document 1

The list of cited documents etc. Cited document 1 Microfilm of Japanese Utility Model Application No. S59-67930 (JP S 60 - 179053U)

Remarks The composition of the solar cell which connects a by-pass diode to the relay frame (refer to Cited document 1 Fig. 1 5 and 5') which is the connection part which provided to the point of the power cable in which it corresponds to the branch line in the present invention is described in Cited document 1.

Contact against this reason for refusal : second part of the Optical Devices (tel 03 to 3581 - 1101 Extensions 3253) Yamashita

- Record of the result of prior art search

Field of Investigation : IPC, sixth Edition
H01L31/04

- Prior art documents :

Japanese Patent Application No. 3 - 332004 (Japanese Unexamined Patent Application Publication No. 5 - 167095), the recording of the results of the prior art document does not constitute a reason for refusal.

Section, Examination Length, Examiner, assistant examiner, Ministry of Civil Property, Yamashita Certified , 8102 8806 , Yamashita

[Document Name]Notification of Acceptance of Power of Attorney
[Date of submission]Heisei 10(1998) July 7
[Recipient] Commissioner of the Patent Office
[Indication of case]
[Application number]Application for patent Heisei 5-151711
[The person who took the necessary procedure]
[A relation with an incident] Applicant:
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[Name]KUBOTA CORP.
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[Patent attorney]
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[Tel No.]06-374-1221
[The list of submitted documents]
[Number of General Authority of Agent]9710829

[Document Name]Notification of Change of Power of Attorney
[Date of submission]Heisei 9(1997) August 21
[Recipient] Commissioner of the Patent Office
[Indication of case]
[Application number]Application for patent Heisei 5-151711
[The person who took the necessary procedure]
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[The list of submitted documents]
[Number of General Authority of Agent]9710829

[Document Name]Request for patent
[Reference Number]T093089500
[Date of submission]Heisei 5(1993) June 23
[Recipient] Commissioner of the Patent Office
[Title of the invention]The electrical component for solar cell power plants
[Number of claims]1
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[Fee-related information]
[The payment method] Prepayment
[Deposit account number]004673
[Payment amount]14,000 yen
[The list of submitted documents]
[Document name]Description 1
[Document name]Drawings 1
[Document name]Abstract 1
[Number of General Authority of Agent]9001996
[Necessity of proof] Necessary

[Document Name]Request for Examination
[Date of submission]Heisei 9(1997) January 20
[Recipient] Commissioner of the Patent Office
[A display of application]
[Application number]Application for patent Heisei 5-151711
[Title of the invention]The electrical component for solar cell power plants
[Number of claims]1
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