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(12) Utility Model Patent

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(21) Application no.: 201020667514.X (22) Filing date: Dec 20, 2010 (73) Patentee: Dongguan Anwell Digital Machinery Co., Ltd. Address: Dongguan Anwell Digital Machinery Co., Ltd., Hongtu High-Tech Development Zone, Nancheng District, Dongguan City, Guangdong Province 523000 (72) Inventors: YE Jian, YANG Mingsheng (74) Patent agency: Guangzhou Scihead Patent Agent Co., Ltd. 44202 Agents: ZHANG Yanmei, HAO Chuanxin (51) Int. Cl. H01R 13/52 (2006.01) H01R 13/68 (2006.01) H01R 31/06 (2006.01)	(ESM) An invention patent application has been filed on the same day for the same invention/creation Claims: 1 page Description: 3 pages Accompanying drawings: 1 page
(54) Title of utility model Solar cell connecting line (57) Abstract The present utility model discloses a solar cell connecting line, comprising a fuse holder, two electric cables and two plug terminals, one end of the electric cable being connected to the plug terminal and another end forming a wiring end, the fuse holder comprising a fuse component, a holder body and an integrally formed insulating case, the wiring ends of the two electric cables being fixedly connected to the holder body separately, the fuse component being installed in the holder body and electrically connected at two ends to the wiring ends of the electric cables separately, and the insulating case covering the holder body and being in sealed connection with the electric cables. When the current is too high, the configuration of the fuse holder can effectively serve the function of cutting power for protection, and the integrally formed insulating case seals and covers the fuse component, the holder body and the wiring ends of the electric cables. As a result, the solar cell connecting line of the present utility model is waterproof, corrosion-resistant and well-sealed, and meets the requirements for use in harsh outdoor environmental conditions, ensuring stable and reliable operation of the solar cell.	

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1. A solar cell connecting line, characterized by comprising a fuse holder, two electric cables and two plug terminals, one end of the electric cable being
5 connected to the plug terminal and another end forming a wiring end, the fuse holder comprising a fuse component, a holder body and an integrally formed insulating case, the wiring ends of the two electric cables being fixedly
10 connected to the holder body separately, the fuse component being installed in the holder body and electrically connected at two ends to the wiring ends of the electric cables separately, and the insulating case covering the holder body and being in sealed connection with the electric cables.

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2. The solar cell connecting line as claimed in claim 1, characterized in that the insulating case is a radiation-crosslinked polyethylene case.

20 3. The solar cell connecting line as claimed in claim 2, characterized in that two ends of the radiation-crosslinked polyethylene case are tapered and formed with annular grooves.

25 4. The solar cell connecting line as claimed in claim 1, characterized in that the electric cable is also covered by a radiation-crosslinked polyethylene layer.

30 5. The solar cell connecting line as claimed in claim 1, characterized in that the solar cell connecting line further comprises two sealing rings, disposed between the insulating case and the electric cables.

Solar cell connecting line

Technical field

[0001] The present utility model relates to a connecting
5 line, in particular to a solar cell connecting line.

Background art

[0002] Solar power, which is inexhaustible, is becoming
more and more popular due to being safe, clean and
10 environmentally friendly. The solar power industry has
become a global sunrise industry in which everyone is
vying to catch up with each other. In China, more and
more enterprises have joined this "daily industry", and
China has already become the world's third largest solar
15 power manufacturing base. Solar cells are devices that
convert solar radiation directly to electrical energy;
solar energy is converted to electrical energy by panels
of cells, then the electrical energy converted by the
solar panels is delivered to AC loads, DC loads and
20 storage batteries via wiring boxes, cable components,
controllers and inverters, thus effectively converting
solar energy to a source of energy for people's everyday
life or work. As the use of solar power generation has
become more widespread, connecting lines specifically for
25 solar cells have also emerged in response, and developed
rapidly. When building a solar power generating system,
thousands of solar panels need to be connected in series
and parallel via connecting lines, so as to obtain a
larger output power, for example by series connection in
30 rows and parallel connection in columns. If the output
voltage at two ends of a column is large, this will result
in an increase in the row current, possibly causing an
excessively large output current. Current overload is
likely to damage the panel and other components, so it
35 is necessary to introduce a protection apparatus to
achieve cut-off protection in the event of current
overload. However, since solar cells are generally used
and set up in outdoor environments where the climate is

harsh and variable, their connecting lines and protection
apparatuses are generally all exposed to the elements:
with exposure to the sun and rain, the operating
environment is harsh, so the protection apparatus is
5 required to be waterproof, corrosion-resistant and UV-
resistant. Thus, there is a need for a waterproof,
corrosion-resistant and well-sealed connecting line
which has an overload protection function and meets the
requirements for use in harsh outdoor environmental
10 conditions, to realize an output connection of a solar
cell.

Summary of the utility model

[0003] An objective of the present utility model is to
15 provide a waterproof, corrosion-resistant and well-
sealed solar cell connecting line which has an overload
protection function and meets the requirements for use
in harsh outdoor environmental conditions.

[0004] To achieve this objective, the present utility
20 model provides a solar cell connecting line, comprising
a fuse holder, two electric cables and two plug
terminals, one end of the electric cable being connected
to the plug terminal and another end forming a wiring
end, the fuse holder comprising a fuse component, a
25 holder body and an integrally formed insulating case, the
wiring ends of the two electric cables being fixedly
connected to the holder body separately, the fuse
component being installed in the holder body and
electrically connected at two ends to the wiring ends of
30 the electric cables separately, and the insulating case
covering the holder body and being in sealed connection
with the electric cables.

[0005] Preferably, the insulating case is a radiation-
crosslinked polyethylene case, two ends of the radiation-
35 crosslinked polyethylene case being tapered and formed
with annular grooves. Under the action of radiation,
polyethylene can undergo a radiation crosslinking
reaction to form a three-dimensional polymer, increasing

the heat tolerance and corrosion resistance level of the polyethylene. By using a radiation-crosslinked polyethylene case, it is possible to enhance the resistance of the solar cell connecting line to ageing,
5 radiation and high temperatures, protect the fuse component from damage by the harsh external environment, and improve the operating stability of the solar cell. The groove structure can make the structure of the insulating case tighter, to enhance sealing and
10 facilitate water drainage, preventing accumulation on the insulating case.

[0006] Preferably, the electric cable is also covered by a radiation-crosslinked polyethylene layer. Due to the fact that the electric cable likewise needs to be exposed
15 in a harsh environment, the electric cable covered by a radiation-crosslinked polyethylene layer has good resistance to heat and ageing.

[0007] Preferably, the solar cell connecting line further comprises two sealing rings, disposed between the
20 insulating case and the electric cables. The sealing rings can effectively enhance sealing between the insulating case and the wiring ends of the electric cables.

[0008] Compared to the prior art, the solar cell
25 connecting line of the present utility model can be connected to a solar cell and another component separately by means of the plug terminals; when the output current is too large, the configuration of the fuse holder can effectively cut the path and thus serve
30 a protecting function; the wiring ends of the two electric cables are fixedly connected to the holder body of the fuse holder and electrically connected to the two ends of the fuse component respectively; the insulating case is integrally formed outside the holder body,
35 sealing and covering the fuse component, the holder body and the wiring ends of the electric cables; the structure is compact with stable mechanical performance, waterproof, corrosion-resistant, UV-resistant and well-

sealed, and meets the requirements for use in harsh outdoor environmental conditions, so that the operating performance of the solar cell is more stable and reliable.

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Brief description of the drawings

[0009] Fig. 1 is a schematic structural drawing of a solar cell connecting line in embodiments of the present utility model.

10 [0010] Fig. 2 is a schematic structural drawing of the fuse holder of a solar cell connecting line in embodiments of the present utility model.

Detailed description of embodiments

15 [0011] Embodiments of the present utility model are now described with reference to the drawings, in which similar element labels denote similar elements.

[0012] Referring to Figs. 1 and 2, a solar cell connecting line in an embodiment of the present utility model comprises two electric cables 10, a fuse holder 20 and two plug terminals 30. One end of the electric cable 10 is connected to the plug terminal 30, while another end forms a wiring end 11. The plug terminals 30 are matched for butt-connection to a wiring end of a solar panel and other components such as a wiring box or inverter; suitable plug terminals 30 may be selected according to actual needs. The fuse holder 20 comprises a fuse component 22, a holder body 24 and an integrally formed insulating case 26. The wiring ends 11 of the two electric cables 10 are fixedly connected to the holder body 24 separately; the fuse component 22 is installed in the holder body 24 and electrically connected at two ends to the wiring ends 11 of the electric cables 10. The fuse component 22 is similar to existing components, which all utilize the principle whereby a melting body melts when the current is too large and thereby cuts the path between the two ends; the electrical connection to the electric cables 10 may be achieved via leads.

Specifically, two ends of the holder body 24 are correspondingly provided with insertion holes 25 in which the electric cables 10 can be inserted in order to achieve the electrical connection to the fuse component 22. The wiring ends 11 of the electric cables 10 extend into the holder body 24 through the insertion holes 25 and are electrically connected to the fuse component 22; the insulating case 26 covers the holder body 24 and is in sealed connection with the electric cables 10.

[0013] Preferably, the insulating case 26 is a radiation-crosslinked polyethylene case; two ends of the insulating case 26 are tapered and formed with annular grooves 27. Under the action of radiation, polyethylene can undergo a radiation crosslinking reaction to form a three-dimensional polymer, increasing the heat tolerance and corrosion resistance level of the polyethylene. By using a radiation-crosslinked polyethylene case, it is possible to enhance the resistance of the solar cell connecting line to ageing, radiation and high temperatures, protect the fuse component 22 from damage by the harsh external environment, and improve the operating stability of the solar cell. The profile of the holder body 24 is matched to the insulating case 26; the insulating case 26 covers the holder body 24, and is joined to the wiring ends 11 of the electric cables 10 by casting, having excellent sealing, a compact structure and a high level of practicality. The grooves 27 may also be helical, and a logo may be printed on the insulating case 26, to facilitate identification and improve the appearance. Likewise preferably, the electric cable 10 is also covered by a radiation-crosslinked polyethylene layer; due to the fact that the electric cable 10 likewise needs to be exposed in a harsh environment, the electric cable 10 covered by a radiation-crosslinked polyethylene layer has good resistance to heat and ageing.

[0014] Preferably, the solar cell connecting line further comprises two sealing rings 40, the sealing rings 40 being disposed between the insulating case 26 and the

electric cables 10. The sealing rings 40 can effectively enhance sealing between the insulating case 26 and the wiring ends 11 of the electric cables 10.

[0015] A method for manufacturing the solar cell connecting line of the present utility model comprises the following steps:

[0016] (1): providing two electric cables and two plug terminals, wherein one end of the electric cable is connected to the plug terminal, and another end forms a wiring end;

[0017] (2): providing a fuse component and a holder body for installing the fuse component, fixing the wiring ends of the two electric cables to the holder body separately and electrically connecting to the wiring ends of the electric cables separately;

[0018] (3): forming an insulating case from polyethylene outside the holder body by casting, such that the insulating case covers the holder body and is in sealed connection with the electric cables.

[0019] In detail: when manufacturing the solar cell connecting line of the present utility model, the fuse component 22 is first installed in the holder body 24, the respective wiring ends 11 of the two electric cables 10 are passed through the insertion holes 25 of the holder body 24 and electrically connected to the fuse component 22 by soldering or another method, then an insulating case 26 of polyethylene material is formed by casting on the holder body 24 and the electric cables 10 together, at the position of the holder body 24; annular grooves 27 may be formed on the insulating case 26 by hot pressing at the two tapered ends, to not only make the structure tighter and thus facilitate water drainage, but also to help enhance sealing. Once the insulating case 26 has been integrally formed, the insulating case 26 of the polyethylene material undergoes electron accelerator irradiation treatment and thus becomes a radiation-crosslinked polyethylene case. Preferably, the electric cables 10 are also covered by a polyethylene layer, and

the electric cables 10 undergo electron accelerator irradiation treatment at the same time to form a radiation-crosslinked polyethylene layer.

[0020] Compared to the prior art, the solar cell
5 connecting line of the present utility model can be connected to a solar cell and another component separately by means of the plug terminals 30; when the output current is too large, the configuration of the fuse holder 20 can effectively cut the path and thus
10 serve a protecting function; the wiring ends 11 of the two electric cables 10 are fixedly connected to the holder body 24 of the fuse holder 20 and electrically connected to the two ends of the fuse component 22 respectively; the insulating case 26 is integrally formed
15 outside the holder body 24, sealing and covering the fuse component 22, the holder body 24 and the wiring ends 11 of the electric cables 10; the structure is compact, waterproof, corrosion-resistant and well-sealed, and meets the requirements for use in harsh outdoor
20 environmental conditions, so that the operating performance of the solar cell is more stable and reliable.

[0021] The embodiments disclosed above are merely preferred embodiments of the present utility model, but
25 of course, cannot be used to limit the scope of protection of the present utility model. Thus, equivalent changes made on the basis of the claims of the present utility model still fall within the scope of the present utility model.

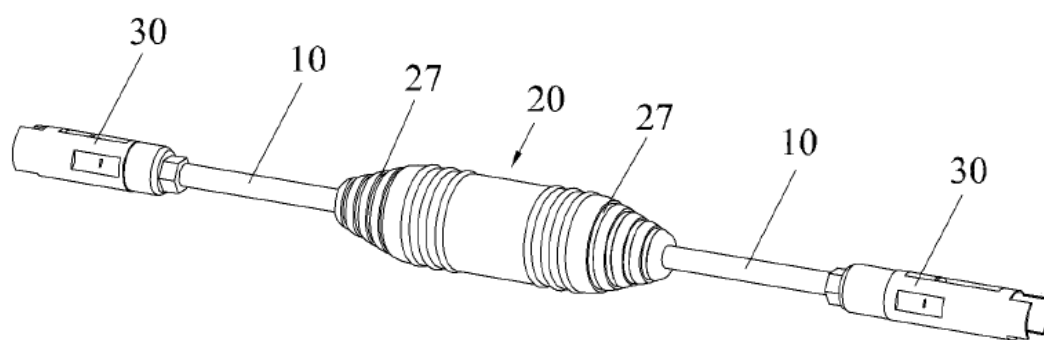


Fig. 1

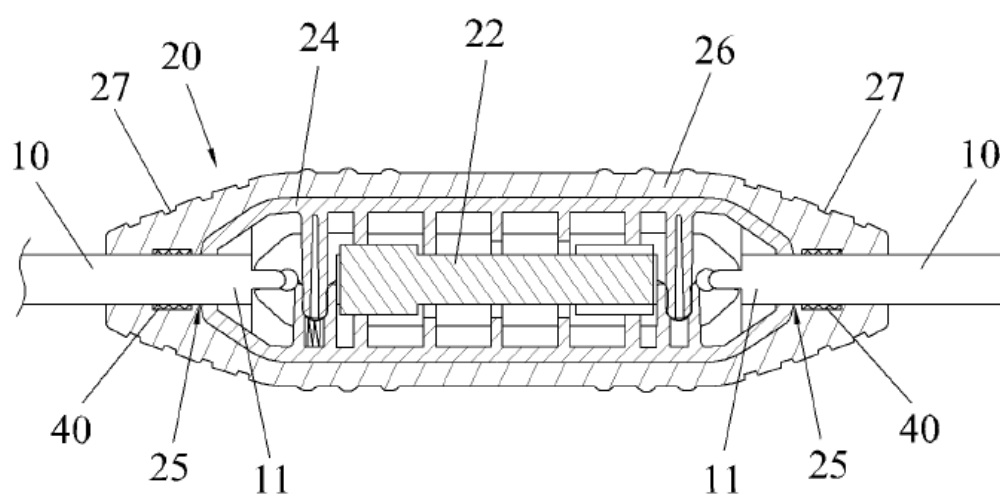


Fig. 2

I, Stephen Robert MURRAY BSc (Hons), Dip. Trans. IoL,
translator to RWS Group Ltd, of Europa House, Chiltern Park, Chiltern Hill, Chalfont St Peter,
Buckinghamshire, United Kingdom, hereby declare that I am conversant with the English and
Chinese languages and am a competent translator thereof. I declare further that to the best of
my knowledge and belief the following is a true and correct translation of the accompanying
document in the Chinese language.

Signed this 8th day of September 2023



S. R. MURRAY

For and on behalf of RWS Group Ltd