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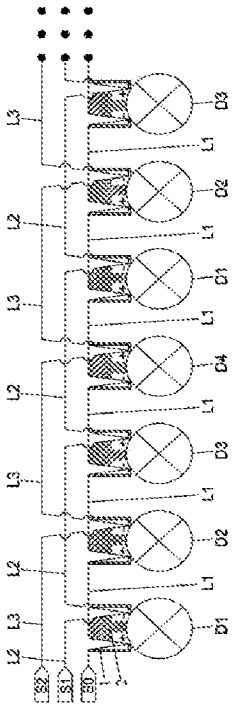
(54) **THREE-WIRE FOUR-WAY LED LAMP STRING**

(57) The patent application discloses a three-wire four-way LED lamp string, comprising a plurality of first LED lamps , a plurality of second LED lamps, a plurality of third LED lamps and a plurality of fourth LED lamps, further comprising:several first wires, wherein a first electrode of the first LED lamp is electrically connected with a first electrode of an adjacent second LED lamp through a first wire, a first electrode of the second LED lamp is electrically connected with a first electrode of an adjacent third LED lamp through a first wire, a first electrode of the third LED lamp is connected with a first electrode of an adjacent fourth LED lamp through a first wire, and a first electrode of the fourth LED lamp is electrically connected with a first electrode of an adjacent first LED lamp through a first wire;several second wires, wherein a second electrode of the first LED lamp is electrically connected with a second electrode of the third LED lamp through a second wire;several third wires, wherein a second electrode of the second LED lamp is electrically connected with a second electrode of the fourth LED lamp through a third wire.which not only simplifies the structure of the lamp string, but also reduces the cost.



NL B1 2034120

THREE-WIRE FOUR-WAY LED LAMP STRING

TECHNICAL FIELD

[0001] The present patent application relates to an LED lamp string, in particular to a three-wire four-way LED lamp string.

BACKGROUND

[0002] LED lamp string is the main ornament of Christmas, which is also an indispensable lighting decorative electronic product for festivities of the general public, homes, storefronts, cultural activities and night scenes in public places and has a broad market.

[0003] At present, most LED lamp strings use a two-wire two-way structure, that is, several LED lamps are connected in parallel on two wires, and the polarities of two adjacent LED lamps are provided in opposite states. For example, the anode terminal of the first LED lamp is electrically connected with the first wire, the cathode terminal of the first LED lamp is electrically connected with the second wire, the cathode terminal of the second LED lamp is electrically connected with the first wire, the anode terminal of the second LED lamp is electrically connected with the second wire, and the rest LED lamps are alternately arranged in the above manner.

[0004] When a high level is applied to the first wire and a low level is applied to the second wire, the odd-numbered LED lamps are lit, and when a low level is applied to the first wire and a high level is applied to the second wire, the even-numbered LED lamps are lit.

[0005] It can be seen according to the two-wire two-way LED lamp string structure described above that the odd-numbered LED lamps are the first street lamps, and the even-numbered LED lamps are the second street lamps, thus forming a two-wire two-way LED lamp string. Under the control of the controller, the first street lamps and the second street lamps can work alternately.

[0006] However, with higher and higher requirements of people for LED lamps, the two-wire two-way LED lamp string cannot meet the corresponding requirements, which is specifically as follows.

[0007] First, it is necessary to form more ways on the same LED lamp string to produce

a better flash effect. At present, there is a structure that four-way lamps are formed on the same LED lamp string, but the structure of the four-way lamp is five-wire four-way. The four-way structure formed by five wires is not only complicated in structure, but also high in cost.

[0008] Second, when the structure with more than three ways is realized, an SMD LED lamp is usually electrically connected with the wire. The specific method is to strip off several parts on the whole continuous wire to expose the conductive parts in the wire, then weld the SMD LED with these exposed conductive parts, and finally seal with sealants. However, since the SMD LED is assembled with the wire by a machine, the distance between two adjacent stripped conductive parts cannot be changed, which leads to the situation that the lamp distance needs to be different in some places. The above structure cannot meet the use requirements.

SUMMARY

[0009] The present patent application provides a three-wire four-way LED lamp string, which not only simplifies the structure of the lamp string, but also reduces the cost.

[0010] A three-wire four-way LED lamp string, comprising a plurality of first LED lamps , a plurality of second LED lamps, a plurality of third LED lamps and a plurality of fourth LED lamps, further comprising:

[0011] several first wires, wherein a first electrode of the first LED lamp is electrically connected with a first electrode of an adjacent second LED lamp through a first wire, a first electrode of the second LED lamp is electrically connected with a first electrode of an adjacent third LED lamp through a first wire, a first electrode of the third LED lamp is connected with a first electrode of an adjacent fourth LED lamp through a first wire, and a first electrode of the fourth LED lamp is electrically connected with a first electrode of an adjacent first LED lamp through a first wire;

[0012] several second wires, wherein a second electrode of the first LED lamp is electrically connected with a second electrode of the third LED lamp through a second wire;

[0013] several third wires, wherein a second electrode of the second LED lamp is electrically connected with a second electrode of the fourth LED lamp through a third wire.

[0014] With the above structure, a three-wire four-way LED lamp string is formed by connecting a first wire, a second wire and a third wire with a first LED lamp to a fourth LED lamp, respectively. Compared with a five-wire four-way LED lamp string, the lamp string with this structure is obviously simplified in structure, thus reducing the cost. Moreover, because the lengths of the first wire, the second wire and the third wire can be selected as required, a three-wire four-way LED lamp string with a controllable lamp distance is formed.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015] FIG. 1 is a structure diagram of a three-wire four-way LED circuit according to the present patent application.

[0016] FIG. 2 is a structure diagram of a plug-in LED lamp.

[0017] FIG. 3 is a simplified diagram of a first LED lamp separated from FIG. 1 and a first LED lamp connected with a first wire and a second wire.

[0018] FIG. 4 is a schematic diagram of a second LED lamp separated from FIG. 1 and a fourth LED lamp connected with a first wire and a third wire.

[0019] Reference numbers in the figures:

[0020] first LED lamps D1, second LED lamps D2, third LED lamps D3, fourth LED lamps D4, first wires L1, second wires L2, third wires L3, sleeves 1, and insulating and isolating parts 2.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0021] The present patent application will be further explained in detail with reference to the attached drawings and specific embodiments hereinafter.

[0022] As shown in FIG. 1, the three-wire four-way LED lamp string of the present patent application comprises a plurality of first LED lamps D1, a plurality of second LED lamps D2, a plurality of third LED lamps D3, a plurality of fourth LED lamps D4, several first wires L1, several second wires L2, and several third wires L3. The first LED lamps D1, the second LED lamps D2, the third LED lamps D3, and the fourth LED lamps D4 in this embodiment are all plug-in LED lamps (as shown in FIG. 2). Each part and the correlation among various parts will be described in detail hereinafter.

[0023] As shown in FIG. 1, a first electrode of the first LED lamp D1 is electrically

connected with a first electrode of an adjacent second LED lamp D2 through a first wire L1, a first electrode of the second LED lamp D2 is electrically connected with a first electrode of an adjacent third LED lamp D3 through a first wire L1, a first electrode of the third LED lamp D3 is connected with a first electrode of an adjacent fourth LED lamp D4 through a first wire L1, and a first electrode of the fourth LED lamp D4 is electrically connected with a first electrode of an adjacent first LED lamp D1 through a first wire L1.

[0024] As shown in FIG. 1, a second electrode of the first LED lamp D1 is electrically connected with a second electrode of the third LED lamp D3 through a second wire L2. In this embodiment, specifically, the third LED lamp D3 with the smallest distance from the first LED lamp D1 is electrically connected with the second electrodes of the first LED lamp D1 and the third LED lamp D3 through a second wire L2.

[0025] As shown in FIG. 1, a second electrode of the second LED lamp D2 is electrically connected with a second electrode of the fourth LED lamp D4 through a third wire L3. In this embodiment, specifically, the fourth LED lamp D4 with the smallest distance from the second LED lamp D2 is electrically connected with the second electrodes of the second LED lamp D2 and the fourth LED lamp D4 through a third wire L3.

[0026] In FIG. 1, the first LED lamps D1, the second LED lamps D2, the third LED lamps D3 and the fourth LED lamps D4 are arranged in sequence, namely, a first lamp is the first LED lamp D1, a second lamp is the second LED lamp D2, a third lamp is the third LED lamp D3, a fourth lamp is the fourth LED lamp D4, a fifth lamp is the first LED lamp D1, a sixth lamp is the second LED lamp D2, a seventh lamp is the third LED lamp D3, an eighth lamp is the fourth LED lamp D4, and other LED lamps circulate in the above arrangement.

[0027] It can be seen according to the above arrangement that the first LED lamp D1 adjacent to the first lamp is the second lamp, that is, the second LED lamp D2. The second LED lamp D2 adjacent to the second lamp is the third lamp, that is, the third LED lamp D3. The third LED lamp D3 adjacent to the third lamp is the fourth lamp, that is, the fourth LED lamp D4. The fourth LED lamp D4 adjacent to the fourth lamp is the fifth lamp, that is, the first LED lamp D1. The adjacent modes of other LED lamps circulate as described above.

[0028] In the present patent application, several first wires L1, second wires L2 and third wires L3 are used to connect the above LEDs. On the one hand, the length of each of the first wires L1, the second wires L2 and the third wires L3 can be selected as required. When welding each wire with the LED lamp manually or by a machine, the conductive ends of the first wires L1, the second wires L2 and the third wires L3 are used. Therefore, it is only necessary to use the end of each wire as the basis for welding, so that the distance between two adjacent lamps can be easily controlled.

[0029] The length of each of the first wires L1 is 5 to 100cm. The length of the second wire L2 is 5 to 100cm. The the length of the third wire L3 is 5 to 100cm. In this embodiment, the lengths of the first wires L1, the second wires L2, and the third wires L3 can all be selected from 5 to 100cm as required, so as to meet the use requirements.

[0030] The first LED lamp D1 has the same polarity as that of the first electrode of the adjacent second LED lamp D2, the second LED lamp D2 has the opposite polarity to that of the first electrode of the adjacent third LED lamp D3, the third LED lamp D3 has the same polarity as that of the first electrode of the adjacent fourth LED lamp D4, and the fourth LED lamp D4 has the opposite polarity to that of the first electrode of the adjacent first LED lamp D1.

[0031] The polarities of the above LED lamps are illustrated: the first electrode of the first LED lamp D1 is anode, the second electrode of the first LED lamp D1 is cathode, the first electrode of the second LED lamp D2 is anode, the second electrode of the second LED lamp D2 is cathode, the first electrode of the third LED lamp D3 is cathode, the second electrode of the third LED lamp D3 is anode, the first electrode of the fourth LED lamp D4 is cathode, and the second electrode of the fourth LED lamp D4 is anode.

[0032] As can be seen from the schematic diagram of FIG. 1, the first LED lamps D1 and the third LED lamps D3 are alternately connected in parallel between the first wire L1 and the second wire L2. In addition, it can be seen according to the above polarities that the first LED lamps D1 and the third LED lamps D3 are connected with the first wire L1 and the second wire L2 in the state of opposite polarities. This arrangement is shown in the simplified schematic diagram of FIG. 3.

[0033] Similarly, the second LED lamps D2 and the fourth LED lamps D4 are alternately connected in parallel between the first wire L1 and the third wire L3. In

addition, it can be seen according to the above polarities that the second LED lamps D2 and the fourth LED lamps D4 are connected with the first wire L1 and the third wire L3 in the state of opposite polarities. This arrangement is shown in the simplified schematic diagram shown of FIG. 4. It can be seen from the above that the first wire L1 is a common line.

[0034] As can be seen from the simplified diagram of FIG. 3, when S0 is at a high level and S1 is at a low level, all the first LED lamps D1 are turned on and all the third LED lamps D3 cannot be turned on at this time, so that all the first LED lamps D1 are lit, and all the third LED lamps D3 are turned off. When S0 is at a low level and S1 is at a high level, all the first LED lamps D1 cannot be turned on and all the third LED lamps D3 are turned on at this time, so that all the first LED lamps D1 are turned off and all the third LED lamps D3 are lit.

[0035] As can be seen from the simplified diagram of FIG. 4, when S0 is at a high level and S2 is at a low level, all the second LED lamps D2 are turned on and all the fourth LED lamps D4 cannot be turned on, so that all the second LED lamps D2 are lit, and all the fourth LED lamps D4 are turned off. When S0 is at a low level and S2 is at a high level, all the second LED lamps D2 cannot be turned on and all the fourth LED lamps D4 are turned on at this time, so that all the second LED lamps D2 are turned off, and all the fourth LED lamps D4 are lit.

[0036] To sum up, the first wire L1, the second wire L2 and the third wire L3 are connected with the first LED lamps D1 to the fourth LED lamps D4, respectively, and the duty ratios of S0, S1 and S2 are controlled, so that the four-way LED lamps are alternately turned on and off, resulting in different lighting effects. It can be seen that the LED lamp string of the present patent application is a three-wire four-way LED lamp string. Compared with the five-wire four-way lamp string, the lamp string with this structure is obviously simplified in structure, thus reducing the cost. Moreover, because the lengths of the first wire L1, the second wire L2 and the third wire L3 can be selected as required, a three-wire four-way LED lamp string with a controllable lamp distance is formed.

[0037] The present patent application further comprises sleeves 1. The first electrodes and the second electrodes of the first LED lamps D1, the second LED lamps D2, the third LED lamps D3 and the fourth LED lamps D4 are all wrapped with the sleeves 1.

The electrode of each of the LED lamps is wrapped with the sleeve 1, which can prevent the electrode from being broken when it is stressed or prevent the welding between the electrode and the wire from falling off. The sleeves 1 are made of plastic or rubber.

[0038] The present patent application further comprises insulating and isolating parts 2. The insulating and isolating parts 2 are provided between the first electrodes and the second electrodes of the first LED lamps D1, the second LED lamps D2, the third LED lamps D3 and the fourth LED lamps D4. The first electrode and the second electrode are isolated by the insulating and isolating part 2, which can avoid short circuit when the first electrodes and the second electrodes are combined together. The insulating and isolating parts 2 are made of plastic or rubber.

[0039] Finally, it should be explained that the above embodiments are only the preferred embodiments of the present patent application to illustrate the technical solution of the present patent application, rather than limit the technical solution or limit the protection scope of the present patent application. Although the present patent application has been described in detail with reference to the aforementioned embodiments, it should be understood by those skilled in the art that the technical solution described in the aforementioned embodiments can be still modified, or some or all of the technical features can be equivalently substituted. These modifications or substitutions do not make the essence of the corresponding technical solutions depart from the scope of protection of the claims.

Conclusies

1. Een driedraads vierweg LED lamp snoer, dat een veelvoud omvat aan eerste LED lampen (D1), een veelvoud aan tweede LED lampen (D2), een veelvoud aan derde LED lampen (D3) en een veelvoud aan vierde LED lampen (D4), dat verder omvat:

meerdere eerste draden (L1), waarin een eerste elektrode van de eerste LED lamp (D1) door een eerste draad (L1)) elektrisch verbonden is met een eerste electrode van een naastgelegen tweede LED lamp (D2), een eerste elektrode van de tweede LED lamp (D2) door een eerste draad (L1) elektrisch verbonden is met een eerste elektrode van een naastgelegen derde LED lamp (D3), een eerste elektrode van de derde LED lamp (D3) door een eerste draad (L1) verbonden is met een eerste elektrode van een naastgelegen vierde LED lamp (D4), en een eerste elektrode van de vierde LED lamp (D4) door een eerste draad (L1) elektrisch verbonden is met een eerste elektrode van een naastgelegen eerste LED lamp (D1);

meerdere tweede draden (L2), waarbij een tweede elektrode van de eerste LED lamp (D1) door een tweede draad (L2) elektrisch verbonden is met een tweede elektrode van de derde LED lamp (D3);

meerdere derde draden (L3), waarbij een tweede elektrode van de tweede LED lamp (D2) door een derde draad (L3) elektrisch verbonden is met een tweede elektrode van de vierde LED lamp (D4).

2. Driedraads vierweg LED lamp snoer volgens conclusie 1, waarbij de eerste LED lampen (D1), de tweede LED lampen (D2), de derde LED lampen (D3) en de vierde LED lampen (D4) allemaal plug-in LED lampen zijn.

3. Driedraads vierweg LED lamp snoer volgens conclusie 1, waarbij de lengte van elk van de eerste draden (L1) 5 tot 100 cm is.

4. Driedraads vierweg LED lamp snoer volgens conclusie 1, waarbij de lengte van de tweede draad (L2) 5 tot 100 cm is.

5. Driedraads vierweg LED lamp snoer volgens conclusie 1, waarbij de lengte van

de derde draad (L3) 5 tot 100 cm is.

6. Driedraads vierweg LED lamp snoer volgens conclusie 1, waarbij de eerste LED lamp (D1) dezelfde polariteit heeft als de eerste elektrode van de naastgelegen tweede LED lamp (D2), de tweede LED lamp (D2) de polariteit heeft tegenovergesteld aan die van de eerste elektrode van de naastgelegen derde LED lamp (D3), de derde LED lamp (D3) dezelfde polariteit heeft als de eerste elektrode van de naastgelegen vierde LED lamp (D4), en de vierde LED lamp (D4) de polariteit heeft tegenovergesteld aan die van de eerste elektrode van de naastgelegen eerste LED lamp (D1).

7. Driedraads vierweg LED lamp snoer volgens conclusie 1, dat verder hulzen (1) omvat, waarbij de eerste elektroden en de tweede elektroden van de eerste LED lampen (D1), de tweede LED lampen (D2), de derde LED lampen (D3) en de vierde LED lampen (D4) allemaal omhuld zijn door hulzen (1).

8. Driedraads vierweg LED lamp snoer volgens conclusie 1 tot 7, dat verder isolerende delen (2) omvat, waarbij de isolerende delen (2) geleverd worden tussen de eerste elektroden en de tweede elektroden van de eerste LED lampen (D1), de tweede LED lampen (D2), de derde LED lampen (D3) en de vierde LED lampen (D4).

1/2

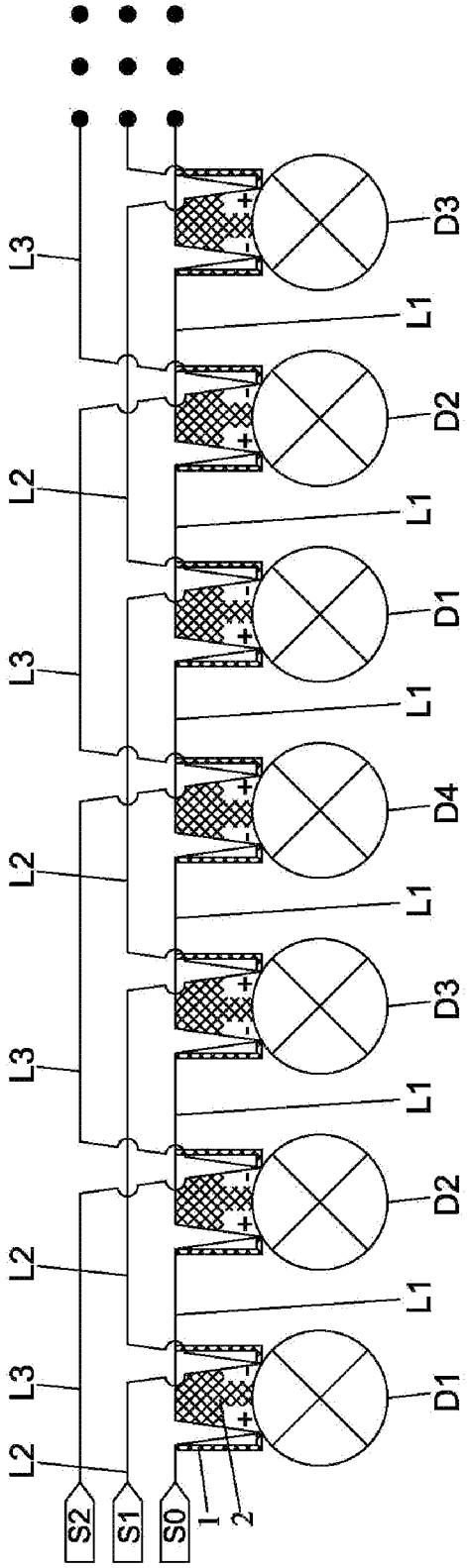

L3
L1
D3
L2
L1
D2
L3
L1
D1
L2
L1
D4
L3
L1
D3
L2
L1
D2
L3
L1
D1
L2
S2
S1
S0
1
2

Fig. 1

2/2

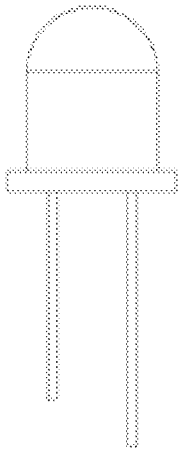


Fig. 2

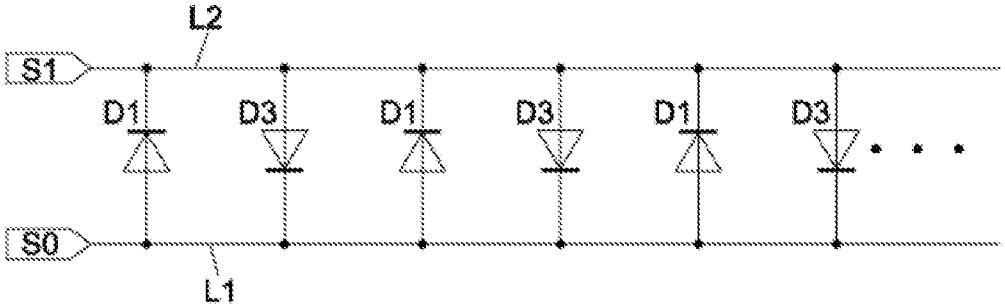


Fig. 3

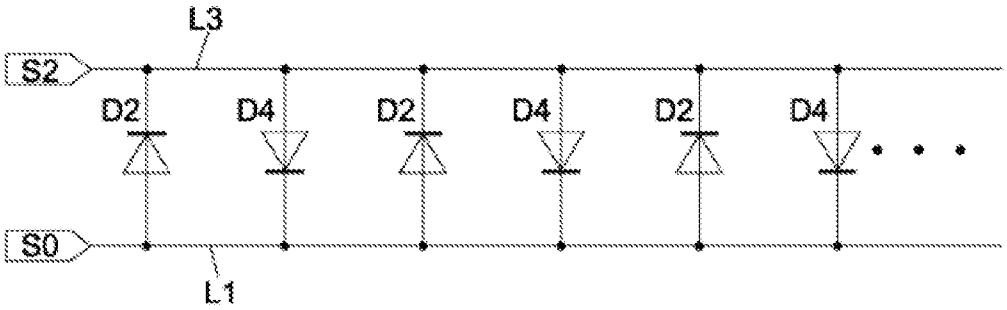


Fig. 4

Rijksdienst voor Ondernemend Nederland

OCTROOIAANVRAAG NR.:
NO 143453
NL 2034120

ONDERZOEKSRAPPORT

BETREFFENDE HET RESULTAAT VAN HET ONDERZOEK NAAR DE STAND VAN DE TECHNIEK

RELEVANTE LITERATUUR

Categorie[1]	Literatuur met, voor zover nodig, aanduiding van speciaal van belang zijnde tekstgedeelten of figuren.	Van belang voor conclusie(s) nr:	Classificatie(IPC)
X Y	EP 3 748 222 A1 (SHANGYOU JIAYI LIGHTING PRODUCT CO LTD [CN]) 9 december 2020 (2020-12-09) * alinea [0040] - alinea [0046]; figuur 3 * -----	1,2,6 3-5,7,8	INV. H05B45/10 H05B45/42 H05B47/155
X	DE 20 2022 104960 U1 (CHANGZHOU JUTAI ELECT CO LTD [CN]) 8 november 2022 (2022-11-08) * figuur 4 * -----	1	
X	US 2019/186724 A1 (XIE HUARONG [CN]) 20 juni 2019 (2019-06-20) * figuur 6 * -----	1	
Y	EP 3 789 656 A1 (ZHUHAI BOJAY ELECTRONICS CO LTD [CN]) 10 maart 2021 (2021-03-10) * figuren 1, 7, 11 * -----	3-5,7,8	

Onderzochte gebieden van de techniek
H05B

Indien gewijzigde conclusies zijn ingediend, heeft dit rapport betrekking op de conclusies ingediend op:

Plaats van onderzoek:	Datum waarop het onderzoek werd voltooid:	Bevoegd ambtenaar:
München	23 april 2024	Plamann, Tobias

[1] NDERLINCATEGORIE VAN DE VERMELDE LITERATUUR

X: de conclusie wordt als niet nieuw of niet inventief beschouwd ten opzichte van deze literatuur
Y: de conclusie wordt als niet inventief beschouwd ten opzichte van de combinatie van deze literatuur met andere geciteerde literatuur van dezelfde categorie, waarbij de combinatie voor de vakman voor de hand liggend wordt geacht
A: niet tot de categorie X of Y behorende literatuur die de stand van de techniek beschrijft
O: niet-schriftelijke stand van de techniek
P: tussen de voorrangsdatum en de indieningsdatum gepubliceerde literatuur
T: na de indieningsdatum of de voorrangsdatum gepubliceerde literatuur die niet bezwarend is voor de octrooiaanvrage, maar wordt vermeld ter verheldering van de theorie of het principe dat ten grondslag ligt aan de uitvinding
E: eerdere octrooi(aanvrage), gepubliceerd op of na de indieningsdatum, waarin dezelfde uitvinding wordt beschreven
D: in de octrooiaanvrage vermeld
L: om andere redenen vermelde literatuur
&: lid van dezelfde octrooifamilie of overeenkomstige octrooipublicatie

EOB FORM 02.83 (P0414B)

AANHANGSEL BEHORENDE BIJ HET RAPPORT BETREFFENDE HET ONDERZOEK NAAR DE STAND VAN DE TECHNIEK, UITGEVOERD IN DE OCTROOIAANVRAGE NR.

NO 143453
NL 2034120

Het aanhangsel bevat een opgave van elders gepubliceerde octrooiaanvragen of octrooien (zogenaamde leden van dezelfde octrooifamilie), die overeenkomen met octrooischriften genoemd in het rapport.
De opgave is samengesteld aan de hand van gegevens uit het computerbestand van het Europees Octrooibureau per
De juistheid en volledigheid van deze opgave wordt noch door het Europees Octrooibureau, noch door het Bureau voor de Industriële eigendom gegarandeerd;; de gegevens worden verstrekt voor informatiedoeleinden.

23-04-2024

In het rapport genoemd octrooigeschrift	Datum van publicatie	Overeenkomend(e) geschrift(en)	Datum van publicatie
EP 3748222 A1	09-12-2020	CN 210662395 U	02-06-2020
		EP 3748222 A1	09-12-2020
		US 2020386374 A1	10-12-2020
DE 202022104960 U1	08-11-2022	CN 217789939 U	11-11-2022
		DE 202022104960 U1	08-11-2022
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US 2019186724 A1	20-06-2019	CN 109963370 A	02-07-2019
		US 2019186724 A1	20-06-2019
EP 3789656 A1	10-03-2021	EP 3789656 A1	10-03-2021
		US 2021071850 A1	11-03-2021

Algemene informatie over dit aanhangsel is gepubliceerd in de 'Official Journal' van het Europees Octrooibureau nr 12/82 blz 448 ev

SCHRIFTELIJKE OPINIE

DOSSIER NUMMER	INDIENINGSDATUM	VOORRANGSDATUM	AANVRAAGNUMMER
NO143453	09.02.2023	18.12.2022	NL2034120

CLASSIFICATIE
INV. H05B45/10 H05B45/42 H05B47/155

AANVRAGER
Linhai Weihong Christmas Lighting Co.,Ltd.

Deze schriftelijke opinie bevat een toelichting op de volgende onderdelen:

- ☒ Onderdeel I Basis van de schriftelijke opinie
- ☐ Onderdeel II Voorrang
- ☐ Onderdeel III Vaststelling nieuwheid, inventiviteit en industriële toepasbaarheid niet mogelijk
- ☐ Onderdeel IV De aanvraag heeft betrekking op meer dan één uitvinding
- ☒ Onderdeel V Gemotiveerde verklaring ten aanzien van nieuwheid, inventiviteit en industriële toepasbaarheid
- ☐ Onderdeel VI Andere geciteerde documenten
- ☒ Onderdeel VII Overige gebreken
- ☐ Onderdeel VIII Overige opmerkingen

DE BEVOEGDE AMBTENAAR
Plamann, Tobias

Aanvraag nr.:

SCHRIFTELIJKE OPINIE

NL2034120

Onderdeel I Basis van de Schriftelijke Opinie

1. Deze schriftelijke opinie is opgesteld op basis van de meest recente conclusies ingediend voor aanvang van het onderzoek.

2. Deze motivering is opgesteld, met betrekking tot **nucleotide- en/of aminozuursequenties** die genoemd worden in de aanvraag, op basis van een sequentielijst die:

   a. ☐ is opgenomen in de aanvraag zoals deze oorspronkelijk is ingediend

   b. ☐ aangeleverd is na de indieningsdatum ten behoeve van het onderzoek

      ☐ en vergezeld ging van een verklaring dat de sequentielijst niet meer informatie bevat dan de aanvraag zoals deze oorspronkelijk is ingediend.

3. ☐ Deze motivering is opgesteld, met betrekking tot nucleotide- en/of aminozuursequenties die genoemd worden in de aanvraag, voor zover een zinvolle motivering gevormd kon worden zonder een sequentielijst die voldeed aan WIPO standaard ST.26.

4. Overige opmerkingen:

Onderdeel V Gemotiveerde verklaring ten aanzien van nieuwheid, inventiviteit en industriële toepasbaarheid

1. Verklaring

Nieuwheid	Ja:	Conclusies	3-5, 7, 8
	Nee:	Conclusies	1, 2, 6
Inventiviteit	Ja:	Conclusies	
	Nee:	Conclusies	1-8
Industriële toepasbaarheid	Ja:	Conclusies	1-8
	Nee:	Conclusies	

2. Citaties en toelichting:

   Zie aparte bladzijde

Onderdeel VII Overige gebreken

De volgende gebreken in de vorm of inhoud van de aanvraag zijn opgemerkt:

Zie aparte bladzijde

Reference is made to the following documents:

D1 EP 3 748 222 A1 (SHANGYOU JIAYI LIGHTING PRODUCT CO LTD [CN]) 9 december 2020 (2020-12-09)

D2 DE 20 2022 104960 U1 (CHANGZHOU JUTAI ELECT CO LTD [CN]) 8 november 2022 (2022-11-08)

D3 US 2019/186724 A1 (XIE HUARONG [CN]) 20 juni 2019 (2019-06-20)

D4 EP 3 789 656 A1 (ZHUHAI BOJAY ELECTRONICS CO LTD [CN]) 10 maart 2021 (2021-03-10)

Item V

1 The present application does not meet the criteria of patentability, because the subject-matter of independent claim 1 is not new.

1.1 Document D1 discloses (the whole document) *een driedraads vierweg LED lamp snoer (figure 3), dat een veelvoud omvat aan eerste LED lampen (figure 3: 1101), een veelvoud aan tweede LED lampen (figure 3: 1102), een veelvoud aan derde LED lampen (figure 3: 1103) en een veelvoud aan vierde LED lampen (figure 3: 1104), dat verder omvat:*

- *meerdere eerste draden, waarin een eerste elektrode van de eerste LED lamp door een eerste draad elektrisch verbonden is met een eerste electrode van een naastgelegen tweede LED lamp, een eerste elektrode van de tweede LED lamp door een eerste draad elektrisch verbonden is met een eerste elektrode van een naastgelegen derde LED lamp, een eerste elektrode van de derde LED lamp door een eerste draad verbonden is met een eerste elektrode van een naastgelegen vierde LED lamp, en een eerste elektrode van de vierde LED lamp door een eerste draad elektrisch verbonden is met een eerste elektrode van een naastgelegen eerste LED lamp (see second cable 140 in figure 3 in connection with paragraph 41);*

- *meerdere tweede draden, waarbij een tweede elektrode van de eerste LED lamp door een tweede draad elektrisch verbonden is met een tweede elektrode van de derde LED lamp (see first cable 130 in figure 3 in connection with paragraph 41);*

- *meerdere derde draden, waarbij een tweede elektrode van de tweede LED lamp door een derde draad elektrisch verbonden is met een tweede elektrode van de vierde LED lamp (see third cable 150 in figure 3 in connection with paragraph 41).*

1.2 Therefore, the subject-matter of claim 1 lacks novelty in view of D1.

1.3 The subject-matter of claim 1 also lacks novelty in view of D2 and D3 (D2, figure 4; D3, figure 6).

2 The subject-matter of dependent claims 2 to 8 is not novel or does not involve an inventive step. The Applicant may refer to the following passages in the prior art:

2.1 Claim 2: Paragraph 40 of D1;

2.2 Claims 3 to 5: The claimed distances are rendered obvious by figure 1 of D4.

2.3 Claim 6: figure 3 of D1.

2.4 Claim 7: The use of sleeves is rendered obvious by figure 7 of D4 (see elements 213 and 222).

2.5 Claim 8: The use of insulating portions is rendered obvious by figure 11 of D4 (see elements 15).

Item VII

3 Independent claim 1 is not in the two-part form, which in the present case would be appropriate, with those features known in combination from the prior art being placed in the preamble and the remaining features being included in the characterising part.

3.1 The relevant background art disclosed in documents D1 to D3 is not mentioned in the description, nor are those documents identified therein.

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