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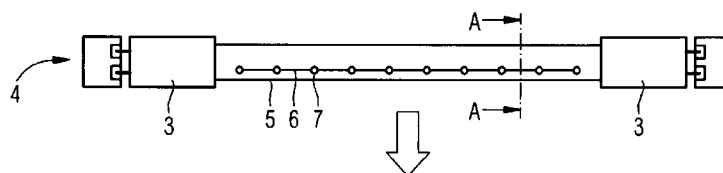
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(54) Title: COMPLETELY PLASTIC LED TUBE LIGHT AND MANUFACTURING METHOD THEREOF

FIG 2a



(57) Abstract: A completely plastic LED tube light, comprising: plastic shell comprising wires embedded therein, two or more projections having bigger dimensions than that of the wires are formed on the wires; end caps located at two ends of the plastic shell, respectively; and LEDs positioned in a space enclosed by the plastic shell and the end caps. There is also provided A method for manufacturing a completely plastic LED tube light.

Description

Completely Plastic LED Tube Light and Manufacturing Method thereof

5 Technical Field

[01] The present invention relates to a completely plastic LED tube light, particularly, to a completely plastic LED tube light which can prevent its plastic shell from deforming. The present invention also relates to a method for manufacturing
10 the completely plastic LED tube light.

Background Art

[02] There are two typical types of LED tube light in the market. The first type of LED tube light has a shell. Part of the shell is made of plastics forming a transparent
15 portion for transmitting light to outside, and other parts of the shell is made of aluminum heat sink which is opposite to a mounting surface for mounting the LED tube light. The disadvantages of such LED tube light lies in its expensive manufacturing cost, limiting its wide appli-
20 cation.

[03] To reduce manufacturing cost, as the LED tube light develops, the second type of LED tube light emerges in the market, which uses a shell totally made of plastics instead of comprising a metal heat sink therein to reducing
25 manufacturing cost. That is, it is a completely plastic LED tube light and it has become more and more popular. However, though it is not as expensive as the first type of the LED tube light, it has another undesirable defect. That is, as time goes, especially in cases when the light
30 is on and a lot of heat is generated, the plastic shell will begin to deform. Such deformation may cause bad con-

tact between some circuits in the tube light, and thus cause failure in the light. Moreover, because such deformation is irreversible, the amount of deformation becomes bigger and bigger as time goes by, which means users have to exchange it after a not long period of time, thus increasing the usage cost.

[04] Figure 1a is a side view showing the second type of completely plastic LED light 1 in the prior art, in which the plastic shell 2 has not deformed, Figure 1b is a side view showing the second type of completely plastic LED light 1 in the prior art, in which the plastic shell 2 has deformed after being used for a period of time. As shown in Figures 1a and 1b, the tube light comprises a plastic tubular shell 2 and two end caps 3 at both ends of the plastic tubular shell 2.

[05] The above defects of the completely plastic LED light in the prior art result in that it cannot be a LED tube light of high quality and good performance. Currently, no completely plastic LED light which can prevent its plastic shell from deforming has been disclosed.

Contents of Invention

[06] The present invention aims to provide a new completely plastic LED light which can prevent its plastic shell from deforming, which can overcome the above defects in the prior art.

[07] Meanwhile, the present invention aims to provide a method for manufacturing the new completely plastic LED light.

[08] A completely plastic LED tube light according to the

invention, comprising: plastic shell comprising wires embedded therein, two or more projections having bigger dimensions than that of the wires are formed on the wires; end caps located at two ends of the plastic shell, respectively; and LEDs positioned in a space enclosed by the plastic shell and the end caps. The present invention also provides a method for manufacturing the completely plastic LED tube light.

[09] A method for manufacturing a completely plastic LED tube light according to the invention, comprising the steps of delivering raw materials for making plastic shell into an inlet of an extrusion device for manufacturing the completely plastic LED tube light; continuously embedding the wires having projections into the raw materials of liquid phase in a direction by a wire feeding device; extruding solid plastic shell having wires with projections from outlets of the extrusion device by the extrusion device; and assembling the plastic shell and other parts of the completely plastic LED tube light together.

Description of Figures

[10] Figure 1a is a side view showing a completely plastic LED tube light in the prior art, in which the plastic shell of the tube light has not deformed, and Figure 1b is a side view showing a completely plastic LED tube light in the prior art, in which the plastic shell of the tube light has deformed;

[11] Figure 2a is a side view showing a completely plastic LED tube light according to the invention, in which the plastic shell of the tube light has not deformed, and Figure 2b is a side view showing a completely plastic LED tube light according to the invention, in which the plas-

tic shell of the tube light has deformed, and Figure 2c schematically shows the principal of the completely plastic LED tube light according to the invention to prevent its plastic shell from deforming;

5 [12] Figure 3 shows a sectional view of the plastic shell of the completely plastic LED tube light taken along line A-A of Figure 2; and

[13] Figure 4 schematically shows a method for manufacturing the completely plastic LED tube light according to the
10 invention.

Specific Mode for Carrying out the Invention

[14] Figure 2a is a side view showing a completely plastic LED tube light 4 according to the invention, in which the plastic shell of the tube light 4 has not deformed, and
15 Figure 2b is a side view showing a completely plastic LED tube light 4 according to the invention, in which the plastic shell of the tube light 4 has deformed. To simplify the figures, LEDs for constructing the completely plastic LED tube light are omitted in all figures. As
20 shown in Figures 2a and 2b, to prevent plastic shell 5 of the tube light 4 from deforming due to the heat generated by the light during usage, according to the invention, wires are embedded in plastic shell 5 made of PC or PMMA. Two or more projections 7, having bigger dimensions than
25 that of the wires 6, are formed on the wires 6, so that friction occurs between projections 7 and the plastics contacting therewith when the plastic shell 5 deforms. The projections 7 can be of any shape which has a bigger size than the wires 6, for example of spherical, or ellipsoid
30 or cube shape. The wires 6 can extend part of the lengths of the plastic shell 5, preferably extent entire lengths

of the plastic shell 5. The wires 6 are made of materials having less stretch than plastic so as not to deform easily, for example, are made of metals, and preferably made of copper or steels. Projections 7 and wires 6 can be made of the same or different materials. Projections 7 and wires 6 can be made integrally, or separately and then bonded together by welding or other means. Preferably, wires 6 with projections 7 are embedded in the plastic shell 5 in an extrusion molding method, which will be described further in combination with Figure 4 below.

[15] Figure 2c schematically shows the principal of the completely plastic LED tube light 4 according to the invention to prevent its plastic shell 5 from deforming. During usage of the tube light 4, the plastic shell 5 tends to soften due to heat generated by the light and thus to deform, as shown in Figure 2b. When such changes happens to the plastic shell 5, wires 6 embedded in the plastic shell 5 is subject to a pulling force due to such changes of the plastic shell 5, as shown in Figure 2c. At this time, projections 7 of the wires 6 tends to slide in softening plastics, thereby creating frictions between projections 7 and plastics contacting therewith. Such frictions will create resistance, preventing projections 7 from sliding in the plastic shell 5. That is to say, friction force between projections 7 and plastics prevents projections 7 from sliding, thus prevents wires 6 between adjacent projections 7 from deforming by stretching and further prevents the deformation of the plastics shell.

[16] Figure 3 shows a sectional view of the plastic shell 5 of the completely plastic LED tube light 4 taken along line A-A of Figure 2. As can be seen from Figure 3, the plastic shell 5 has a circular section. For convenient of

explanation, the plastic shell is herein divided into a transparent portion A (the portion above the axis X) for transmitting light to outside and a mounting portion B (the portion below the axis X) opposite to a wall or other mounting surface on which the tube light is mounted. Generally, wires 6 with projections 7 is formed in the mounting portion B of the plastics shell 5, to avoid the influence of the projections 7 on the light pattern and effects of the tube light. However, wires 6 with projections 7 can be also formed in the transparent portion A of the shell. In order to prevent the plastics shell 5 from deforming better, preferably, wires 6 with projections 7 is arranged in the shell 5 perpendicular to the axis Y of the wall or the other mounting surface. Of course, wires 6 can also be arranged in asymmetrical or other manners.

[17] Figure 4 schematically shows a method for manufacturing the completely plastic LED tube light 4 according to the invention. As is shown in Figure 4, this method for manufacturing the completely plastic LED tube light is substantially the same as that in the prior art, except that there is a step of embedding wires 6 with projections 7 into liquid PC or PMMA raw materials, curing and then obtaining the final product. Below are descriptions of steps of the method. Firstly, delivering PC or PMMA raw materials for making plastic shell 5 of the LED tube light 4 into an inlet 10 of an extrusion device 8 for manufacturing the plastic shell 5 of the completely plastic LED tube light 4; secondly, continuously embedding the wires 6 having projections 7 into the PC or PMMA raw materials of liquid phase in a direction indicated by an arrow B by a wire feeding device 9; thirdly, extruding solid plastic shell having wires 6 with projections 7 at a certain of

extruding velocity V from outlets 11 of the extrusion device by the extrusion device 8; and lastly, assembling the obtained plastic shell 5 and other parts of the completely plastic LED tube light 4 together, thus obtaining a completely plastic LED tube light 4 according to the invention.

[18] The completely plastic LED tube light according to the invention can be used in T10, T8 and T5 LED products. By the method for manufacturing the completely plastic LED tube light according to the invention, T10, T8 and T5 LED light can be produced which can prevent its plastic shells from deforming.

[19] The completely plastic LED tube light according to the invention reduces manufacturing cost by embedding wires with projections into plastic shell in an extrusion method.

[20] Though embodiments have been described as above, the skilled in the art will be appreciated that the scope of protection of the invention is not limited thereto, but rather defined by the accompanying claims. Moreover, the present invention is intended to include all modifications and variations without departing from the scope and spirit of the invention.

Patent claims

1. A completely plastic LED tube light, comprising:

plastic shell comprising wires embedded therein, two or
5 more projections having bigger dimensions than that of the
wires are formed on the wires;

end caps located at two ends of the plastic shell, re-
spectively; and

LEDs positioned in a space enclosed by the plastic
10 shell and the end caps.

2. A completely plastic LED tube light according to
claim 1, wherein the wires are embedded into the plastic
shell in an extrusion process.

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3. A completely plastic LED tube light according to
claim 1, wherein the plastic shell is made of polycarbon-
ate or PMMA.

20 4. A completely plastic LED tube light according to
claim 1, wherein the wires extend entire or part of the
lengths of the plastic shell.

25 5. A completely plastic LED tube light according to
claim 1, wherein the wires are made of materials having
less stretch than plastic.

6. A completely plastic LED tube light according to
claim 1, wherein the wires are made of metals.

30

7. A completely plastic LED tube light according to claim 6, wherein the wires are made of copper or steel.

8. A completely plastic LED tube light according to
5 claim 1, wherein the wires and the projections are formed integrally or formed separately and then secured together.

9. A completely plastic LED tube light according to
10 claim 1, wherein the wires and the projections are made of same or different materials.

10. A completely plastic LED tube light according to
claim 1, wherein the projections are of spherical, or ellipsoid or cube shape.

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11. A completely plastic LED tube light according to claim 1, wherein the projections are made of metals.

12. A completely plastic LED tube light according to
20 claim 11, wherein the projections are made of copper or steel.

13. A completely plastic LED tube light according to
claim 1, wherein the wires having the projections are
25 formed in a mounting part of the plastic shell.

14. A completely plastic LED tube light according to
claim 1, wherein the wires having the projections are
formed in both of a mounting part and a transparent part
30 of the plastic shell.

15. A completely plastic LED tube light according to claim 1, wherein the wires having the projections are arranged symmetrically in the plastic shell with respect to an axis perpendicular to a wall or other mounting faces.

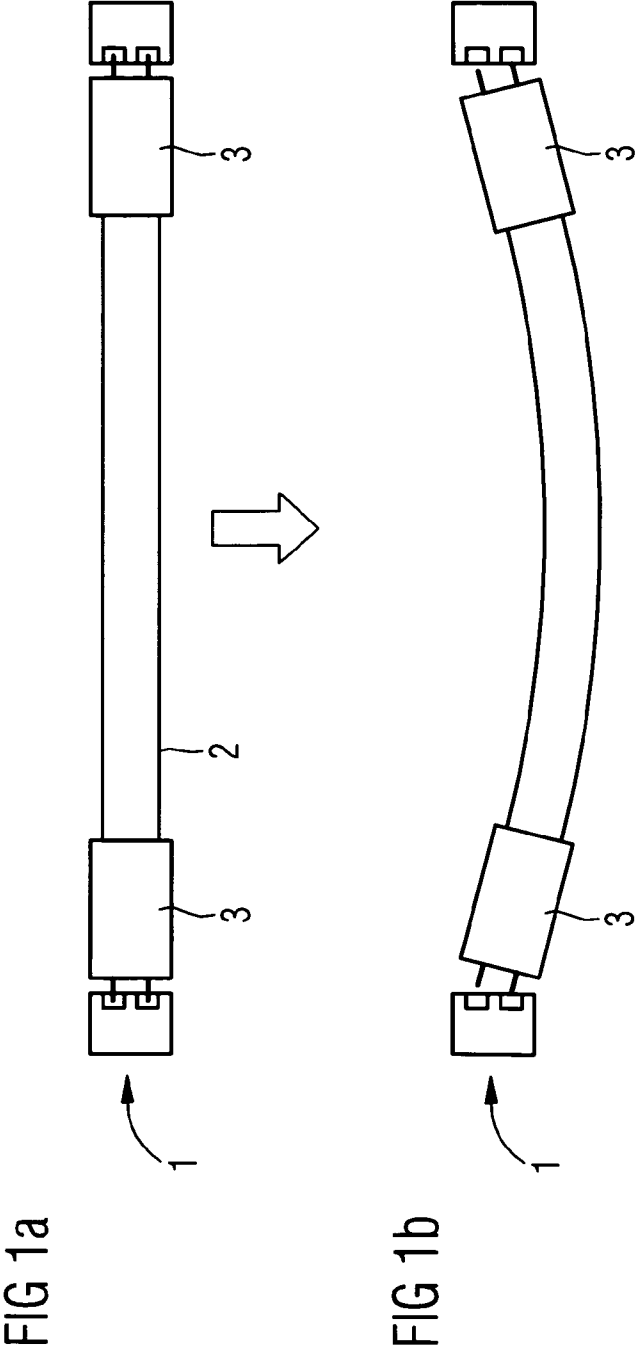
16. A method for manufacturing a completely plastic LED tube light, comprising the steps of:

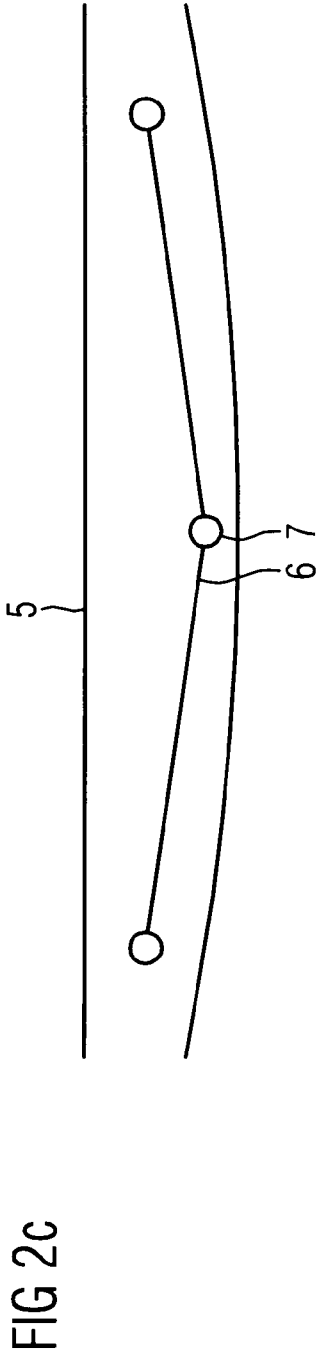
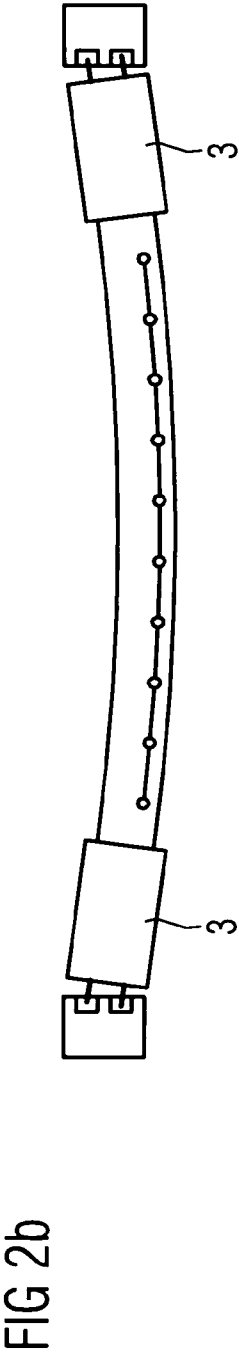
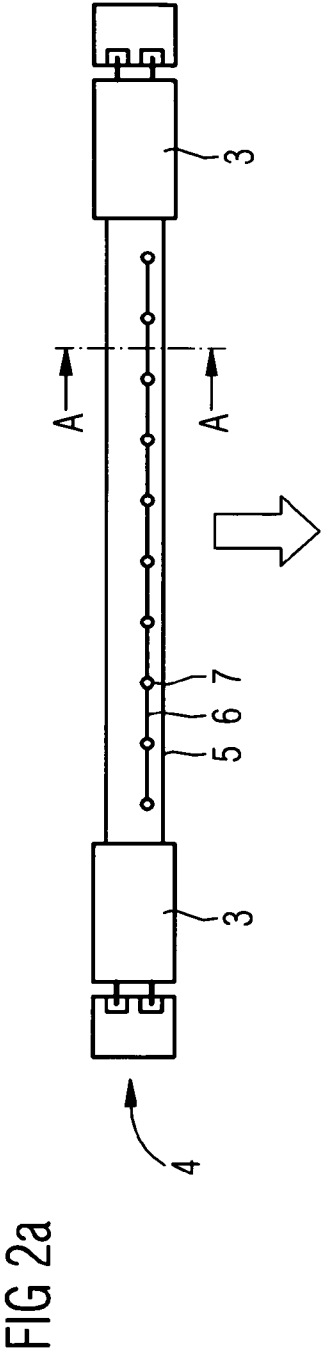
delivering raw materials for making plastic shell into an inlet of an extrusion device for manufacturing the completely plastic LED tube light;

continuously embedding the wires having projections into the raw materials of liquid phase in a direction by a wire feeding device;

extruding solid plastic shell having wires with projections from outlets of the extrusion device by the extrusion device; and

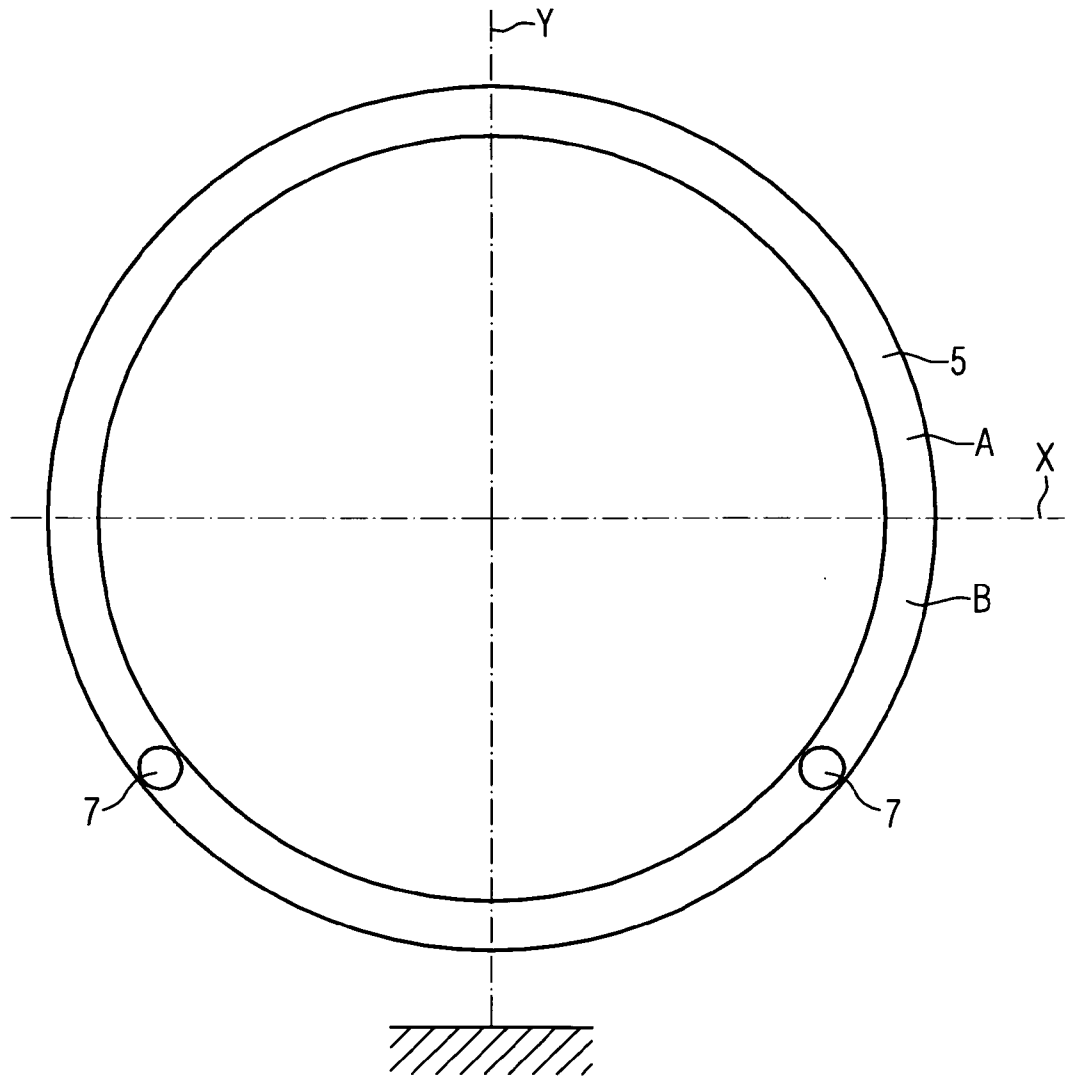
assembling the plastic shell and other parts of the completely plastic LED tube light together.





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FIG 3



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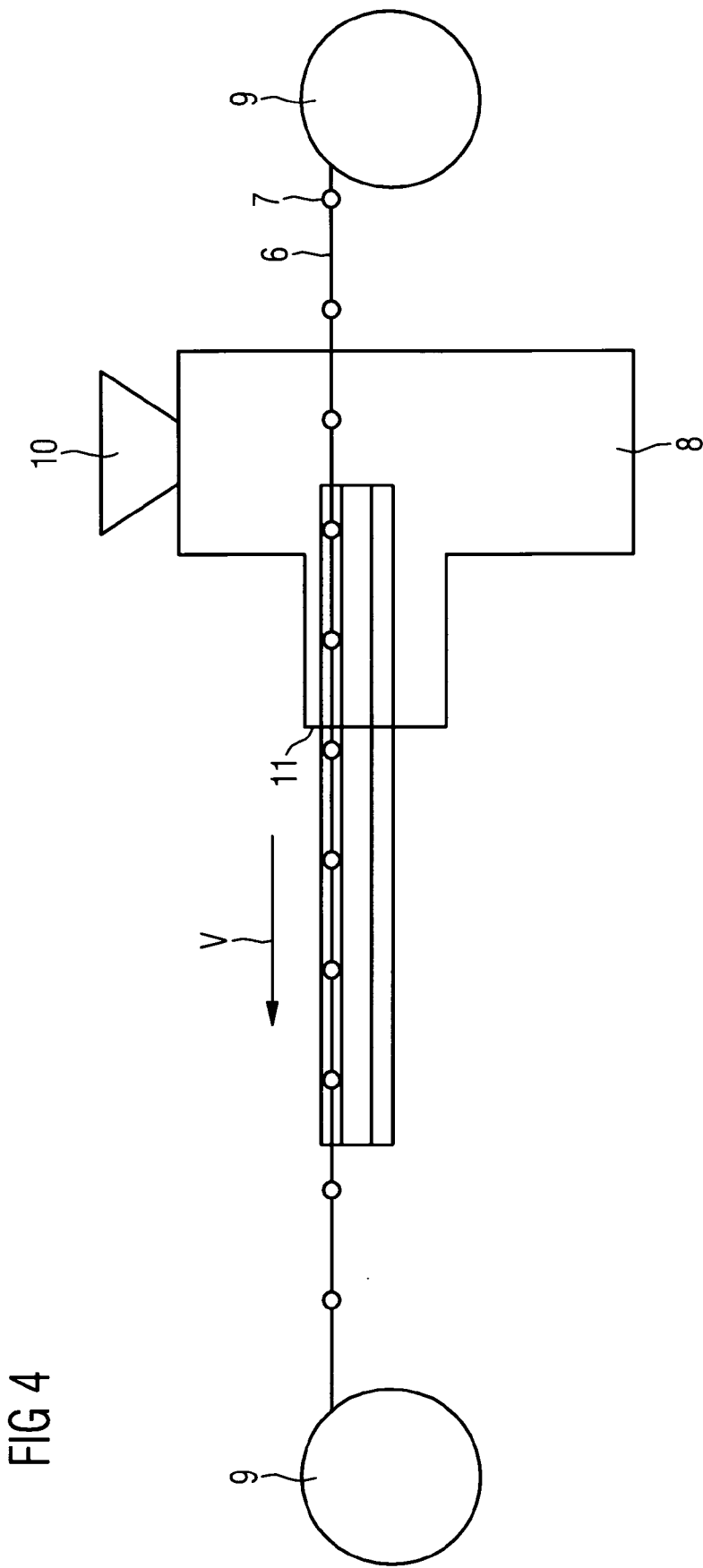


FIG 4

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2012/067541

A. CLASSIFICATION OF SUBJECT MATTER
INV. F21K99/00
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)
F21V F21K F21S F16L

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, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DE 20 2010 008114 U1 (JADE YANG CO LTD [TW]) 7 October 2010 (2010-10-07) the whole document	1-16
A	US 2003/218879 A1 (TIESZEN DWAYNE A [US]) 27 November 2003 (2003-11-27) the whole document	1-16
A	EP 2 208 922 A1 (OSRAM GMBH [DE]) 21 July 2010 (2010-07-21) the whole document	1-16
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A	US 6 394 623 B1 (TSUI PUI-HING [HK]) 28 May 2002 (2002-05-28) the whole document	1-16



Further documents are listed in the continuation of Box C.



See patent family annex.

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Date of the actual completion of the international search

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

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