A method and apparatus for a horticultural light for use in a horticultural facility that uses both continuous current control and discontinuous current control to select an intensity for each LED string in the horticultural light. Continuous current control is selected when the horticultural light is operating above a threshold intensity and discontinuous current control is selected when the horticultural light is operating below the threshold intensity for enhanced dimming fidelity. A CPU detects the number of LED strings present in the horticultural light and determines the optimal operating voltage for each detected LED string based upon the detected forward voltage of each detected LED string. Based upon the optimal operating voltage determined for each LED string, the CPU may additionally select an optimized current stabilization network for each detected LED string.

Declarations under Rule 4.17:
— as to applicant’s entitlement to apply for and be granted a patent (Rule 4.17(1))

Published:
— with international search report (Art. 21(3))
— before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(b))
— with information concerning request for restoration of the right of priority in respect of one or more priority claims (Rules 26bis.3 and 48.2(b)(vii))

Date of publication of the international search report:
11 May 2018 (11.05.2018)
INTERNATIONAL SEARCH REPORT

A. CLASSIFICATION OF SUBJECT MATTER

IPC: A01 G 7/04; H01 L 25/075; 37/02 (2018.01)

CPC: A01 G 7/045; F21V 23/003; H01 L 25/075, 25/0753; H05B 37/02

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)

See Search History document

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

See Search History document

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

See Search History document

C. DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
<thead>
<tr>
<th>Category*</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
</tr>
</thead>
</table>

Further documents are listed in the continuation of Box C.

See patent family annex.

- Document categories cited documents:
  - "A" document defining the general state of the art which is not considered to be of particular relevance
  - "E" earlier application or patent but published on or after the international filing date
  - "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
  - "O" document referring to an oral disclosure, use, exhibition or other means
  - "P" document published prior to the international filing date but later than the priority date claimed

- Document categories cited documents:
  - "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
  - "X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
  - "Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
  - "&" document member of the same patent family

Date of the actual completion of the international search: 17 January 2018 (17.01.2018)

Date of mailing of the international search report: 28 MAR 2018

Name and mailing address of the ISA/
Mail Stop PCT, Attn: ISA/US, Commissioner for Patents
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PCT QSP: 571-272-7774

Form PCT/ISA/210 (second sheet) (January 2015)
INTERNATIONAL SEARCH REPORT

Box No. II  Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. [ ] Claims Nos.;
   because they relate to subject matter not required to be searched by this Authority, namely:

2. [ ] Claims Nos.;
   because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. [ ] Claims Nos.;
   because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III  Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

See extra sheet.

1. [ ] As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.

2. [ ] As all searchable claims could be searched without effort justifying additional fees, this Authority did not invite payment of additional fees.

3. [ ] As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. [ ] No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1-8

Remark on Protest

[ ] The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.

[ ] The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.

[ ] No protest accompanied the payment of additional search fees.
This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1. In order for all inventions to be examined, the appropriate additional examination fee must be paid.

Group I: Claims 1-8 are directed towards a lighting system comprising first and second current magnitudes.

Group II: Claims 9-20 are directed towards lighting systems comprising selection of a magnitude of a voltage level.

The inventions listed as Groups I-II do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons:

The special technical features of Group I include at least wherein the current signal is continuous between a first current magnitude and a second current magnitude and wherein the current signal is discontinuous below the second current magnitude, and wherein an intensity of light generated by the LED string is determined by an averaged magnitude of the current signal, which are not present in Group II.

The special technical features of Group II include at least wherein the CPU is configured to detect the number of LED strings present in the lighting system and to select a magnitude of the voltage signal for each detected LED string to be substantially equal to a forward voltage of each detected LED string, which are not present in Group I.

The common technical features shared by Groups I-II are a lighting system, comprising: a power supply including, an AC-DC converter configured to convert an AC power signal to a plurality of DC power signals; a CPU coupled to receive a first of the plurality of DC power signals and configured to provide a DC-DC conversion control signal; and a DC-DC converter coupled to receive a second of the plurality of DC power signals and configured to provide a voltage signal and a current signal in response to the DC-DC conversion control signal; and an LED string coupled to receive the voltage and current signals.

However, these common features are previously disclosed by US 2013/0127353 A1 to CREE, INC. (hereinafter "CREE"). CREE discloses a lighting system (a solid state lighting apparatus 100; paragraph [0065]), comprising: a power supply including, an AC-DC converter configured to convert an AC power signal to a plurality of DC power signals (a driving circuit [power supply] for the solid state lighting apparatus 100 comprising a rectifier 110 (AC-DC converter) configured to convert AC signal and provide rectified input signals (plurality of DC power signals) to a switched-mode boost circuit 120 and a boost controller circuit 116; FIG. 6, paragraphs [0065], [0070], & claim 1); a CPU coupled to receive a first of the plurality of DC power signals and configured to provide a DC-DC conversion control signal (the boost controller circuit 116 (CPU) is configured to receive one of the rectified input signals and to provide a switch signal SW (DC-DC conversion control signal) to control the operation of the switched-mode boost circuit 120; paragraphs [0068] & [0070]); and a DC-DC converter coupled to receive a second of the plurality of DC power signals (the switched-mode boost circuit 120 (DC-DC converter) is configured to receive a second of the rectified input signals; FIG. 6, paragraph [0065]) and configured to provide a voltage signal and a current signal in response to the DC-DC conversion control signal (the switched-mode boost circuit 120 is configured to provide generate a DC voltage (voltage signal) and to provide an inductor current (current signal) in response to the switch signal SW; FIG. 6, paragraphs [0068] & [0070]); and an LED string coupled to receive the voltage and current signals (a first high voltage LED component 142 (LED string) comprising a plurality of LEDs configured to receive the DC voltage and the inductor current; FIG. 6, paragraphs [0070] & [0075]).

Since the common technical features are previously disclosed by the CREE reference, these common features are not special and so Groups I-II lack unity.