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FORM 1

COMMONWEALTH OF AUSTRALIA

PATENTS ACT 1952

APPLICATION FOR A STANDARD PATENT

I\We,

HELLA KG HUECK & CO.

of POSTFACH 2840
LIPPSTADT 4780
GERMANY

hereby apply for the grant of a standard patent for an invention entitled:

CIRCUITRY ARRANGEMENT FOR A MOTOR VEHICLE HEADLIGHT.

which is described in the accompanying complete specification

Details of basic application(s):

Number of basic application	Name of Convention country in which basic application was filed	Date of basic application
P4015399.1	DE	14 MAY 90

My/our address for service is care of GRIFFITH HACK & CO., Patent Attorneys, 601 St. Kilda Road, Melbourne 3004, Victoria, Australia.

DATED this 29th day of April 1991

HELLA KG HUECK & CO.
GRIFFITH HACK & CO.

TO: The Commissioner of Patents.

M 026 [illegible]

643782

P/00/008
Section 29(1)
Regulation 3.1(2)

AUSTRALIA
Patents Act 1990

NOTICE OF ENTITLEMENT

We HELLA KG HUECK & CO.

of POSTFACH 2840
LIPPSTADT 4780
GERMANY

being the applicant in respect of an application for a patent for an invention entitled CIRCUITRY ARRANGEMENT FOR A MOTOR VEHICLE HEADLIGHT. (Application No. 76149/91), state the following:

1. The nominated person has, for the following reasons, gained entitlement from the actual inventors:

   The nominated person is the assignee of the actual inventor.

2. The nominated person has, for the following reasons, gained entitlement from the basic applicant listed on the patent request:

   The nominated person is the basic applicant.

3. The basic application listed on the request form is the first application made in a Convention country in respect of the invention.

4. The name and addresses of the actual inventors are as follows:

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DATE: 20 September 1993

HELLA KG HUECK & CO.

GRIFFITH HACK & CO.

Patent Attorney for and
on behalf of the applicant

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(12) PATENT ABRIDGMENT (11) Document No. AU-B-76149/91
(19) AUSTRALIAN PATENT OFFICE (10) Acceptance No. 643782

(54) Title
CIRCUITRY ARRANGEMENT FOR A MOTOR VEHICLE HEADLIGHT

International Patent Classification(s)
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(56) Prior Art Documents
US 3800121
US 3876862
US 3441975

(57) Claim

1. A circuitry arrangement for a motor vehicle headlight with a reflector and a light source which is ~~or a lens which are~~ connected to a voltage supply device, with a cover screen having at least one electrically-conducting heating element on, or in, the cover screen, and with a switching-on device for the heating element, wherein the heating element is electrically connected to an evaluation device provided with a device for monitoring fracture of the cover screen, said device for monitoring fracture being configured as a current-measurement device or a voltage-measurement device, wherein the light source is a high-pressure-gas discharge lamp, and wherein the voltage-supply device is the series reactor of the high-pressure-gas discharge lamp.

AUSTRALIA 643782

PATENTS ACT 1952

Form 10

COMPLETE SPECIFICATION

(ORIGINAL)

FOR OFFICE USE

Short Title:

Int. Cl:

Application Number:
Lodged:

Complete Specification-Lodged:
Accepted:
Lapsed:
Published:

Priority:

Related Art:

TO BE COMPLETED BY APPLICANT

Name of Applicant:
HELLA KG HUECK & CO.

Address of Applicant: POSTFACH 2840
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Actual Inventor:

Address for Service: GRIFFITH HACK & CO.,
601 St. Kilda Road,
Melbourne, Victoria 3004,
Australia.

Complete Specification for the invention entitled:
CIRCUITRY ARRANGEMENT FOR A MOTOR VEHICLE HEADLIGHT.

The following statement is a full description of this invention including the best method of performing it known to me:-

The present invention relates to a circuitry arrangement for a motor vehicle headlight with a reflector and ~~a lens which are~~ connected to a voltage supply device, with a cover screen having at least one electrically-conducting heating element on, or in, the cover screen, and with a switching-on device for the heating element.

A circuitry arrangement for motor vehicle headlights of this type is known from the German Auslegeschrift (OPI) DE-AS 27 14 781. Here the motor vehicle headlight has a reflector and a light source which is connected to a voltage supply device. The cover screen of the motor vehicle headlight has at least one electrically-conducting heating element on, or in, the cover screen, which is connected to a switching-on device.

With regard to a headlight of which the light source is not continuously switched-on, there is a tendency for the cover screen, under certain temperature conditions, to become fogged or covered with ice. However, the electrical heating element, which is here switched-on in dependence upon different switching-on conditions, does have the disadvantage that, if there is a fracture of the cover screen endangering its security, such a fracture is not detected.

The problem to be solved by the present invention is how to create a circuitry arrangement for a motor vehicle headlight which, along with avoidance of fogging and ice formation, provides for reliable, security-enhancing monitoring of fracture of the cover screen in a simple and inexpensive manner.

The problem can be solved, in accordance with the present invention, by having the heating element electrically connected to an evaluation device provided with a device for monitoring fracture of the cover screen, said device being configured as a current-measurement device or a voltage-measurement device.

It is an advantage for the heating element to be electrically connected to an evaluation device which is provided with a device for monitoring fracture of the cover screen, said device being configured as a current-measurement device or a voltage-measurement device because, in this way, in a particularly simple and inexpensive manner, along with avoidance of fogging and ice formation, monitoring of fracture of the cover screen is ensured, so that it operates with a high degree of reliability and enhances the safety of driving the motor vehicle.

It has been shown to be particularly advantageous for the light source to be a high-pressure-gas discharge lamp and for the voltage-supply device to be the series reactor (ballast) of the high-pressure-gas discharge lamp because, in this way, on the one hand, it is ensured that, in the utilisation of the high-pressure-gas discharge lamps in motor vehicle headlight, which have a high efficiency and therewith, such a low power loss (dissipation), that is not sufficient, even during prolonged operation, to keep the cover screen of the motor vehicle headlight free from fogging or ice formation under certain temperature conditions, so that fogging and ice formation can be avoided with certainty and, on the other hand, the safety of driving the motor vehicle will be substantially enhanced, for the reason that, with fracture of the cover screen, some components of the motor vehicle headlight, which have a life-endangering high voltage, can be accidentally touched. In the case of detection of a fracture of the cover screen, the series reactor (ballast) of the high-pressure-gas discharge lamp has the electrical current supply to it cut off.

Because of the fact that the switching-on device and the evaluation device are components of the series reactor of the high-pressure-gas discharge lamp, the advantage is gained that the circuitry arrangement is simple and inexpensive.

It is an advantage for the switching-on device to have a switching facility which has time-cycle control of the heating element because, in this way, in a particularly

simple and inexpensive manner, control or regulation of the electric current supplied to the heating element is made possible.

Because of the fact that the voltage-supply device is the pre- transducer of the series reactor of the high-pressure-gas discharge lamp, the advantage is gained of a particularly simple and inexpensive form of embodiment of the circuitry arrangement.

It is an advantage for the pre-transducer to have a voltage-booster circuit which boosts the supply voltage of the heating element at the time of putting the high-pressure-gas discharge lamp into operation and for a period of time thereafter, so that the advantage is gained, when putting the high-pressure-gas discharge lamp into operation, that any pre-existing fogging or ice formation on the cover screen will be removed as rapidly as possible without making large demands on the circuitry.

Because of the fact that the switching-on device is connected to a temperature-measurement device, the advantage is gained that the heating element is only then supplied with current, with a saving of energy, when temperature conditions exist under which fogging and ice formation are possible.

Because of the fact that the heating element is constructed of at least one heater coil or a heater spiral, this results in a particularly simple and inexpensive design and arrangement of said heating element.

Similar advantages are gained when the heating element is constructed as a conducting, transparent, coating applied to the surface of the cover screen.

An example of embodiment of the invention is depicted in the single drawing and

will be described in greater detail in what follows, with reference to the accompanying drawing.

The only drawing depicts a circuitry arrangement for a motor vehicle headlight, in which said headlight (not depicted here) is provided with a cover screen (B) which is furnished with at least one electrical heating element (H) which is located in, or on, the cover screen (B). The connecting wires of the heating element which is depicted here, by way of example, has at least one heater coil, are electrically connected to a voltage-supply device which here, by way of example, is the series reactor (V) of a high-pressure-gas discharge lamp (not depicted) of the motor vehicle headlight. One of the connecting wires of the heating element (H) is electrically connected to the pre-transducer (W) of the series reactor (V), whereas the other connecting wire of the heating element (H) is electrically connected, on the one hand, to an evaluation device (A) and, on the other hand, to a switching-on device (E). In another example of embodiment, the switching-on device (E) and the evaluation device (A) can be combined together into a single device. In addition, the evaluation device (A) and the switching-on device (E) can be arranged separated from the series reactor (V) of the high-pressure-gas discharge lamp.

In the connection between the switching-on device (E) and the heating element (H), here, by way of example, a switching facility (S) is interposed. The switching facility (S) is here, by way of example, in the form of a transistor, the contact-break distance of which, gated by the switching-on device (E), can connect the heating element (H) to earth. The contact-break distance of the switching facility (S) here, on the one hand, is connected to the evaluation device (A), by way of a first resistance (R1) and, on the other hand, is connected to the heating element (H).

The first resistance (R1) is the measurement resistance at which the voltage drops if the switching facility (S) is closed. If the heating element (H) is broken, then the

second resistance (R2) which, on the one hand, connects the earth to the heating element (H) and, on the other hand, connects the earth to the evaluation device (A), serves the purpose that the voltage is broken down to a defined value. The input to the evaluation device (A) is high-resistive.

The evaluation device (A) also monitors the heating element (H) if the switching facility (S) is opened, because then the voltage at the input of the evaluation device (A) is equal to the supply voltage to the series reactor (V).

For a particularly energy-saving form of embodiment of the circuitry arrangement, The switching-on device (E) can be connected to a temperature-measurement device, so that the heating element is only then supplied with current, when temperature conditions exist under which fogging and ice formation are possible. The cover screen (B), which can also be designed as a dispersion screen in order to disperse the light from the light source into a pre-determined region, can be furnished with a heating element (H), which is constructed as a conducting, transparent, coating that is applied to the surface of the cover screen (B).

High-pressure-gas discharge lamps have a high efficiency, so that the power loss is frequently not sufficient to avoid fogging or ice formation on the cover screen or to remove already existing ice after putting the lamp into operation. For this reason, in the utilisation of high-pressure-gas discharge lamps in motor vehicle headlights, it is advantageous to provide for electrical heating of said cover screen. In this situation, it has been found to be particularly advantageous, by way of example, to boost the supply voltage from the pre-transducer (W) of the series reactor (V) to the heating element at the time of putting the high-pressure-gas discharge lamp into operation and for a period of time thereafter, so that any fogging or ice formation on the cover screen will be removed as rapidly as possible, thus enhancing the safety of driving the motor vehicle.

Because of the fact that the evaluation device (A) is provided with a device for monitoring fracture of the cover screen (B), the particular advantage is gained, in the utilisation of high-pressure-gas discharge lamps in motor vehicle headlights, that the safety of driving the motor vehicle will be substantially enhanced, for the reason that, with fracture of the cover screen (B), high-voltage components of the motor vehicle headlight can be accidentally touched, which could lead to life-endangering injuries. In the case of reliable detection of a fracture of the cover screen (B), the series reactor (V) of the high-pressure-gas discharge lamp has the electrical current supply to it cut off.

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A circuitry arrangement for a motor vehicle headlight with a reflector and, a light source which is ~~or a lens which are~~ connected to a voltage supply device, with a cover screen having at least one electrically-conducting heating element on, or in, the cover screen, and with a switching-on device for the heating element, wherein the heating element is electrically connected to an evaluation device provided with a device for monitoring fracture of the cover screen, said device for monitoring fracture being configured as a current-measurement device or a voltage-measurement device, wherein the light source is a high-pressure-gas discharge lamp, and wherein the voltage-supply device is the series reactor of the high-pressure-gas discharge lamp.

2. The circuitry arrangement according to Claim 1, wherein the switching-on device and the evaluation device are components of the series reactor of the high-pressure-gas discharge lamp.

3. The circuitry arrangement according to Claim 2, wherein the switching-on device has a switching facility which has time-cycle control of the heating element.

4. The circuitry arrangement according to Claim 3, wherein the voltage-supply device is the pre-transducer of the series reactor of the high-pressure-gas discharge lamp.

5. The circuitry arrangement according to Claim 4, wherein the pre-transducer has a voltage-booster circuit which boosts the supply voltage of the heating element at the time of putting the high-pressure-gas discharge lamp into operation and for a period of time thereafter.

6. The circuitry arrangement according to any one of the preceding Claims, wherein the switching-on device is connected to a temperature-measurement device.

7. The circuitry arrangement according to any one of the preceding Claims, wherein the heating element is constructed of at least one heater coil or a heater spiral.

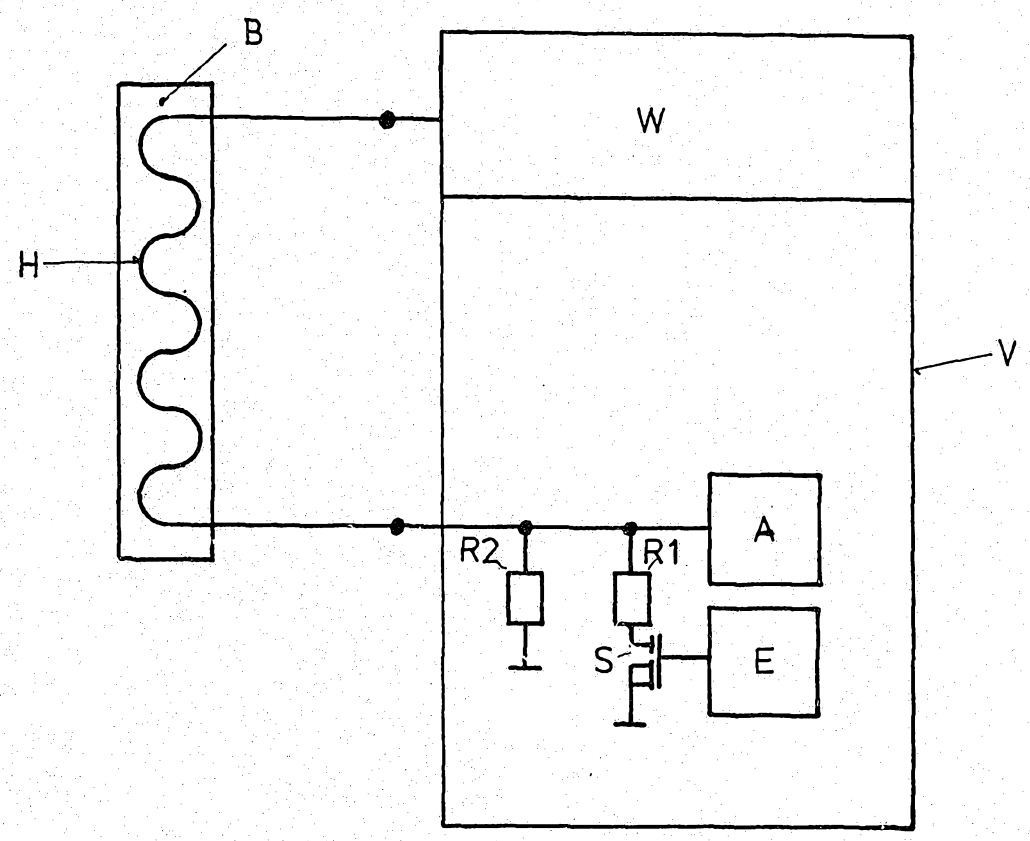
8. The circuitry arrangement according to any one of the preceding Claims, wherein the heating element is constructed as a conducting, transparent, coating applied to the surface of the cover screen.

9. The circuitry arrangement according to any one of the preceding Claims, wherein the cover screen is a dispersion screen.

DATED THIS 11TH DAY OF AUGUST 1993

HELLA KG HUECK & CO
By Its Patent Attorneys

GRIFFITH HACK & CO
Fellows Institute of Patent
Attorneys of Australia


B
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