

PRIOR ART SEARCH - SAMPLE

Lights with some Heating Element



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Objective:

To perform a prior art search and to identify related prior art Patents/ Patent applications pertaining to “**lights with some heating element**” as disclosed in the invention disclosure.

Methodology:

- After thorough understanding of the query, key concepts are identified based on the request
- Appropriate synonyms (or key words) are collected for each concept.
- Suitable search strings are framed based on collected keywords
- Comprehensive searches are performed on various databases
- Search results are screened for relevancy
- Related references are provided with suitable comments

Understanding & Search focus:

- Lights for vehicles where there is some heating element, either for the entire light or just lens of the light.
- Lights with some heating element” to mitigate snow/frost build up on headlight lenses in cold environments.

Jurisdictions: US, Canada, EU, China, and Japan

Databases used:

- ❖ **Patent:** Thomson innovation, USPTO, EPO, Google patents

Keywords used:

S. No	Concept	Keywords
1	Light	Headlight, Backlight, Tail Light, Light
2	Vehicle	Vehicle, Automobile, Car, Truck, Bus
3	Heating Element	Heating Element, Heater
4	Lens	Lens, Optics
5	Snow	Snow, Fog, Frost, Ice, Di-Icing , Defrosting, Defogging , Cool, Cold Environment, Cold Weather
6	Mitigate	Mitigate, Remove

Patent classification (IPC, CPC):**IPC:**

B60Q1/00: Arrangement of optical signalling or lighting devices, the mounting or supporting thereof or circuits therefor

F21S41/00: Illuminating devices specially adapted for vehicle exteriors, e.g. headlamps

F21S45/00: Arrangements within vehicle lighting devices specially adapted for vehicle exteriors, for purposes other than emission or distribution of light

F21S45/60: Heating of lighting devices, e.g. for demisting

F21V29/90: Heating arrangements

F21S45/33: specially adapted for headlamps

CPC:

B60Q1/00: Arrangement of optical signalling or lighting devices, the mounting or supporting thereof or circuits therefor

F21S41/00: Illuminating devices specially adapted for vehicle exteriors, e.g. headlamps

F21S45/00: Arrangements within vehicle lighting devices specially adapted for vehicle exteriors, for purposes other than emission or distribution of light

F21S45/60: Heating of lighting devices, e.g. for demisting

H05B3/84: Heating arrangements specially adapted for transparent or reflecting areas, e.g. for demisting or de-icing windows, mirrors or vehicle windshields

Executive Summary:

- ❖ We have performed comprehensive and broad searches to locate the prior art based on the provided information.
- ❖ We have come across many references which may be of interest to you.
- ❖ We have listed 49 references in this report that disclose Lights for vehicles where there is some heating element, either for the entire light or just lens of the light. Further the references disclose Lights with some heating element” to mitigate snow/frost build up on headlight lenses in cold environments.
- ❖ For some references, details are mapped and provided. For many other references patent/ patent application number with family members information was given.
- ❖ We have included the references which are teaching in and around the concept
- ❖ Some of the references disclose partially or very partially on the proposed concept. Provided these references just for your reference
- ❖ All references are hyperlinked. Please click on the reference for complete details.
- ❖ Information for “one member per family” been provided. Please check the Family member section for complete family information
- ❖ Text highlighted in colour is just for quick review. Please go through the reference for complete information

References (Patents/Publications):**Result # 1**

Patent/Publication No.	US10408415B2
Title of the Invention	Heater plate for vehicle light heating
Assignee/ Inventor(s)	Valeo North America Inc
Priority date / Filing date	2017-07-12
Publication date / Patent date	2019-09-10
Family Members	US10408415B2; US2019017677A1
Abstract	A vehicle light assembly, a heater plate, and a method for vehicle light heating. The vehicle light assembly includes an outer lens and a heater plate. The heater plate is moveable between a stowed position and a deployed position, the heater plate being situated in operative relationship with the outer lens and the heater plate being energized when in the deployed position.
Relevant Claim (s):	
1. A vehicle light assembly comprising: an outer lens; and a heater plate configured to be moveable between a stowed position and a deployed position, the heater plate being situated in operative relationship with an inner surface of the outer lens and the heater plate being activated when in the deployed position.	
Relevant Text(s):	
An aspect of the present disclosure includes a vehicle light assembly. The vehicle light assembly includes an outer lens and a heater plate. The heater plate is moveable between a stowed position and a deployed position, the heater plate being situated in operative relationship with the outer lens and the heater plate being energized when in the deployed position.	

Result # 2

Patent/Publication No.	US10323818B2
Title of the Invention	Vehicle light assembly having moisture sensing and heating
Assignee/ Inventor(s)	Ford Global Technologies LLC
Priority date / Filing date	2017-05-04
Publication date / Patent date	2019-06-18
Family Members	US10323818B2; US2018320854A1
Abstract	A vehicle light assembly is provided that includes a light source, a lens in front of the light source, conductive circuitry provided on the lens and forming a capacitive sensor for sensing moisture on the lens and a heater for removing the moisture, and switching circuitry for selectively energizing one of the capacitive sensor and the heater.
Relevant Claim (s):	
<p>1. A vehicle light assembly comprising: a light source; a lens in front of the light source; conductive circuitry provided on a surface of the lens and forming a capacitive sensor for sensing moisture on the lens and a heater for removing the moisture; and a controller selectively controlling energization of one of the capacitive sensor and the heater, wherein the conductive circuitry comprises a first electrode comprising a first plurality of electrode fingers on the surface of the lens, a second electrode comprising a second plurality of electrode fingers on the surface of the lens, overlapping regions of the first and second pluralities of fingers, and a dielectric layer layered between and disposed to isolate the overlapping regions of the first and second pluralities of electrode fingers.</p> <p>2. The vehicle light assembly of claim 1, wherein the conductive circuitry forming the capacitive sensor also serves as the heater.</p> <p>3. The vehicle light assembly of claim 1 further comprising switching circuitry for selectively switching operation of the conductive circuitry between the capacitive sensor and the heater.</p>	
Relevant Text(s):	
According to one aspect of the present invention, a vehicle light assembly is provided. The vehicle light assembly includes a light source, a lens in front of the	

light source, and conductive circuitry provided on the lens and forming a capacitive sensor for sensing moisture on the lens and a heater for removing the moisture.

Result # 3

Patent/Publication No.	US11460167B2
Title of the Invention	Sensor assembly for motor vehicle
Assignee/ Inventor(s)	Magna Electronics Inc
Priority date / Filing date	2021-01-27
Publication date / Patent date	2022-10-04
Family Members	CN111623313A; CN111623313B; DE102020105206A1; US10907794B2; US11460167B2; US2020271295A1; US2021148540A1
Abstract	A motor vehicle light assembly includes a housing; a light source disposed in the housing, and a light-transmissive lens operably attached to the housing. A heater member is disposed between the housing and the light-transmissive lens. The heater member is configured to radiate heat emitted from the light source, with the heater member being routed to direct the radiated heat onto the light-transmissive lens to regulate the temperature of the light-transmissive lens to inhibit fogging, frosting and icing of the light-transmissive lens.
Relevant Claim (s):	<p>1. A sensor assembly for a motor vehicle, the sensor assembly comprising:</p> <p>a housing;</p> <p>a sensor disposed in the housing;</p> <p>a processor disposed in the housing for processing signals output by the sensor during operation of the sensor assembly, wherein processing at the processor of the signals output by the sensor causes the processor to generate heat;</p> <p>a heater member disposed in the housing, the heater member configured to radiate heat generated by the processor to exterior of the housing to regulate the temperature of the processor;</p> <p>wherein the heater member comprises an elongated portion having an outer wall and an internal cavity;</p> <p>wherein the elongated portion comprises a plurality of radiator fins extending radially outwardly from the outer wall;</p>

wherein the heater member is openable and closeable responsive to temperature at the sensor assembly;
 wherein, with the sensor assembly disposed at the motor vehicle, signals output by the sensor are processed at the processor to detect movement of a body part of a person at the motor vehicle; and
 wherein, responsive to detecting, via processing at the processor of signals output by the sensor, movement of the body part of the person, a closure panel of the vehicle is moved.

Relevant Text(s):

It is an aspect of the present disclosure to provide a motor vehicle light assembly having a light-transmissive lens that is resistant to fogging, to the buildup of frost and to the buildup of ice in reliable and economic fashion.

It is a further aspect of the present disclosure to provide a motor vehicle light assembly having a light-transmissive lens that is able to be defogged, defrosted, and deiced in reliable and economic fashion.

It is an aspect of the present disclosure to provide a motor vehicle light assembly having a lens heater assembly including a heater member that is routed over a predetermined path to optimize the flow of radiant heat toward a light-transmissive lens to render the light-transmissive lens resistant to fogging, to the buildup of frost and to the buildup of ice.

Result # 4

Patent/Publication No.	WO2022063500A1
Title of the Invention	Projection module of a motor vehicle headlight, and motor vehicle headlight comprising such a projection module
Assignee/ Inventor(s)	MARELLI AUTOMOTIVE LIGHTING REUTLINGEN GERMANY GMBH
Priority date / Filing date	2021-08-23
Publication date / Patent date	2022-03-31
Family Members	DE102020124774A1; WO2022063500A1
Abstract	The invention relates to a projection module (2) of a headlight of a motor vehicle. The light module (2) comprises a light source for emitting light, a primary optical unit for focusing, shaping and/or deflecting the light emitted by the light source, and a secondary optical unit (4) in the form of a projection lens, which images an intermediate image of an intermediate image plane arranged in the beam path

between the primary optical unit and the secondary optical unit (4) in a light exit direction (6) of the projection module (2) in a front area ahead of the motor vehicle as a resulting light distribution of the projection module (2). The projection module (2) comprises a heating element (8) for heating the projection lens (4). It is proposed that the heating element (8) comprises a transparent film (10) composed of an electrically insulating material and conductor tracks (12) which are applied thereto or incorporated therein and which are connected to an electrical energy source (16) via a switching element (14), the heating element (8) being applied at least to a partial region of a light entrance and/or light exit surface of the projection lens (4) of the projection module (2) or being introduced at least into a part of the projection lens (4) itself, such that the heating element (8) heats up the projection lens (4) when current flow through the conductor tracks (12) is switched on.

Relevant Claim (s):

1. Projection module (2) of a headlight of a motor vehicle, comprising a light source for emitting light, primary optics for bundling, shaping and/or deflecting the light emitted by the light source, and secondary optics (4) in the form of a projection lens, which forms an intermediate image an intermediate image plane, which is arranged in the beam path between the primary optics and the secondary optics (4), in a light exit direction (6) of the projection module (2) in an area in front of the motor vehicle as the resultant light distribution of the projection module (2), the projection module (2) has a heating element (8) for heating the projection lens (4), characterized in that the heating element (8) has a transparent film (10) made of an electrically insulating material and conductor tracks (12) applied thereto or embedded therein, which have a Switching element (14) are connected to an electrical energy source (16), wherein the heating element (8) z applied to at least a partial area of a light entry and/or light exit surface of the projection lens (4) of the projection module (2) or at least in part of the projection lens (4) itself, so that the heating element (8) when the current flow is switched on through the conductor tracks (12) heats up the projection lens (4).

Relevant Text(s):

The present invention relates to a projection module of a headlight of a motor vehicle. The projection module comprises a light source for emitting light, primary optics for bundling, shaping and/or deflecting the light emitted by the light source, and secondary optics in the form of a projection lens, which forms an intermediate

image of an intermediate image plane in the beam path between the primary optics and the secondary optics is arranged, images in a light exit direction of the projection module in an apron in front of the motor vehicle as a resultant light distribution of the projection module. **The projection module has a heating element for heating the projection lens.**

Result # 5

Patent/Publication No.	US20220090756A1
Title of the Invention	De-icing headlight
Assignee/ Inventor(s)	Nelson Rivas
Priority date / Filing date	2021-09-21
Publication date / Patent date	2022-03-24
Family Members	US2022090756A1
Abstract	There is a self heating light comprising a body and a cover. Disposed inside of the body is a circuit board, a light element, a heat transfer device, a temperature sensor, a heating element, a power contact, and a switch. The switch is configured to switch power between the heating element and the light depending on a predetermined temperature of determined by the temperature sensor inside of the body of the light.
Relevant Claim (s):	<p>1. A self heating light comprising:</p> <ul style="list-style-type: none"> a body; a cover coupled to the body; at least one circuit board disposed in the body; at least one light element disposed in the body and in communication with the circuit board; at least one heat transfer device disposed in the body; at least one temperature sensor disposed in the body, said at least one temperature sensor configured to determine a temperature inside of the body of the light; at least one heating element configured to generate heat inside of the body; at least one power contact coupled to the body of the light, said at least one power contact configured to receive power into the body of the light; at least one switch, configured to switch power to the heating element when said at least one temperature sensor determines that the temperature inside of the light body is below a predetermined temperature and to switch power back to said at least one light element when said temperature sensor determines that a temperature inside of the light body is above a predetermined temperature.

Relevant Text(s):

[0003] One embodiment of the invention relates to a forward-cooling/self-deicing light comprising a body and a cover coupled to the body. Disposed inside of the cover and the body is at least one circuit board and at least one LED, wherein the LED is in communication with the circuit board. There is also at least one heat transfer device disposed in the body wherein the heat transfer device is configured to transfer heat from one component to another component where one is located inside the body, and another is located outside of the body. There is also at least one temperature sensor disposed in the body, wherein the temperature sensor configured to determine a temperature inside of the body of the light. There is also at least one heating element configured to generate heat around the perimeter of the front of the headlight wherein the heating element is coupled to the front circular heatsink which is coupled to the body. There is also at least one switch, configured to provide power to the heating element when the temperature sensor determines that the temperature inside of the light body is below a predetermined temperature

Result # 6

Patent/Publication No.	US11262045B2
Title of the Invention	Circuit assembly, lighting device, and vehicle headlight
Assignee/ Inventor(s)	ZKW Group GmbH
Priority date / Filing date	2019-01-11
Publication date / Patent date	2022-03-01
Family Members	CN111656861A; CN111656861B; EP3522682A1; EP3522682B1; JP2021512480A; JP6942272B2; KR102421603B1; KR20200115571A; US11262045B2; US2021018157A1; WO2019154581A1
Abstract	The invention relates to a circuit assembly (1) comprising a printed circuit board (2), at least one micromirror component (3) which is connected to the printed circuit board (2) for modulating a light beam oriented towards the micromirror component (3), a cooling body which is thermally connected to the at least one micromirror component (3), and a current regulating unit (5). The micromirror component (3) has a heating element (3a)

which can be controlled by the current regulating unit (5), and the current regulating unit (5) is electrically connected to the heating element (3a) in order to actuate same. The current regulating unit (5) is additionally connected to the micromirror component (3) via a thermal connection to the cooling body (4) in order to transfer heat losses occurring on the current regulating unit (5).

Relevant Claim (s):

1. A circuit assembly (1) comprising:
 - a printed circuit board (2);
 - at least one micromirror component (3) connected to the printed circuit board (2) and configured to modulate a light beam of a light source directed onto the micromirror component (3);
 - a cooling body (4) thermally connected to the at least one micromirror component (3);
 - a current regulating unit (5);
 - a support frame configured to be connected to a vehicle headlight housing; and
 - spring elements,

wherein a heating element (3 a) is assigned to the micromirror component (3), which heating element is configured to be controlled by the current regulating unit (5) and is thermally connected to the micromirror component (3),

wherein the current regulating unit (5) is electrically connected to the heating element and configured to actuate the heating element,

wherein the current regulating unit (5) is also connected to the cooling body (4) by way of a thermal connection to the micromirror component (3) and configured to transfer heat loss occurring at the current regulating unit (5),

wherein the printed circuit board (2) is arranged between the cooling body (4) and the support frame (6), and the support frame (6) has positioning means (6 a) configured to establish the position of the micromirror component (3) with respect to the support frame (6),

wherein the cooling body (4) is connected to the support frame (6) by a screw connection (7) such that the printed circuit board (2) can be fixed in its position with respect to the support frame (6) by the cooling body (4), and the cooling body (4) can be relocated along the screw connection, and

wherein the spring elements (8) press the cooling body (4) in the direction of the support frame (6).
2. The circuit assembly (1) according to claim 1, wherein the printed circuit board (2) has an opening (2 a), through which a heat conduction element (4 a) extends from the micromirror component (3) to the cooling body (4) for purposes of heat transfer.

Relevant Text(s):

At temperatures that are lower than e.g. 0° C., however, the provision of the cooling body could have a negative effect, since the intended operating temperature of a micromirror component also has a lower temperature limit, below which ambient temperatures of 0° C. and less could fall, since in this case the operating temperature

approximates to the undesirably low ambient temperature. To prevent the temperature from falling below the permissible operating temperature in the event of low ambient temperatures, the micromirror component therefore has a heating element that is thermally connected to the component, or preferably is integrated into the component.

Since the cooling body acts counter to the heating of the micromirror component, considerable power is required to heat the micromirror component. In addition, the winding resistance of typical integrated heating elements, in DMD chips, is, in particular, highly temperature-dependent, which is why a current regulating unit is provided for purposes of actuating the heating element, that is to say, for controlling the heating power. In accordance with the product of voltage drop U_{SR} and current I_{Heater} , losses occur at this current regulating unit, (see FIG. 4), which depend very strongly on the temperature of the heating element.

Result # 7

Patent/Publication No.	US11193647B2
Title of the Invention	Dehumidifier for a closed vehicle headlamp housing
Assignee/ Inventor(s)	AML Systems SAS
Priority date / Filing date	2018-03-13
Publication date / Patent date	2021-12-07
Family Members	CN110582669A; CN110582669B; EP3601876A1; EP3601876B1; FR3064722A1; FR3064722B1; JP2020516019A; KR20200015464A; US11193647B2; US2021088197A1; US2022057068A1; WO2018178532A1
Abstract	A device for dehumidifying a closed vehicle headlamp housing includes a box with an opening connecting the inside of the box with the inside of the closed housing, and an opening connecting the inside of the box with the outside of the closed housing. The device further includes a shutter for alternatively opening the opening or sealingly closing it, an actuation module configured such that the shutter closes the opening when it is activated, and a heating element for emitting heat when the actuation module is activated.
Relevant Claim (s):	1. A device for dehumidifying a closed housing of a vehicle headlamp to prevent moisture from occurring in said closed housing, the device comprising:

a first box defining a first chamber, the first box comprising at least two series of orifices, each series of orifices comprising at least one orifice, one first series of orifices being configured so that the first chamber communicates with the inside of the closed housing and a second series of orifices being configured so that the first chamber communicates with the outside of the closed housing,
at least a first shutter configured to alternatively open the orifice or orifices of the first series of orifices and close in a sealed manner the orifice or orifices of the first series of orifices,
an actuation module configured so that the first shutter or shutters close the orifice or the orifices of the first series of orifices when the actuation module is activated,
a heating element configured to emit heat when the actuation module is activated,
a second box defining a second chamber, the second box being configured so that the second chamber communicates with the first chamber via the second series of orifices, the second box comprising a third series of orifices configured so that the second chamber communicates with the outside of the closed housing.

Relevant Text(s):

For this purpose, the invention concerns **a device suitable for being used to dehumidify a closed vehicle headlamp housing or for preventing moisture from occurring in said closed housing.**

According to the invention, the device comprises:

a first box (2) defining a first chamber (5), the first box (2) comprising at least two series of orifices (3, 4), each series of orifices (3, 4) comprising at least one orifice, a first series of orifices (3) being configured so that the first chamber (5) communicates with the inside of the closed housing (15) and a second series of orifices (4) being configured so that the first chamber (5) communicates with the outside of the closed housing (15),

at least a first shutter (7) configured to alternatively open the orifice or the orifices of the first series of orifices (3) or to close in a sealed manner the orifice or the orifices of the first series of orifices (3),

an actuation module (8) configured so that the first shutter or shutters (7) close the orifice or the orifices of the first series of orifices (3) when the actuation module (8) is activated,

a heating element (9) configured to emit heat when the actuation module (8) is activated.

Result # 8

Patent/Publication No.	US20210341121A1
Title of the Invention	Headlamp heater
Assignee/ Inventor(s)	Paccar Inc
Priority date / Filing date	2021-04-22
Publication date / Patent date	2021-11-04
Family Members	CA3116667A1; US2021341121A1
Abstract	Examples of the present disclosure relate to a headlamp heater for a headlamp assembly. In examples, a headlamp assembly comprises a heating element, which directs radiation toward a lens of the headlamp assembly in order to prevent or remove condensation/precipitation on the lens. In examples, the heating element is an infrared heating element, and the wavelength of radiation emitted by the heating element is selected to be a wavelength that excites water. In some examples, the heating element is angled toward the lens and/or has multiple angled surfaces, thereby altering the radiation pattern that is directed toward the lens such that it better matches the beam pattern of a light source in the headlamp assembly.
Relevant Claim (s):	<p>1. A headlamp assembly comprising:</p> <p>a lens;</p> <p>a light source having a beam pattern that is projected through the lens; and</p> <p>a heating element positioned to direct radiation to at least a region of the lens associated with the beam pattern.</p>
Relevant Text(s):	

[0004] Examples of the present disclosure relate to a headlamp heater for a headlamp assembly. In examples, a **headlamp assembly comprises a heating element, which directs radiation toward a lens of the headlamp assembly in order to prevent or remove condensation/precipitation on the lens.** For example, the heating element stimulates convection within the headlamp assembly, which may remove condensation on the inside of the lens. As another example, the heating element may cause sublimation or thawing of accumulated ice/snow on the outside of the lens, thereby clearing the outside of the lens. In examples, the heating element is an infrared heating element, and the wavelength of radiation emitted by the heating element is selected to be a wavelength that excites water. In some examples, **the heating element is angled toward the lens and/or has multiple angled surfaces, thereby altering the radiation pattern that is directed toward the lens such that it better matches the beam pattern of a light source in the headlamp assembly.**

Result # 9

Patent/Publication No.	US20210302006A1
Title of the Invention	Heating unit for light sources, installation and control system thereof
Assignee/ Inventor(s)	Yi Deng
Priority date / Filing date	2019-12-04
Publication date / Patent date	2021-09-30
Family Members	US2021302006A1; WO2020114408A1
Abstract	The present disclosure relates to apparatus and methods for heating a lens for a light source. More particularly, the present disclosure relates to a heating unit for use in a vehicle light, methods of installation and control systems for the heating unit. For example, a heating unit according to the present disclosure includes a connector configured to maintain an electronic connection between a heating element and a control circuit by a bias force, such as a spring force. Instead of forming a fixed attachment with the heating element, the connector is pushed against the heating element to maintain connection therebetween. The non-fixed contact to the heater provides reliability, flexibility and simplicity to the heating unit.

Relevant Claim (s):

1. A heating unit for a light assembly, comprising:
a heating element attached to a transparent window and configured to heat the transparent window;

a controller configured to provide electrical power to the heating element; and
a connector having a first end in contact with the heating element and a second end in connection with the controller, wherein the first end contacts the heating element under a pre-loaded force.

Relevant Text(s):

[0004] The present disclosure includes apparatus and methods for heating lenses of light sources.

[0005] Embodiments of the present disclosure provide a heating unit for a light assembly. The light assembly includes a heating element attached to a transparent window and configured to heat the transparent window, a controller configured to provide electrical power to the heating element, and a connector having a first end in contact with the heating element and a second end in connection with the controller, wherein the first end contacts the heating element under a pre-loaded force.

Result # 10

Patent/Publication No.	US20180245767A1
Title of the Invention	Headlight equipped with heating wires
Assignee/ Inventor(s)	Gwang Young LEE
Priority date / Filing date	2017-10-19
Publication date / Patent date	2018-08-30
Family Members	CN207350236U; JP3214563U; KR101765435B1; US2018245767A1
Abstract	Disclosed herein is a headlight equipped with heating wires, which is implemented such that transparent heating wires are disposed in the plastic of the headlight and the plastic of the headlight is heated through the generation of heat by the heating wires. The headlight equipped with heating wires includes: plastic configured to protect the headlight of a vehicle from external impact; and a plurality of heating wires disposed in connection with the plastic,

and configured to be connected to the power supply of the vehicle and to receive power and generate heat when a switch is turned on.

Relevant Claim (s):

1. A headlight equipped with heating wires, comprising: plastic configured to protect the headlight of a vehicle from external impact; and a plurality of heating wires disposed in connection with the plastic, and configured to be connected to a power supply of the vehicle and to receive power and generate heat when a switch is turned on;

wherein the plastic comprises concave lenses coupled to an inner surface of the plastic at locations opposite to the heating wires, and configured to refract light from the headlight.

Relevant Text(s):

[0006] The present invention has been conceived to overcome the above-described disadvantages, and an object of the present invention is to provide a headlight equipped with heating wires, which is implemented such that transparent heating wires are disposed in the plastic of the headlight and the plastic of the headlight is heated through the generation of heat by the heating wires.

[0007] In order to accomplish the above object, the present invention provides a headlight equipped with heating wires, including: plastic configured to protect the headlight of a vehicle from external impact; and a plurality of heating wires disposed in connection with the plastic, and configured to be connected to the power supply of the vehicle and to receive power and generate heat when a switch is turned on.

Result # 11

Patent/Publication No.	US20220221126A1
Title of the Invention	Apparatus for defrosting a vehicle light
Assignee/ Inventor(s)	Aac Enterprises dba Oracle Lighting LLC
Priority date / Filing date	2021-12-23
Publication date / Patent date	2022-07-14
Family Members	CA3144741A1; CN114763892A; US2022221126A1
Abstract	An apparatus for defrosting a vehicle light comprises a frame, a heating element connected to at least a portion of an internal facing surface of the frame, an attachment mechanism, and an electrical communication connection electrically connected between the heating element and a power source. The heating element may be configured to generate heat in the direction of the vehicle light, thereby melting snow, ice, or frost buildup on or in the vehicle light.
Relevant Claim (s):	<p>1. An apparatus (10) for defrosting a vehicle light (52) comprising: a frame (100) having an external facing surface (110) and an internal facing surface (120), a heating element (200) connected to at least a portion of the internal facing surface, an attachment mechanism, and an electrical communication connection (400) electrically connected between the heating element and a power source; and wherein the attachment mechanism is selected from the group consisting of at least one mounting bracket (300), a plurality of protrusions adapted to provide a friction fit with a surface of the vehicle (50), an adhesive, a fastener, a set screw, and combinations thereof; and wherein the apparatus is configured to connect to an exterior surface of a vehicle or a vehicle light lens (54).</p>
Relevant Text(s):	[0007] Described herein is an apparatus for defrosting a vehicle light. The apparatus may comprise a frame, a heating element, an attachment mechanism, and an electrical communication connection. The frame will have an external facing surface and an internal facing surface. The heating element may be connected to at least a portion of the internal facing surface of the frame. The electrical communication

connection may be electrically connected between the heating element and a power source.

[0008] The apparatus may be configured to connect to an exterior surface of a vehicle or a vehicle light lens. The attachment mechanism may be selected from the group consisting of at least one mounting bracket, a plurality of protrusions adapted to provide a friction fit with a surface of the vehicle, an adhesive, a fastener, a set screw, and combinations thereof.

Additional References (Patents/Publications):

12. [US8431869B2](#): Defrosting, defogging and de-icing structures
Family Member (s): US2011297661A1; US8431869B2
13. [US20160046262A1](#): Heated Light Enclosure Having an Adaptable Heating System
Family Member (s): US10046692B2; US10272818B2; US11142114B2; US2016046262A1; US2017327028A1; US2019176680A1; US2022030672A1
13. [CN104214664A](#): Fog-proof vehicle headlight lampshade
Family Member (s): CN104214664A
14. [EP2014972B1](#): Device for treating moisture inside the headlight of an automobile, and headlight equipped with such a device
Family Member (s): EP2014972A1; EP2014972B1; FR2918738A1; JP2009021245A
15. [KR20140049903A](#): Dehumidifying device for headlight in vehicle
Family Member (s): KR20140049903A
16. [KR20120139359A](#): Lens restoration method of headlight
Family Member (s): KR101279295B1; KR20120139359A
17. [US20170234503A1](#): Headlamp Assembly with a Housing and Heat Sink Structure
Family Member (s): US2017234503A1
18. [US20220146086A1](#): Light emitting and receiving module with snow melting heater
Family Member (s): CN113574796A; DE112020002095T5; JP2020181726A; JP6804722B2; US2022146086A1; WO2020217950A1
19. [US20220024369A1](#): Light assembly heater systems, apparatus, and methods
Family Member (s): US11142115B2; US2020290502A1; US2022024369A1
20. [US9625114B2](#): LED reflector optic for an automotive headlight

Family Member (s): CA2836580A1; CA2836580C; US2012294024A1; US2015023041A1; US2017045193A1; US8851723B2; US9482404B2; US9625114B2; WO2012158814A1

21. [KR20130130225A](#): Snow removal device for vehicle headlight

Family Member (s): KR101358499B1; KR20130130225A

22. [US10429025B2](#): Vehicle light assembly sensing moisture with light reflection

Family Member (s): US10429025B2; US2018320884A1

23. [US6419382B1](#): Headlight for vehicle

Family Member (s): CN1119550C; CN1271072A; JP2000306415A; JP3904757B2; US6419382B1

24. [US20210174676A1](#): Led light fixture

Family Member (s): US2021174676A1

25. [CN212901325U](#): Cold light source LED automobile lamp

Family Member (s): CN212901325U

25. [CN111780051A](#): Cold light source LED automobile lamp

Family Member (s): CN111780051A

26. [US20200232635A1](#): Heated Light Apparatus

Family Member (s): US2020232635A1

27. [US9829179B2](#): Parabolic quadrant LED light fixture

Family Member (s): US2015377452A1; US9829179B2

28. [US9429293B2](#): Vehicle light fixture having internal heatsink for LED lamp

Family Member (s): CN204494255U; DE202015100766U1; MX2015002235A; MX344196B; RU2015106086A; RU2015106086A3; RU2666082C2; US2015241018A1; US9429293B2

29. [US9028106B2](#): Light-emitting device, illuminating device, vehicle headlamp, and method for producing light-emitting device

Family Member (s): CN102401280A; US2012057364A1; US2014347843A1; US8833975B2; US9028106B2

30. [US7914162B1](#): LED light assembly having heating board

Family Member (s): US7914162B1

31. [US7683395B2](#): Light-emitting diode arrangement and motor vehicle headlamp

Family Member (s): DE102004047324A1; EP1643188A1; EP1643188B1; JP2006100836A;

US2006076572A1; US7683395B2

32. [CN108860400A](#): A kind of heating installation of new energy electric motor vehicle

Family Member (s): CN108860400A

33. [CN205378300U](#): Vehicle headlamp control device

Family Member (s): CN205378300U

34. [KR20150093020A](#): heat sink structure of LED head light in vehicle

Family Member (s): KR101559750B1; KR20150093020A

35. [EP1927507A1](#): LED assembly for a light, in particular a headlamp or signalling light for a rail vehicle, comprising a heating element

Family Member (s): DE102006056271A1; EP1927507A1

36. [JP2022071442A](#): Lamp device for vehicle

Family Member (s): JP2022071442A

37. [EP1388461B1](#): Lighting device for a vehicle and method for controlling light distribution of the lighting device

Family Member (s): EP1388461A2; EP1388461A3; EP1388461B1; JP2004071409A; US2004027834A1; US7201501B2

38. [US10544915B2](#): Vehicle lamp assembly having an improved heat sink with light shield

Family Member (s): CN108826219A; CN108826219B; EP3396240A1; EP3396240B1; JP2018190717A; JP7091127B2; KR20180120608A; US10544915B2; US2018313512A1

39. [US10215441B2](#): Integrated light and heat arrangement of low profile light-emitting diode fixture

Family Member (s): US10215441B2; US2017299167A1; WO2017181023A1; WO2017181023A8

40. [US20180345845A1](#): Vehicle light assembly

Family Member (s): CN208349213U; DE202018103097U1; US10144337B1; US2018345845A1

41. [US20200233292A1](#): Laser-based fiber-coupled white light system

Family Member (s): US2020233292A1

42. [US20210339709A1](#): Headlamp heater control

Family Member (s): CA3116536A1; US2021339709A1

43. [JP5392589B1](#): LED lighting device with snow melting function

Family Member (s): JP2014102881A; JP5392589B1

44. [US7262388B2](#): Vehicle light heater

Family Member (s): EP1718127A1; US2006245202A1; US7262388B2

45. [US20110044065A1](#): Front cover for vehicle lighting fixture, method of manufacturing the front cover, and electric heating structure

Family Member (s): EP2264360A1; EP2264360A4; JP2009272303A; US2011044065A1; US8258444B2; WO2009125854A1

46. [US6601983B1](#): Led vehicular light assembly with heater

Family Member (s): US6601983B1

47. [US9623790B2](#): Light retainer assembly and heated light assembly

Family Member (s): US2015055363A1; US9623790B2

48. [JP2002150812A](#): Headlamp for vehicle

Family Member (s): JP2002150812A

49. [EP4061629A1](#): Laminated glazing for a light aerial vehicle, heating over a portion of the surface thereof

Family Member(s): BR112022009678A2; CA3158329A1; CN114650910A; EP4061629A1; FR3103411A1; FR3103411B1; IL293150A; KR20220103126A; WO2021099741A1

Field of Search

Source	Jurisdiction	Query	Hits
Thomson Innovation	ALL	ALL=(Light) AND ALL=(Vehicle) AND ALL=(heating);	362,341
Thomson Innovation	ALL	CTB=(Light) AND CTB=(Vehicle) AND CTB=(heating);	5228
Thomson Innovation	ALL	TI=(Light) AND TI=(Vehicle) AND TI=(heating);	51
Thomson Innovation	ALL	ALL=(Headlight) AND ALL=(Vehicle) AND ALL=(heating);	10701
Thomson Innovation	ALL	CTB=(Headlight) AND ALL=(Vehicle) AND ALL=(heating);	964
Thomson Innovation	ALL	CTB=(Headlight) AND ALL=(Vehicle) AND CTB=(heating);	298
Thomson Innovation	ALL	ALL=(Vehicle or Car) AND ALL=(Light) AND ALL=(heat) AND ALL=(snow or frost or fog or ice);	22506
Thomson Innovation	ALL	ALL=(Vehicle or Car) AND CTB=(Light) AND CTB=(heat) AND ALL=(snow or frost or fog or ice);	1267
Thomson Innovation	ALL	ALL=(Vehicle or Car) AND TI=(Light) AND CTB=(heat) AND ALL=(snow or frost or fog or ice);	161
Thomson Innovation	ALL	ALL=(Vehicle or Car or automobile) AND ALL=(Light) AND ALL=(lens) AND ALL=(heat) AND ALL=(snow or frost or fog or ice);	6176
Thomson Innovation	ALL	ALL=(Vehicle or Car or automobile) AND CTB=(Light) AND ALL=(lens) AND CTB=(heat) AND ALL=(snow or frost or fog or ice);	576

Thomson Innovation	ALL	ALL=(Vehicle or Car or automobile) AND CTB=(Light) AND CTB=(lens) AND CTB=(heat) AND ALL=(snow or frost or fog or ice);	298
Thomson Innovation	ALL	ALL=(Vehicle or Car or automobile) AND TI=(Light) AND CTB=(lens) AND CTB=(heat) AND ALL=(snow or frost or fog or ice);	64
Thomson Innovation	ALL	ALL=(Vehicle or Car or automobile) AND ALL=(headlight or (head lamp) or backlight or taillight) AND ALL=(lens) AND ALL=(heat) AND ALL=(snow or frost or fog or ice);	1428
Thomson Innovation	ALL	ALL=(Vehicle or Car or automobile) AND CTB=(headlight or (head lamp) or backlight or taillight) AND ALL=(lens) AND ALL=(heat) AND ALL=(snow or frost or fog or ice);	178
Thomson Innovation	ALL	ALL=(Vehicle or Car or automobile) AND CTB=(headlight or (head lamp) or backlight or taillight) AND ALL=(lens) AND CTB=(heat) AND ALL=(snow or frost or fog or ice);	58
Thomson Innovation	ALL	ALL=(Vehicle or Car or automobile) AND ALL=(headlight or (head lamp) or backlight or taillight OR LIGHT) AND ALL=(heat) AND IC=("B60Q1/00" OR "F21S41/00" OR "F21S45/00" OR "F21S45/60" OR "F21V29/90" OR "F21S45/33");	3124
Thomson Innovation	ALL	ALL=(Vehicle or Car or automobile) AND ALL=(headlight or (head lamp) or backlight or taillight OR LIGHT) AND ALL=(heat) AND IC=("F21V29/90");	70
Thomson Innovation	ALL	ALL=(Vehicle or Car or automobile) AND ALL=(headlight or (head lamp) or backlight or taillight OR LIGHT) AND ALL=(heat) AND CPC=("B60Q1/00" OR "F21S41/00" OR "F21S45/00" OR "F21S45/60" OR "F21V29/90" OR "H05B3/84");	523
Thomson Innovation	ALL	ALL=(Vehicle or Car or automobile) AND ALL=(headlight or (head lamp) or backlight or taillight OR LIGHT) AND ALL=(heat) AND CPC=("F21V29/90");	152

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