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(54) **POWER WINDOW CIRCUIT**

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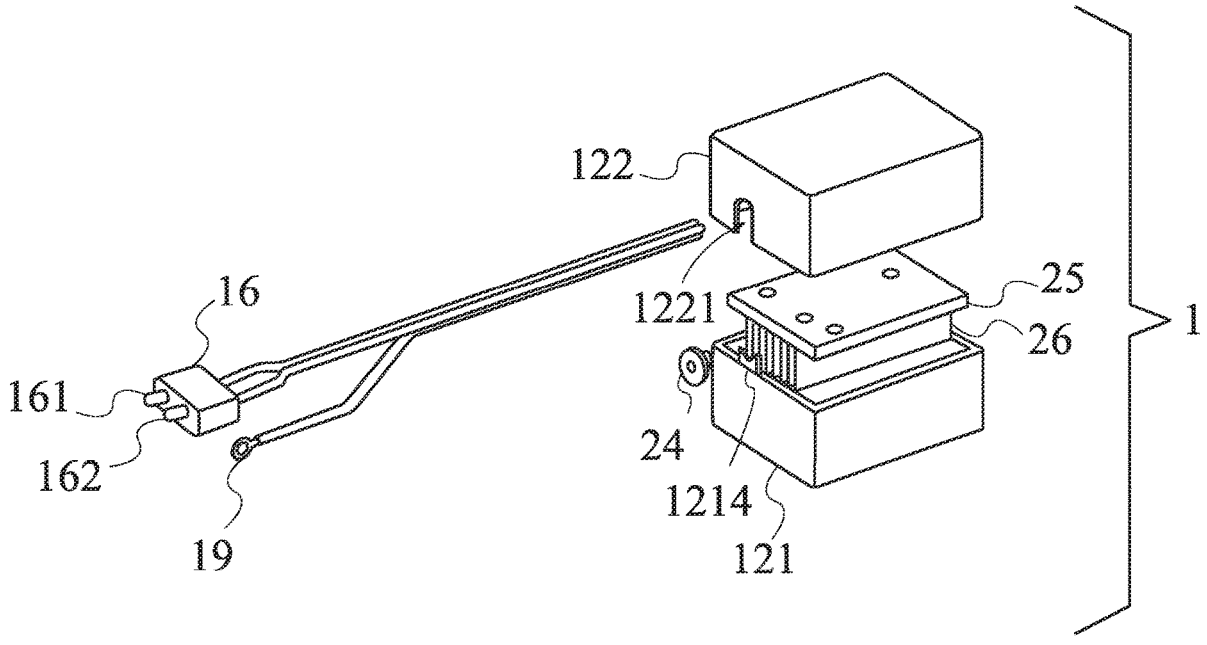
(52) **U.S. Cl.**

CPC ***B60R 16/0307*** (2013.01); ***E05F 15/695*** (2015.01); ***B60J 1/17*** (2013.01)

(57) **ABSTRACT**

A car window circuit is provided. The car window circuit provides a closed-circuit voltage step up converter that increases the car window movement speed of slow or old window power circuits. The car window circuit contains a DC converter module, a case, an electrical input, an electrical output, and a circuit check module. The DC converter module resides within the case, serving as the voltage step up converter. The electrical input, the electrical output, and a ground wiring are electrically connected to the DC converter module. The circuit check module is electrically connected between the electrical input and the DC converter module, serving as the car window circuit voltage regulator. When installed to a window power circuit, the car window circuit will indicate successful installation through the activation and illumination of a power indicator LED and a bridge indicator LED.



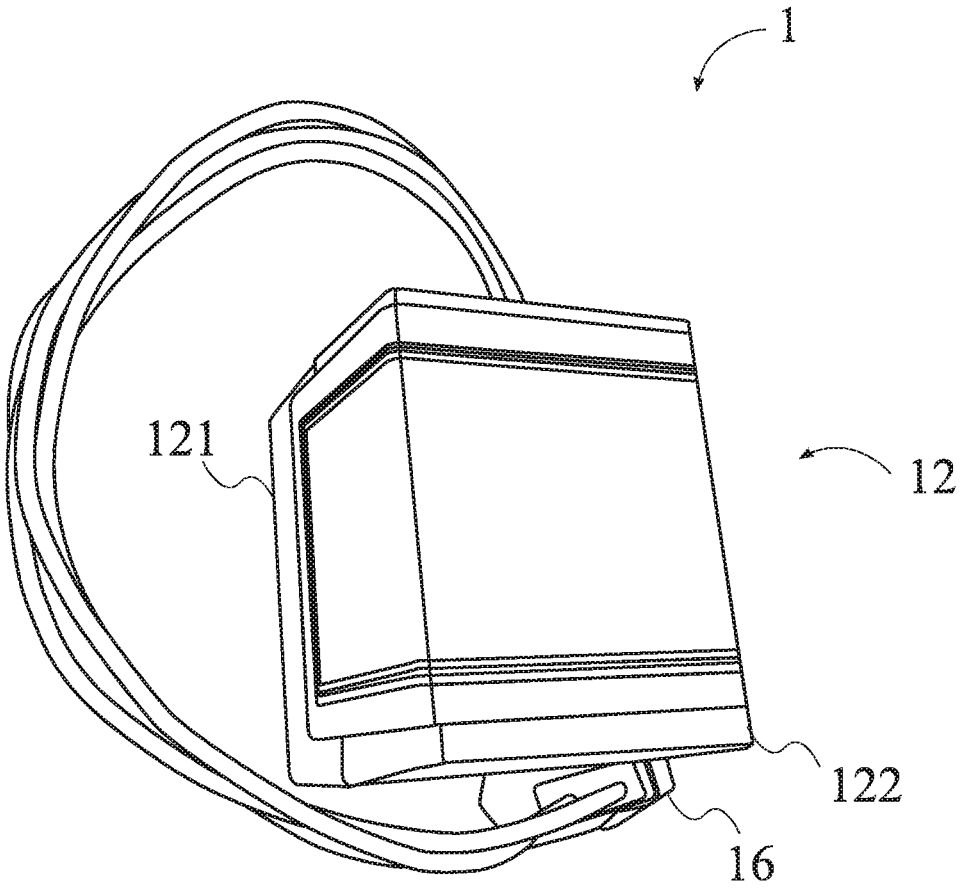


FIG. 1

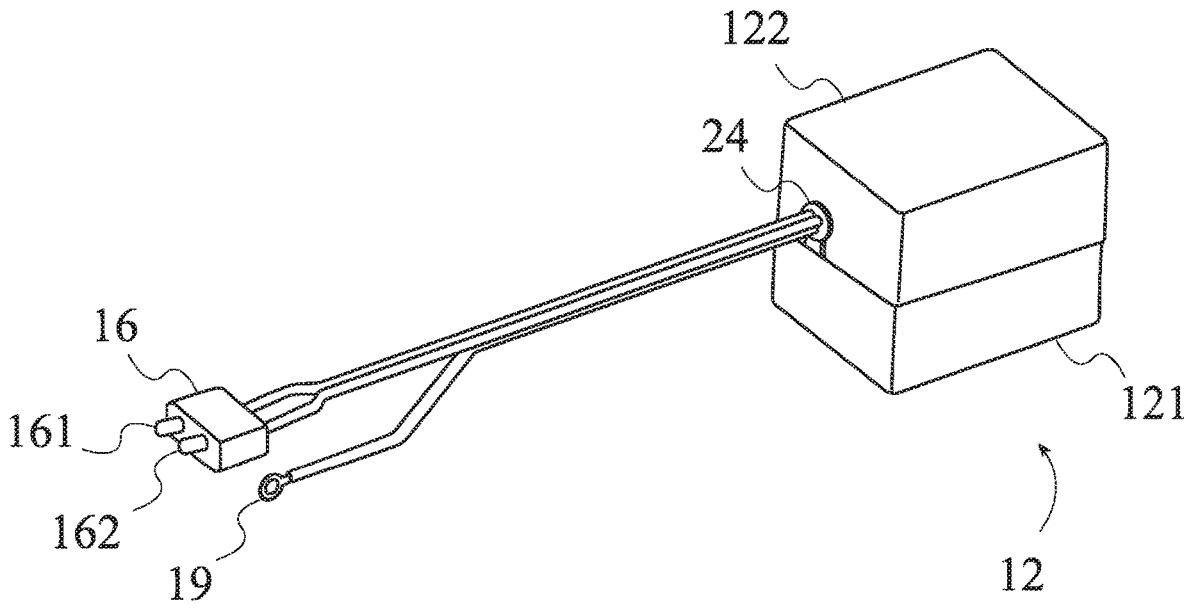


FIG. 2

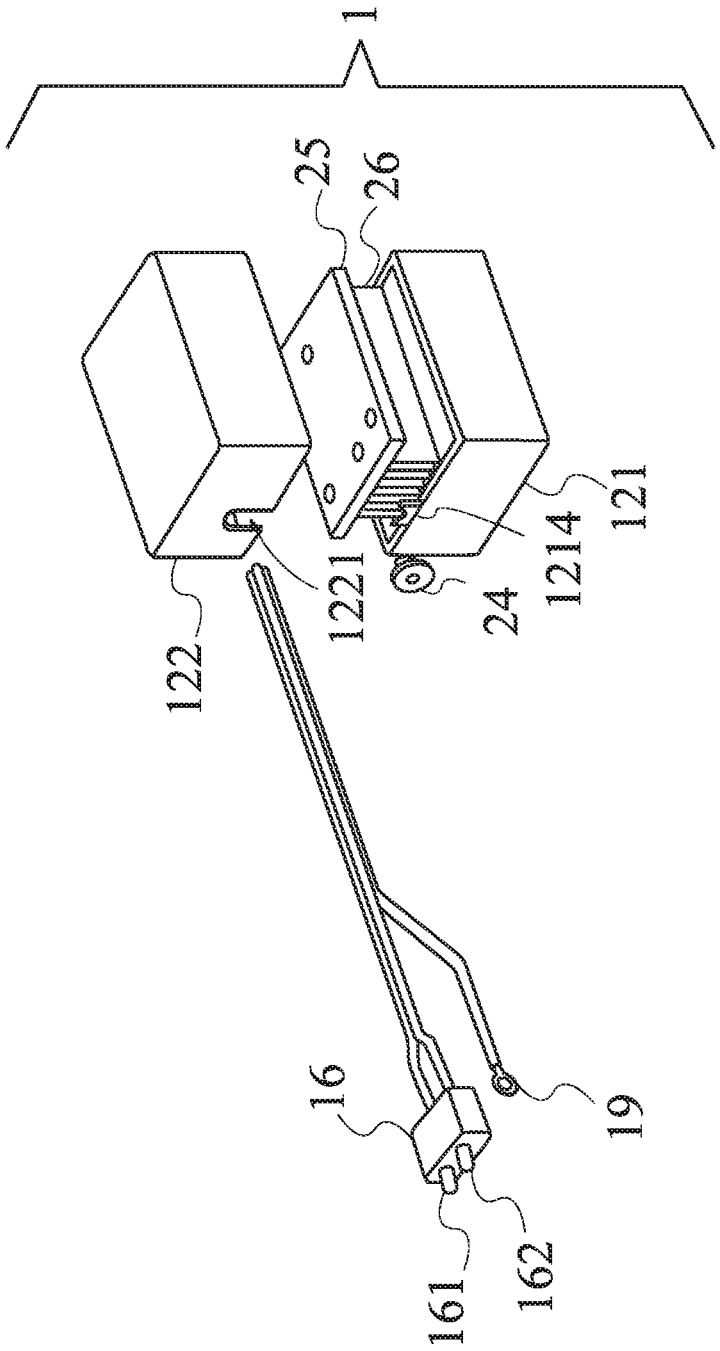


FIG. 3

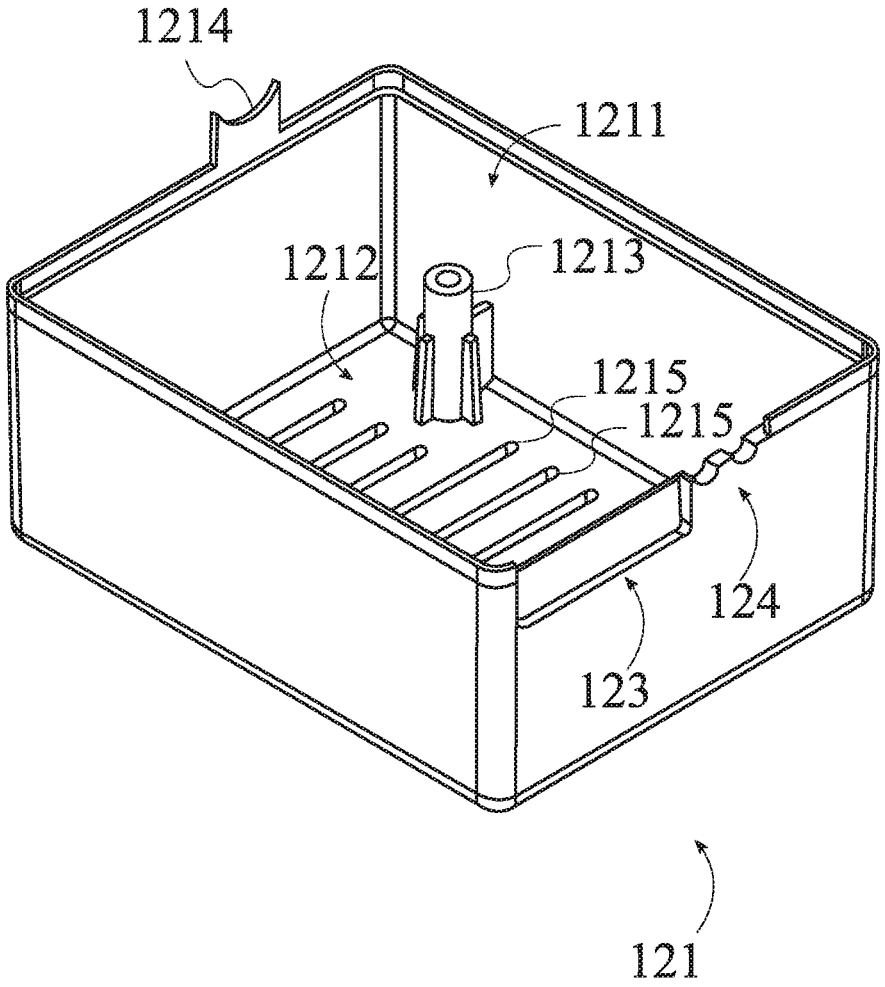


FIG. 4

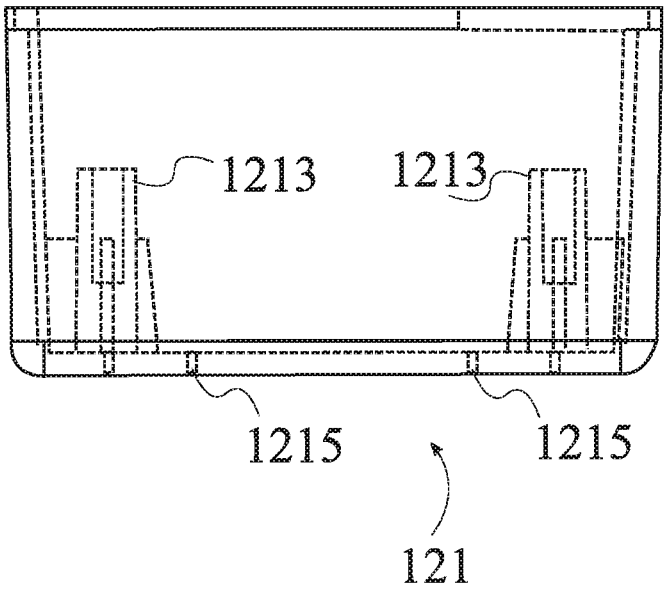


FIG. 5

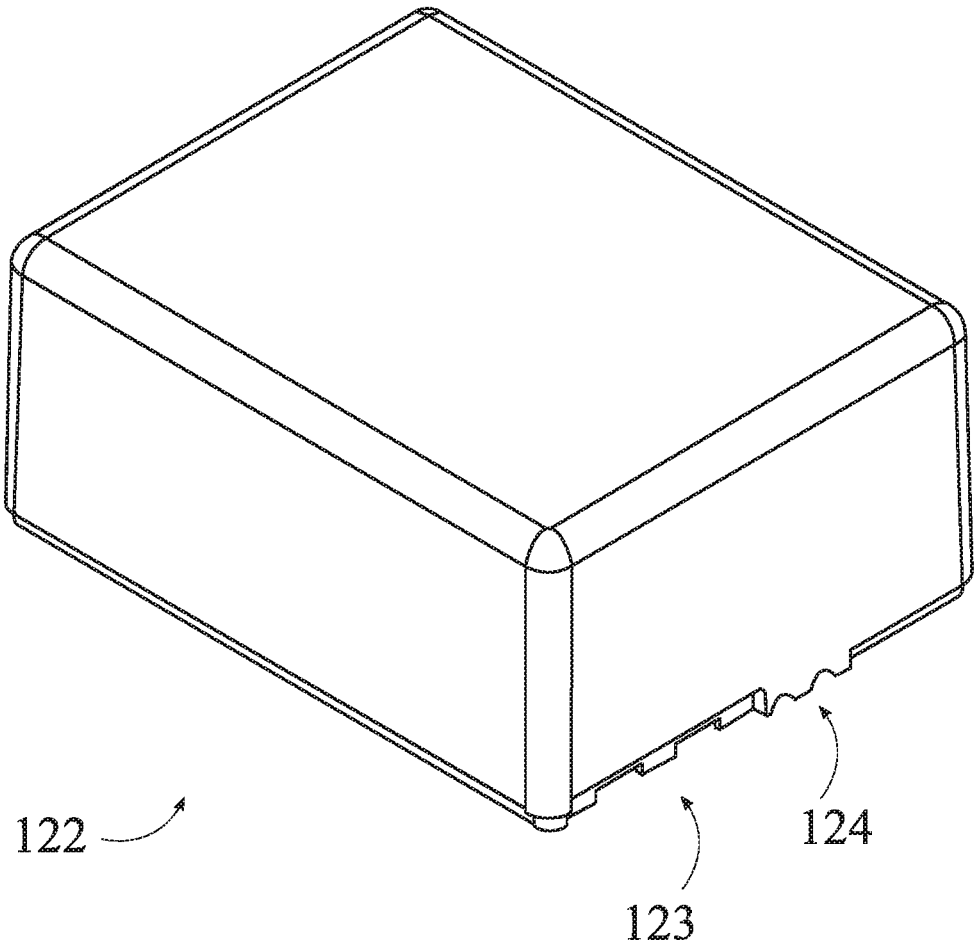


FIG. 6

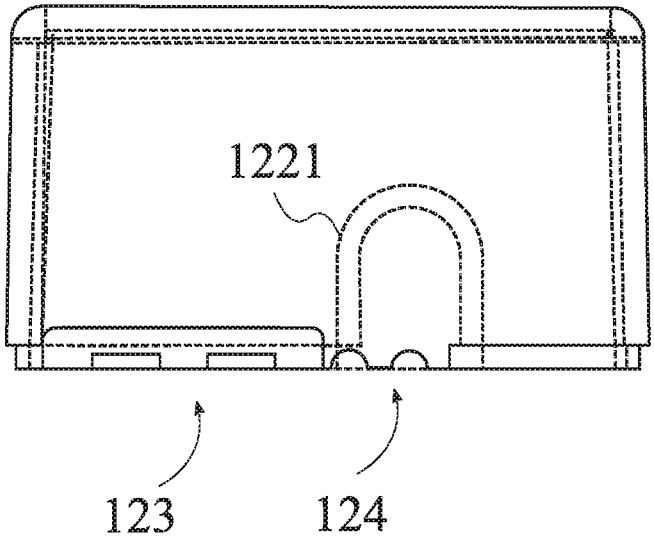


FIG. 7

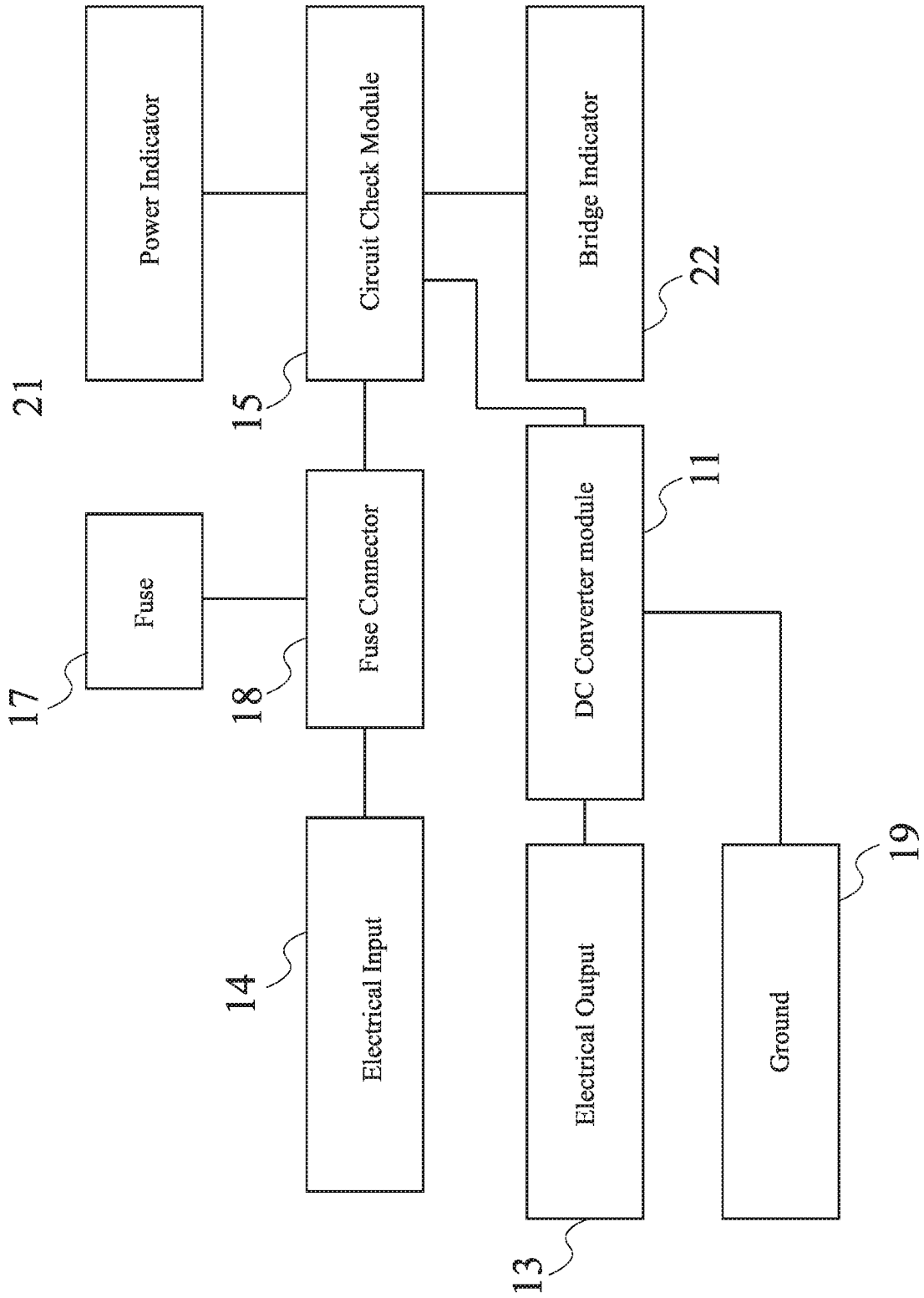

Power Indicator
Circuit Check Module
Bridge Indicator
21
15
22
Fuse
Fuse Connector
DC Converter module
11
17
18
Electrical Input
Electrical Output
Ground
14
13
19

FIG. 8

25

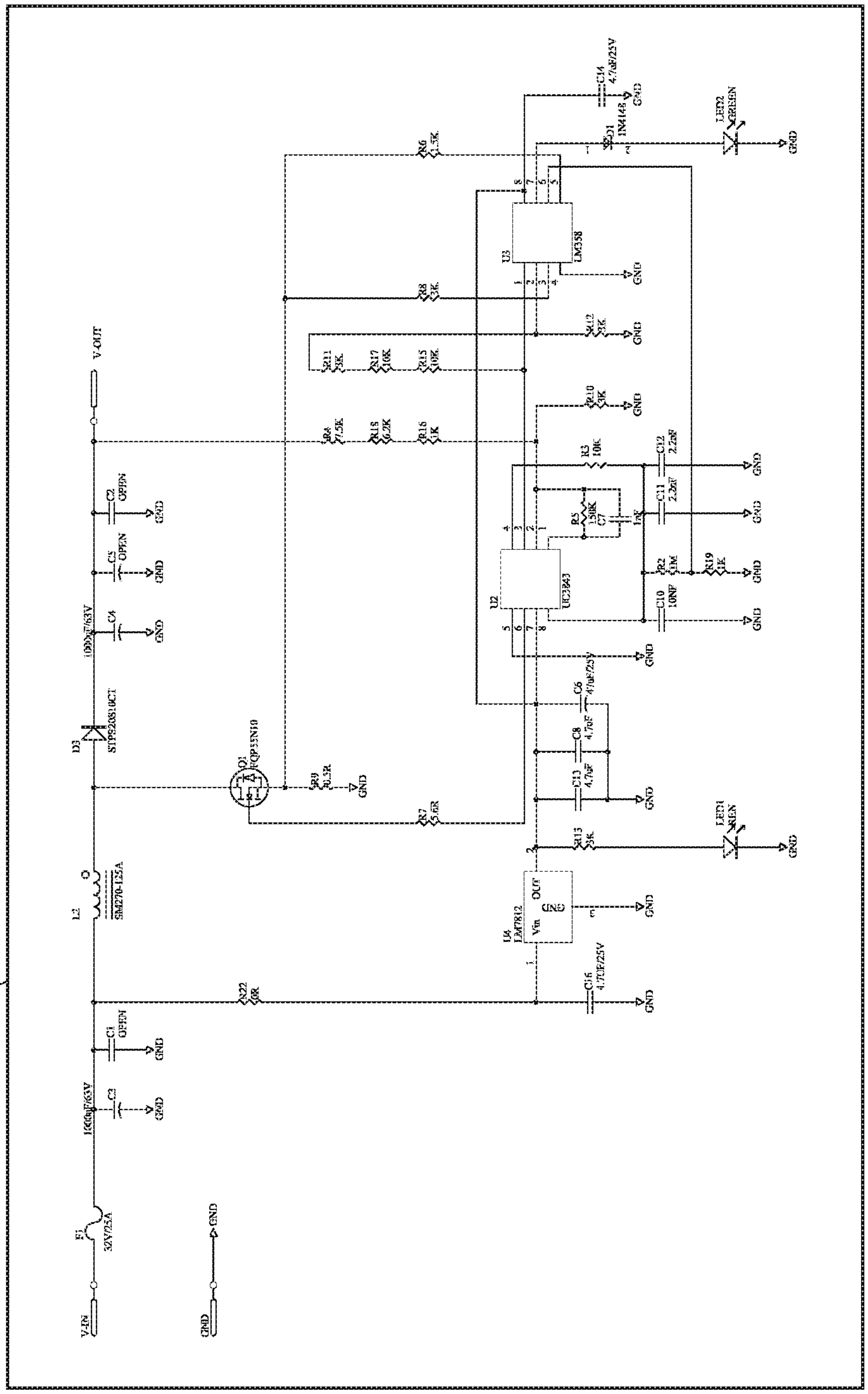


FIG. 9

POWER WINDOW CIRCUIT

[0001] The current application claims a priority to the U.S. Provisional Patent application Ser. No. 62/811,363 filed on Feb. 27, 2019.

FIELD OF THE INVENTION

[0002] The present invention relates generally to a vehicle window circuits. More particularly, automotive electronics and accessories.

BACKGROUND OF THE INVENTION

[0003] As a vehicle ages, its power windows operate at a much slower speed. It is an objective of the present invention to address this issue by providing users with a contained circuit that makes old power windows work like new.

[0004] The present invention is easy to install. The user simply needs to locate the window power fuse slot in the vehicle circuit breaker. The user can then replace the window power fuse with the present invention. Finally, the user can then ground the present invention to a suitable ground connection, such as a vehicle frame bolt. Once installed, the present invention optimizes the window power circuit by enhancing the voltage, while decreasing the amperage draw of the vehicle. The present invention also features voltage and amperage regulation features, prolonging the performance and life of the power window switch, power window motor, or any other components that constitutes the window power circuit. Furthermore, the present invention features indicators that diagnoses a faulty window power circuit such as open circuit faults, short circuits, or insufficient voltage/amperage draw.

SUMMARY OF THE INVENTION

[0005] The present invention is a car window circuit. The car window circuit comprises a DC converter module, a case, an electrical input, an electrical output, and a circuit check module. The car window circuit may take the form of a contained circuit that increases the voltage while lowering the amp load to the window motor of a vehicle, increasing the window movement speed in older vehicles with sluggish window movement speeds. Additionally, the car window circuit prolongs the life of the vehicle window circuit by regulating voltage and amperage flow to safe and optimal levels.

[0006] The DC converter module is positioned within the case. In the preferred embodiment of the present invention, the case serves as a protective housing for the electronic components that constitutes car window circuit In the preferred embodiment of the present invention, the case is made out of an insulative, weather-proof, durable, hard plastic material, but can be made out of any other suitable material such as, but not limited to hard rubber, aluminum, silicone, wood, or any other suitable material. In the preferred embodiment of the present invention, the case may take the form of a rectangular box shape, allowing the case to install within a vehicle door panel compartment or any other suitable space. In various embodiments, the case may take the form of any other suitable shape, such as but not limited to spherical, elliptical, or triangular shapes. In the preferred embodiment of the present invention, the DC converter module may take the form of a step-up voltage converter, increasing the 12V vehicle power input to optimal voltage levels while lowering the amperage draw to the window motor of the vehicle.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007] FIG. **1** is a front perspective view of the present invention.

[0008] FIG. **2** is a top perspective view of the present invention.

[0009] FIG. **3** is an exploded top perspective view of the present invention.

[0010] FIG. **4** is a top perspective view of a case body used in the present invention.

[0011] FIG. **5** is a side view of the case body used in the present invention.

[0012] FIG. **6** is a top perspective view of a cover used in the present invention.

[0013] FIG. **7** is a side view of the cover used in the present invention.

[0014] FIG. **8** is a box circuit diagram used in the present invention.

[0015] FIG. **9** is circuit diagram that constitute the electronic components used in the present invention.

DETAIL DESCRIPTIONS OF THE INVENTION

[0016] All illustrations of the drawings are for the purpose of describing selected versions of the present invention and are not intended to limit the scope of the present invention. The present invention is to be described in detail and is provided in a manner that establishes a thorough understanding of the present invention. There may be aspects of the present invention that may be practiced or utilized without the implementation of some features as they are described. It should be understood that some details have not been described in detail in order to not unnecessarily obscure focus of the invention. References herein to "the preferred embodiment", "one embodiment", "some embodiments", or "alternative embodiments" should be considered to be illustrating aspects of the present invention that may potentially vary in some instances, and should not be considered to be limiting to the scope of the present invention as a whole.

[0017] In reference to FIGS. **1-3** and **8-9**, the present invention is a car window circuit **1**. The car window circuit **1** comprises a DC converter module **11**, a case **12**, an electrical input **14**, an electrical output **13**, and a circuit check module **15**. The car window circuit **1** may take the form of a contained circuit that increases the voltage while lowering the amp load to the window motor of a vehicle, increasing the window movement speed in older vehicles with sluggish window movement speeds. Additionally, the car window circuit **1** prolongs the life of the vehicle window circuit by regulating voltage and amperage flow to safe and optimal levels.

[0018] The DC converter module **11** is positioned within the case **12**, as shown in FIG. **2**. In the preferred embodiment of the present invention, the case **12** serves as a protective housing for the electronic components that constitutes car window circuit **1**. In the preferred embodiment of the present invention, the case **12** is made out of an insulative, weather-proof, durable, hard plastic material, but can be made out of any other suitable material such as, but not limited to hard rubber, aluminum, silicone, wood, or any other suitable material. In the preferred embodiment of the present inven-

tion, the case **12** may take the form of a rectangular box shape, allowing the case **12** to install within a vehicle door panel compartment or any other suitable space. In various embodiments, the case **12** may take the form of any other suitable shape, such as but not limited to spherical, elliptical, or triangular shapes. In the preferred embodiment of the present invention, the DC converter module **11** may take the form of a step-up voltage converter, increasing the 12V vehicle power input to optimal voltage levels while lowering the amperage draw to the window motor of the vehicle.

[0019] The electrical input **14** is electrically connected to the DC converter module **11**, as shown in FIG. **8**. In the preferred embodiment of the present invention, the electrical input **14** may take the form of an electrical conduit or wire that bridges the input electrical connection of the **12**V power supply to the DC converter module **11**. The electrical output **13** is electrically connected to the DC converter module **11**, as shown in FIG. **8**. In the preferred embodiment of the present invention, the electrical output **13** may take the form of an electrical conduit or wire that bridges the output electrical connection of the stepped-up voltage produced by the DC converter module **11** to the vehicle window motor. In reference to FIG. **8**, the circuit check module **15** is electrically connected between the electrical input **14** and the DC converter module **11** where the circuit check module **15** is configured to determine whether the car window circuit **1** is capable of operating at a specified voltage threshold. More specifically, the circuit check module **15** regulates the voltage and amperage draw that feeds into the DC converter module **11**, serving as a safety gateway, preventing insufficient power, voltage spikes, or over-amperage from damaging the DC converter module **11**.

[0020] In the preferred embodiment of the present invention, the car window circuit **1** further comprises a circuit breaker connector **16**, a fuse **17**, a fuse connector **18**, a power indicator **21**, and a bridge indicator **22**, a grommet **24**, a ground **19**, an electronics board **25**, and a heatsink **26**. The case **12** comprises a case body **121** and a cover **122**, as shown in FIGS. **4-5**. The case body **121** is connected adjacent to the cover **122**, as shown in FIGS. **1-3**. In the preferred embodiment of the present invention, the case body **121** mounts and secures the electronic components that constitute the car window circuit **1**. The case body **121** comprises an electronics cavity **1211**, electronics mounting surface **1212**, at least one electronics mounting bracket **1213**, a seal mounting tab **1214**, and a plurality of vent apertures **1215**. The electronics cavity **1211** is positioned within the case body **121**, as shown in FIG. **4**. In the preferred embodiment of the present invention, the electronics cavity **1211** serves as the interior chamber of the case body **121** that facilitates the mounting and placement of the electronic components that constitutes the car window circuit **1**. The electronics mounting surface **1212** is positioned within the electronics cavity **1211**. The electronics mounting surface **1212** portion of the case body **121** serves as the mounting surface for the at least one electronics bracket. In the preferred embodiment of the present invention, the at least one electronics mounting bracket **1213** is connected on the electronics mounting surface **1212**. The seal mounting tab **1214** is connected to the case body **121** opposite to the electronics mounting surface **1212**. The seal mounting tab **1214** is positioned between the case body **121** and the cover **122**. The seal mounting tab **1214** facilitates the connection of the grommet **24** to the case body **121**. In reference to FIG. **3**, the grommet **24** is connected between the seal mounting tab **1214** and the at least one light aperture **1221**. In the preferred embodiment of the present invention, the grommet **24** serves as a protective seal for the wiring that constitutes the electrical output **13**, the electrical input **14**, and the ground **19** connections. The plurality of vent apertures **1215** traverses through the case body **121**. The plurality of vents allows air to pass through the case body **121**, cooling the DC converter module **11** and circuit check module **15**.

[0021] The cover **122** comprises a wire aperture **1221**. In the preferred embodiment of the present invention, the cover **122** closes off the electronics cavity **1211** and protects the electronic components that constitutes the car window circuit **1**. The wire aperture **1221** is aligned with a seal mounting tab **1214** of the case body **121**. In reference to FIGS. **3** and **7**, the wire aperture **1221** traverses through the cover **122**. The wire aperture **1221** allows the electrical input **14**, the electrical output **13**, and ground **19** wires to traverse through the case **12**. In the preferred embodiment of the present invention, the case **12** further comprises at least one light aperture **124**, and a fuse aperture **123**. The at least one light aperture **124** traverses through the case **12**. The fuse aperture **123** traverses through the case **12**. The at least one aperture secures and mounts the power indicator **21** and the bridge indicator **22** to the case **12**.

[0022] The circuit breaker connector **16** comprises an electrical input terminal **161** and an electrical output terminal **162**, as shown in FIGS. **1-3**. The electrical input terminal **161** is electrically connected with the electrical input **14**. The electrical output terminal **162** is electrically connected with the electrical output **13**. In the preferred embodiment of the present invention, the circuit breaker connector **16** may take the form of a connector plug that allows the user to install the car window circuit **1** to the vehicle window power fuse **17** box. In the preferred embodiment of the present invention, the electrical input terminal **161** and the electrical output terminal **162** can be di-similar from each other such that the circuit breaker connector **16** only installs in one electrical configuration, preventing the possibilities of a reverse polarity connection. The ground **19** is electrically connected to the DC converter module **11**, as shown in FIG. **8**. In the preferred embodiment of the present invention, the ground **19** connection serves as the electrical ground **19** for the car window circuit **1**.

[0023] In the preferred embodiment of the present invention, the fuse connector **18** is electrically connected between the electrical input **14** and the circuit check module **15**, as shown in FIG. **8**. The fuse **17** is electrically connected with the fuse connector **18**. The fuse **17** is electrically connected between the electrical input **14** and the circuit check module **15**. The fuse connector **18** is aligned with the fuse aperture **123**. In the preferred embodiment of the present invention, the fuse **17** is removably attached to the fuse connector **18**. The fuse **17** serves as an amperage safety cut-off device for the circuit check indicator, such that the fuse **17** will blow when the receiving amperage from the electrical input **14** exceeds the amperage safety threshold of the fuse **17**. In the preferred embodiment of the present invention, the fuse connector **18** facilitates a quick and easy means of replacing a blown fuse **17**.

[0024] In reference to FIG. **8**, the power indicator **21** is electrically connected with the circuit check module **15**. The bridge indicator **22** is electrically connected with the circuit check module **15**. In the preferred embodiment of the

present invention, the power indicator **21** and the bridge indicator **22** each is aligned with one of the at least one light aperture **124**. In the preferred embodiment of the present invention, the power indicator **21** indicates that current is running through the circuit check module **15**, indicating that electrical input **14** current is closed or not shorted. In the preferred embodiment of the present invention, the bridge indicator **22** indicates that current is running through the DC converter module **11**, prompting that the amperage draw provides sufficient input for the DC converter module **11**. In the preferred embodiment of the present invention, the power indicator **21** and bridge indicator **22** may take the form of a LED diodes, but may take the form of any other type of indicator such as, but not limited to audible beepers, vibrator pulse devices, or any other suitable indicators.

[0025] In reference to FIG. **3**, the electronics board **25** is connected adjacent to the electronics mounting bracket of the case **12**. The DC converter module **11** and the circuit check module **15** is connected to the electronics board **25**. In the preferred embodiment of the present invention, the electronics board **25** may take the form of an PCB board that integrates the DC converter module **11** and circuit check module **15** together, as shown in FIG. **9**. In the preferred embodiment of the present invention, the electronic components that constitutes the electronics board may take the form of a specific arrangement of diodes, capacitors, resistors, step up converters, relays, or any other suitable components to achieve step up and voltage or amperage regulative functions, as shown in FIG. **9**. The electronics board **25** may take the form of a PCB board that mounts the DC converter module **11** and the circuit check module **15** in to one electronic unit. In reference to FIG. **3**, the heatsink **26** is connected adjacent to the DC converter module **11** and the circuit check module **15**. In the preferred embodiment of the present invention, the heatsink **26** may take the form of a finned heatsink **26** that dissipates heat emitted from the DC converter and the circuit check module **15**.

[0026] Although the invention has been explained in relation to its preferred embodiment, it is to be understood that many other possible modifications and variations can be made without departing from the spirit and scope of the invention as hereinafter claimed.

What is claimed is:

1. A car window circuit comprising:
- a DC converter module;
- a case;
- an electrical input;
- an electrical output;
- a circuit check module;
- the DC converter module being positioned within the case;
- the electrical input being electrically connected to the DC converter module;
- the electrical output being electrically connected to the DC converter module; and
- the circuit check module being electrically connected between the electrical input and the DC converter module; wherein the circuit check module is configured to determine whether the car window circuit is capable of operating at a specified voltage threshold.

2. The car window circuit as claimed in claim **1** comprising:
- the case comprising a case body and a cover; and
- the case body being connected adjacent to the cover.

3. The car window circuit as claimed in claim **2** comprising:
- the case body comprising an electronics cavity, an electronics mounting surface, at least one electronics mounting bracket, a seal mounting tab, and a plurality of vent apertures;
- the electronics cavity being positioned within the case body;
- the electronics mounting surface being positioned within the electronics cavity;
- the at least one electronics mounting bracket being connected on the electronics mounting surface;
- the seal mounting tab being connected to the case body opposite to the electronics mounting surface;
- the seal mounting tab being positioned between the case body and the cover; and
- the plurality of vent apertures traversing through the case body.

4. The car window circuit as claimed in claim **2** comprising:
- the cover comprising a wire aperture;
- the wire aperture traversing through the cover; and
- the wire aperture being aligned with a seal mounting tab of the case body.

5. The car window circuit as claimed in claim **1** comprising:
- the case comprising at least one light aperture, and a fuse aperture;
- the at least one light aperture traversing through the case; and
- the fuse aperture traversing through the case.

6. The car window circuit as claimed in claim **1** comprising:
- a circuit breaker connector;
- the circuit breaker connector comprising an electrical input terminal and an electrical output terminal;
- the electrical input terminal being electrically connected with the electrical input; and
- the electrical output terminal being electrically connected with the electrical output.

7. The car window circuit as claimed in claim **1** comprising:
- a fuse; and
- the fuse being electrically connected between the electrical input and the circuit check module.

8. The car window circuit as claimed in claims **1** comprising:
- a fuse connector;
- a fuse;
- the case comprising a fuse aperture;
- the fuse connector being electrically connected between the electrical input and the circuit check module;
- the fuse being electrically connected with the fuse connector; and
- the fuse connector being aligned with the fuse aperture.

9. The car window circuit as claimed in claim **1** comprising:
- a power indicator;
- a bridge indicator;
- the case comprising at least one light aperture;
- the power indicator being electrically connected with the circuit check module;
- the bridge indicator being electrically connected with the circuit check module; and

the power indicator and the bridge indicator each being aligned with one of the at least one light aperture.

10. The car window circuit as claimed in claim **1** comprising:

a grommet;

a case body of the case comprising a seal mounting tab;

a cover of the case comprising a wire aperture; and

the grommet being connected between the seal mounting tab and the wire aperture.

10. The car window circuit as claimed in claim **1** comprising:

a grommet;

a case body of the case comprising a seal mounting tab;

a cover of the case comprising a wire aperture; and

the grommet being connected between the seal mounting tab and the wire aperture.

11. The car window circuit as claimed in claim **1** comprising:

a ground; and

the ground being electrically connected to the DC converter module.

12. The car window circuit as claimed in claim **1** comprising:

an electronics board; and

the electronics board being connected adjacent to an electronics mounting bracket of the case.

13. The car window circuit as claimed in claim **1** comprising:

a heatsink; and

the heatsink being connected adjacent to the DC converter module and the circuit check module.

* * * * *