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(54) **CAP HAVING AN ILLUMINATING FAN AND HEATING DEVICE**

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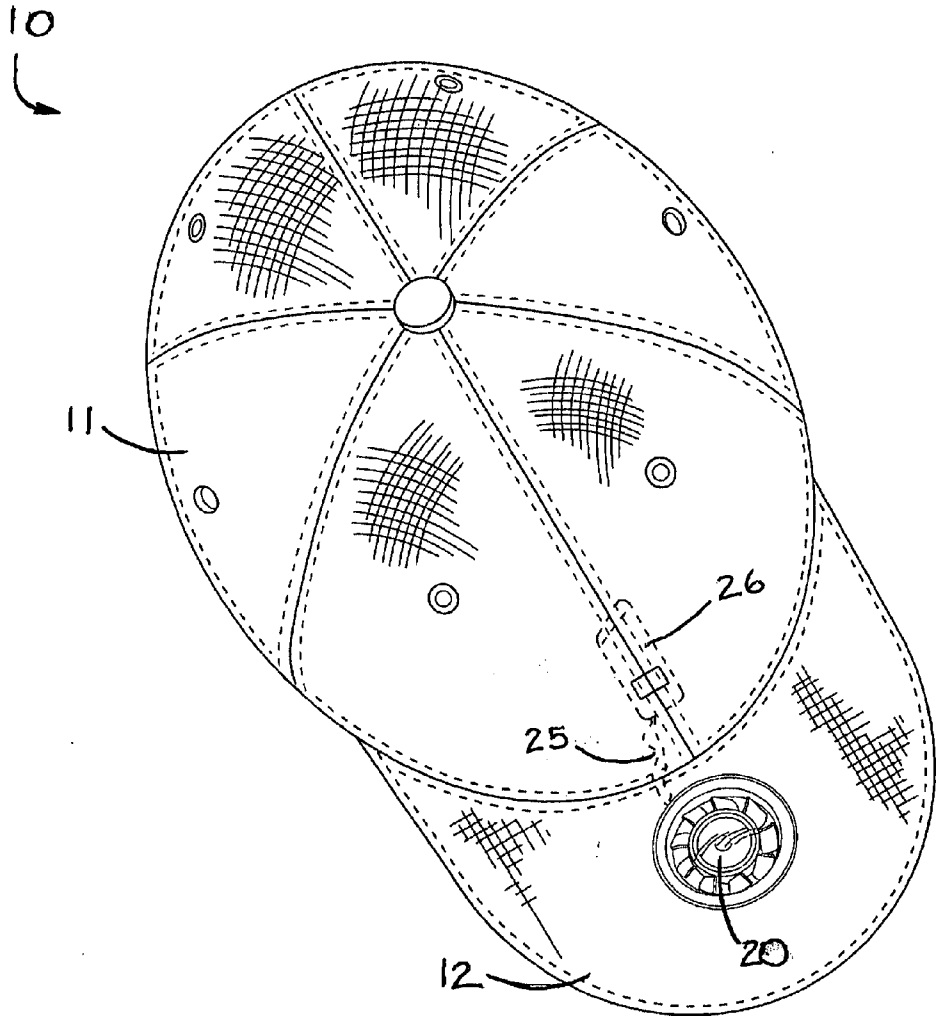
(57) **ABSTRACT**

A cap having a crown sized for receiving a head of a wearer and a lid connected to a front portion of the crown, the cap including a fan having a fan body and a motor for driving a plurality of rotatable fan blades for providing cool ambient air to the wearer, and at least one heating device removably attached to the crown for providing heat to the wearer. A protective cover may also be provided for covering a top portion of the cooling device for preventing at least one of debris and moisture from impeding the operation of the cooling device. At least one of the fan body and the fan blades is composed of a transparent material having at least one illuminator for projecting light by illuminating the at least one of the fan body and the fan blades.



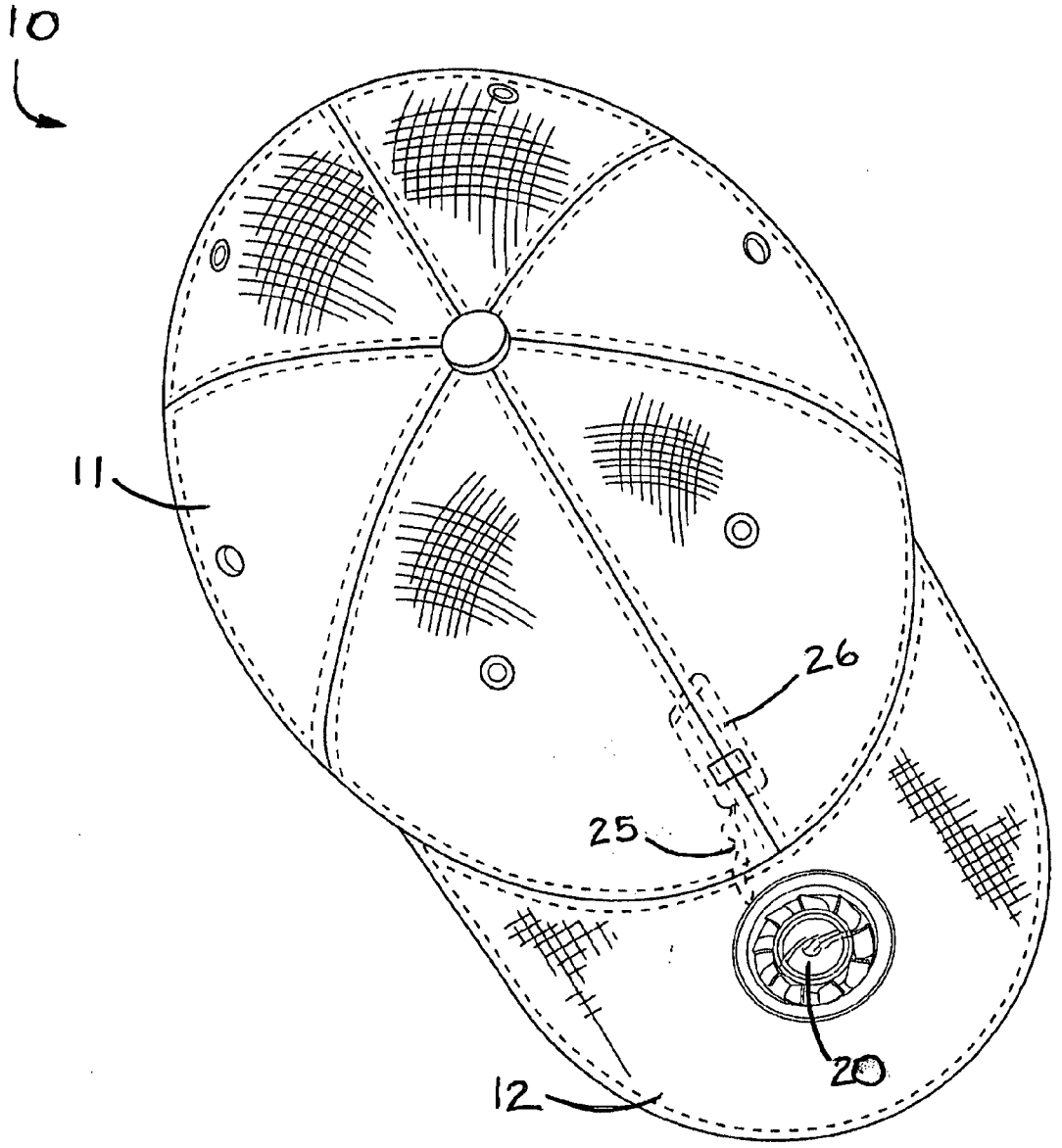


Fig. 1

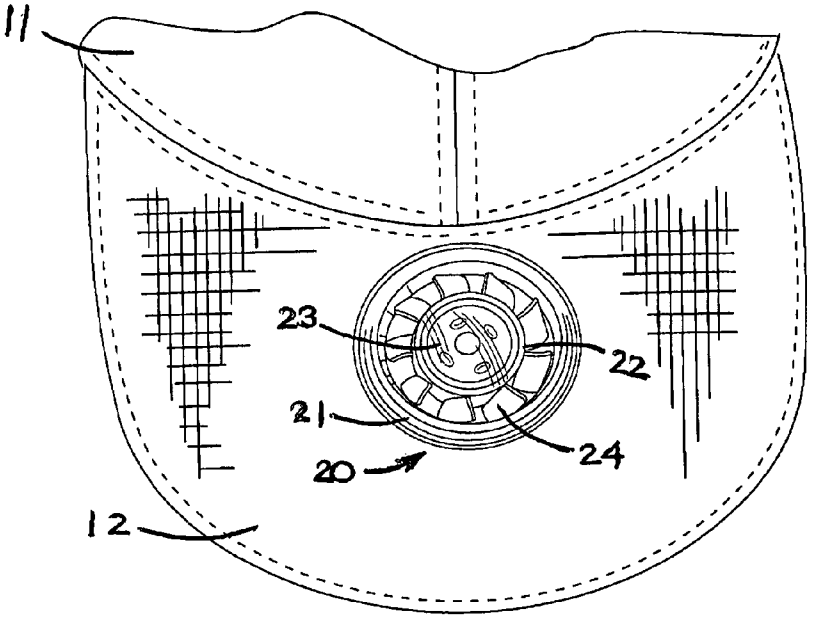


Fig. 2

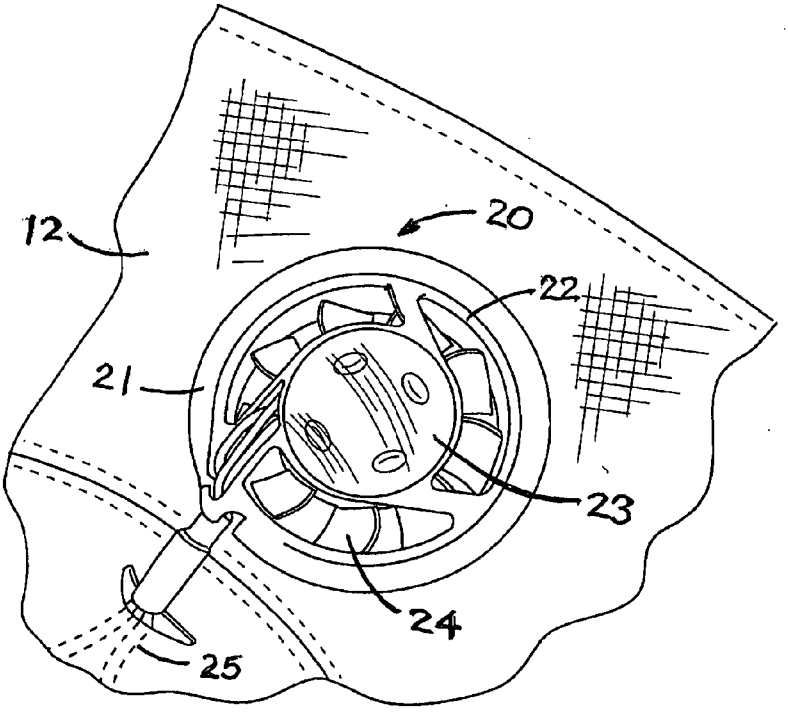


Fig. 3

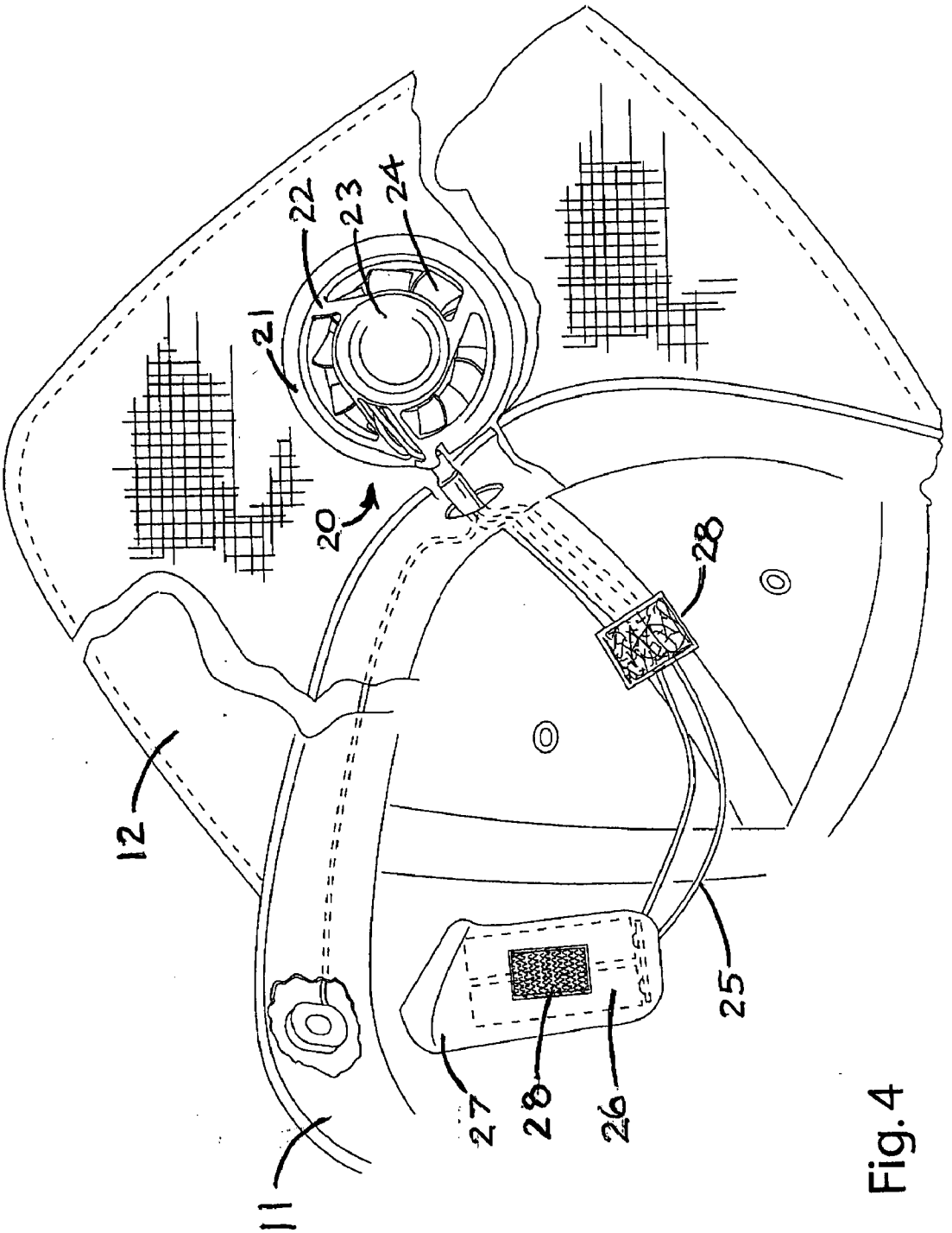


Fig. 4

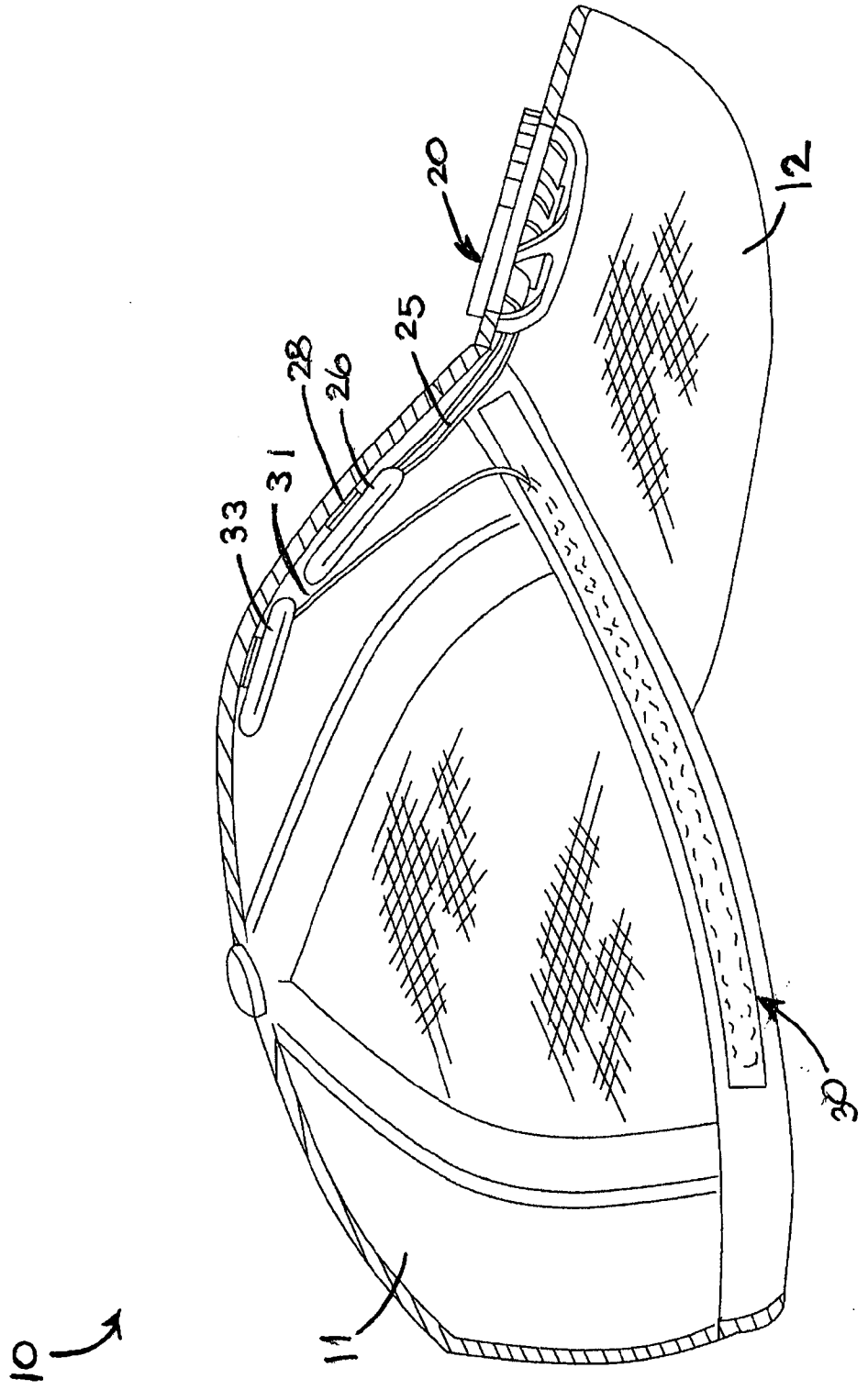


Fig. 5

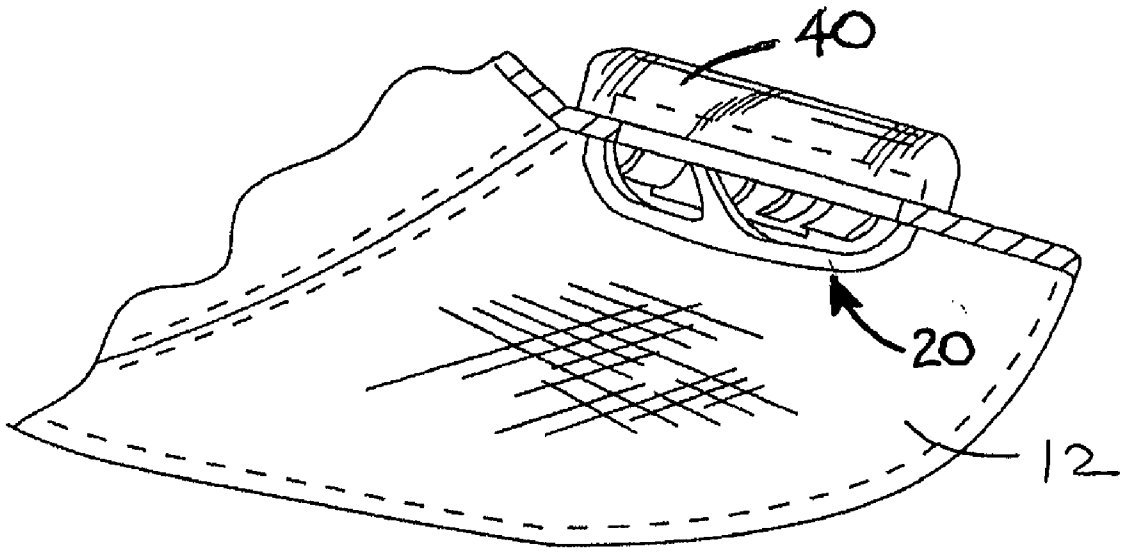


Fig. 6

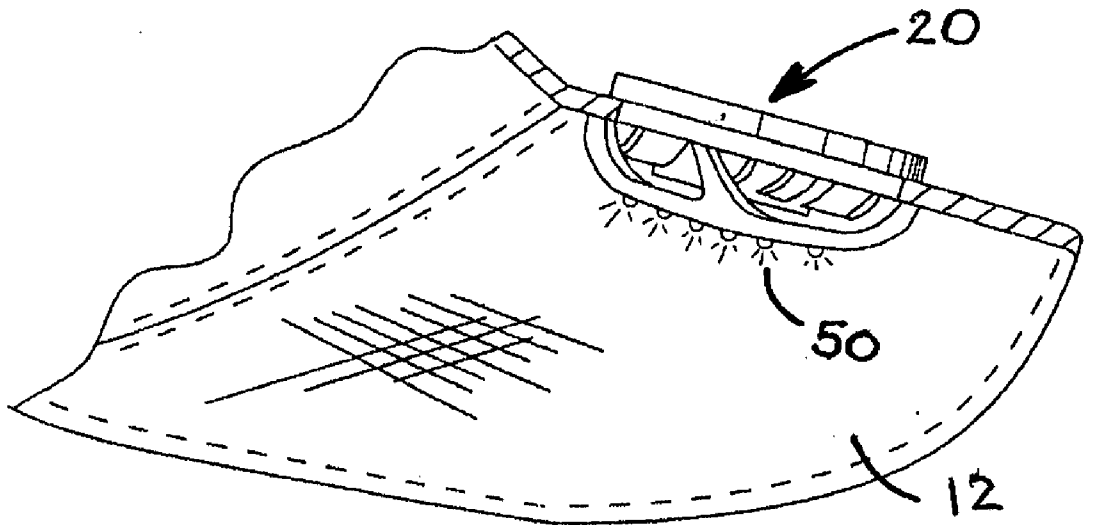


Fig. 7

CAP HAVING AN ILLUMINATING FAN AND HEATING DEVICE

BACKGROUND

[0001] Various types of headwear such as hats, caps and the like may be equipped with a battery-driven fan provided at the visor or lid for cooling the wearer by supplying cool, ambient air thereto.

[0002] The aforementioned cap design, however, has serious ergonomic drawbacks. For instance, the fan body may be permanently attached to the visor or lid at an opening by way of a retaining ring, flange or bracket. Consequently, the fan is not removably attached to permit wearing of the cap when a cooling function is not required or otherwise needed. Moreover, the cap lacks any mechanism for not only providing cool, ambient air to the wearer, but also providing heat during cold weather climates.

[0003] Moreover, during instances when a wearer would like to wear the cap at a sporting event or during other leisure moments, the lid usually blocks or obstructs light projecting toward the wearer. Therefore, it may become difficult for a wearer to comfortably read a publication such as a book, newspaper and the like.

[0004] The configuration and size of the battery is such that it makes the cap uncomfortable for the wearer. Particularly, the placement of the battery may be provided at a frontal interior surface of the crown of the cap which contacts the forehead of the wearer, making it uncomfortable to wear, especially for prolonged periods of time.

[0005] Lastly, because the fan and its motor are exposed to the elements, the motor, and thus the functionality of the fan, will be compromised if the cap is worn during rain, snow, sleet conditions.

[0006] Accordingly, there is a need to mitigate or otherwise reduce the aforementioned limitations.

SUMMARY

[0007] In view of the foregoing, embodiments are related to an article of headwear such as a cap, hat or the like including a crown for receiving a head of a wearer and a lid portion connected to a front portion of the crown. Particularly, the lid can include at least one of: a cooling device, one or more heating elements; an attachment mechanism or bracket for removably attaching the cooling device to the lid; at least one motor for driving the heating and/or cooling device; a power source electrically connected to the motor; and a protective cover for covering a top portion of the cooling device.

[0008] Embodiments are related to a cap having a crown sized for receiving a head of a wearer and a lid connected to a front portion of the crown. In accordance with embodiments, the cap can include at least one of a cooling device removably attached to the lid, the cooling device having a plurality of rotatable blades for providing cool ambient air to the wearer and a motor for driving the plurality of rotatable blades; a plurality of illuminating devices for projecting light to the wearer; and at least one heating device removably attached to the crown for providing beat to the wearer.

[0009] Embodiments are related to a cap having a crown sized for receiving a head of a wearer and a lid connected to a front portion of the crown. In accordance with embodiments, the cap can include at least one of a fan having a fan body and a motor for driving a plurality of rotatable fan blades for providing cool ambient air to the wearer; a power source electrically connected to the motor; and a protective cover for covering a top portion of the cooling device for preventing at least one of debris and moisture from impeding the operation of the cooling device. At least one of the fan body and the fan blades is composed of a transparent material having at least one illuminator for projecting light by illuminating the at least one of the fan body and the fan blades.

[0010] Embodiments are related to a cap having a crown sized for receiving a head of a wearer and a lid connected to a front portion of the crown. In accordance with embodiments, the cap can include at least one of a cooling device removably attached to the lid for providing cool ambient air to the wearer; at least one heating device removably attached to the crown for providing heat to the wearer; and a protective cover for covering a top portion of the cooling device for preventing at least one of debris and moisture from impeding the operation of the cooling device.

[0011] The cooling device may include a fan having a fan body and a plurality of fan blades that are driven when the fan motor is activated. The fan motor is electrically connected to a power source such as a dry cell battery that is connected to an inner surface of the crown.

[0012] The heating device can include one or more inserts composed of a polymeric material having a printed circuit element with a resistance circuit provided thereon. The heating elements may be attached to the inner surface of the crown and may be each electrically connected by wiring to a power source such as a dry cell battery.

[0013] In order to permit the wearer to see during poorly lit situations, the fan body and/or the fan blades can be composed of a transparent material provided with one or more illuminators which project light. Such illuminators can take the form of a plurality of light emitting diodes (LEDs) that project light with a minimum amount of electric energy. The LEDs may be programmable to change colors. In such case, the fan body can be connected to an electric motor which causes the fan blades to rotate when activated and also causes the fan to project light. Alternatively, a plurality of LEDs may be provided on the bottom and/or top surfaces of the fan body and/or the fan blades. In such case, the LEDs may be electrically connected to the same power source as the heating device and/or the cooling device, or have a separate and distinct power source that is attachable to the crown of the cap.

[0014] The cap can be removably secured to the top portion attachment mechanism in order to prevent moisture and/or debris from entering the fan. This can permit the fan to be activated during instances of inclimate weather to prevent the fan from shutting off fro the entry of rain and/or snow. The cap may also be used at the beach to prevent the entry of sand and/or dust particles.

[0015] Embodiments are related to a cap having a crown sized for receiving a head of a wearer and a lid connected to a front portion of the crown, the cap including at least one heating device removably attached to the inner surface of the crown for providing localized heat to the wearer. In accordance with embodiments, each at least one heating device can include a plurality of electrical resistance heaters electrically connected to a printed circuit element which delivers an electrical current thereto. Moreover, the least one heating element is disposed in an insulating jacket composed of at least one of a flexible, durable, insulating, weather-resistant material.

[0016] These and other objects, features and advantages of the invention will become more apparent from the following

description when taken in conjunction with the detailed drawings that show, for purposes of illustration only, the preferred embodiments of the invention.

DRAWINGS

[0017] Example FIGS. **1-7** illustrate a cap having an illuminating fan and heating device, in accordance with embodiments.

DESCRIPTION

[0018] As illustrated in example FIGS. **1** to **3**, in accordance with embodiments, cap **10** having crown portion **11** and lid portion **12** connected to crown portion. Lid portion **12** can include a cooling device for providing cool, ambient air to a wearer. The cooling device can be composed of a fan **20** sized for removable attachment to lid **12** by way of an attachment mechanism such as retaining ring **21**. The removability feature of fan **20** makes cap **10** wearable in instances when cooling air is not required since the wearer may simply remove fan **20** from ring **21** for temporary storage.

[0019] As illustrated in example FIG. **4**, fan **20** can include fan body **22** and electric motor **23** for driving a plurality of rotatable fan blades **24**. Motor **23** can be electrically connected by wiring **25** to a power source. The power source can be composed of at least one solar panel or at least one dry cell battery **26**. Battery **26** can be removably storable in compartment **27**. Compartment **27** can be removably attached using mechanical fastener **28** such as velcro and the like to the inner surface of crown **11**. Accordingly, cap **10** may be worn with fan **20** by removing both fan **20** and battery **26** for temporary storage until needed.

[0020] Compartment **27** prevents battery **26** from unwanted contact with the head of the wearer, or otherwise exposure of battery **26** to moisture and/or debris. Compartment **27** can be composed of a flexible and durable material such as leather or a polymer and include a pivotable flap which when manipulated upwardly exposes an anterior pocket sized to receive battery **26** and also permit the removal of battery **26** when replacement is required. The power source can include a switch to permit activation or deactivation of fan **20**. The switch may be an on/off switch or a variable switch.

[0021] In order to permit the wearer to see during poorly lit situations, at least one of fan body **22** and fan blades **24** can be composed of a transparent material provided with one or more illuminators which project light. Such illuminators can take the form of a plurality of light emitting diodes (LEDs) that project light with a minimum amount of electric energy. The LEDs may be programmable to change colors. In such case, fan body **22** can be electrically connected to motor **23** causing fan blades **24** to rotate and also project light when activated.

[0022] As illustrated in example FIG. **5**, in accordance with embodiments, cap **10** can include a cooling device such as fan **13** as described hereinabove, but also one or more heating devices **30** for providing sufficient heat and comfort to the head of the wearer. Heating device **30** can include a plurality of electrical resistance heaters electrically connected to a printed circuit element such as wiring **31** which delivers an electrical current thereto. The resistance heaters of heating device **30** can have a predetermined resistance of sufficient to generate localized heat to the head of the wearer. The heating elements can be encased or otherwise disposed in insulating jacket **32** composed of a flexible, durable, insulating, water-resistant material. Insulating jacket **32** can be provided with a padded layer.

[0023] The printed circuit element, i.e., wiring **31** of the heating device **30** can be electrically connected to a second power source such as at least one dry cell battery **33**. Alternatively, heating device **30** may be electrically connected to the same power source as fan **20**. Battery **33** can be removably storable in a suitable compartment constructed in the same manner as compartment **27**. The power source for heating device **30** can also include a separate switch to permit activation or deactivation of heating device **30**. The switch may be an on/off switch or a variable switch.

[0024] Insulating jacket or housing **32** can be removably attached to the inner surface of crown **11**. Because insulating jacket **32** can be removably attached by a mechanical fastener such as velcro to enable the wearer to position heating devices **30** in selected areas along the inner surface of crown **11**. For instance, at least one heating device **30** can be placed at a front portion of crown **11** such as behind the sweat pad, at a rear portion of crown **11**, and at an upper portion of crown **11** to enable the head of the wearer to be provided with sufficient heat during cold weather situations. Moreover, because heating devices **30** are encased in insulating jacket **32**, heating devices **30** can be activated even in rain, snow or windy weather conditions.

[0025] While embodiments illustrate a cap having a cooling device and a heating device for providing cooling and heating to a wearer, respectively, cap may include only a heating configuration as described herein.

[0026] As illustrated in example in example FIG. **6**, cap **10** may include protective cover **40** that can be removably secured on and/or over fan **20** for preventing moisture and/or debris from entering fan **20**, and thus, prematurely shutting off fan **20**. Cover **40** can be advantageous for permitting activation of fan **20** during instances of poor weather conditions such as rain, sleet, snow, etc. Cover **40** can also be used at sandy or dusty environments such as the beach to prevent the entry of sand and/or dust particles into fan **20**. Cover **40** can be composed of a durable, non-conductive material such as a polymer and/or composite. Cover **40** can be composed of a transparent material that permits illuminating light of fan **20** to be seen.

[0027] As illustrated in example in example FIG. **7**, a plurality of LEDs **50** can be attached to bottom and/or top surfaces of at least one of fan body **22**, motor **23** and fan blades **24** to project light in order to permit the wearer to read when located in a poorly lit environment. In such case, LEDs **50** can be electrically connected to the same power source of at least one of fan **20** and heating device **30**, or have a separate and distinct power source attachable to crown **11**.

[0028] Although embodiments have been described herein, it should be understood that numerous other modifications and embodiments can be devised by those skilled in the art that will fall within the spirit and scope of the principles of this disclosure. More particularly, various variations and modifications are possible in the component parts and/or arrangements of the subject combination arrangement within the scope of the disclosure, the drawings and the appended claims. In addition to variations and modifications in the component parts and/or arrangements, alternative uses will also be apparent to those skilled in the art.

What is claimed is:

1. A cap having a crown sized for receiving a head of a wearer and a lid connected to a front portion of the crown, the cap comprising:

a cooling device removably attached to the lid, the cooling device having a plurality of rotatable blades for providing cool ambient air to the wearer and a motor for driving the plurality of rotatable blades;

a plurality of illuminating devices for projecting light to the wearer; and

at least one heating device removably attached to the crown for providing heat to the wearer.

2. The cap of claim **1**, wherein each at least one heating device comprises a plurality of electrical resistance heaters electrically connected to a printed circuit element which delivers an electrical current thereto.

3. The cap of claim **2**, wherein the resistance heaters of the at least one heating device can have a predetermined resistance sufficient to generate localized heat.

4. The cap of claim **3**, wherein the at least one heating element is disposed in an insulating jacket.

5. The cap of claim **4**, wherein the insulating jacket is composed of at least one of a flexible, durable, insulating, water-resistant material.

6. The cap of claim **1**, wherein the cooling device comprises a fan having a fan body and an electric motor for driving a plurality of rotatable fan blades.

7. The cap of claim **6**, wherein the electric motor is electrically connected to a power source.

8. The cap of claim **7**, wherein the power source comprises at least one dry cell battery removably storable in a compartment.

9. The cap of claim **8**, wherein the compartment is removably attached to the inner surface of crown using a mechanical fastener.

10. A cap having a crown sized for receiving a head of a wearer and a lid connected to a front portion of the crown, the cap comprising:

a fan having a fan body and a motor for driving a plurality of rotatable fan blades for providing cool ambient air to the wearer;

a power source electrically connected to the motor; and

a protective cover for covering a top portion of the cooling device for preventing at least one of debris and moisture from impeding the operation of the cooling device,

wherein at least one of the fan body and the fan blades is composed of a transparent material having at least one illuminator for projecting light by illuminating the at least one of the fan body and the fan blades.

11. The cap of claim **10**, further comprising at least one heating device removably attached to the crown for providing heat to the wearer.

12. The cap of claim **10**, wherein the protective cover is removably secured over the fan.

13. The cap of claim **12**, wherein the protective cover is composed of a durable, non-conductive material.

14. The cap of claim **13**, wherein the durable, non-conductive material comprises a polymer.

15. The cap of claim **10**, wherein the protective cover is composed of a transparent material that permits projection of the illuminating light from at least one of the fan body and fan blades through the protective cover.

16. A cap having a crown sized for receiving a head of a wearer and a lid connected to a front portion of the crown, the cap comprising:

at least one heating device removably attached to the inner surface of the crown for providing localized heat to the wearer, each at least one heating device including a plurality of electrical resistance heaters electrically connected to a printed circuit element which delivers an electrical current thereto.

wherein the at least one heating element is disposed in an insulating jacket composed of at least one of a flexible, durable, insulating, weather-resistant material.

17. The cap of claim **16**, further comprising a cooling device removably attached to the lid for providing cool ambient air to the wearer.

18. The cap of claim **17**, further comprising a protective cover for covering a top portion of the cooling device for preventing at least one of debris and moisture from impeding the operation of the cooling device.

19. The cap of claim **17**, wherein the cooling device comprises a fan having a fan body and an electric motor for driving a plurality of rotatable fan blades.

20. The cap of claim **19**, wherein at least one of the fan body and the fan blades is composed of a transparent material having at least one illuminator for projecting light by illuminating the at least one of the fan body and the fan blades.

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