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CA 2189378 C 2006/10/17

(11)(21) 2 189 378

(12) BREVET CANADIEN
CANADIAN PATENT

(13) C

(22) Date de dépôt/Filing Date: 1996/11/01

(41) Mise à la disp. pub./Open to Public Insp.: 1998/05/01

(45) Date de délivrance/Issue Date: 2006/10/17

(51) Cl.Int./Int.Cl. *A62B 18/02* (2006.01)

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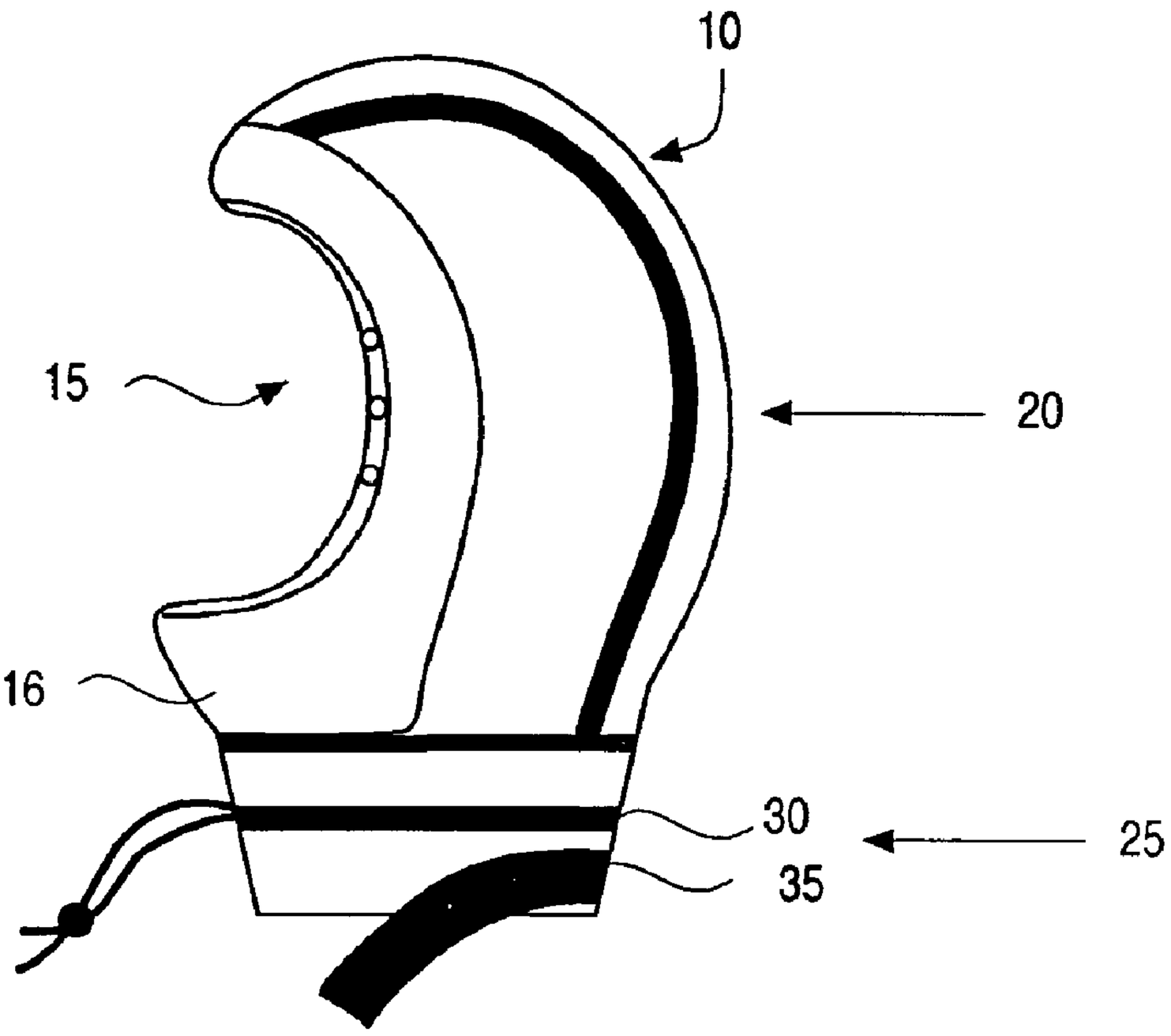
(54) Titre : CAGOULE DE PROTECTION
(54) Title: PROTECTIVE HOOD



(57) Abrégé/Abstract:
A protective hood is provided for wearers of gas masks in emergency situations. The hood is formed to provide a "synthetic skin" for the wearer's head, with openings for the eyes, nose and mouth, and neck. A smooth surface around such openings provides for a sealing contact with the gas mask which is donned over the hood. Various means are provided for constricting the hood about the neck to ensure a gas-tight contact. Circulation means within the hood, and a pouched ice gel pack on the exterior of the hood, is provided to cool the wearer's head.

ABSTRACT

A protective hood is provided for wearers of gas masks in emergency situations. The hood is formed to provide a "synthetic skin" for the wearer's head, with openings for the eyes, nose and mouth, and neck. A smooth surface around such openings provides for a sealing contact with the gas mask which is donned over the hood. Various means are provided for constricting the hood about the neck to ensure a gas-tight contact. Circulation means within the hood, and a pouched ice gel pack on the exterior of the hood, is provided to cool the wearer's head.

PROTECTIVE HOOD

FIELD OF INVENTION

The present invention relates to protective hoods which are suitable for military and industrial applications and also in civil emergency situations where dangerous gases or airborne chemicals are present.

BACKGROUND OF INVENTION

In emergencies, the ease with which a wearer can don protective equipment is very important. Furthermore, for those with a beard, the conventional gas mask is inadequate because the beard creates an uneven surface for the gas mask to contact and hence allows dangerous substances to leak through. It would be advantageous to enjoy gas-tight protection for the wearer's head using existing, conventional gas masks (especially over designing or purchasing special gas masks).

Previous attempts include those in which the wearer dons the hood over the mask (for example, USP 2,446,530) or those in which the gas mask is integral with the hood (for example, US H1360). The present invention intends to avoid disadvantages inherent in such attempts.

Conventional wet hoods used by a diver are usually concerned with minimizing (but not preventing) the entrance of water between the hood and the wearer's head. In such hoods, the important contact surface is the interior of the

hood because it contacts the head. Accordingly, a conventional wet hood is not concerned with the exterior contact with the diving mask.

SUMMARY OF INVENTION

According to one embodiment of the invention, a hood is provided for protecting the wearer's head, made of gas-impervious, flexible material, to be used with a gas mask having a face and mouth piece, comprising: (a) a head portion for enclosing snugly the head of the wearer, which has: (i) a back; and (ii) a front portion having a smooth exterior surface for a gas-tight contact with the face piece of the gas mask and defining a face opening for the eyes, nose and mouth of the wearer; and (b)a tubular neck portion, integral with said head portion, for covering the neck of the wearer, which has: (i) a smooth interior surface for a gas-tight contact with the neck of the wearer; and (ii) neck portion constricting means for constricting said neck portion about the neck of the wearer.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a conventional gas mask.

FIG. 2 is a side external view of the hood in accordance with this invention.

FIG. 3 is a side, partially internal view of the hood.

FIG. 4 is a back external view of the hood

FIG. 5 is a back, partially internal view of the hood.

FIG. 6 is a front external view of the hood.

FIG. 7 is a side external view of a variation of the hood.

FIG. 8 is a front external view of a variation of the hood.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

The protective hood of the present invention is used with a conventional gas mask 1, as illustrated in FIG. 1, which has a face piece 2 which normally contacts directly the face of the wearer around the eyes, nose and mouth, straps 3 and a gas filtration device 4.

FIGS. 2-8, illustrate hood 10 of the present invention. Hood 10 has two main portions, head portion 20 and neck portion 25. Hood 10 can be thought of as "synthetic skin" for the wearer's head and neck.

Head portion 20 is approximately shaped like a conventional diver's hood to cover snugly the wearer's head, including the chin. The bottom of head portion 20 when hood 10 is donned, approximately corresponds to the nape of the neck of the wearer. Typical dimensions for head portion 20 can be easily established for wearers of a given population.

In the front of head portion 20 is a facing or front

portion 16 which defines an approximately oval face opening 15 for the wearer's eyes, nose and mouth when hood 10 is donned. Front portion 16 has an outer surface which is smooth and is suitable for a gas-tight, sealing fit with face piece 2 of gas mask 1 when gas mask 1 is donned and strapped tightly on the wearer's head (not shown). Herein, "smooth" as it relates to a surface, means a very smooth, non-textured or very finely textured surface which is the same as or comparable to the smooth surface of the mouth piece of the face mask which normally contacts the face of the wearer around the eyes, nose and mouth.

Head portion 20 is made primarily of a suitable gas-impervious and resilient material (like 420 Denier Nylon, a polyurethane coated nylon). As seen in FIG. 4, head portion 20 is made of two side panels 21 and 22, central panel 23 therebetween, and front portion 16. Panels 21, 22 and 23 may be made of double sided Nylon coated neoprene. Panels 21, 22 23 and front portion 16 are fastened together conventionally (blind stitched with nylon thread, heat bonded with welding tape on the interior and sewn with elastic tape on the exterior) to provide an integral connection. The term "integral" as it relates to a connection between two parts of hood 10 of this invention, means a connection of two parts whose disconnection will

damage one or both parts, which allows for four way stretch and which is gas-tight or sealed.

Front portion 16 is made of neoprene (like that made by Rubatex neoprene, 2mm thick, with Nylon coated surface facing inwardly) which has a smooth side facing outwardly to contact face piece 2 of gas mask 1. The inner surface may be nylon coated.

The top of neck portion 25 has an about 18" diameter and is integrally connected to the bottom of head portion 20 by conventional methods described above. Neck portion 25 is made of neoprene (like that made by Rubatex, 3 mm thick) with a smooth side facing inwardly to contact snugly the neck of the wearer.

All other materials are possible, the ideal materials for front portion 16 and neck portion 25 should have characteristics of neoprene, that is: be smooth, have high tensile strength and stretchable in all directions but not easily punctured or ripped, and be bondable or sewable to other materials without losing the important characteristics.

It can be seen that hood 10 is designed to provide a "synthetic skin" for the wearer, with an opening for the eyes, nose and mouth, and an opening for the neck, and to provide a gas-tight fit between the "synthetic skin" and the

gas mask at the face opening and a gas-tight fit between the "synthetic skin" and the neck at the neck opening.

The gas-tight fit between neck portion 25 and the neck can be provided by several constricting means.

Neck portion 25 downwardly tapers or flares inwardly (like a truncated cone) for about 3" to terminate in a hem of about 16" diameter. Accordingly, the smooth inner surface of neck portion 25 contacts the neck of the wearer in a constricted way to provide a gas-tight fit.

Conventional draw string and toggle 30, is slidably housed in a circumferential draw string casing or enclosure around neck portion 25, as shown in FIG. 2. It can be cinched by the wearer to constrict neck portion 25 around the neck of the wearer.

A band 35 having elastic properties, is secured at the back of neck portion 25 and has free ends which may be drawn forward and secured together quickly and conventionally (for example, by interlocking Velcro fasteners ends, snap fasteners or simply tied, not shown) to constrict neck portion 25 around the wearer's neck.

The average wearer may have a neck size of 16". The diameter and taper of neck portion 25 can be adjusted to be wider than described above to facilitate a quicker donning of hood 10 or to accommodate a wearer with a large head or neck. To compensate, constricting means such as elastic

bands 35 and draw string and toggle 30, can be employed by the wearer after hood 10 is donned to provide for constriction.

To improve the circulation of air between hood 10 and the wearer's head and thereby cool, a cooling or circulation system is provided by small gaps between the wearer's head and head portion 20. The gaps are created by a plurality of ribs 50, 51 and 52, disposed around the inside of head portion 20, as illustrated in FIGS. 3 and 5. Rib 50 is a central, crown rib which runs centrally from the crown of head portion 20 to the bottom thereof. Ribs 51 extend from central rib 50 towards face opening 15 in front portion 16. In particular, ribs 51 may intersect smoothly with central rib 50 or be a continuous rib which runs over central rib 50. Ribs 52 (as shown in FIG. 5), are in the form of a rectangle and will explained later in conjunction with pouch 70 (as shown in FIG. 4).

Ribs 50, 51 and 52 may be made of neoprene cords of about ½" thickness and are attached to the inside surface of head portion 20 by conventional bonding techniques.

As seen in FIG. 6, gaps in front portion 16 are provided by tubes 60 disposed in front portion 16 approximately co-planar with the surface of front portion 16 when in contact with the wearer's face. Tubes 60 allow air at face opening 15 to enter between hood 10 and the wearer's

head, to circulate within the gaps formed by ribs 50, 51 and 52 and to exit at face opening 15. FIG. 3 shows the spatial relationship, in conceptual form, between tubes 60 and the gaps created by ribs 50 and 51.

Although tubes 60 are shown, other means of producing a small gap between the interior of head portion 20 and the head of the wearer, will be sufficient. For example, any slugs or similar object disposed in front portion 16 or a corrugated band of sufficient stiffness will be sufficient to create the requisite gaps.

To cool hood 10 further, external pouch 70 is disposed on the exterior of head portion 20 to hold a cold pack (for example, a conventional ice gel pack (not shown)). Pouch 70 can be closed by a conventional flap and Velcro fastening means. Pouch 70 is advantageously disposed near the bottom of the back of head portion 20, which is proximate the position of the nape of the neck of the wearer when hood 10 is donned. Corresponding to pouch 70 on the exterior, is rectangular rib 52 bonded to the interior of head portion 20. Rectangular rib 52 creates a cushion of air to attenuate the direct cooling effect of the cold pack (in pouch 70) on the wearer's head.

As with the beard, there are other features of a wearer which may need accommodation, such as a large head or neck, mustache and a turban.

The increase in dimensions is a matter of simple design of hood 10 to match the situation.

If the dimensions of central panel 23 are increased to facilitate the donning of hood 10, then means for constricting head portion 20 are provided by cinching device 80, as illustrated in FIG. 4. Cinching device 80 includes two triangular flaps 81, 82 and a zipper 83 closing downwardly. After donning hood 10 of expanded dimensions, zipper 83 is drawn downwardly to bring flaps 81 and 82 (and thereby side panels 21 and 22) together.

The shape of head portion 20 can be adjusted to be complementary to a wearer with a turban, as illustrated in FIG. 7. By simple design, panels 21, 22 and 23 can be profiled appropriately so that when assembled, head portion 20 fits comfortably with a turban.

For those with a mustache, an inverted V-shaped cover 90 is provided as an extension of front portion 16 (as shown in FIG. 8) for the mustache. Being made like front portion 16, the outer surface of cover 80 is very smooth to contact the mouth piece of face mask 1 (not shown) in a gas-tight fit.

Depending on the application, it may be sufficient if only one or two constricting means or cooling means are employed to the basic model of "synthetic skin" of hood 10. For example, in certain applications, cooling is very

desirable while the gas-tight fit is perhaps not as important. In such applications, it is not necessary to have constriction means for neck portion 25 beyond a snug fit.

While specific embodiments of the invention have been shown and described in detail to illustrate the application of the principles of the invention, it will be understood that the invention may be embodied otherwise without departing from such principles.

CLAIMS:

1. A hood for protecting the wearer's head, made of gas-impervious, flexible material, to be used with a gas mask having a face and mouth piece, comprising:

(a) a head portion for enclosing snugly the head of the wearer, which has:

(i) a back; and

(ii) a front portion having a smooth exterior surface for a gas-tight contact with the face piece of the gas mask and defining a face opening for the eyes, nose and mouth of the wearer; and

(b) a tubular neck portion, integral with said head portion, for covering the neck of the wearer, which has: (i) a smooth interior surface for a gas-tight contact with the neck of the wearer; and (ii) neck portion constricting means for constricting said neck portion about the neck of the wearer.

2. The hood of claim 1, wherein said neck portion constricting means includes the inwardly and downwardly flaring of said neck portion without any outwardly flaring.

3. The hood of claims 1 or 2, further comprising cooling means disposed on the interior of said head portion to permit air to circulate in contact with wearer's head under the hood.

4. The hood of claim 3, wherein said cooling means includes a rib disposed on the interior of said head portion.

5. The hood of claim 4, wherein said cooling means further comprises a gap in said front portion for creating a passageway for air entering through the face opening to enter the hood.

6. The hood of claim 5, wherein said gap is created by a tube.

7. The hood of any one of claims 4, 5 or 6, wherein said cooling means further includes a plurality of ribs on the interior of said head portion to define a cushion of air in the interior of the hood.

8. The hood of any one of claims 1, to 7 , wherein said head portion is profiled in a turban-like shape.

NEW CLAIMS

9. The hood of claims 1 to 8, wherein said neck portion restricting means further includes a draw string and a circumferential draw string enclosure for housing said draw string.

10. The hood of claims 1 to 8, where in said neck portion restricting means further includes and elastic band secured to said neck portion, having two free end portions and having means for securing said end portions together.

11. The hood of claims 1 to 10, further comprising means for constricting the head portion.

12. The hood of claim 11 wherein said head portion constricting means is a cinching device.

13. The hood of claim 12 wherein said hood cinching device includes two flaps and a zipper.

14. The hood of claims 1 to 13 wherein, said front portion has an extension across the face opening for receiving a mouth piece of a face mask in a gas-tight fit, said extension being made of the same material as the remainder of the front portion.

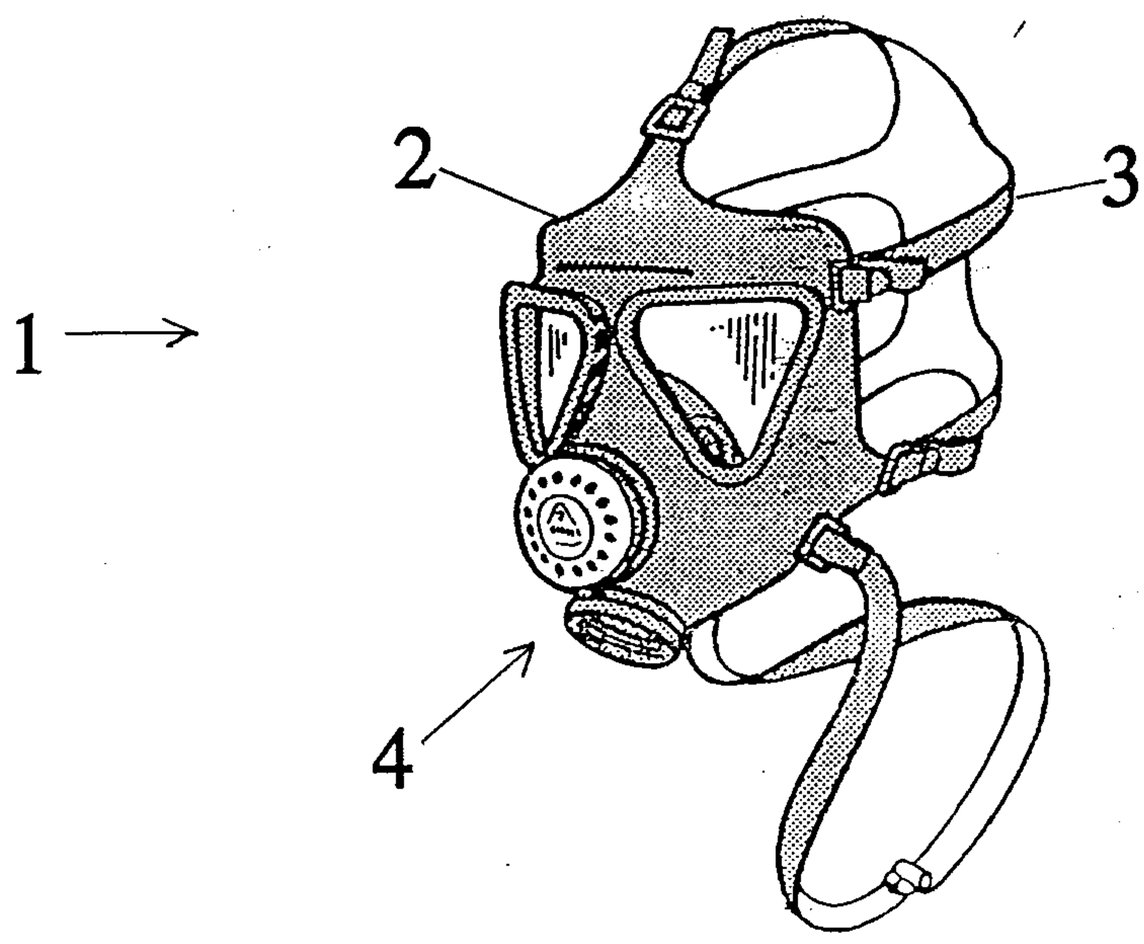


FIG. 1

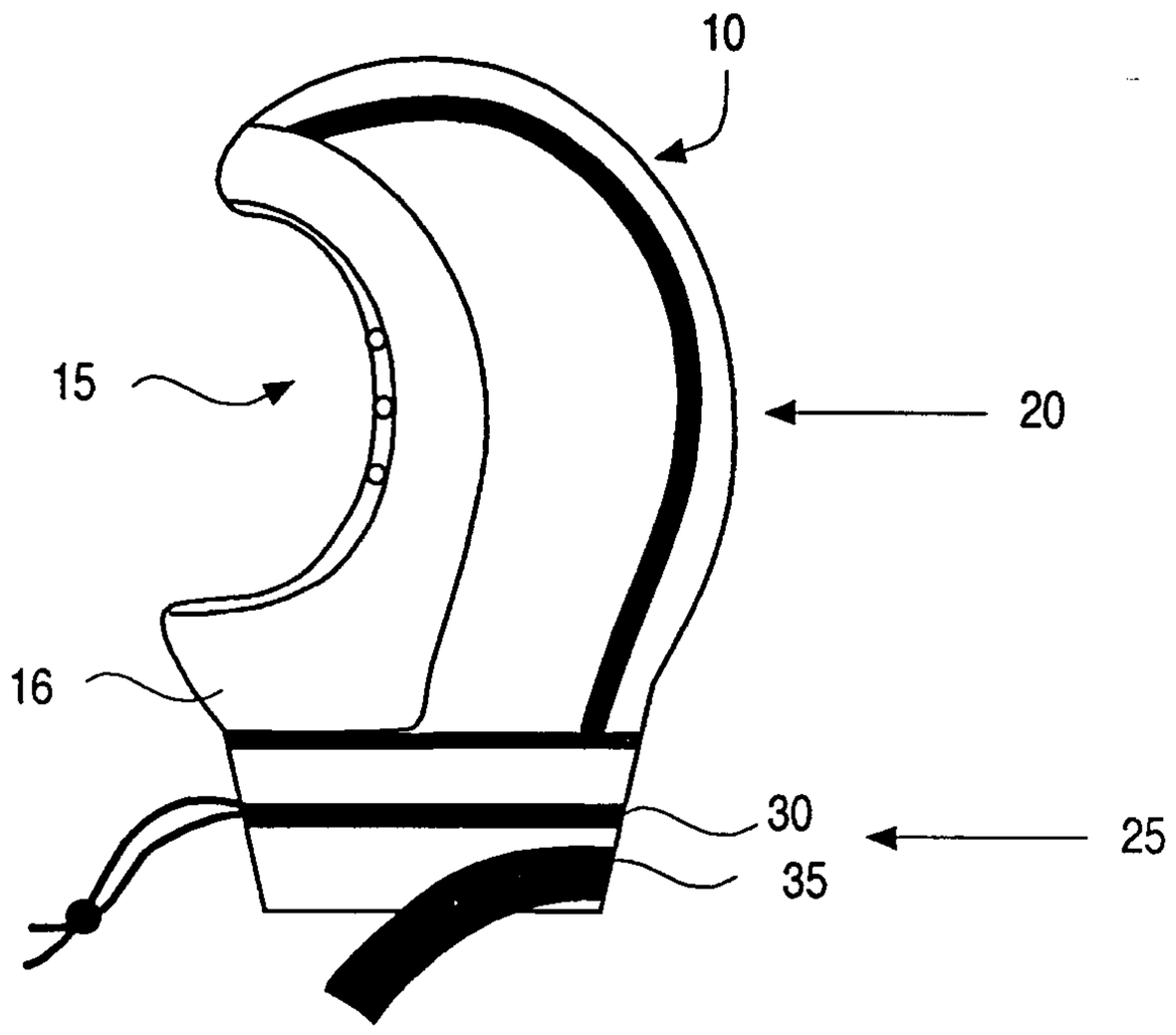


Figure 2

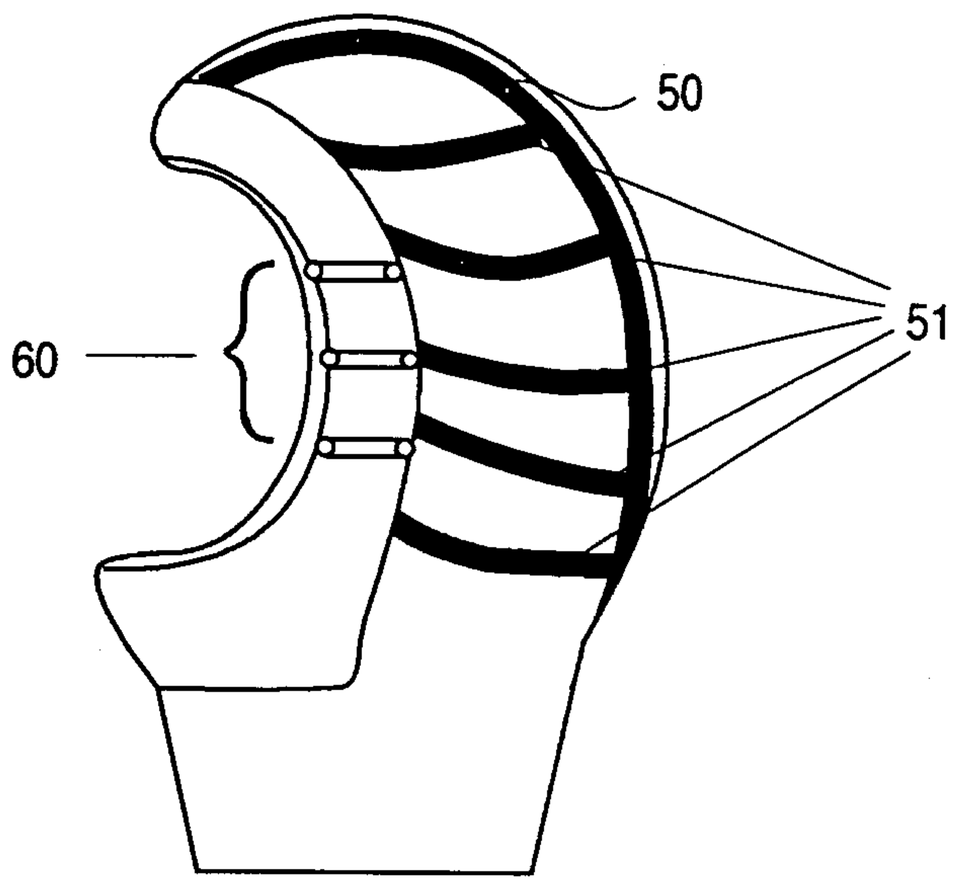


Figure 3

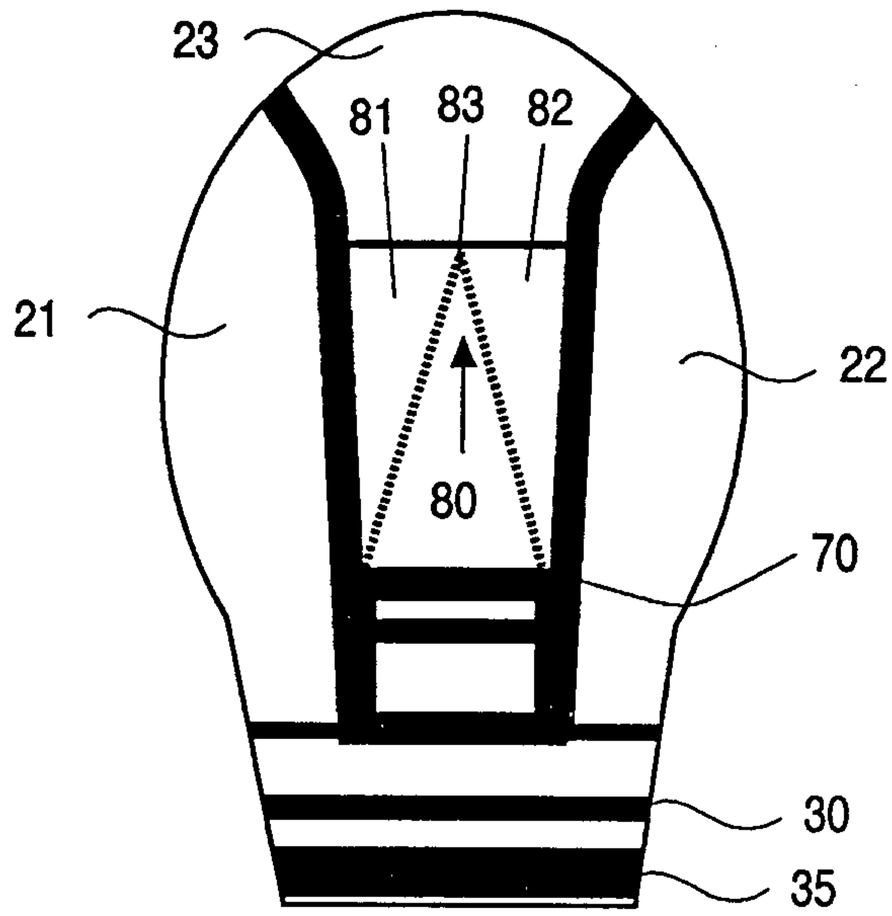


Figure 4

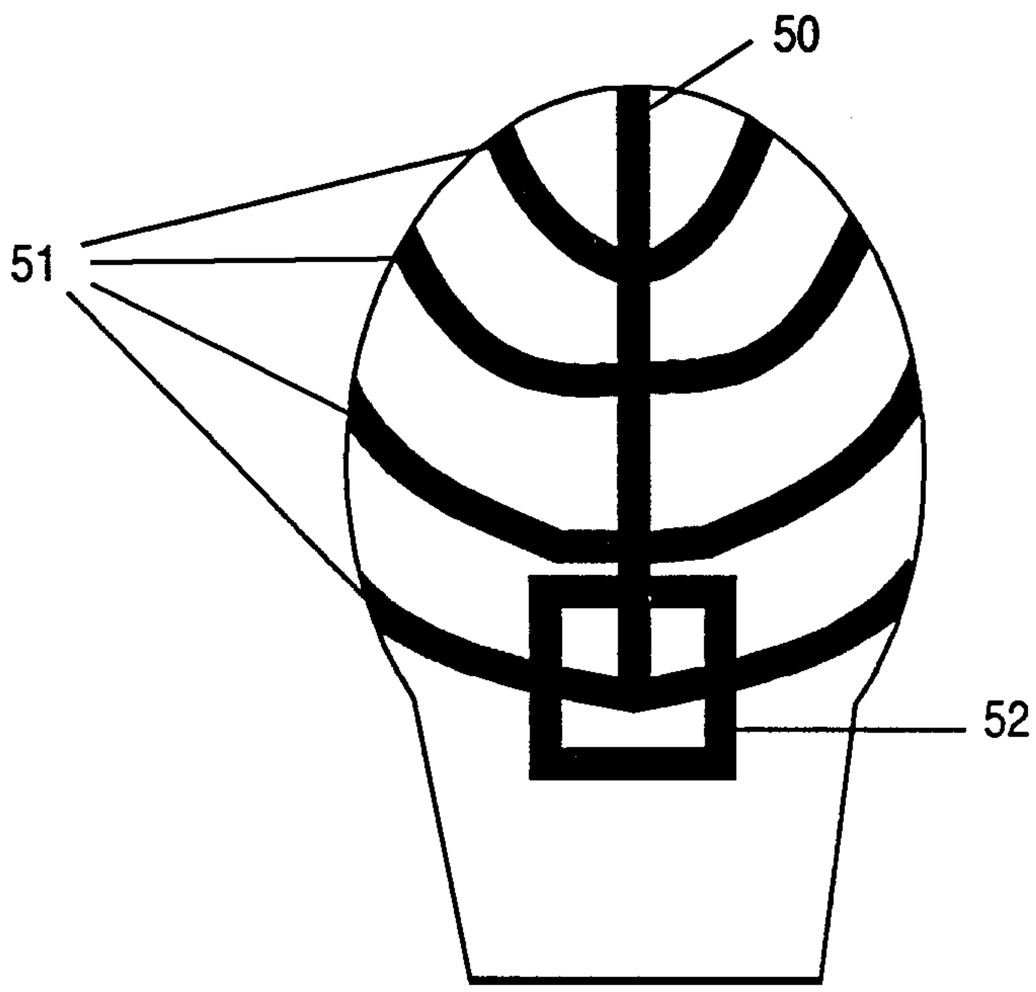


Figure 5

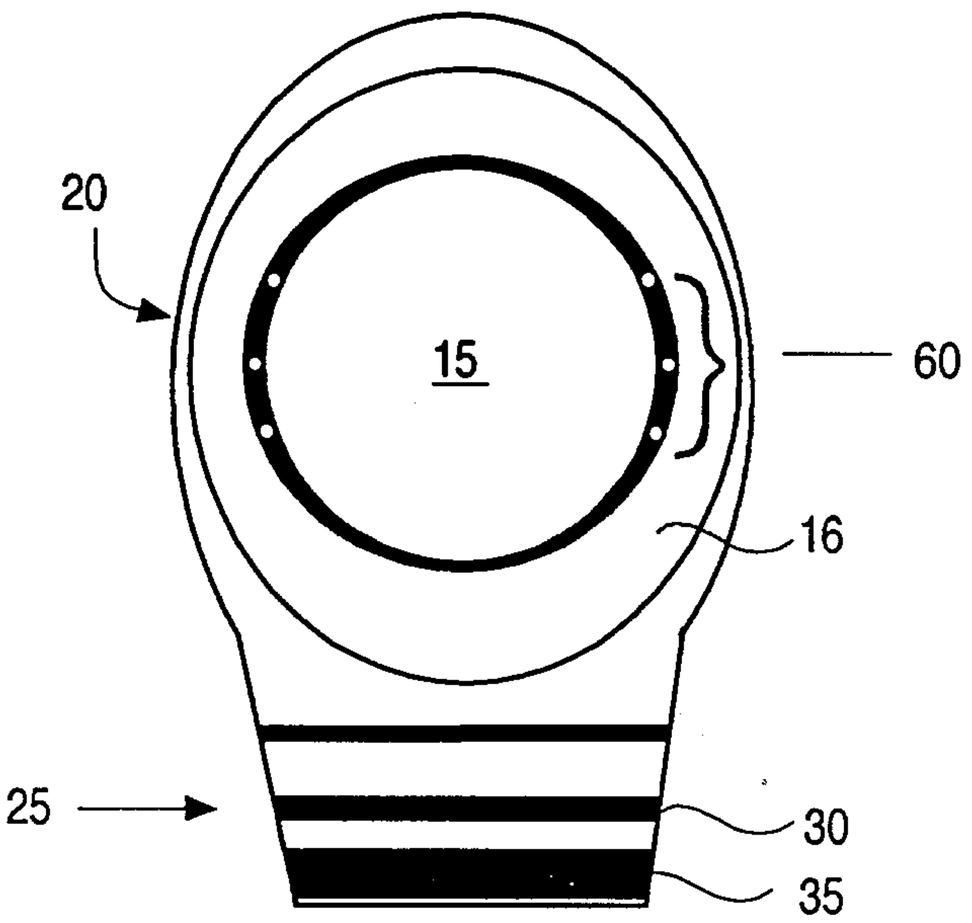


Figure 6

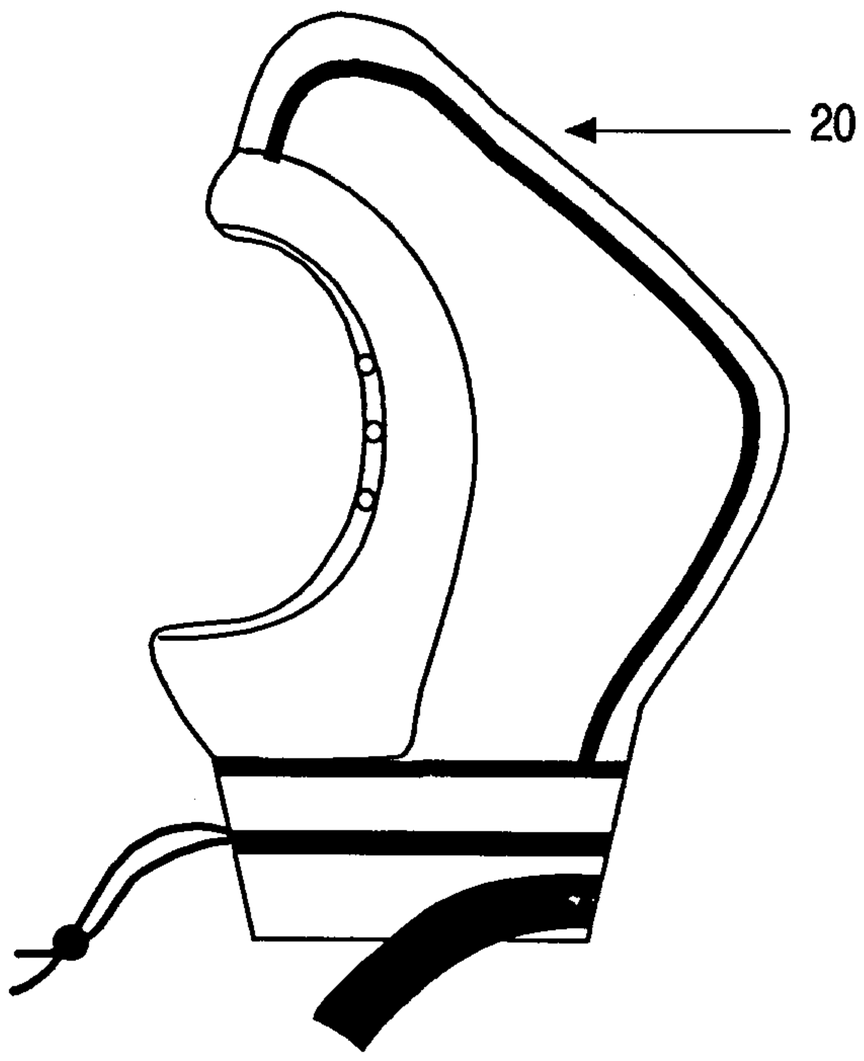


Figure 7

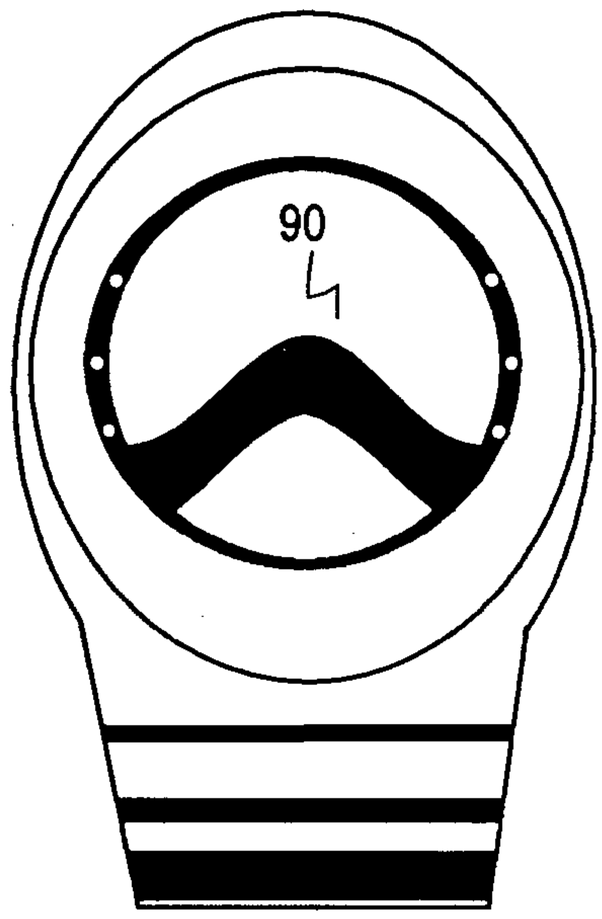
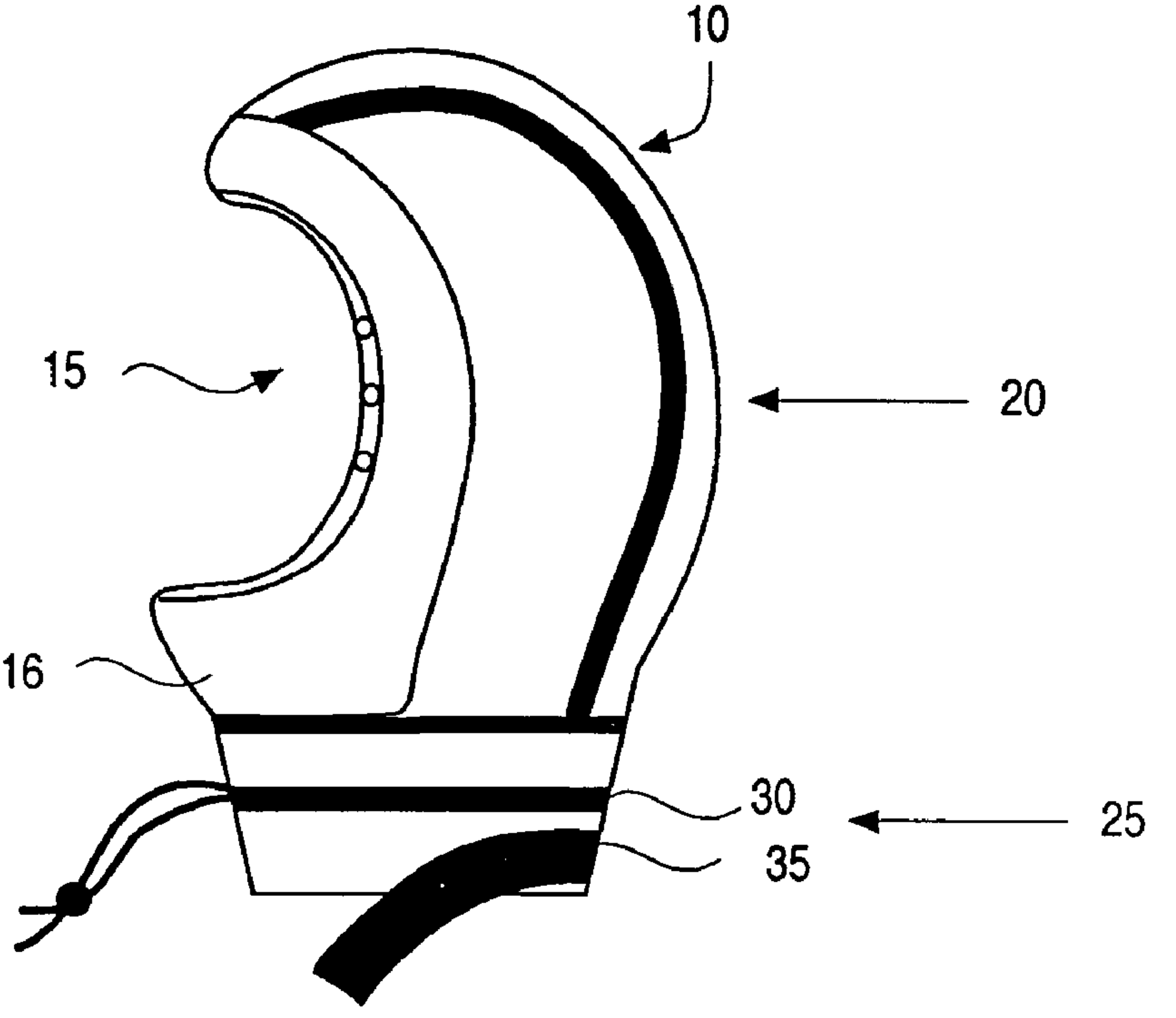


Figure 8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