Office de la Propriété Intellectuelle du Canada
Un organisme d'Industrie Canada

Canadian Intellectual Property Office
An agency of Industry Canada

CA 2525581 C 2006/11/28

(11)(21) 2 525 581

(12) BREVET CANADIEN
CANADIAN PATENT

(13) C

(86) Date de dépôt PCT/PCT Filing Date: 2004/05/17
(87) Date publication PCT/PCT Publication Date: 2004/12/02
(45) Date de délivrance/Issue Date: 2006/11/28
(85) Entrée phase nationale/National Entry: 2005/11/10
(86) N° demande PCT/PCT Application No.: US 2004/015679
(87) N° publication PCT/PCT Publication No.: 2004/103104
(30) Priorité/Priority: 2003/05/16 (US10/440,954)

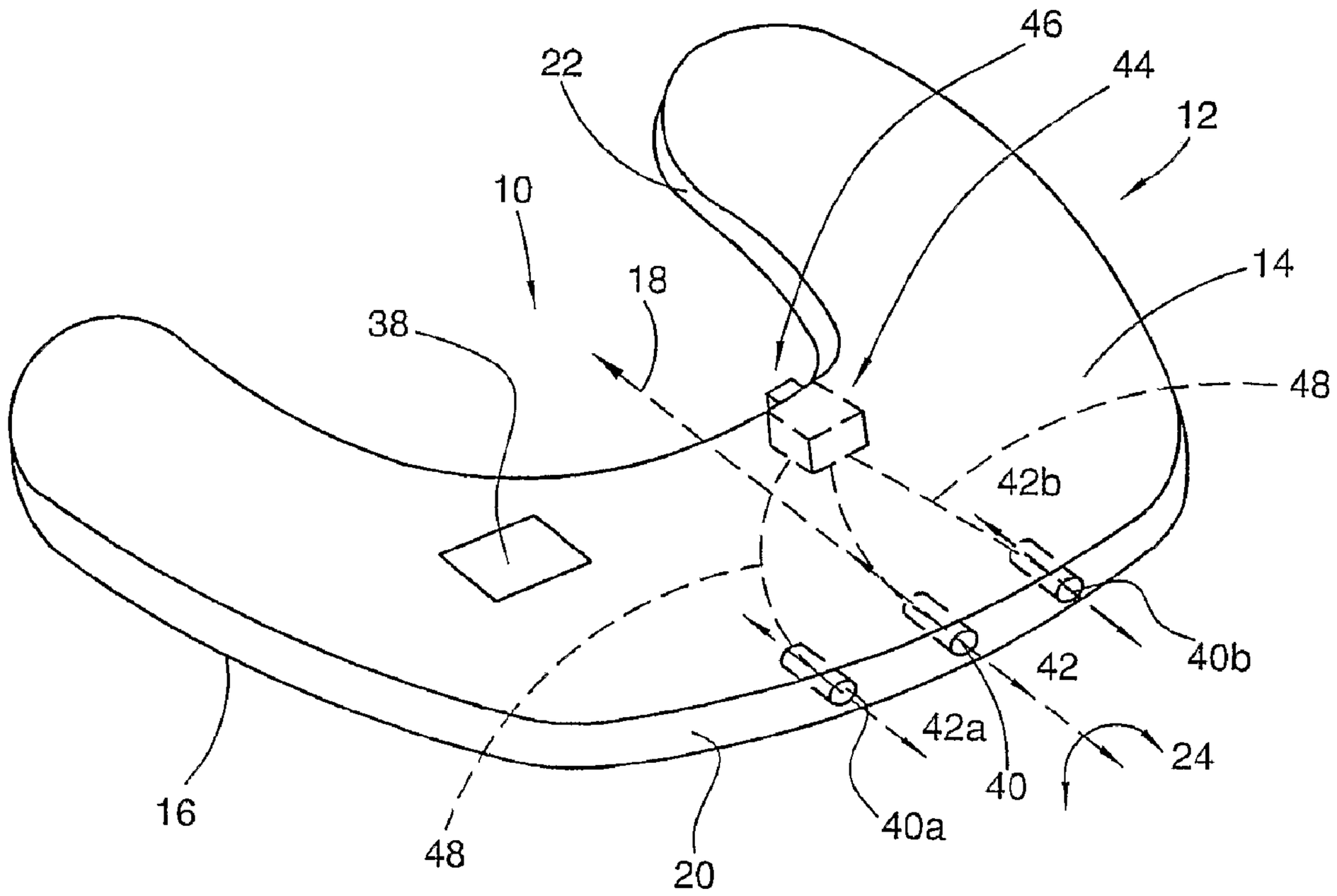
(51) Cl.Int./Int.Cl. *F21V 33/00* (2006.01), *F21V 21/084* (2006.01), *A42B 1/24* (2006.01)

(72) Inventeur/Inventor:
BECKER, KENNETH, US

(73) Propriétaire/Owner:
ANGEL LIGHTING LLC, US

(74) Agent: RIDOUT & MAYBEE LLP

(54) Titre : LUMIERE DE BORD DE CASQUE
(54) Title: BRIM LIGHT



(57) Abrégé/Abstract:
A flexible light assembly is provided. The flexible light assembly is mountable with respect to the underside of the brim of the hat. The light assembly can be made of a flexible resilient material and be conformed to correspond to any configuration of brim. The light assembly includes at least one light emitter, means for powering the light emitter, and means for controlling the emission of light. The light assembly can be completely positional under the brim of a hat. The light assembly can be removably associated with respect to a hat.

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
2 December 2004 (02.12.2004)

PCT

(10) International Publication Number
WO 2004/103104 A3

(51) International Patent Classification[7]: F21V 21/084, G06K 7/10

(21) International Application Number: PCT/US2004/015679

(22) International Filing Date: 17 May 2004 (17.05.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
10/440,954 16 May 2003 (16.05.2003) US

(71) Applicant *(for all designated States except US)*: **ANGEL LIGHTING LLC** [US/US]; 410 Whippers in Court, Bloomfield Hills, MI 48304 (US).

(72) Inventor: **BECKER, Kenneth**; 7310 Milton Road, Alanson, MI 49706 (US).

(74) Agent: **BASILE, Andrew, R.**; Young & Basile, P.C., Suite 624, 3001 West Big Beaver Road, Troy, MI 48084-3107 (US).

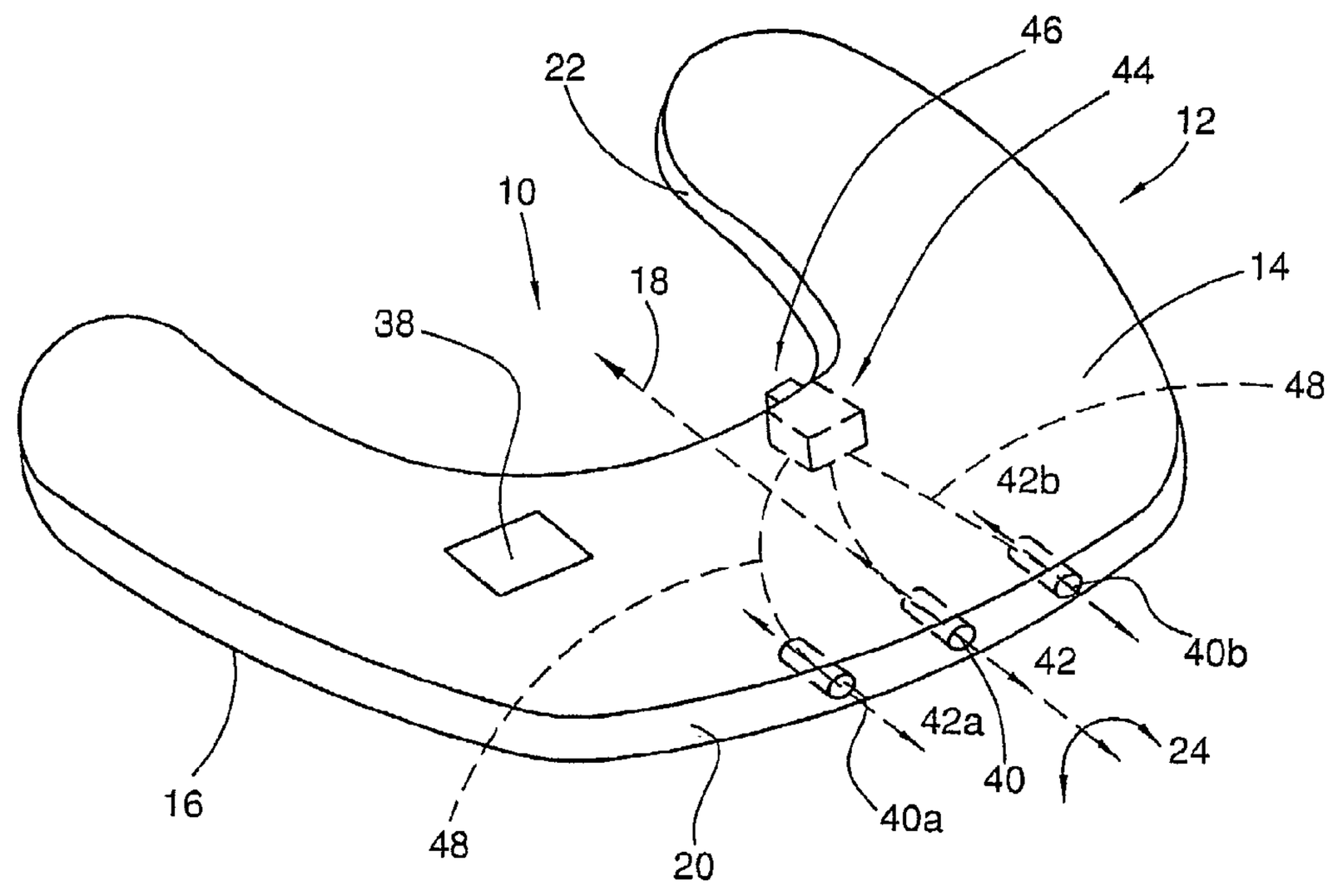
(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:
— *with international search report*

[Continued on next page]

(54) Title: BRIM LIGHT



(57) Abstract: A flexible light assembly is provided. The flexible light assembly is mountable with respect to the underside of the brim of the hat. The light assembly can be made of a flexible resilient material and be conformed to correspond to any configuration of brim. The light assembly includes at least one light emitter, means for powering the light emitter, and means for controlling the emission of light. The light assembly can be completely positional under the brim of a hat. The light assembly can be removably associated with respect to a hat.

WO 2004/103104 A3

WO 2004/103104 A3

— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*

(88) Date of publication of the international search report:
14 April 2005

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

BRIM LIGHT

FIELD OF THE INVENTION

[0001] The invention relates to an apparatus operable to emit light, and, more specifically, the invention provides a flexible light assembly engageable with the brim of a hat.

BACKGROUND OF THE INVENTION

[0002] It can be desirable to position a light with respect to an operator's head to provide light along the operator's line of sight and adjacent the line of sight, as well as to free the operator's hands for the performance of various tasks. For example, light assemblies can be mounted with respect to motorcycle helmets, construction helmets, mining helmets, firefighter helmets and athletic helmets. Light assemblies are configured to engage a particular style of hat.

SUMMARY OF THE INVENTION

[0003] The present invention provides an apparatus operable to emit light and engageable with a hat brim or visor. As used herein, the term "hat" refers to any style headpiece including a brim or visor. The apparatus includes a flexible member. The flexible member defines a longitudinal axis and can bend about or along the longitudinal axis to conform to at least one surface defined by the hat. The flexible member can selectively conform to the surface such that the flexible member can be engaged with a plurality of differently configured surfaces. The flexible member can be resilient and formed from foam rubber.

[0004] The flexible member can engage a surface associated with the brim of the hat. For example, the surface can be an underside of the brim of the hat. The flexible member can be sized and/or shaped to be completely disposed under the brim of the hat. The thickness of the flexible member can be less than a distance defined between the underside of the brim of the hat and a sight line of a wearer of the hat. In other words, the flexible member can be sized to ensure that the flexible member does not obscure the operator's line of sight. An outer surface of the flexible member can be aligned with an edge of the brim of the hat. An inner surface of the flexible member can be aligned with a head of a wearer of the hat.

[0005] The invention can also include means for operably associating the flexible member with the hat. For example, the flexible member can be engaged to the hat with velcro, adhesive, or clips. The flexible member can be permanently engaged with the surface of the hat, or removable with respect to the hat.

[0006] The flexible member can support at least one light emitter or a plurality of light emitters. The flexible member can be bendable about a longitudinal axis of the at least one light emitter. The invention can include a plurality of light emitters and the flexible member can be bendable about the longitudinal axis of each of the plurality of light emitters. The light emitters can be pointed in the same direction, or can be pointing in different directions.

[0007] Other applications of the present invention will become apparent to those skilled in the art when the following description of the best mode contemplated for practicing the invention is read in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] The description herein makes reference to the accompanying drawings wherein like reference numerals refer to like parts throughout the several views, and wherein:

[0009] Figure 1 is a perspective view of a light assembly according to an embodiment of the invention;

[0010] Figure 2 is a front plan view of a light assembly according to the invention engaged with respect to a hat; and

[0011] Figure 3 is a perspective view of a light assembly according to the invention engaged with respect to a hat.

DESCRIPTION OF THE PREFERRED EMBODIMENT

[0012] Various embodiments of the invention are shown throughout the figures. The figures include common elements in different operating environments. Common elements are designated with a common base numeral and differentiated with an alphabetic designation.

[0013] Referring now to Figure 1, the invention provides a light assembly 10 operable to emit light and engageable with a hat including a flexible member 12 defining a longitudinal axis 18 and operable to selectively conform to at least one

surface defined by the hat. The flexible member 12 can selectively conform to a plurality of different surfaces of a hat. The flexible member 12 can include a top surface 14 and a bottom surface 16. The flexible member 12 can be engageable with respect to a hat adjacent either the top surface 14 or the bottom surface 16. The flexible member 12 can also include a first or outwardly facing surface 20 and a second or inwardly-facing surface 22. The surfaces 14, 16, 20 and 22 can cooperate to define a substantially U-shaped member 12. The flexible member 12 can be shaped to correspond to the shape of at least one surface of a hat. For example, the flexible member 12 can be shaped by a user to correspond to the brim of a hat.

[0014] The flexible member 12 can be fabricated from a flexible material. The flexible member 12 can be formed from a resilient material. For example, the flexible member 12 can be conformed to the surface of a first hat, disengaged with respect to the first hat, and conformed to a second hat. The flexible member 12 can be bendable about the longitudinal axis 18, such as along an angular path 24. The flexible member can be bendable along the longitudinal axis 18, such that the longitudinal axis 18 can be arched.

[0015] Referring now to Figures 2 and 3, the light assembly 10a can be engaged with a hat 26. The flexible member12a can be operable to conform to at least one surface 30 of the hat 26. The at least one surface can be defined by a brim 28 of the hat 26. The at least one surface can be an underside surface 30 of the brim 28. The flexible member 12a can be completely disposed under the brim 28 of the hat 26. For example, the first surface 20a can be recessed with respect to a front edge 32 of the brim 28. Alternatively, the first surface 20a can be substantially aligned with the edge 32 of the brim 28 when the flexible member 12a is conformed with respect to the surface 30 of the hat 26. Alternatively, the first surface 20a can project outwardly with respect to the edge 32. The second surface 22a can be substantially aligned with a head 34 of a wearer 36 of the hat 26 when the flexible member 12 is conformed with respect to the hat 26 and the hat 26 is worn by the wearer 36. Alternatively, the surface 22a can be spaced from the head 34 of the wearer 36, best shown in Figure 3. The surface 22a can be spaced to accommodate positioning of controls for a power source for a light emitter.

[0016] The surface 22a can define an arcuate profile extending generally parallel to the head 34 of the wearer 36. The first surface 20a and the second surface 22a can be, at least partially, substantially parallel to one another. The first surface 20a can be spaced with respect to the second surface 22a a predetermined distance substantially equal to a width of the brim 28 of the hat 26.

[0017] The flexible member 12 can be sized such that the thickness T1 of the flexible member 12 is substantially similar to the thickness T2 of the brim 28. The thickness T1 of the flexible member can be determined to ensure that a sight line of the wearer 36 is not obstructed by the flexible member 12a. Thus, the flexible member 12a can be positioned between the underside surface 30 of the brim 28 and the sight line of the wearer 36.

[0018] Referring now to Figures 1-3 the flexible member 12 can include means 38 for operably associating the flexible member 12 with respect to a hat. Means 32 can be velcro or adhesive. Means can also include at least one clip 50. Figure 2 shows a single clip 50, however, more than one clip 50 can be positionable along the brim 28 to removably secure the flexible member 12 with respect to the brim 28. Means 38 can be disposed at one position along either surface 14 or 16, or can be disposed at a plurality of positions along either surface 14 or 16. The flexible member 12 can be removably engageable with respect to a hat. For example, the flexible member 12 can be engaged with a first hat, removed with respect to the first hat, and engaged with a second, differently configured hat. The hat can be any configuration of hat, especially hats defining a brim.

[0019] Referring now to Figure 1, the light assembly 10 can also include at least one light emitter 40. The light emitter 40 can be a light-emitting diode. The light emitter 40 can be operably supported by the flexible member 12. The light emitter 40 can define a longitudinal axis and the flexible member 12 can be bendable about the longitudinal axis 42 of the light emitter 40. The light assembly 10 can include a plurality of light emitters 40, 40a and 40b. Each of the light emitters 40, 40a, and 40b can define respective longitudinal axis 42, 42a and 42b. One of more of the axis 42, 42a and 42b can be parallel with respect to the axis 18. The flexible member 12 can be selectively bendable about one or more of the axis 42, 42a and 42b

of the plurality of light emitters 40, 40a and 40b. One or more of the axis 42, 42a and 42b can be angled with respect to one another.

[0020] Flexible member 12 can be removably engageable with respect to a hat to selectively position the at least one light emitter 40 relative to the brim of the hat. In other words, the flexible member 12 can be positioned to direct light in any desired direction relative to the hat. Also, the flexible member 12 can be recessed with respect to an edge 32 of the brim 28 to limit light emitted in an upward direction. Alternatively, the member 12 can be positioned with respect to the hat 26 to extend past the brim 28 to maximize the light emitted in an upward direction. The at least one light emitter can be disposed in an aperture defined by the flexible member 12.

[0021] Referring now to Figure 1, the light assembly can also include means 44 for powering the one or more light emitters 40, 40a and 40b. Means 44 can include a battery in electric communication with the one or more light emitters 40, 40a and 40b. Means such as wires 48 for communicating electrical power between the light emitters 40, 40a and 40b and the means 44 can be disposed internal with respect to the flexible member 12. The light assembly 10 can also include means 46 for controlling powering means 44 to selectively power to the one or more light emitters. Means 46 can be a push button switch. Means 46 can include a flexible circuit board. Means 44 can be at least partially disposed internal with respect to the flexible member 12. Means 44 and means 46 can be positional with the flexible member 12 adjacent the underside 30 of the brim 28. Means 46 can include a switch to selectively engage and disengage electrical communication between means 44 and the one or more light emitters 40, 40a and 40b. Means 46 can be positional between the first surface 20 and the hat 34 of the wearer 36.

[0022] While the invention has been described in connection with what is presently considered to be the most practical and preferred embodiment, it is to be understood that the invention is not to be limited to the disclosed embodiments but, on the contrary, is intended to cover various modifications and equivalent arrangements included within the spirit and scope of the appended claims, which scope is to be accorded the broadest interpretation so as to encompass all such modifications and equivalent structures as is permitted under the law.

CLAIMS

1. A lighting apparatus for mounting on a brim of a hat comprising:

a flexible member having a generally planar top surface, a generally planar bottom surface extending parallel to and spaced from said top surface by a predetermined thickness of said member, an outwardly facing surface extending transverse to said top and bottom surfaces, an inwardly facing surface extending transverse to said top and bottom surfaces, and a longitudinal axis extending through said flexible member from said outwardly facing surface to said inwardly facing surface, said flexible member being formed of a resilient material and being bendable about and along said longitudinal axis;

at least one light emitter mounted in said flexible member and being exposed at said outwardly facing surface; and

means for releasably attaching said flexible member to the hat with one of said top and bottom surfaces abutting a mounting surface of the brim whereby when said flexible member is attached to the brim and the mounting surface is contoured, said flexible member bends to conform to the contoured mounting surface and said light emitter is positioned to provide hands-free illumination along and adjacent to a line of sight of a wearer of the hat.

2. The apparatus according to Claim 1 wherein said flexible member is formed from a foam material.

3. The apparatus according to Claim 1 wherein said flexible member is generally U-shaped in plan view and is sized to attach said top surface to an underside of the brim forming the mounting surface.

4. The apparatus according to Claim 3 wherein said top surface covers substantially the entire underside of the brim.

5. The apparatus according to Claim 1 wherein said predetermined thickness is less than a distance between an underside of the brim and the line of sight of the wearer.

6. A lighting apparatus for mounting on a brim of a hat comprising:

a flexible member having a generally planar top surface and an outwardly facing surface extending transverse to said top surface, said flexible member being formed of a resilient material and being bendable along and about a longitudinal axis extending from said outwardly facing surface through said flexible member;

at least one light emitter mounted in said flexible member and exposed at said outwardly facing surface; and

means for releasably attaching said flexible member to an underside surface of the brim of the hat whereby when said flexible member is attached to the underside surface and the underside surface is contoured, said flexible member bends to conform said top surface to the contoured underside surface and said light emitter is positioned to provide hands-free illumination along and adjacent to a line of sight of a wearer of the hat.

7. The apparatus according to Claim 6 wherein said flexible member is formed of a resilient material.

8. The apparatus according to Claim 7 wherein said flexible member is formed a foam rubber material.

9. The apparatus according to Claim 6 wherein said flexible member is sized to be completely disposed under the brim of the hat.

10. The apparatus according to Claim 6 wherein said flexible member has a thickness between said top surface and a generally parallel planar bottom surface less than a distance between the underside surface of the brim and the line of sight of the wearer.

11. The apparatus according to Claim 6 wherein said means for releasably attaching is at least one of a hook and loop material, a clip and an adhesive.

12. The apparatus according to Claim 6 wherein said flexible member has an inwardly facing surface extending transverse to said top surface and being configured to align with a head of the wearer.

13. The apparatus according to Claim 6 including a power source mounted in said flexible member and a switch connected between said power source and said at least one light emitter for selectively applying electrical power from said power source to said at least one light emitter.

14. A lighting apparatus for mounting on a brim of a hat comprising:

a flexible member having a generally planar top surface, a generally planar bottom surface extending parallel to and spaced from said top surface, an outwardly facing surface extending transverse to said top and bottom surfaces, said flexible member being bendable to conform at least one of said top and bottom surfaces to an external mounting surface on the brim of the hat;

a plurality of light emitters mounted in said flexible member and exposed at said outwardly facing surface; and

means for releasably attaching said flexible member at one of said top and bottom surfaces to the mounting surface whereby when said one of said top and bottom surfaces is attached abutting the mounting surface and the mounting surface is contoured, said flexible member bends to conform said one of said top and bottom surfaces to the contoured mounting surface and each of said light emitters is positioned to provide hands-free illumination along and adjacent to a line of sight of a wearer of the hat.

15. The apparatus according to Claim 14 wherein each of said light emitters is mounted on an associated longitudinal axis along which each said light emitter emits light from said outwardly facing surface.

16. The apparatus according to Claim 15 wherein said flexible member is selectively bendable about and along each said associated longitudinal axis.

17. The apparatus according to Claim 15 wherein at least one of said associated longitudinal axes is angled with respect to another one of said associated longitudinal axes.

18. The apparatus according to Claim 14 wherein said means for releasably attaching is at least one of a hook and loop material, a clip and an adhesive.

19. The apparatus according to Claim 14 including a power source mounted in said flexible member and a switch connected between said power source and said at least one light emitter for selectively applying electrical power from said power source to each said light emitter.

20. The apparatus according to Claim 19 wherein said switch is positioned at an inwardly facing surface of said flexible member.

21. A lighting apparatus for mounting on the brim of a hat comprising:

a member having a generally arcuate top surface, a generally arcuate bottom surface extending parallel to and spaced from said top surface, an outwardly facing surface extending transverse to said top and bottom surfaces, said member conforming at least one of said top and bottom surfaces to an external mounting surface on the brim of the hat;

a light emitter mounted in said member and exposed at said outwardly facing surface; and means for releasably attaching said member at one of said top and bottom surfaces to the mounting surface whereby when said one of said top and bottom surfaces is attached abutting the mounting surface and the mounting surface is contoured, one of said generally arcuate top or bottom surfaces of said member conforms to said one of said top and bottom surfaces to the contoured mounting surface and said light emitter is positioned to provide hands-free illumination along and adjacent to a line of sight of a wearer of the hat.

22. The apparatus according to Claim 21 and further comprising at least two light emitters.

23. The apparatus according to Claim 22 wherein each of said light emitters is mounted on an associated longitudinal axis along which each said light emitter emits light from said outwardly facing surface.

24. The apparatus according to Claim 23 wherein at least one of said associated longitudinal axes is angled with respect to another one of said associated longitudinal axes.

25. The apparatus according to Claim 21 wherein said means for releasably attaching is at least one of a hook and loop material, a clip and an adhesive.

26. The apparatus according to Claim 22 including a power source mounted in said member and connected to said at least one light emitter for applying electrica1 power from said power source to each said light emitter.

27. A lighting apparatus for mounting on the brim of a hat comprising:

a housing having an arcuate upper surface and an arcuate lower surface extending parallel to said upper surface;

light source supported by said housing;

flexible attachment means for mounting said housing to a brim of a hat, wherein said arcuate upper surface of said housing conforms to the lower surface of the brim of a hat; and

means for powering said light source, said powering means enclosed within said housing, wherein said powered light source emits light outwardly from the brim of the hat and is positioned to provide hands-free illumination along and adjacent to a line of sight of a wearer of the hat.

28. The lighting apparatus of Claim 27 and further comprising:

at least two light sources extending parallel to each other and supported within said housing along an arcuate plane parallel to said arcuate upper and lower surfaces.

29. The lighting apparatus of claim 28 and further comprising:

at least three light sources extending parallel to each other and supported within said housing along an arcuate plane parallel to said arcuate upper and lower surfaces.

30. The lighting apparatus of Claim 27 wherein said flexible attachment means comprises at least one clip arrangement extending perpendicular to and atop said arcuate upper surface.

31. The lighting apparatus of Claim 27, said housing further comprising a switch connected between said power source and said light source for selectively applying electrical power from said power source to said light source.

32. A lighting apparatus for mounting on the brim of a hat comprising:

a resilient housing having an upper surface extending along a generally arcuate plane;

a lower surface extending parallel to and apart from said upper surface;

a front surface extending perpendicular to and between said upper and lower surfaces;

parallel side surfaces extending perpendicular to said front surface between said upper and lower surfaces;

a rear surface extending between said parallel side surfaces and enclosing said housing; said front surface conforming to said arcuate plane of said upper and lower surfaces, and said rear surface extending arcuately in a plane generally perpendicular to said upper and lower arcuate surfaces and between said side surfaces forming an enclosed housing;

three spaced apart light sources supported within said housing along said arcuate front surface for emitting light outwardly and adjacent to a line of sight of a wearer of the hat;

a power source enclosed within said housing mounted and a switch connected between said power source and said three light source for selectively applying electrical power from said power source to each said light source;

and two spaced apart flexible clips provided along said top surface for mounting said housing along the brim of a hat and positioning said light emitting apparatus to provide hands-free illumination.

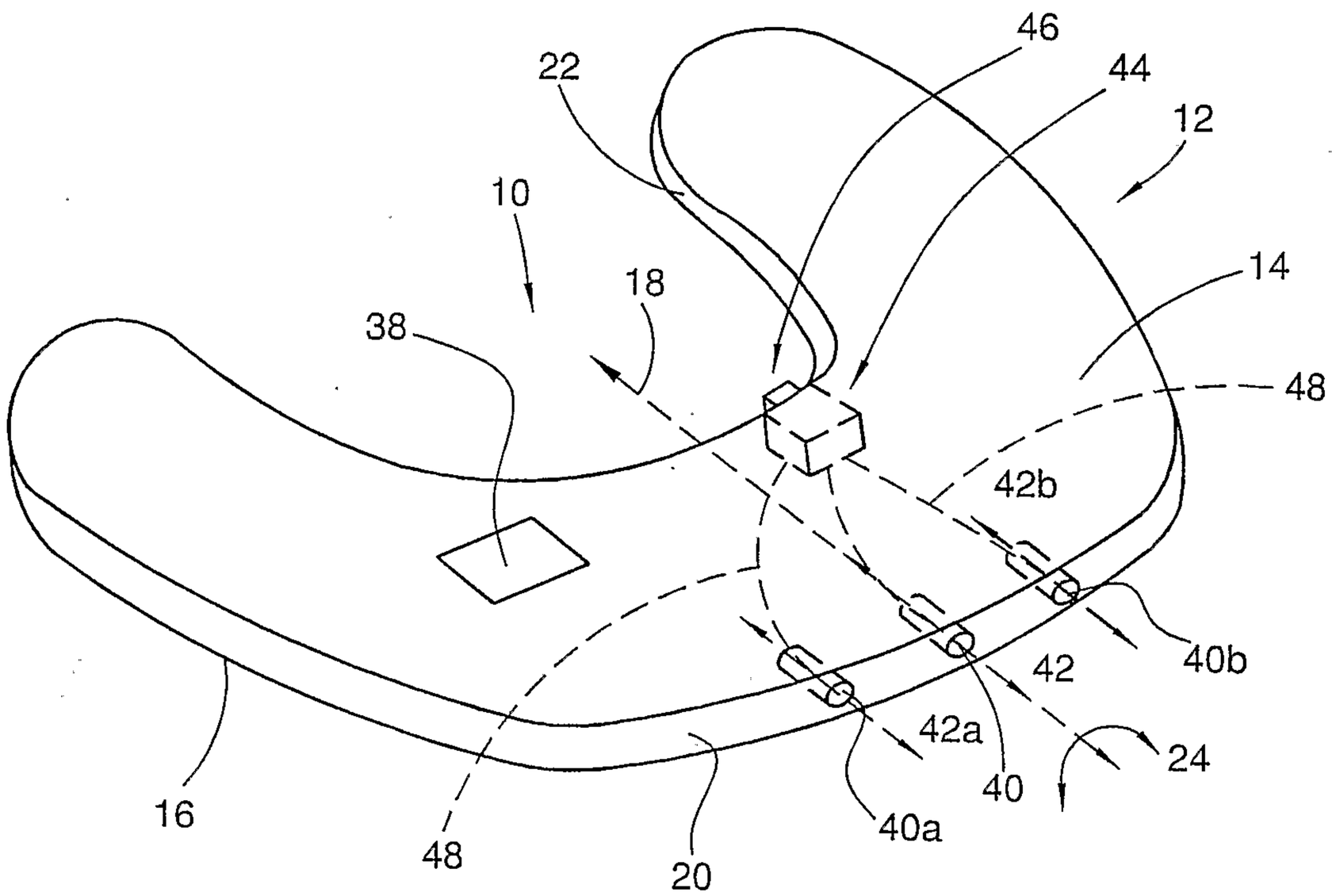

46
22
44
12
10
18
14
38
48
42b
40b
42
42a
24
40
16
48
20
40a

FIG. 1

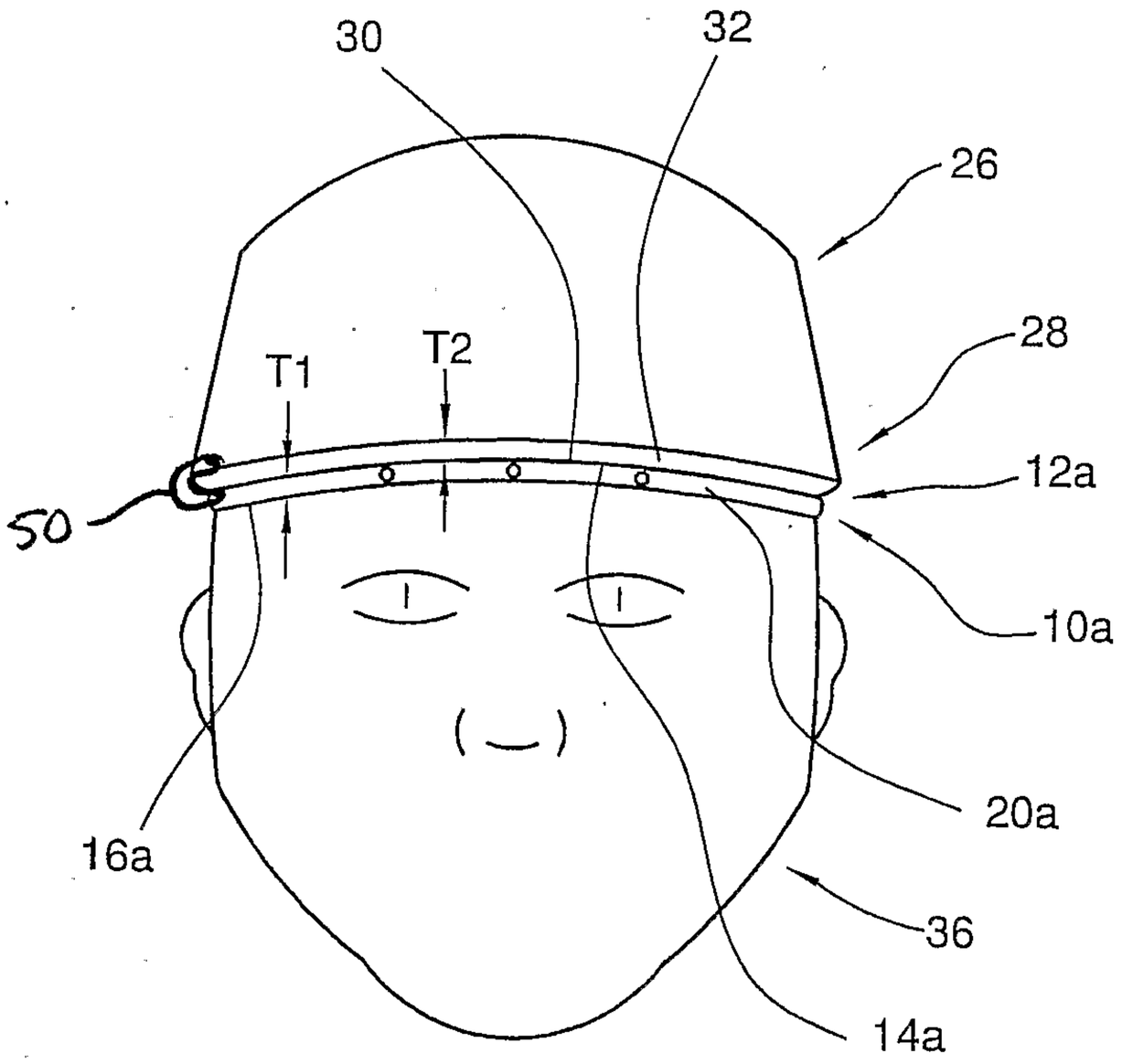

30
32
26
T1
T2
28
12a
50
10a
20a
16a
36
14a

FIG. 2

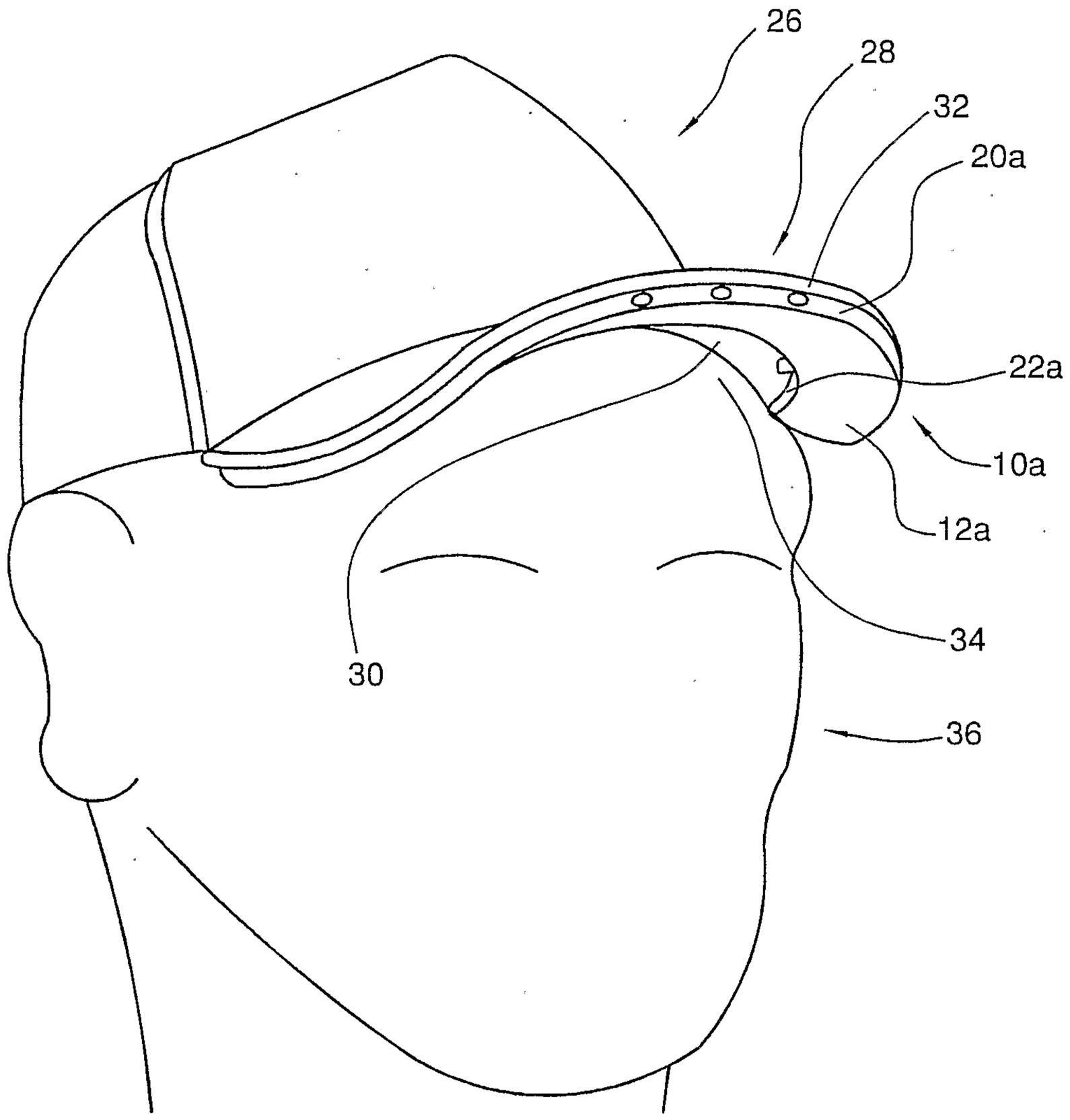
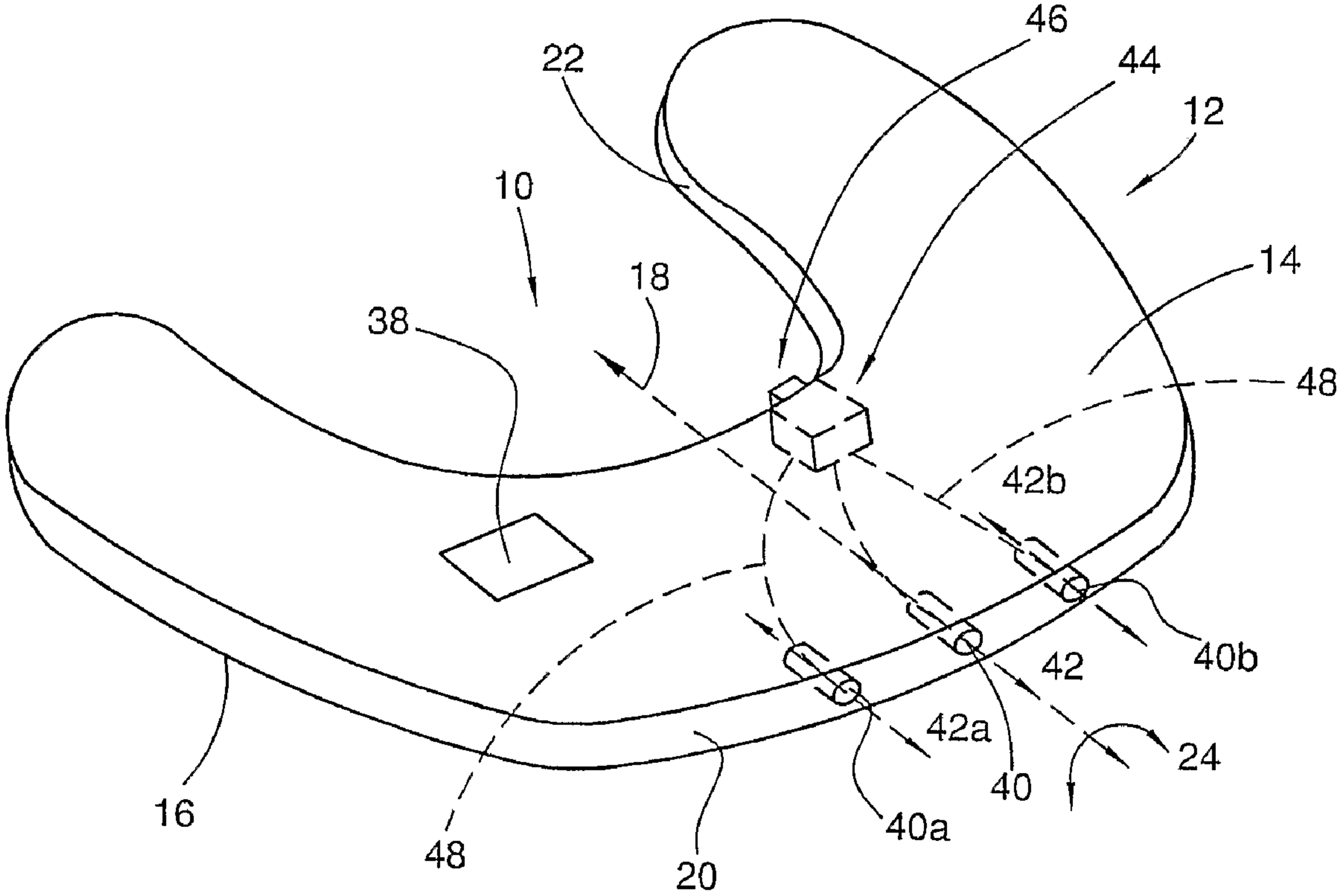


FIG. 3


46
44
22
12
10
14
18
38
48
42b
40b
42
42a
24
40
40a
16
48
20