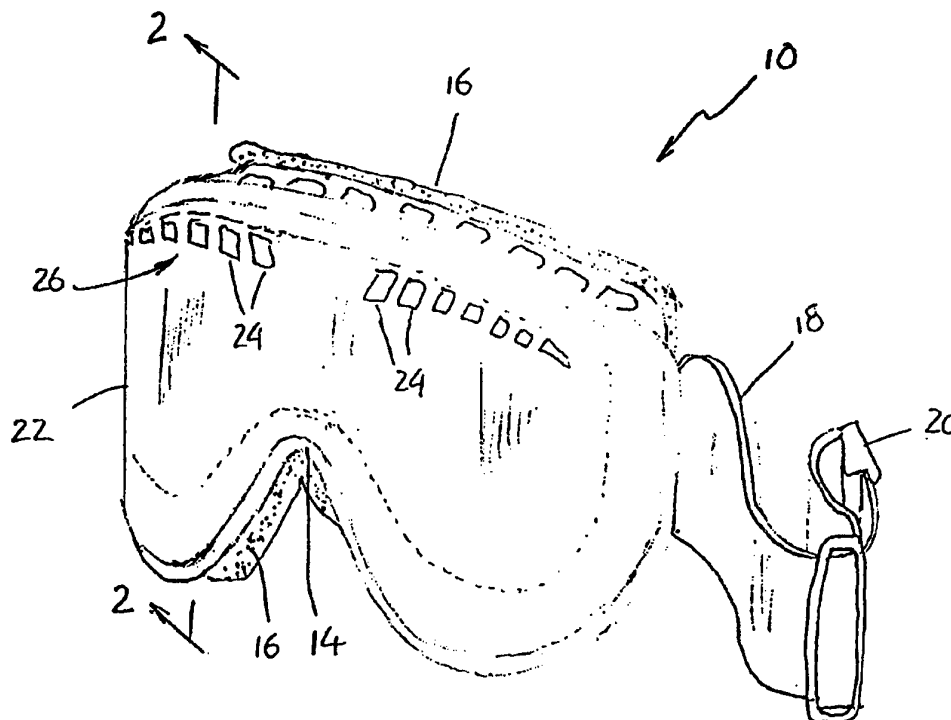




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(54) Title: VENTILATION SYSTEM FOR A GOGGLE



(57) Abstract

A ventilation system for a goggle is disclosed in which a goggle lens (22) is provided with a series of closely spaced generally trapezoidal-shaped apertures (24) disposed along the upper edge of the lens such that improved movement of air across the inner surface of the lens is achieved thereby preventing fogging.

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VENTILATION SYSTEM FOR A GOGGLE

BACKGROUND OF THE INVENTION

5 1. Field of the Invention

The present invention relates generally to a ventilation system for a goggle, and it relates more particularly to a system in which a goggle lens is provided with a series of closely spaced generally
10 trapezoidally-shaped apertures disposed along the upper edge of the lens such that improved movement of air across the inner surface of the lens is achieved thereby preventing fogging.

15 2. Description of the Prior Art

Goggles are an important accessory to wear when participating in sports such as motorcycle racing or snow skiing, for example. In such sports, it is common for the participant to travel at such speeds as
20 to cause air to be rushed against the participant's face. With the use of goggles, the eyes of the participant can be protected against tearing and normal unimpeded vision is made possible. Also, the eyes can be protected against snow, dust or foreign debris as
25 could cause the participant to completely lose vision temporarily, making the sport dangerous for the participant.

Goggles have long been in use comprising a frame which is contoured to be held by a suitable strap
30 against the forehead and upper cheeks of the user's face with a bridge over the user's nose. The frame may support a unitary lens or a double lens arrangement which is spaced forwardly of the user's eyes defining a goggle cavity between the face and lens. However, when
35 the user of such goggles is engaged in a high level of

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activity, as is common in motorcycle racing or skiing, for example, perspiration from the user's face can create a condition of moisture-laden air within the goggle cavity which can condense on the inside lens surface tending to impair the vision of the user. This condition is commonly known as fogging.

Many attempts have been made to vent air through goggles to prevent fogging of the goggle lens during active use. In one common form, the frame of the goggle is provided with a series of openings formed in the upper ridge of the frame proximate the forehead of the user, and openings in the frame may also be provided along lower portions of the frame adjacent the cheeks of the user. The openings are typically covered with a porous foam material which will transmit air but not foreign matter. By this arrangement, ambient air can circulate through the goggle cavity and displace moisture-laden air, thereby reducing fogging of the interior surface of the lens. In another form of prior art goggles, particularly goggles having a one-piece lens, vent apertures are provided in an array across the upper margin of the lens, in addition to the above-described vent openings in the top and bottom of the frame. This use of vent apertures in the lens offers the advantage of allowing rushing air directed against the front surface of the lens to be forced into the goggle cavity thereby serving to more positively displace moisture-laden air within the cavity.

Goggle vent systems using lens vent apertures, as heretofore known, characteristically use round apertures for vents. This is so because the vent apertures are punched through the lens in manufacture using standard punch tools which are commercially

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available only in round form. While it is economical to use round punch tools in the manufacture of vented lenses, a disadvantage of such a lens construction is that the apertures must be spaced from one another by a sufficient separation dimension as to leave enough lens material between the apertures such that the structural integrity of the lens in the area of the vent apertures is not compromised. In so doing, only a relatively few number of vent apertures may be formed in the lens. In this regard, it is also important in the manufacture of vented lenses to limit the vent aperture array to a configuration which will not obstruct the vision of the goggle user or otherwise create an annoying distraction as the user normally looks through the lens. As a consequence, the resulting overall vent area of a typical vented lens is necessarily limited in size by the use of round vent apertures. The resulting flow of air through the lens vent array is correspondingly limited.

Accordingly, it is desirable to provide a ventilation system for a goggle wherein a goggle lens is formed with a maximum of vent aperture area without obstructing the vision of the goggle user or otherwise creating an annoying distraction to normal viewing. It is further desirable to provide such a ventilation system wherein the lens is fabricated with vent apertures having an arrangement which does not impair the structural integrity of the lens. Still further, it is desirable to provide a lens having vent apertures formed in such an array as to be aesthetically pleasing in appearance and does not detract from the overall appearance of the goggle.

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SUMMARY OF THE INVENTION

The present invention improves over the prior art by providing an improved ventilation system for a goggle wherein the goggle is of the type having a frame which is contoured to conform to the face of a user and bridges the user's nose. The frame supports at least one lens and cooperates with the lens and face of the user to define an internal goggle cavity. A plurality of apertures are formed in the lens in an array disposed along an upper marginal portion of the lens and configured to be substantially imperceptible to the user during normal use of the goggle. The apertures are non-circular in shape and preferably trapezoidal such that they are separated by strips of lens material having a substantially uniform width extending from top to bottom of the marginal portion. By such a configuration, the apertures provide improved venting of the goggle cavity as ambient air is forced through the apertures into the cavity and out through one or more vent openings provided in the frame. Fogging of the lens by condensation of moisture-laden air within the cavity is thereby minimized. The non-circular shape of the apertures permits the effective size of the aperture openings to be maximized without unduly weakening the lens or impairing the view of the user.

BRIEF DESCRIPTION OF THE DRAWINGS

The foregoing and other novel features and advantages of the invention will become apparent upon a reading of the following detailed description taken in conjunction with the accompanying drawings wherein:

- 5 -

FIG. 1 is a front perspective view of a goggle having a ventilation system constructed in accordance with the principles of the invention;

5 FIG. 2 is a cross-sectional view taken substantially along the line 2-2 of FIG. 1 and illustrating the function of the ventilation system;

FIG. 3 is a front view of a prior art lens
10 used in a goggle; and

FIG. 4 is a front view of a goggle lens constructed in accordance with the principles of the invention.

15 DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to the drawings, and initially to FIG. 1, a goggle constructed in accordance with the principles of the invention is designated generally by the reference numeral 10. The goggle is of a type
20 particularly well-suited for use in the sports of motorcycle racing and snow skiing, or the like, wherein the eyes of the user need to be protected against rushing air, dust, snow, or foreign debris. To this end, a main component of the goggle 10 is a frame 12
25 constructed of a suitable flexible rubber or plastic material and configured to generally conform to the shape of the user's face with a bridge portion 14 supported by the user's nose. A suitable foam material 16 may be adhered to the frame to provide a comfortable
30 seal between the frame 12 and face of the user. An elastic strap 18 and buckle arrangement 20 is attached to opposite sides of the frame 12 and is dimensioned to

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extend around the back of the user's head to hold the goggle 10 in place.

The illustrated goggle 10 is of a type having
5 a unitary lens 22 extending across the user's normal complete line of vision and secured to the frame 12 in a well-known manner. This type of goggle has been well-received by sports enthusiasts, over double lens goggles, for example, for maximizing the user's angle
10 and range of sight while fully protecting the eyes during the sporting activity. The lens 22 is preferably formed from a relatively rigid, transparent material such as propionate, butyrate or polycarbonate, and may be suitably tinted to reduce glare. As will be
15 described in detail hereinafter, an array of apertures 24 extend across an upper marginal portion 26 of the lens 22.

Turning now to FIG. 2, it can be seen that
20 the frame 12 and lens 22 of the goggle cooperate with the face of the user to define an internal goggle cavity 30. Particularly when the goggle 10 is used in active sports, the goggle cavity 30 may become filled with moisture-laden air as a result of perspiration of
25 the user. Accordingly, it is known to provide a ventilation system for the goggle 10 wherein ambient air rushing against the forward surface of the lens 22 is admitted into the cavity 30 through the lens apertures 24 and exits the cavity 30 through vent
30 openings 32 and 34 which may be formed in upper and lower portions, respectively, of the frame 12. This venting system serves to minimize condensation of moist air on the inner surface of the lens 22 which is a

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condition known as fogging. A suitable porous foam material 36 disposed inside the goggle frame and is preferably used to cover the apertures 24 and openings 32 and 34 to allow passage of air but prevent foreign matter from entering the cavity 30.

Referring next to FIG. 3, a prior art goggle lens is designated 22'. In the prior art lens 22', apertures 24' are provided along an upper marginal portion 26' of the lens 22' to admit air into the goggle cavity. However, these apertures 24' have been typically formed with a circular shape, for reasons as detailed above. It can be appreciated that by using circular shaped apertures 24', the apertures 24' must be spaced from one another by a sufficient separation dimension as to allow for enough lens material to avoid weakening the lens 22' unduly in the area of the apertures 24'. In this regard, it is desirable to construct the lens such that it has adequate impact resistance against debris or the like which might strike the lens while the goggle is in normal use. Moreover, with circular apertures 24' spaced sufficiently to avoid compromising the strength of the lens 22', only a limited number of apertures 24' may be formed in the lens 22', and with relatively limited size, to avoid interfering with the vision of the user.

Turning now to FIG. 4, a goggle lens 22 constructed in accordance with the principles of the invention has an upper marginal portion 26 with vent apertures 24 formed in non-circular shapes. Preferably, these shapes are square, rectangular or trapezoidal, such that when the apertures 24 are formed

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in the lens 22, strips 40 of lens material having a generally uniform width extend between the apertures 24 from top to bottom of the marginal portion 26.

5 It can now be appreciated that with lens apertures 24 constructed of non-circular shapes and defining strips 40 of lens material between adjacent apertures 24, the effective total area of the array of apertures 24 can be maximized while assuring that the
10 strength of the lens 22 in the area of the aperture array is not unduly weakened. Thus, enhanced ventilation of the goggle cavity 30 is made possible and fogging is minimized. It can further be appreciated that the array of apertures 24 may be
15 configured to provide maximum vent area while also being disposed sufficiently above the normal line of sight of the user such that the apertures 24 do not impair the user's vision or create an annoying distraction. Still further, the array of apertures 24
20 in accordance with the invention has an aesthetically pleasing appearance, which while enhancing ventilation, does not lend an unacceptable mechanical look to the goggle 10. In a most preferred form of the invention, as shown in FIG. 4, an array of apertures 24 has a
25 generally elongate configuration with the apertures 24 being trapezoidal in shape and diminishing in size in a direction away from the center of the lens 22. Thereby, maximum ventilation and unimpaired vision can be achieved. In one form of prior art lens, such as
30 that illustrated in FIG. 3 having round apertures, apertures having a diameter of 4 millimeters will have an aggregate vent opening area of approximately 200 sq. mm. In contrast, a lens constructed in accordance with

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the invention such as is illustrated, for example, in FIG. 4 will have an aggregate vent opening area of approximately 260 sq. mm. Thus, an increase in vent area of approximately 23 percent is achieved by the lens of FIG. 4, as compared to the prior art lens of FIG. 3, for the same number of apertures.

Still further, it can be appreciated that a ventilation system in accordance with the invention may be utilized advantageously in eyewear such as shields in which a lens is used without a frame conforming tightly to the user's face. In the use of such shields, a dead air space can exist between the lens and the user's face which can fill with moisture-laden air if the shield is being used in an active sport. A ventilation system of the present invention including non-circular vent apertures arranged along an upper marginal portion of the shield can be quite advantageous in displacing moisture from behind the shield thereby eliminating fogging.

While the present invention has been described in connection with preferred embodiments thereof, it will be understood by those skilled in the art that many changes and modifications may be made without departing from the true spirit and scope of the invention. Accordingly, it is intended by the appended claims to cover all such changes and modifications as come within the true spirit and scope of the invention.

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WHAT IS CLAIMED IS:

1. A ventilation system for a goggle of the type having a frame contoured to conform to the face of a user while bridging the user's nose and having at least one lens for covering the eyes of the user, the frame and lens cooperating with the face of the user to define an internal goggle cavity, the system comprising:
 - a plurality of vent apertures formed in said lens for admitting ambient air into said goggle cavity, said vent apertures being arranged within an upper marginal portion of said lens and being dimensioned and configured to be substantially imperceptible to the user during normal use of said goggle, said vent apertures further having a non-circular shape and being spaced from one another to define strips of lens material between adjacent apertures with said strips extending across said marginal portion, said strips each having a generally uniform width from a top of said marginal portion to a bottom of said marginal portion; and
 - at least one vent opening formed in said frame whereby ambient air is forced through said vent apertures into said cavity and exits said cavity through said vent opening when said goggle is in use.
2. The system of claim 1 wherein said apertures are trapezoidal in shape.
3. The system of claim 1 wherein said apertures diminish in size in a direction away from the center of the lens.

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4. The system of claim 1 wherein said apertures are covered with a porous material for transmitting air but preventing foreign matter from passing through said apertures.

5

5. The system of claim 1 wherein the vent opening area of said lens is at least 260 square millimeters.

10

6. A goggle comprising:

a frame structured and configured to conform to the shape of a user's face;

a lens operably connected to said frame and cooperating with said frame and face of the user to

15 define an internal goggle cavity;

a plurality of non-circular apertures formed in said lens, said apertures being arranged in a generally elongate array within an upper marginal portion of said lens, such that pairs of adjacent
20 apertures define strips of lens material extending across said marginal portion between said adjacent apertures, said strips having a substantially uniform width; and

a vent opening formed in said frame;

25 wherein ambient air rushing against said lens is admitted by said apertures into said cavity and exits said cavity through said vent opening.

7. The goggle of claim 5 wherein said
30 apertures are trapezoidal in shape.

8. The goggle of claim 5 wherein said apertures are each covered with a porous material for

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transmitting air but preventing foreign matter from entering said cavity.

9. The goggle of claim 5 wherein said
5 apertures diminish in size in a direction away from the center of said lens.

10. A lens system for eyewear of the type configured to be worn over at least a portion of the
10 face of a user to thereby cover the user's eyes and prevent foreign matter from entering the eyes while the user is engaged in an activity, the lens system comprising:

a relatively rigid, transparent lens member
15 dimensioned and configured to be disposed forwardly of a user's face and directly in a line of vision of the user, said member having an interior surface cooperating with the user's face to define an air space; and

20 a plurality of vent apertures formed in said member along an upper marginal portion thereof, said vent apertures having non-circular shapes and being spaced from one another to define strips of material between adjacent apertures with said strips extending
25 across said marginal portion, said strips having a generally uniform width from a top of said marginal portion to a bottom of said marginal portion;

wherein ambient air passes through said vent apertures and through said air space thereby removing
30 moisture-laden air from said air space and eliminating fogging of said interior surface of said lens member when said eyewear is in use.

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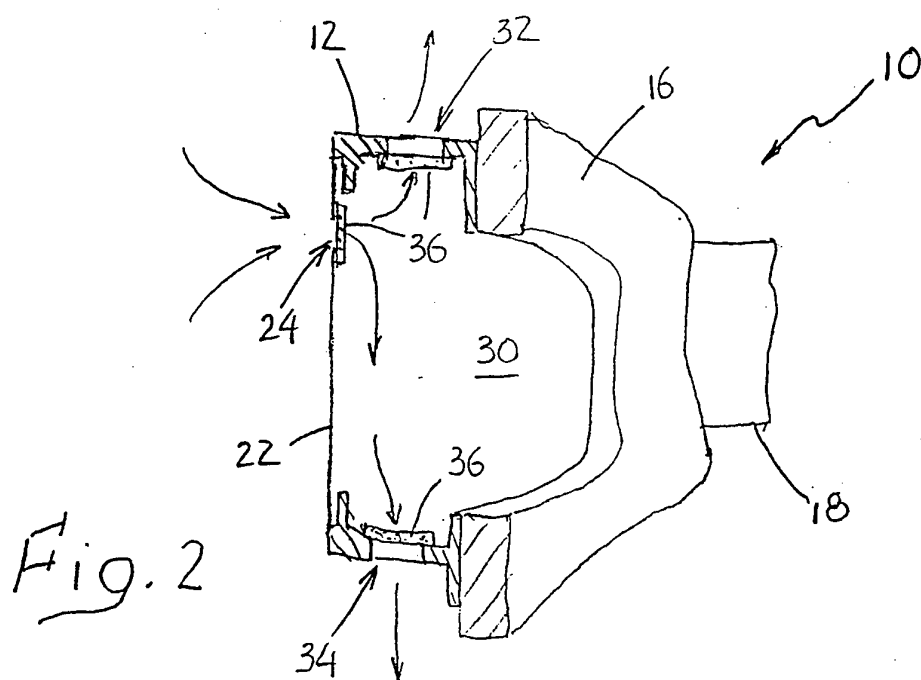
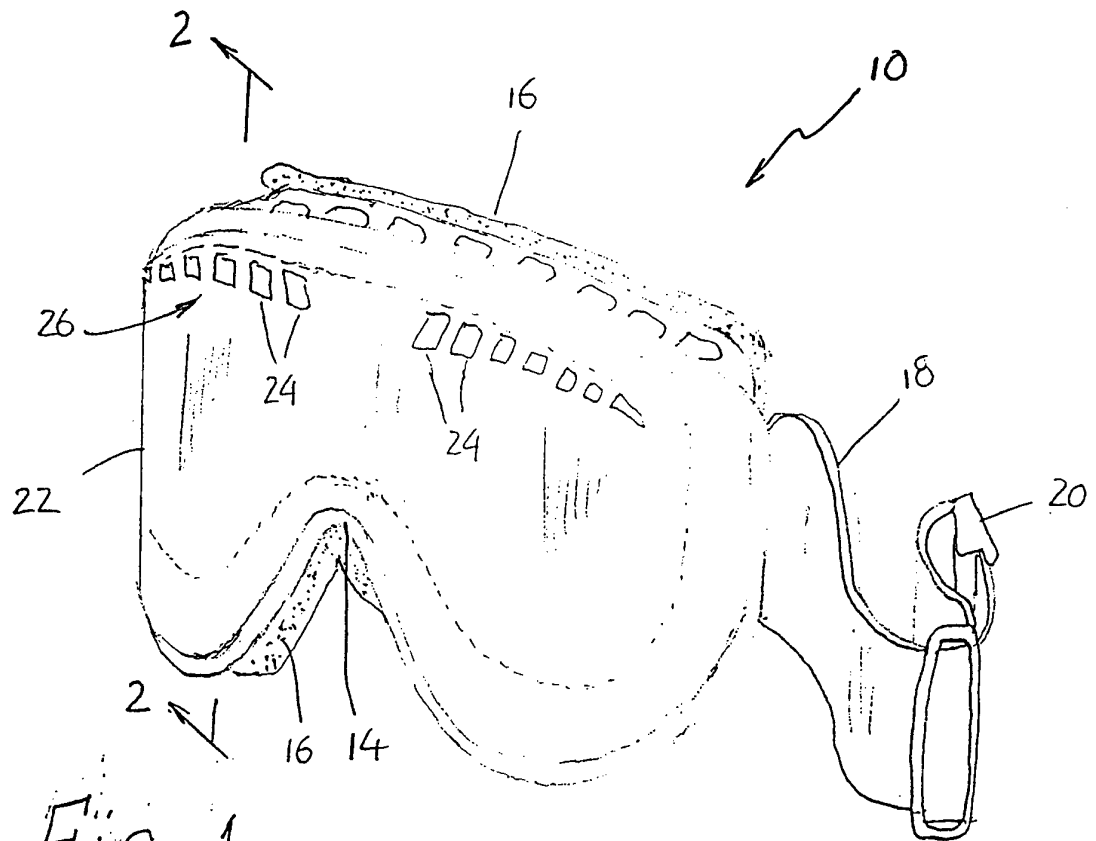
11. The system of claim 10 wherein said apertures are trapezoidal in shape.

12. The system of claim 10 wherein said
5 apertures diminish in size in a direction away from the center of said lens member.

13. The system of claim 10 wherein said apertures are covered with a porous material for
10 transmitting air but preventing foreign matter from passing through said apertures.

14. The system of claim 10 wherein the vent apertures have an aggregate opening area of at least
15 260 square millimeters.

1/2



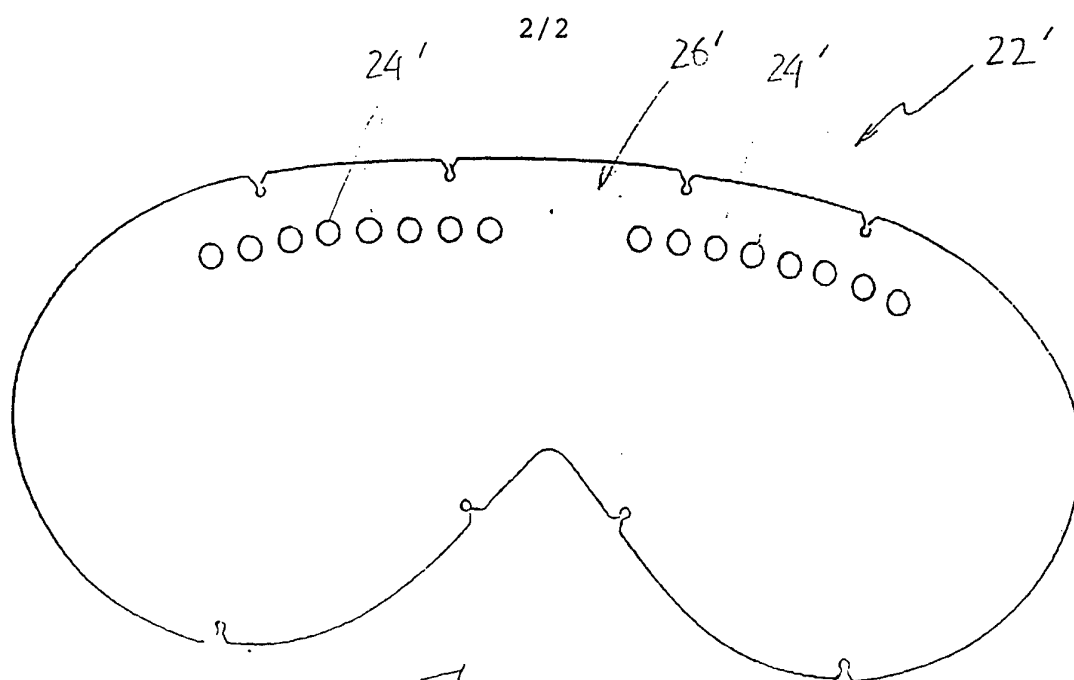


Fig. 3
(PRIOR ART)

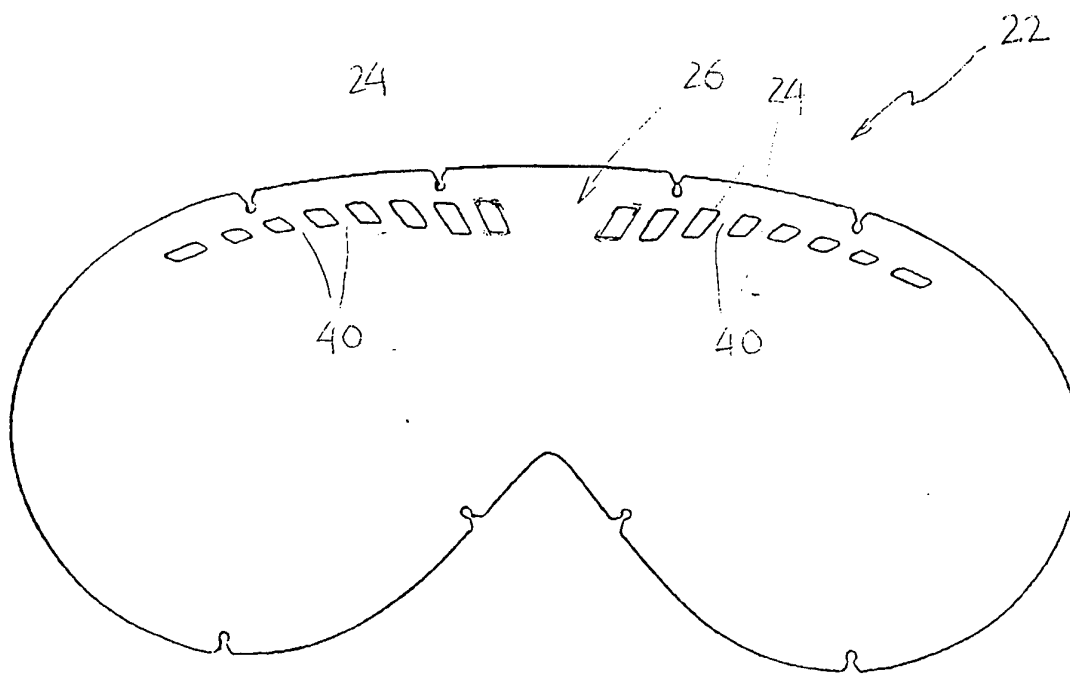


Fig. 4

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US96/13241

A. CLASSIFICATION OF SUBJECT MATTER

IPC(6) :A61F 9/02

US CL :2/436

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 2/436, 437, 439, 431, 432, 426, 447, 8, 9

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
NONEElectronic data base consulted during the international search (name of data base and, where practicable, search terms used)
NONE

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US, A, 4,707,863 (MC NEAL ET AL) 24 November 1987, col. 4, lines 1-7.	1, 6, 10

Y		2-5, 7-9, 11-14
Y	US, A, 4,571,748 (CARROLL ET AL) 25 February 1986, col. 4, lines 10-13.	2, 7, 11
Y	US, A, 4,653,124 (MC NEAL ET AL) 31 March 1987, col. 2, line 68 and col.3, lines 1-4.	4, 8, 13

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:	*T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
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