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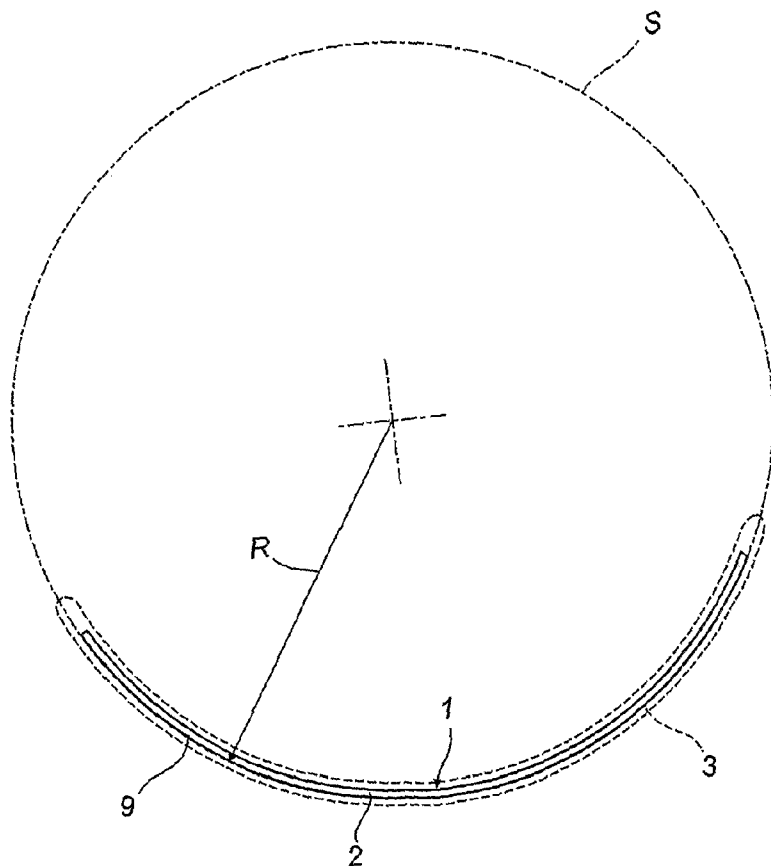
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- (71) Applicant (for all designated States except US): LUXOT-  
TICA S.R.L. [IT/IT]; Via Valcozzena, 10, I-32021 Agordo  
(IT).
- (72) Inventor; and
- (75) Inventor/Applicant (for US only): FRANCAVILLA,  
Luigi [IT/IT]; Via Paganini, 46, I-32021 Agordo (IT).
- (74) Agent: LANZONI, Luciano; Bugnion S.p.A., Via Goito,  
18, I-40126 Bologna (IT).

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(54) Title: A LENS FOR MARKS AND GOGGLES



(57) Abstract: A lens (1) for goggles and masks defined as a portion of a spherical surface S of a radius R, with a base between around 6.3 and around 6.7, the base being intended as the relationship between 523 and the radius R, where the radius R is the outer radius of the spherical surface.

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*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.*

DescriptionA lens for masks and gogglesTechnical Field

This invention relates to a lens for masks and goggles and in particular to a lens with uniform spherical curvature.

5 Background Art

Numerous types of double-lens goggles and single-lens masks are known, the lenses having a wide variety of shapes and sizes.

In particular, the invention refers to lenses developed for specialist sports use, dedicated for example to skiing or mountain bike riding, in which precise optical resolution combined with  
10 satisfactory aerodynamic penetration is required.

The evolution of such lenses has led to the creation of appropriately curved lenses, in particular to reduce penetration of peripheral light, towards the eyes of the user, and to minimize  
15 diffraction gradients. Lenses of the known type can be cylindrical, that is to say preferably consisting of a portion of a cylindrical surface, toroidal, that is to say preferably consisting of a portion of a toroidal surface, or spherical, that is to say formed by a portion of a spherical surface.

20 Toroidal and spherical lenses are therefore characterised by two radii,  $R_1$  and  $R_2$ , relative respectively to the curvature of the lens on a substantially horizontal plane, that is to say around a substantially vertical axis, and to the curvature of the lens on a substantially vertical plane, that is to say around a substantially  
25 horizontal axis; as far as this invention is concerned, that is to say in the case of spherical lenses, the radii  $R_1$  and  $R_2$  are identical to each other and hereafter commonly indicated with  $R$ .

In the industrial sector, the curvature of lenses can not only be characterised and expressed as the radius, but also in terms of  
30 "base". "Base" is generally intended as the relationship between a constant and the curvature radius of the lens expressed in millimetres, whether it is relative to a curvature on the horizontal plane of the lens or to a curvature on the vertical plane (in the case of spherical lenses the base identifies both the curvatures

which are identical).

In the case of lenses made from plastic material, the external radius is considered and the constant normally assumed is equal to 523.

5 Most prior art spherical lenses have a 6 base (a radius of around 87.16 mm) or 7 base (a radius of around 74.71 mm) which are essentially standard measurements for this type of lens.

Lenses with the above-mentioned bases have some drawbacks, particularly in relation to the statistically defined measurements  
10 of the human face.

Lenses with a 7 base are particularly wrap-around and generally suited to specifically sports use as they are too "closed" and unattractive for normal use.

This wrap-around feature, however, creates problems even in  
15 sports use in the event of bad weather and low temperatures as the lack of ventilation due to the excessive "closure", together with the user's perspiration, causes them to suddenly mist over.

On the other hand, 6 base lenses do not provide perfect protection of the user's face, being too open at the sides, and they  
20 are not sufficiently aerodynamic in sports use.

#### Disclosure of the Invention

In this context, the main purpose of the present invention is to propose an ergonomically optimised lens able to overcome the  
25 aforesaid drawbacks.

One aim of the invention is to provide a lens which follows the statistically defined profile of a generic user in a balanced way.

Another aim of the invention is to provide a lens that ensures adequate ventilation and offers adequate peripheral protection of  
30 the user's face.

Yet another aim is to provide a lens that combines attractiveness and comfort in order to increase the number of potential users.

The above mentioned purpose and aims are substantially achieved  
35 by a lens according to claim 1 and one or more of the dependent claims herein.

Description of the Drawings

Further features and advantages of the present invention are more apparent in the indicative, and therefore non-binding, description which follows, with reference to a preferred, non-limiting, embodiment of a lens for goggles, as illustrated in the accompanying drawings, in which:

Figure 1 is a schematic perspective view of a spherical lens according to the present invention, mounted in a frame forming a single-lens mask;

Figure 2 illustrates the lens of Figure 1 in a schematic plan view from above;

Figure 3 illustrates the lens of Figure 1 in a schematic side view;

Figure 4 is a schematic perspective view of a lens according to the present invention, divided into two portions mounted in a frame forming double-lens goggles;

Figure 5 illustrates the lens of Figure 4 in a schematic plan view from above.

Description of the preferred embodiment of the invention

With reference to the accompanying drawings, the numeral 1 denotes a spherical lens according to the present invention.

The lens 1 is defined as a portion of a spherical surface S illustrated schematically with dashed lines in Figures 2, 3 and 5, with an external radius R which identifies the curvature radius of the lens.

It can be noted that since the lens 1 is spherical in the preferred embodiment of the invention the curvature radius R is the same for each section of the surface S.

As shown in Figures 1, 2 and 3, in the preferred embodiment illustrated, the lens 1 consists of a single portion 2 attached to a frame 3, shown in dashed lines not being part of this invention, to form a single-lens mask 4.

In this case, the lens 1 substantially extends between a pair of sidepieces 5 which support the mask 4 on the ears, not shown, of a generic user.

With particular reference to Figures 2 and 3, it can be seen

that the curvature radius R is the same both in plan view and in side view.

According to what is shown in Figures 4 and 5, the lens 1 consists of two portions 5, 6 attached to a relative frame 7 to form double-lens goggles.

In the preferred embodiment illustrated in the drawings, the lens 1, whether it consists of a single portion 2 or of two portions 5, 6, has a curvature radius R between around 78.06 mm and around 83.01 mm, preferably between around 78.65 mm and around 82.36 mm, in particular around 80.47 mm. Experimental investigations have in fact shown that, particularly in relation to the statistical data relative to the measurements of the human face, these curvatures contribute to the ideal ergonomics of the masks 4 or goggles 8.

In particular, these curvatures make the lens 1 aerodynamic and able to ensure sufficient ventilation of the user's face, so as to allow sports use without the risk of misting over.

These curvature radii also make the lens more attractive and appealing to a larger number of people, at the same time ensuring effective protection of the user's eyes.

In the industrial sector, the curvature can be expressed in terms of base: the curvature radius, expressed in millimetres, of the front or outer surface 9 of the lens 1 is substantially equal to 523 divided by the base, that is to say:

$$R = \frac{523}{B}$$

Going into more detail, the outer surface of the lens 1 substantially consists of a spherical dioptric surface that separates the air (first means) from the material (second means) that forms the lens 1.

The dioptric power on the air side, expressed in diopters, of this dioptric surface can be calculated, without taking into account which side the rays of light are coming from, by means of the equation:

$$P = \frac{n-1}{R}$$

where  $n$  is a constant,  $R$  the curvature radius of the reference spherical surface expressed in metres and 1 is the result of having considered the air as the first means.

5 This relation, considering the value 1,523 for the constant  $n$  and considering the radius  $R$  as known, for the plastic materials preferably used in the production of the lens, makes it possible to obtain the value of the base that is equivalent to the dioptric power.

10 Consistent with this convention, the lens 1 according to the present invention preferably has a base between around 6.3 and 6.7.

The base is preferably between around 6.35 and 6.65 and in particular it is around 6.5.

The preferred curvature for the spherical lens according to the present invention is therefore 6.5 base.

15 According to prior art, the lenses 1 for masks and goggles can have various profiles not shown and not described in detail as they are not part of this invention.

20 The invention described has evident industrial applications and can be modified and adapted in several ways without thereby departing from the scope of the inventive concept. Moreover, all the details of the invention may be substituted by technically equivalent elements.

Claims

1. A spherical lens defined as a portion of a spherical surface of a radius R, said lens being designed to be mounted in a frame to form an optical article such as goggles or a mask, characterised in that it has a base between around 6.3 and around 6.7, the base being intended as the relationship between 523 and the radius R, where the radius R is the outer radius of the spherical surface.
2. A lens according to claim 1, characterised in that the base is between around 6.35 and around 6.65.
3. A lens according to claim 1 or 2, characterised in that the base is around 6.5.
4. A lens according to any of the foregoing claims, characterised in that it consists of a single portion of the spherical surface, this optical article being, in particular, a mask.
5. A lens according to any of the claim from 1 to 3, characterised in that it consists of a pair of portions of the spherical surface, this optical article being, in particular, goggles.



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FIG. 1

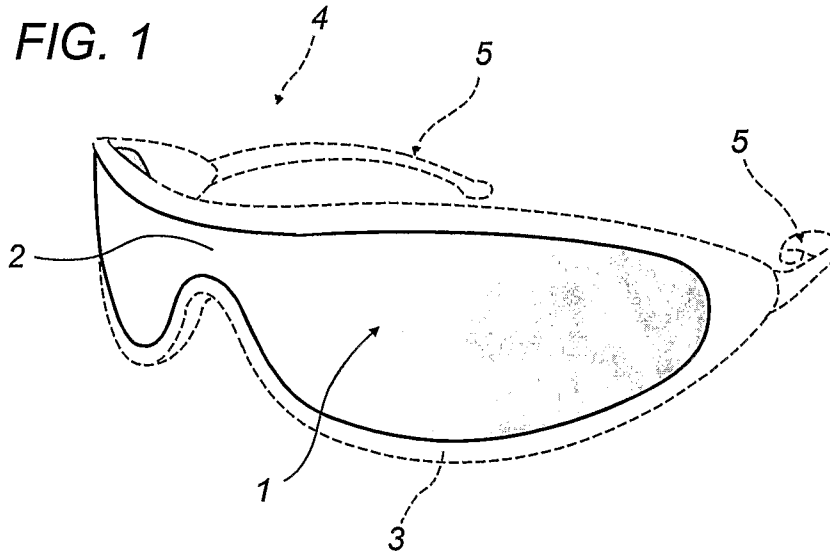


FIG. 2

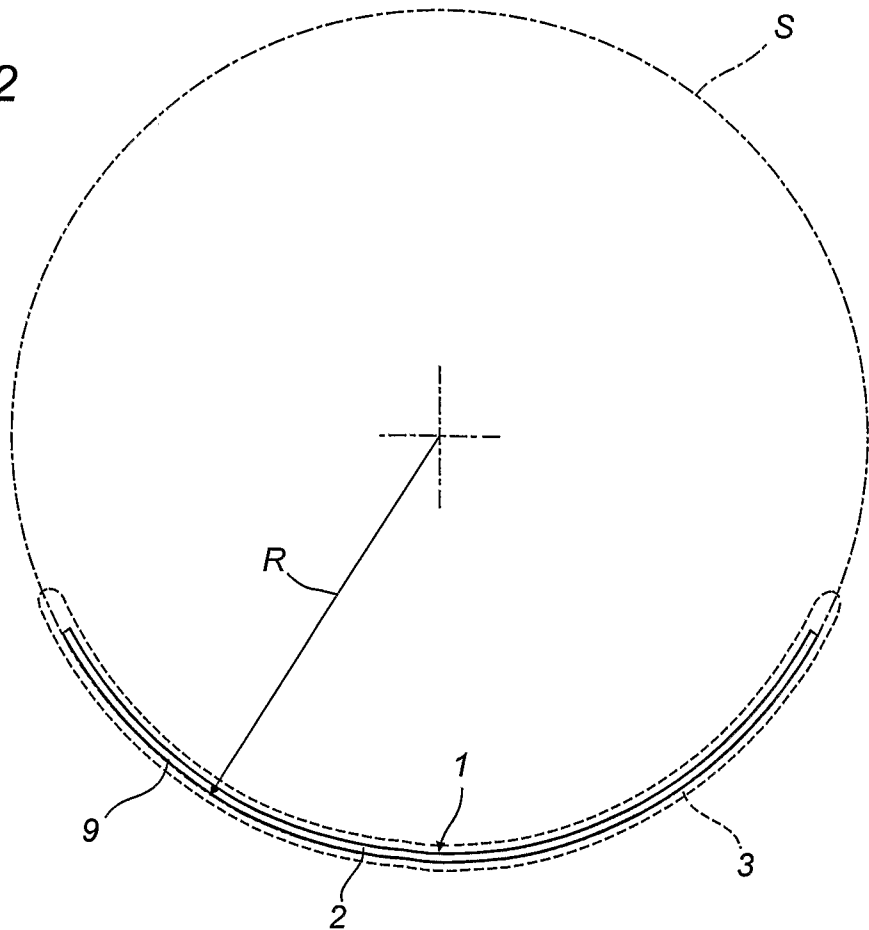


FIG. 3

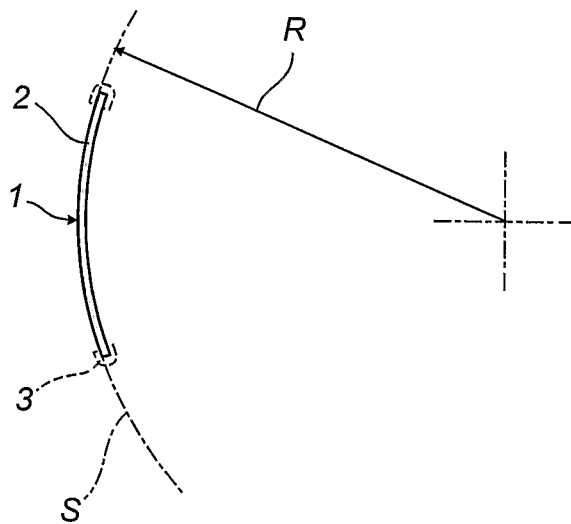
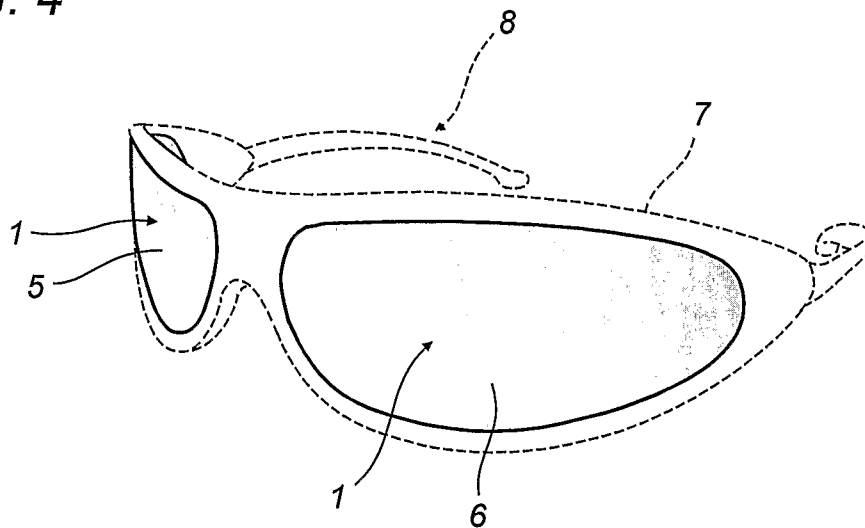
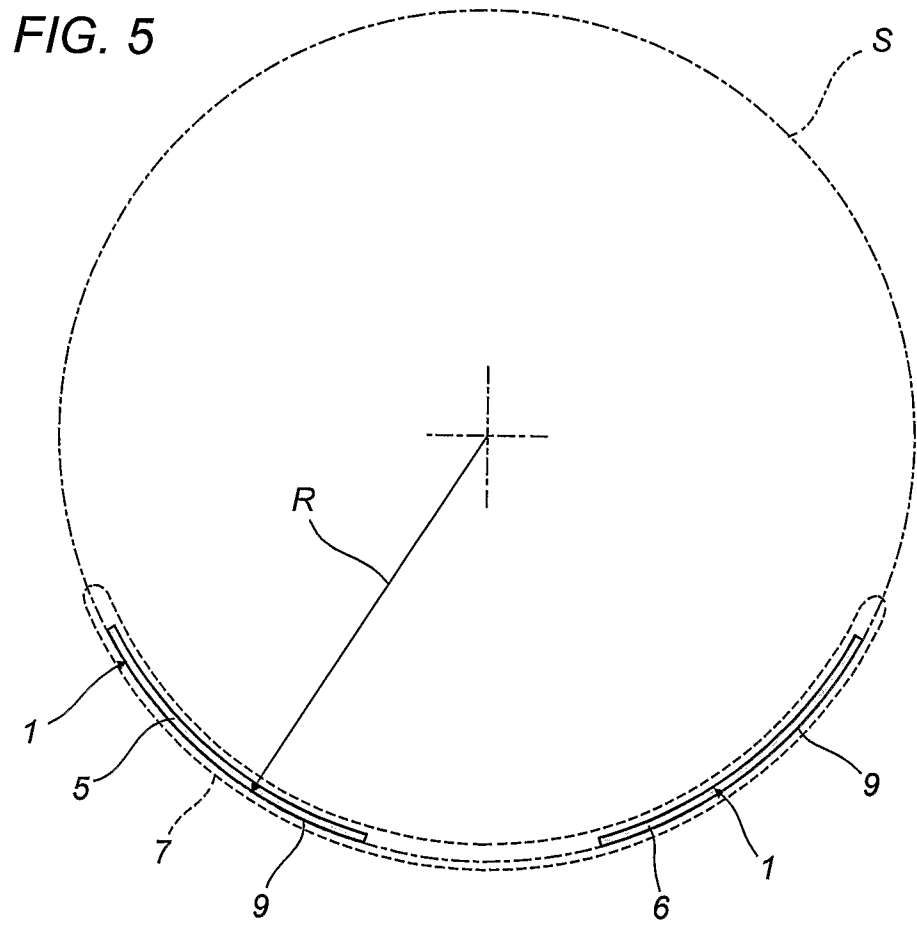


FIG. 4





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Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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A	US 6 009 564 A (TACKLES GEORGE [US] ET AL) 4 January 2000 (2000-01-04) column 1 - column 2 column 6, line 64 - column 7, line 33 column 10, line 54 - column 11, line 56	1-5
A	US 2004/095551 A1 (PIEROTTI ELIZABETH M [US]) 20 May 2004 (2004-05-20) pages 1,2, paragraph 2-12	1-5
A	WO 02/19013 A (GREENHOUSE GROWN PRODUCTS INC [US]) 7 March 2002 (2002-03-07) claims	1-5
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Further documents are listed in the continuation of Box C.

See patent family annex.

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European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,  
Fax: (+31-70) 340-3016

Authorized officer

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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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Information on patent family members

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