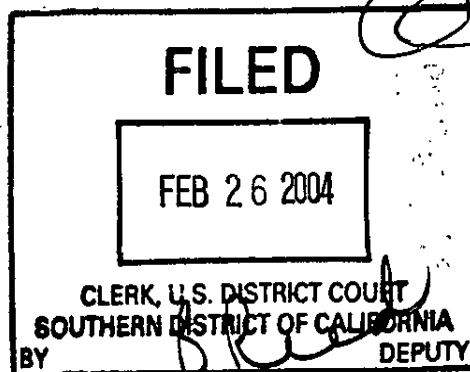


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3:04-CV-00417 SPY OPTIC INC V. STYLE EYES INC

1

CMP.

ORIGINAL

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Attorneys for Plaintiff
 SPY OPTIC, INC.

IN THE UNITED STATES DISTRICT COURT
 FOR THE SOUTHERN DISTRICT OF CALIFORNIA

'04 CV 00417 LAB (LSP)

SPY OPTIC, INC., a California corporation,

CASE NO.:

Plaintiff,

**COMPLAINT FOR PATENT
 INFRINGEMENT OF U.S. PATENT
 NOS.**

v.

STYLE EYES, INC., a California corporation; and
 DOES 1 through 10, inclusive,

1. 5,610,668;
2. 5,801,805;
3. 5,898,468;
4. 6,050,684; AND
5. D397,133

Defendants.

DEMAND FOR JURY TRIAL

Plaintiff Spy Optic, Inc. alleges as follows:

PARTIES

1. Plaintiff, Spy Optic, Inc. (hereinafter "SPY OPTIC") is a corporation organized and existing under the laws of the State of California, and having a principal place of business at 2070 Las Palmas Drive, Carlsbad, California 92008.

2. Upon information and belief, Defendant Style Eyes, Inc. (hereinafter "STYLE EYES") is a California corporation having a business address at 833 West 16th Street, Newport Beach,

1 California 92663 and corporate address of 1811 Von Karman Avenue, Suite 825, Irvine, California
2 92612.

3 3. The true names and capacities of the Defendants named herein as DOES 1 through 10,
4 whether individual, corporate, associate, or otherwise, are unknown to SPY OPTIC, who therefore
5 sues said Defendants by said fictitious names. SPY OPTIC, is informed and believes, and thereon
6 alleges, that each of the Defendants designated herein as DOE is legally responsible for the events and
7 happenings hereinafter alleged and legally caused injury and damages proximately thereby to SPY
8 OPTIC as herein alleged. SPY OPTIC will seek leave to amend the Complaint when the true names
9 and capacities of said DOE Defendants have been ascertained. STYLE EYES and DOES 1 through
10 10 are hereinafter collectively referred to as "Defendants."

11 JURISDICTION AND VENUE

12 4. This action, as hereinafter more fully appears, arises under United States Patent Laws
13 (35 U.S.C. 271 and §§ 281-285) and is for patent infringement and design patent infringement. The
14 Court has jurisdiction over the subject matter of the federal causes of action pursuant to 28 U.S.C. §§
15 1331, 1338(a) and (b).
16

17 5. Upon information and belief, Defendants are registered to do business in the State of
18 California and its products are marketed and sold in this judicial district.
19

20 6. Venue is proper in this judicial district pursuant to 28 U.S.C. §§ 1391 and 1400 because
21 (1) Defendants reside and may be found in this judicial district, (2) the acts of infringement alleged
22 herein were committed in this judicial district, and/or (3) a substantial part of the events giving rise to
23 the claims occurred in this judicial district.
24

25 BACKGROUND OF THE CONTROVERSY

26 7. SPY OPTIC is a Carlsbad, California based manufacturer and international distributor
27 of sunglass products.
28

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8. In association with SPY OPTIC's development of various sunglass products, SPY OPTIC has secured United States Utility Patent No. 5,610,669 entitled "Fog Resistant Sunglasses Incorporating Ventilation Channels", United States Utility Patent No. 5,801,805 entitled "Sport Sunglasses Resistant to Fogging", 5,898,468 entitled Fog-Resistant Sunglasses Incorporating Ventilation Channels", 6,050,684 entitled Fog-Resistant Sunglasses Incorporating Ventilation Channels", and United States Design Patent No. D397,133 entitled "Sunglass". Copies of such patents are attached hereto as Exhibits 1-5, respectively.

9. Upon information and belief, Defendants have been making, selling, using, or offering for sale the product identified as Microlite sunglasses with the model name "Baja". A photograph of the Baja sunglasses and an associated hang tag are attached hereto as Exhibit 6. The Baja sunglasses infringe SPY OPTIC's Utility Patent Nos. 5,610,668, 5,801,805, 5,898,468, and 6,050,684, as well as Design Patent No. D397,133.

FIRST CLAIM FOR RELIEF

(Patent Infringement of U.S. Patent No. 5,610,668)

10. SPY OPTIC incorporates the allegations of paragraphs 1-9 herein.

11. On March 11, 1997, the United States Patent and Trademark Office duly and legally issued United States Letters Patent No. 5,610,668 (the " '668 patent") entitled "Fog-Resistant Sunglasses Incorporating Ventilation Channels" to SPY OPTIC. A true and correct copy of the '668 patent is attached hereto as Exhibit 1.

12. Defendants have been and are infringing the '668 patent within this district and elsewhere in the United States by making, using, selling, importing, distributing or offering for sale products that infringe one or more of the claims of the '668 patent.

13. Defendants are contributorily infringing the '668 patent within this district and elsewhere in the United States by making, using, selling, importing, distributing or offering for sale in

1 the United States materials and/or sunglasses for use in practicing the inventions set forth in the '668
2 patent, that they know to be especially made or especially adapted for use in infringement of the
3 inventions embodied in the '668 patent. On information and belief, these materials and/or sunglasses
4 have no substantial non-infringing use in commerce.

5
6 14. Defendants are inducing infringement of the '668 patent within this district and
7 elsewhere in the United States by instructing in the use of materials and/or sunglasses that infringe one
8 or more of the claims of the '668 patent.

9 15. Upon information and belief, by the acts of patent infringement herein complained of,
10 the Defendants have made substantial profits to which they are not equitably entitled.

11 16. By reason of the aforementioned acts of the Defendants, SPY OPTIC has suffered great
12 detriment in a sum which exceeds this Court's jurisdictional amount, but which cannot be ascertained
13 at this time.

14 17. Upon information and belief, Defendants continue to infringe SPY OPTIC's '668
15 patent, and will continue to infringe SPY OPTIC's '668 patent to SPY OPTIC's irreparable harm,
16 unless enjoined by this Court.

17 18. Any continuing infringement of the '668 patent by Defendants after receiving notice of
18 the '668 patent will be willful, entitling SPY OPTIC to enhanced damages.

19 SECOND CLAIM FOR RELIEF

20 (Patent Infringement of U.S. Patent No. 5,801,805)

21 19. SPY OPTIC incorporates the allegations of paragraphs 1-18 herein.

22 20. On September 1, 1998, the United States Patent and Trademark Office duly and legally
23 issued United States Letters Patent No. 5,801,805 (the " '805 patent") entitled "Sport Sunglasses
24 Resistant to Fogging" to SPY OPTIC. A true and correct copy of the '805 patent is attached hereto as
25 Exhibit 2.
26
27
28

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1 21. Defendants have been and are infringing the '805 patent within this district and
2 elsewhere in the United States by making, using, selling, importing, distributing or offering for sale
3 products that infringe one or more of the claims of the '805 patent.

4 22. Defendants are contributorily infringing the '805 patent within this district and
5 elsewhere in the United States by making, using, selling, importing, distributing or offering for sale in
6 the United States materials and/or sunglasses for use in practicing the inventions set forth in the '805
7 patent, that they know to be especially made or especially adapted for use in infringement of the
8 inventions embodied in the '805 patent. On information and belief, these materials and/or sunglasses
9 have no substantial non-infringing use in commerce.

10 23. Defendants are inducing infringement of the '805 patent within this district and
11 elsewhere in the United States by instructing in the use of materials and/or sunglasses that infringe one
12 or more of the claims of the '805 patent.

13 24. Upon information and belief, by the acts of patent infringement herein complained of,
14 the Defendants have made substantial profits to which they are not equitably entitled.

15 25. By reason of the aforementioned acts of the Defendants, SPY OPTIC has suffered great
16 detriment in a sum which exceeds this Court's jurisdictional amount, but which cannot be ascertained
17 at this time.

18 26. Upon information and belief, Defendants continue to infringe SPY OPTIC's '805
19 patent, and will continue to infringe SPY OPTIC's '805 patent to SPY OPTIC's irreparable harm,
20 unless enjoined by this Court.

21 27. Any continuing infringement of the '805 patent by Defendants after receiving notice of
22 the '805 patent will be willful, entitling SPY OPTIC to enhanced damages.

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THIRD CLAIM FOR RELIEF

(Patent Infringement of U.S. Patent No. 5,898,468)

28. SPY OPTIC incorporates the allegations of paragraphs 1-27 herein.

29. On April 27, 1999, the United States Patent and Trademark Office duly and legally issued United States Letters Patent No. 5,898,468 (the " '468 patent") entitled "Fog-Resistant Sunglasses Incorporating Ventilation Channels" to SPY OPTIC. A true and correct copy of the '468 patent is attached hereto as Exhibit 3.

30. Defendants have been and are infringing the '468 patent within this district and elsewhere in the United States by making, using, selling, importing, distributing or offering for sale products that infringe one or more of the claims of the '468 patent.

31. Defendants are contributorily infringing the '468 patent within this district and elsewhere in the United States by making, using, selling, importing, distributing or offering for sale in the United States materials and/or sunglasses for use in practicing the inventions set forth in the '468 patent, that they know to be especially made or especially adapted for use in infringement of the inventions embodied in the '468 patent. On information and belief, these materials and/or sunglasses have no substantial non-infringing use in commerce.

32. Defendants are inducing infringement of the '468 patent within this district and elsewhere in the United States by instructing in the use of materials and/or sunglasses that infringe one or more of the claims of the '468 patent.

33. Upon information and belief, by the acts of patent infringement herein complained of, the Defendants have made substantial profits to which they are not equitably entitled.

34. By reason of the aforementioned acts of the Defendants, SPY OPTIC has suffered great detriment in a sum which exceeds this Court's jurisdictional amount, but which cannot be ascertained at this time.

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1 35. Upon information and belief, Defendants continue to infringe SPY OPTIC's '468
2 patent, and will continue to infringe SPY OPTIC's '468 patent to SPY OPTIC's irreparable harm,
3 unless enjoined by this Court.

4 36. Any continuing infringement of the '468 patent by Defendants after receiving notice of
5 the '468 patent will be willful, entitling SPY OPTIC to enhanced damages.

6
7 **FOURTH CLAIM FOR RELIEF**

8 **(Patent Infringement of U.S. Patent No. 6,050,684)**

9 37. SPY OPTIC incorporates the allegations of paragraphs 1-36 herein.

10 38. On April 18, 2000, the United States Patent and Trademark Office duly and legally
11 issued United States Letters Patent No. 6,050,684 (the " '684 patent") entitled "Fog-Resistant
12 Sunglasses Incorporating Ventilation Channels" to SPY OPTIC. A true and correct copy of the '684
13 patent is attached hereto as Exhibit 4.

14 39. Defendants have been and are infringing the '684 patent within this district and
15 elsewhere in the United States by making, using, selling, importing, distributing or offering for sale
16 products that infringe one or more of the claims of the '684 patent.

17 40. Defendants are contributorily infringing the '684 patent within this district and
18 elsewhere in the United States by making, using, selling, importing, distributing or offering for sale in
19 the United States materials and/or sunglasses for use in practicing the inventions set forth in the '684
20 patent, that they know to be especially made or especially adapted for use in infringement of the
21 inventions embodied in the '684 patent. On information and belief, these materials and/or sunglasses
22 have no substantial non-infringing use in commerce.

23 41. Defendants are inducing infringement of the '684 patent within this district and
24 elsewhere in the United States by instructing in the use of materials and/or sunglasses that infringe one
25 or more of the claims of the '684 patent.

45. Any continuing infringement of the '684 patent by Defendants after receiving notice of the '684 patent will be willful, entitling SPY OPITC to enhanced damages.

(Design Patent Infringement of U.S. Patent No. Des 397,133)

50. By reason of the aforementioned acts of the Defendants, SPY OPTIC has suffered great detriment in a sum which exceeds this Court's jurisdictional amount, but which cannot be ascertained at this time.

1 51. SPY OPTIC has been damaged by Defendants' infringement of the '133 patent, and
2 will continue to be damaged in the future unless Defendants are enjoined from infringing the '133
3 patent.

4 52. Any continuing infringement of the '133 patent by Defendants after receiving notice of
5 the '133 patent will be willful, entitling SPY OPTIC to enhanced damages.
6

7 **RELIEF REQUESTED**

8 WHEREFORE, SPY OPTIC prays for judgment and relief as follows:

9 A. A judgment that Defendants have infringed the patents-in-suit.

10 B. A judgment that Defendants' infringement of the patents-in-suit have been willful.

11 C. A preliminary and permanent injunction, pursuant to 35 U.S.C. § 283, enjoining
12 Defendants, and all persons in active concert or participation with it, from any further acts of
13 infringement, contributory infringement or inducement of infringement of the patents-in-suit.
14

15 D. An order, pursuant to 35 U.S.C. § 284, awarding SPY OPTIC damages adequate to
16 compensate SPY OPTIC for Defendants' infringement of the patents-in-suit, in an amount to be
17 determined at trial, but in no event less than a reasonable royalty.

18 E. An order, pursuant to 35 U.S.C. § 284, trebling all damages awarded to SPY OPTIC
19 based on Defendants' willful infringement of the patents-in-suit.

20 F. An order, pursuant to 35 U.S.C. § 285, finding that this is an exceptional case and
21 awarding to SPY OPTIC its reasonable attorneys fees incurred in this action.
22

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1 G. That SPY OPTIC be awarded costs of this action and reasonable attorneys fees and to
2 have such other and further relief as the Court may deem just and equitable.

3 STETINA BRUNDA GARRED & BRUCKER

4
5
6 Dated: February 25, 2004

By: 

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William J. Brucker
Attorneys for Plaintiff
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DEMAND FOR JURY TRIAL

Plaintiff, SPY OPTIC, INC., hereby demands a jury trial in this action.

STETINA BRUNDA GARRED & BRUCKER

Dated: February 25, 2004

By: 

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William J. Brucker

Attorneys for Plaintiff

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US005610668A

United States Patent [19][11] **Patent Number:** 5,610,668**Mage**[45] **Date of Patent:** Mar. 11, 1997

[54] **FOG-RESISTANT SUNGLASSES
INCORPORATING VENTILATION
CHANNELS**

[75] **Inventor:** Jérôme J. M. Mage, Carlsbad, Calif.

[73] **Assignee:** Spy Optic, Inc., Carlsbad, Calif.

[21] **Appl. No.:** 565,623

[22] **Filed:** Nov. 28, 1995

[51] **Int. Cl.:** G02C 11/08; G02C 1/00

[52] **U.S. Cl.:** 351/62; 351/41; 2/435;
2/436; 2/437

[58] **Field of Search:** 351/62, 85, 41,
351/158, 156, 157; 2/437, 436, 435

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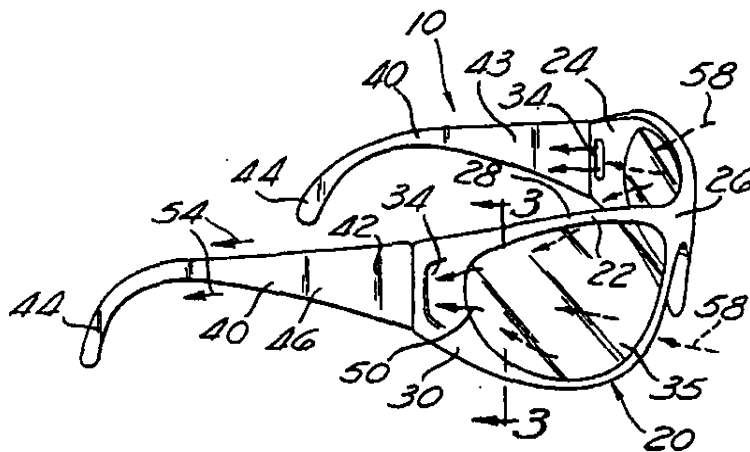
Primary Examiner—Hung Dang

Attorney, Agent, or Firm—Stetina Brunda & Buyan

[57] **ABSTRACT**

Protective eyeglasses (e.g., sunglasses) for use in high-speed outdoor sports activities, the lenses thereof being resistant to condensation, is achieved by air circulation created by venturi effects. The glasses comprise a frame front having middle portions over the wearer's eyes which support protective lenses, and having endpiece portions near the wearer's temples, the outboard edges of which attach temples which hold the glasses in place. A chamber is defined by the volume between the lenses and the wearer's face, and gaps are defined by the distance between the middle portions of the frame front and the wearer's face. Apertures in each of the endpiece portions of the frame front define an entrance of a ventilation channel for air flow through the frame front, adjacent to the respective chamber. Venturi forces are created within the ventilation channels to facilitate circulation of air. Improved ventilation, and the reduction or elimination of fogging on the lenses, is accomplished by low-cost and lightweight glasses.

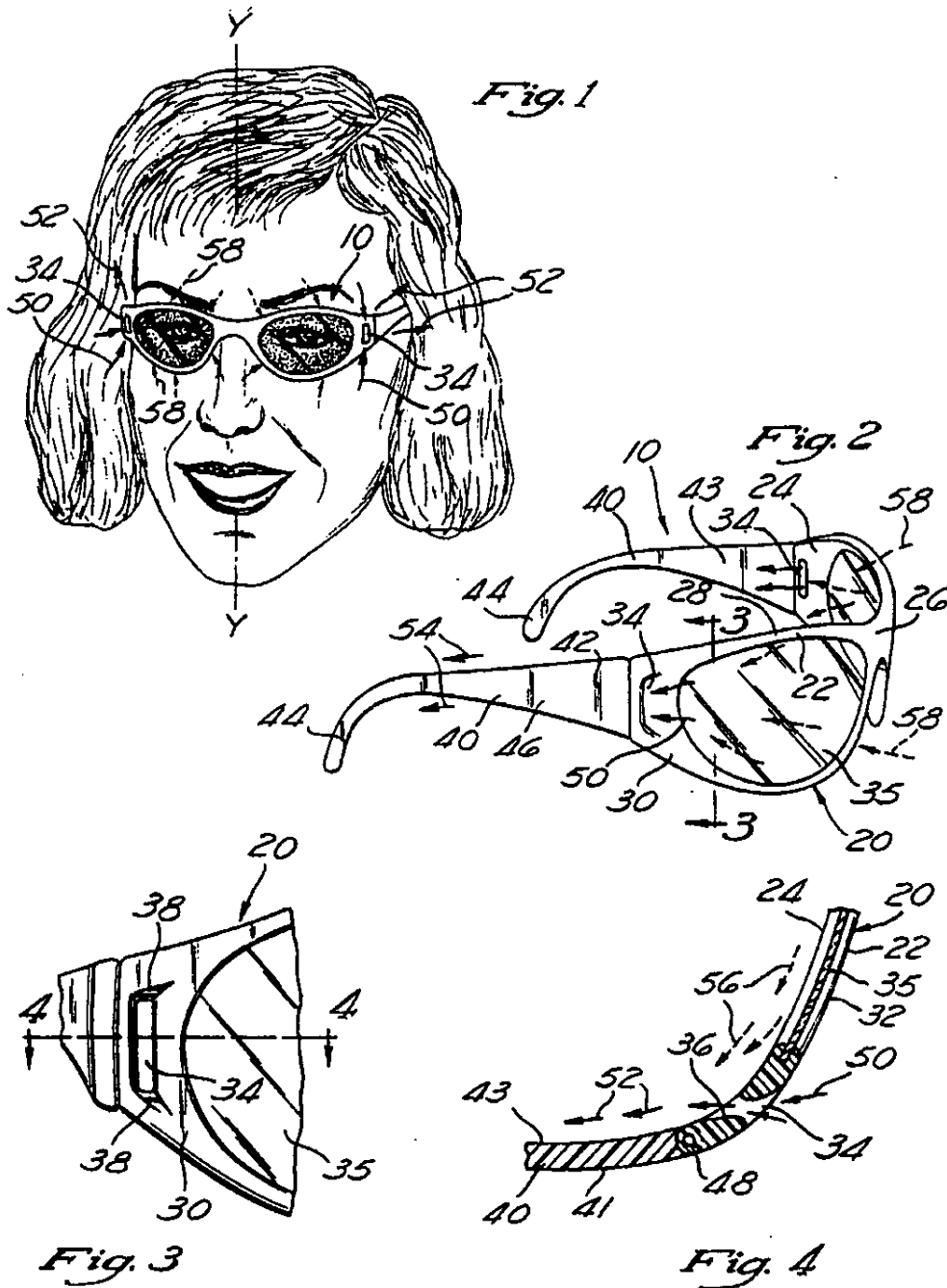
19 Claims, 1 Drawing Sheet



U.S. Patent

Mar. 11, 1997

5,610,668



5,610,668

1

FOG-RESISTANT SUNGLASSES INCORPORATING VENTILATION CHANNELS

FIELD OF THE INVENTION

The present invention relates generally to protective eyeglasses or goggles which protect a wearer's eyes, and more particularly to anti-fogging sunglasses which incorporate a ventilation channel to promote air circulation behind the lenses thereof, minimizing or preventing fogging of the lenses.

BACKGROUND OF THE INVENTION

Goggles, or protective eyewear or sunglasses having tinted lenses, are advisable and commonly used in connection with certain sports and other hazardous activities to protect the participant's eyes. Eye protection is especially called for when the sport or other activity involves unshielded high-speed travel, since traveling through the air increases the velocity of impact on exposed surfaces of foreign matter that may be encountered. A few examples of sporting activities where eye protection is recommended include downhill skiing, snowmobiling, and motorcycle racing, to keep snow, dust, insects, rocks, etc., out of the wearer's eyes.

The problem of fogging or misting, i.e. the buildup of condensation, on the inside surfaces of eyeglasses is well known. The problem is particularly acute when the wearer is warm and/or perspiring, and the environment is cool and/or damp. The fogging of the lenses obviously interferes with the wearer's vision, and as such is a dangerous condition.

The prior art has long recognized the fogging problem and proposed several solutions. For example, the prior art has proposed thermal lenses, which consist of a single lens of increased thickness operative to isolate the cooler air on the outside from the warmer air on the inside of the glasses. The prior art has also proposed double glass, which consists of dual lenses separated by a layer of air, also operative to achieve the effect of isolating the two sides of the glasses. The thermal lenses and double glass, however, add to the bulkiness and weight of the goggles, and thus they are not desirable.

The prior art has also tried various coatings on the inside surface of the glasses, either to immediately condense or to absorb any misting on the lenses. The water must go somewhere though, making the coatings only effective for a limited duration, after which time the inside of the glasses need to be emptied out or dried off in some manner.

The most promising of solutions proposed by the prior art include attempts to improve the air circulation behind the goggles or eyeglasses, i.e., exhausting the warm humid air and replacing it with cool drier air. The prior art has proposed miniature fans powered by portable batteries carried by the user, a needlessly complex and costly way to resist fogging. Of greater interest, the prior art has also proposed ventilation ports around the perimeter of the glasses' frames, surrounding the lens. Unless properly designed however, the ventilation ports may provide too little air flow, resulting in ineffectiveness or even worse in a suction effect. At the other extreme, the ventilation ports may provide for too great of an air flow, resulting in a pressure build up or in uncomfortably high "winds" across the wearer's eyes. In addition, these ventilation ports may allow in the foreign matter, e.g., dust, that the goggles or eyeglasses are envisioned to guard against.

2

In view of the shortcomings of the prior art, it is desirable to provide effective eyeglasses, that safely protect a wearer's eyes and are not subject to fogging. The eyeglasses should be low cost by being simple to manufacture. Finally, the eyeglasses must be lightweight so as not to interfere with the wearer's sporting activities.

SUMMARY OF THE INVENTION

The present invention specifically addresses and alleviates the above-mentioned deficiencies associated with the prior art. Generally, the present invention comprises eyeglasses which are resistant to fogging while being worn during high-speed outdoor sports activities. The resistance to fogging is accomplished by air circulation behind the lenses, that air flow being facilitated by venturi effects.

More particularly, the present invention comprises eyeglasses having a frame front with middle portions over the wearer's eyes, and endpiece portions near the wearer's temples, the endpiece portions having an outboard edge. Attached to the frame front are lenses which cover the wearer's eyes. The eyeglasses, when placed on the wearer's face, define a pair of chambers as volumes of air between the wearer's face and the lenses, and define gaps as the distance between the middle portions of the frame front and the wearer's face. The endpiece portions of the frame front each include an aperture which defines the entrance into a ventilation channel, for air flow through the frame and outward adjacent to the chamber. The air flow through the ventilation channel undergoes acceleration of flow rate due to the creation of a venturi configuration within the ventilation channel.

In a preferred embodiment of the invention, the eyeglasses include temples connected to the frame front endpiece outboard edges. Preferably, the height of the endpiece outboard edges of the frame are substantial, at least half of the maximum height of the lenses. Similarly, the butt portions of the temples, are preferably as wide as the height of the endpiece outboard edges to which they connect. The endpiece portions of the frame are preferably further enlarged to provide space for an elongate aperture, that serves as the entrance to the ventilation channel. The wide forward ends of the temples help define the outboard boundary of the ventilation channels. The shank portions of the temples are preferably less wide, to provide for air flow out of the ventilation channels.

The eyeglasses, resistant to fogging while being worn, function as follows. The wearer is typically traveling forward through relatively cool dry air at a relatively high speed. The wearer's body, through physical exertion, is generating heat, and the wearer's breathing is dispelling warm humid air in the vicinity of the goggles. In the chamber between the lenses and the wearer's face, condensation typically begins to form on the inside of the lenses. The cool outside air flows through the entrances in the frame front endpiece portions and is accelerated and flows through the ventilation channels. The air flow through the ventilation channels is immediately adjacent to the volume of air in the chambers. Warm humid air in the chambers is picked up and pulled along into the ventilation channels, reducing the pressure in the chambers. This pressure drop in the chambers causes cool drier outside air to be pulled into the chambers through the gaps. Improved ventilation, and the reduction or elimination of fogging on the lenses, accomplished through low cost and lightweight eyeglasses, is the desired result.

These, as well as other advantages of the present invention will become more apparent from the following descrip-

3

tion and drawings. It is understood that changes in the specific structure shown and described may be made within the scope of the claims without departing from the spirit of the invention.

5,610,668

4

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view illustrating the glasses of the present invention as placed on the wearer's face;
FIG. 2 is a side perspective view of the glasses of the present invention;
FIG. 3 is a side view of the ventilation channel entrance of the present invention; and
FIG. 4 is a top section view of the ventilation channel of the glasses of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

The detailed discussion set forth below in connection with the appended drawings is intended as a description of the presently preferred embodiments of the invention, and is not intended to represent the only form in which the present invention may be constructed or utilized. The description sets forth the functions and sequence of steps for constructing and operating the invention in connection with the illustrated embodiments. It is to be understood, however, that the same or equivalent functions and sequences may be accomplished by different embodiments that are also intended to be encompassed within the spirit and scope of the invention.

Although the drawings show an embodiment of the invention wherein the lenses are mounted in a spectacle-type frame which does not seal against the user's face, it will be appreciated that the lenses may alternatively be mounted in a goggle-type frame which fits over the wearer's face about the orbital regions of the skull.

The glasses of the present invention are illustrated in FIGS. 1 through 4 which depict a presently preferred embodiment of the invention. FIG. 1 shows the glasses 10 as placed on the wearer's face, and the air flows approaching toward and departing from the glasses 10.

Referring now to FIG. 2, the glasses 10 may be described in more detail. The glasses 10 are preferably symmetrical about a center line Y, running approximately along the bridge of the wearer's nose. The glasses 10 are comprised of a frame front 20 having a forward side 22 and an aft side 24, and a bridge portion 26. Each side of the frame front 20 has a middle portion 28 and an endpiece portion 30. The glasses 10 have a pair of lenses 35, or alternatively a single conventional lens (not shown) could extend across the frame front 20 through the bridge portion 26. Preferably the frame front 20 and the lenses 35 are fabricated of a lightweight and shatter-proof plastic material. The lenses 35 may be transparent, darkly tinted, or of a tint that adjusts to brightness. Specialized lenses 35 may be used for specialized applications, e.g. night vision. The lenses 35 are preferably held in a "sandwich" construction between the forward and aft sides 22 and 24 of the frame front 20 (see FIG. 4). The inside edges of the forward and aft sides 22 and 24 of the frame front 20 are preferably rounded, to promote a smooth air flow. Alternatively, the lenses 35 could be supported only from above or below the lenses (not shown), though such a construction would be less structurally sound.

Each endpiece portion 30 of the frame front 20 is enlarged and has an outboard edge 32 of approximately 1 inch in height. Each endpiece portion 30 of the frame 20 has material removed to form an aperture 34, more easily seen in FIGS. 3 and 4. The general shape of the glasses 10 is preferably concave around the wearer's face, providing the protection around the wearer's eyes and promoting the smooth flow of air around the glasses 10. Importantly, note that the apertures 34 are sufficiently outboard and aft that any debris entering therein should pass away from the wearer's eyes.

The preferred embodiment of the glasses 10 of the present invention further comprises a pair of temples 40, each temple 40 having a butt portion 42, a shank portion 46, and a bent earpiece portion 44. The temples 40 are also preferably fabricated of a plastic material. Alternatively, a conventional strap (not shown), preferably fabricated of an elastic material, the strap running around the back of the wearer's head, could be used instead of the temples 40. The temples 40 are of the greatest width at the butt portion 42, preferably of a gradually reduced width through the shank portion 46. The temples 40 at the butt portion 42 are each respectively connected by a pivot 48 (see FIG. 4) to a allowing the temples 40 to be folded when the glasses 10 are not in use. The forward side 22 of the frame front 20 is preferably substantially flush to the outboard sides 41 of the temples 40, to promote a smooth air flow around the glasses 10. The aft sides 24 of the frame front 20 is also preferably substantially flush to the inboard side 43 of the temple 40, for reasons that will become clear later in this discussion.

Now referring to FIGS. 3 and 4, the details of the aperture 34 may be described. Each aperture 34 is operative to create a ventilation channel, the function of which will be elaborated on in later paragraphs. Each aperture 34 is preferably of a rectangular or oval shape approximately 3/4-inch long and 1/4-inch wide, running vertically in a respective endpiece portion 30 of each frame front 20. The center line of the aperture 34 is preferably substantially parallel to the straight-ahead line of sight of the wearer of the glasses 10. Importantly, the forward and aft ends of each of the apertures 34 are partially defined by outwardly flared, vertically extending corners 36 of the forward and aft sides 22, 24 of the frame front 20, thus causing the forward and aft ends of each aperture 34 to be enlarged relative to the remainder thereof. In this respect, as best seen in FIG. 4, each aperture 34 has a generally "hourglass" shape, with the center thereof being narrowed in relation to its forward and aft ends. Advantageously, this configuration of each aperture 34 creates a "venturi" effect in the air flow therethrough. Additionally, as best seen in FIG. 3, formed in each endpiece portion 30 above and below the forward end of the aperture 34 are ramps 38 which are used to facilitate the flow of greater quantities of air into the aperture 34 to promote the creation of the venturi effect.

The term "venturi" is generally defined as a tube having a narrow region in the middle with flared or widened ends. The venturi effect is the result of the Bernoulli's Principle which says that the flow rate of the fluid will increase and pressure will decrease in the narrowed region of the venturi. This "venturi effect" occurring within the narrowed region of the ventilation channel facilitates circulation of air behind the lenses, thereby mitigating or preventing condensation.

Now referring to FIGS. 1, 2, and 4, the preferred mode of operation of the glasses 10, resistant to fogging while being worn, may be described. The partially enclosed volume bounded by each inboard side 43 of the temple 40 and a

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respective side of the wearer's head defines a ventilation channel, as was described above. Entering air 50 flows through the aperture 34 that defines the entrance to the ventilation channel, and becomes ventilating air 52 that flows from the aperture 34 through the ventilation channel. The smooth transition from the aft side 24 of the frame front 20 to the inboard side 43 of the temple 40 facilitates a smooth air flow. The ventilating air 52 becomes the exiting air 54, egressing from the ventilation channel both above and below the temple 40.

The partially enclosed volume bounded by each lens 35 and the wearer's face around one of the wearer's eyes defines a chamber, as was described above. The distance between the middle portions 28 of the frame front 20 and the wearer's face defines gaps, as was described above. Chamber air 56 adjacent to ventilating air 52 tends to get caught up in the flow of the ventilating air 52. This lowers the pressure in the chamber, drawing in outside air 58 around the middle portion 28 of the frame front 20 of the glasses 10. The exchange of the chamber air 56 for the outside air 58 provides sufficient air circulation to resist fogging of the inside of the lens 35.

It is understood that the glasses described herein and shown in the drawings represents only a presently preferred embodiment of the invention. Indeed, various modifications and additions may be made to the embodiment without departing from the spirit and scope of the invention. These modifications and additions may be obvious to those skilled in the art and may be implemented to adapt the present invention for use in a variety of different applications.

What is claimed is:

1. Fog-resistant eyeglasses positionable upon a wearer's face adjacent the wearer's temples for shielding the wearer's eyes, said eyeglasses comprising:

a frame front which spans across the wearer's face, said frame front including a forward side, an aft side, a pair of middle portions positioned over the wearer's eyes, and a pair of endpiece portions positioned adjacent the wearer's temples, each of said endpiece portions defining an outboard edge;

a pair of lenses attached to respective ones of the middle portions of the frame front and positioned over the wearer's eyes, each of said lenses defining front and back surfaces; and

a pair of apertures disposed within respective ones of the endpiece portions of the frame front, said apertures being forwardly directed and defining ventilation channels for facilitating air flow through the frame front adjacent the lenses;

wherein the ventilation channels defined by the apertures are each sized and configured to create a venturi effect when air flows therethrough which facilitates the circulation of air over the back surfaces of the lenses to resist the fogging thereof.

2. The eyeglasses of claim 1 wherein the ventilation channel defined by each of the apertures defines a forward end at the forward side of the frame front, an aft end at the aft side of the frame front, and a central portion between the forward and aft ends, said central portion being narrower than the forward and aft ends.

3. The eyeglasses of claim 2 wherein the forward ends of the ventilation channels are partially defined by rounded corners formed within the frame front to promote laminar air flow therethrough.

4. The eyeglasses of claim 2 wherein the forward ends of the ventilation channels are partially defined by pairs of

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ramps formed within the frame front to promote laminar air flow therethrough.

5. The eyeglasses of claim 1 wherein the apertures each comprise elongate, vertically oriented slots formed within respective ones of the endpiece portions of the frame front.

6. The eyeglasses of claim 1 wherein the apertures each define a central axis which is substantially parallel to the forward line of sight of the wearer.

7. The eyeglasses of claim 1 wherein the apertures are positioned outwardly beyond the wearer's eyes to prevent debris passing therethrough from entering the wearer's eyes.

8. The eyeglasses of claim 1 further comprising a pair of elongate temple members pivotally connected to said frame front, each of said temple members comprising:

a butt portion pivotally connected to a respective one of the outboard edges of the endpiece portions of the frame front, said butt portion defining inner and outer surfaces;

a shank portion; and

a bent earpiece portion sized and configured to rest upon one of the wearer's ears to maintain the eyeglasses in position upon the wearer's face.

9. The eyeglasses of claim 8 wherein the widths of the butt portions of the temple members and the widths of the outboard edges of the endpiece portions are approximately equal.

10. The eyeglasses of claim 9 wherein the widths of the butt portions of the temple members substantially exceed the widths of the shank portions thereof.

11. The eyeglasses of claim 10 wherein the widths of the shank portions of the temple members substantially exceed the widths of the bent earpiece portions thereof.

12. The eyeglasses of claim 8 wherein the forward side of the frame front and the outer surfaces of the butt portions of the temple members are substantially flush with each other.

13. The eyeglasses of claim 8 wherein the aft side of the frame front and the inner surfaces of the butt portions of the temple members are substantially flush with each other.

14. The eyeglasses of claim 1 wherein the middle portions of the frame front are arcuately contoured to facilitate air flow about the frame front.

15. The eyeglasses of claim 1 wherein the height of the endpiece portions of the frame front is at least half of the maximum height of the lenses.

16. The eyeglasses of claim 1 wherein the frame front and the lenses are generally concave to facilitate the wrapping of the eyeglasses around the wearer's eyes and promote laminar air flow around the wearer's face.

17. The eyeglasses of claim 1 wherein the lenses are darkly tinted.

18. The eyeglasses of claim 1 wherein the lenses are fabricated to be of sufficient thickness to prevent the inadvertent fracturing thereof when impacted by debris.

19. Fog-resistant eyeglasses positionable upon a wearer's face adjacent the wearer's temples for shielding the wearer's eyes, said eyeglasses comprising:

a frame front which spans across the wearer's face, said frame front including a forward side, an aft side, a pair of middle portions positioned over the wearer's eyes, and a pair of end piece portions positioned adjacent the wearer's temples, each of said endpiece portions defining an outboard edge;

a pair of lenses attached to respective ones of the middle portions of the frame front and positioned over the wearer's eyes, each of said lenses defining front and back surfaces; and

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a pair of apertures disposed within respective ones of the endpiece portions of the frame front, said apertures defining ventilation channels for facilitating air flow through the frame front adjacent the lenses;

wherein the ventilation channels defined by the apertures⁵ each include a forward end, an aft end and a central portion between the forward and aft ends, the central

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portion being narrower than the forward and aft ends to create a venturi effect when air flows through the ventilation channels for facilitating the circulation of air over the back surfaces of the lenses to resist the fogging thereof.

* * * * *



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United States Patent [19]

Mage

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[45] Date of Patent: *Sep. 1, 1998

[54] SPORT SUNGLASSES RESISTANT TO FOGGING

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[*] Notice: The term of this patent shall not extend beyond the expiration date of Pat. No. 5,610,668.

[21] Appl. No.: 760,469

[22] Filed: Dec. 5, 1996

Related U.S. Application Data

[63] Continuation of Ser. No. 565,623, Nov. 28, 1995, Pat. No. 5,610,668.

[51] Int. Cl.⁶ G02C 11/08

[52] U.S. Cl. 351/62; 351/41

[58] Field of Search 351/62, 41, 158;
2/235, 236, 237

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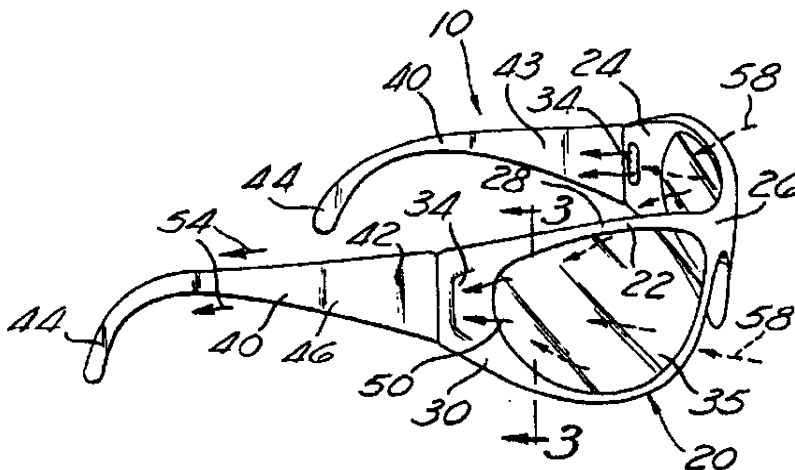
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[57] ABSTRACT

Protective eyeglasses (e.g., sunglasses) for use in high-speed outdoor sports activities, the lenses thereof being resistant to condensation, is achieved by air circulation created by venturi effects. The glasses comprise a frame front having middle portions over the wearer's eyes which support protective lenses, and having endpiece portions near the wearer's temples, the outboard edges of which attach temples which hold the glasses in place. A chamber is defined by the volume between the lenses and the wearer's face, and gaps are defined by the distance between the middle portions of the frame front and the wearer's face. Apertures in each of the endpiece portions of the frame front define an entrance of a ventilation channel for air flow through the frame front, adjacent to the respective chamber. Venturi forces are created within the ventilation channels to facilitate circulation of air. Improved ventilation, and the reduction or elimination of fogging on the lenses, is accomplished by low-cost and lightweight glasses.

9 Claims, 1 Drawing Sheet



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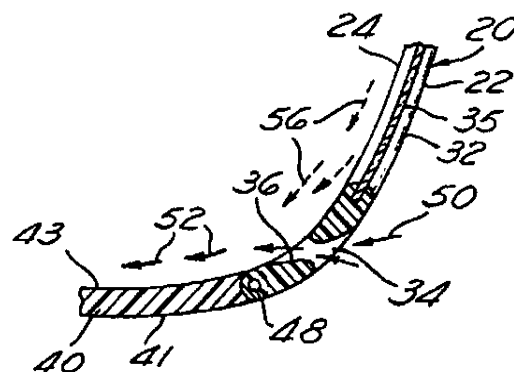
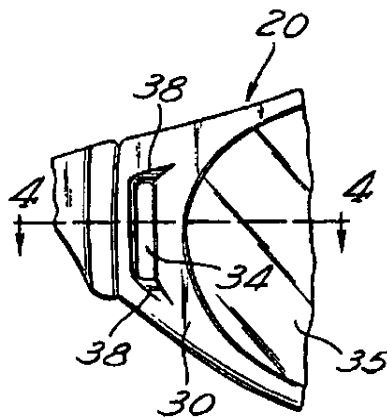
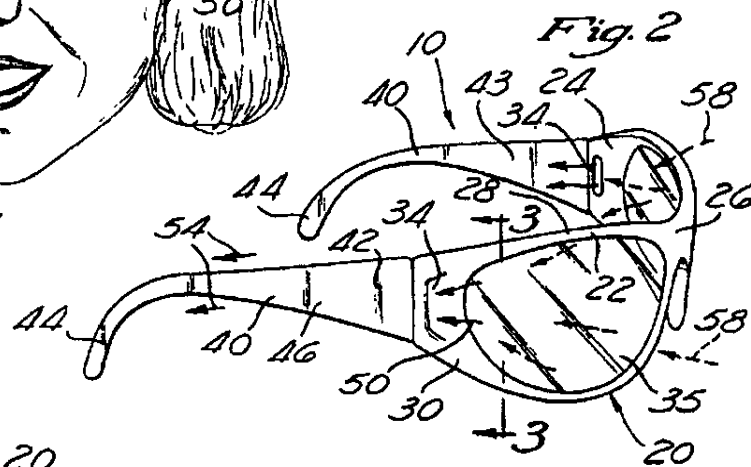
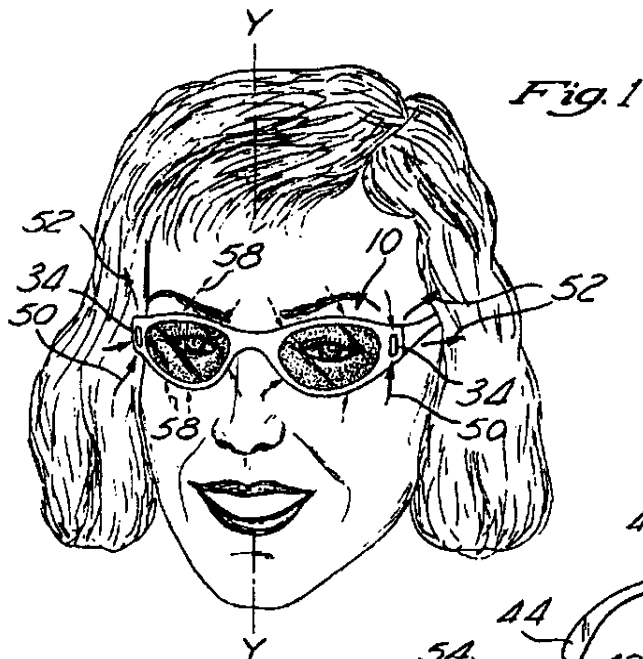
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SPORT SUNGLASSES RESISTANT TO FOGGING

This application is a continuation of application Ser. No. 08/565,623, filed Nov. 28, 1995, now U.S. Pat. No. 5,610,668.

FIELD OF THE INVENTION

The present invention relates generally to protective eyeglasses or goggles which protect a wearer's eyes, and more particularly to anti-fogging sunglasses which incorporate a ventilation channel to promote air circulation behind the lenses thereof, minimizing or preventing fogging of the lenses.

BACKGROUND OF THE INVENTION

Goggles, or protective eyewear or sunglasses having tinted lenses, are advisable and commonly used in connection with certain sports and other hazardous activities to protect the participant's eyes. Eye protection is especially called for when the sport or other activity involves unshielded high-speed travel, since traveling through the air increases the velocity of impact on exposed surfaces of foreign matter that may be encountered. A few examples of sporting activities where eye protection is recommended include downhill skiing, snowmobiling, and motorcycle racing, to keep snow, dust, insects, rocks, etc., out of the wearer's eyes.

The problem of fogging or misting, i.e. the buildup of condensation, on the inside surfaces of eyeglasses is well known. The problem is particularly acute when the wearer is warm and/or perspiring, and the environment is cool and/or damp. The fogging of the lenses obviously interferes with the wearer's vision, and as such is a dangerous condition.

The prior art has long recognized the fogging problem and proposed several solutions. For example, the prior art has proposed thermal lenses, which consist of a single lens of increased thickness operative to isolate the cooler air on the outside from the warmer air on the inside of the glasses. The prior art has also proposed double glass, which consists of dual lenses separated by a layer of air, also operative to achieve the effect of isolating the two sides of the glasses. The thermal lenses and double glass, however, add to the bulkiness and weight of the goggles, and thus they are not desirable.

The prior art has also tried various coatings on the inside surface of the glasses, either to immediately condense or to absorb any misting on the lenses. The water must go somewhere though, making the coatings only effective for a limited duration, after which time the inside of the glasses need to be emptied out or dried off in some manner.

The most promising of solutions proposed by the prior art include attempts to improve the air circulation behind the goggles or eyeglasses, i.e., exhausting the warm humid air and replacing it with cool drier air. The prior art has proposed miniature fans powered by portable batteries carried by the user, a needlessly complex and costly way to resist fogging. Of greater interest, the prior art has also proposed ventilation ports around the perimeter of the glasses' frames, surrounding the lens. Unless properly designed however, the ventilation ports may provide too little air flow, resulting in ineffectiveness or even worse in a suction effect. At the other extreme, the ventilation ports may provide for too great of an air flow, resulting in a pressure build up or in uncomfortably high "winds" across the wearer's eyes. In addition, these ventilation ports may

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allow in the foreign matter, e.g., dust, that the goggles or eyeglasses are envisioned to guard against.

In view of the shortcomings of the prior art, it is desirable to provide effective eyeglasses, that safely protect a wearer's eyes and are not subject to fogging. The eyeglasses should be low cost by being simple to manufacture. Finally, the eyeglasses must be lightweight so as not to interfere with the wearer's sporting activities.

SUMMARY OF THE INVENTION

The present invention specifically addresses and alleviates the above-mentioned deficiencies associated with the prior art. Generally, the present invention comprises eyeglasses which are resistant to fogging while being worn during high-speed outdoor sports activities. The resistance to fogging is accomplished by air circulation behind the lenses, that air flow being facilitated by venturi effects.

More particularly, the present invention comprises eyeglasses having a frame front with middle portions over the wearer's eyes, and endpiece portions near the wearer's temples, the endpiece portions having an outboard edge. Attached to the frame front are lenses which cover the wearer's eyes. The eyeglasses, when placed on the wearer's face, define a pair of chambers as volumes of air between the wearer's face and the lenses, and define gaps as the distance between the middle portions of the frame front and the wearer's face. The endpiece portions of the frame front each include an aperture which defines the entrance into a ventilation channel, for air flow through the frame and aftward adjacent to the chamber. The air flow through the ventilation channel undergoes acceleration of flow rate due to the creation of a venturi configuration within the ventilation channel.

In a preferred embodiment of the invention, the eyeglasses include temples connected to the frame front endpiece outboard edges. Preferably, the height of the endpiece outboard edges of the frame are substantial, at least half of the maximum height of the lenses. Similarly, the butt portions of the temples, are preferably as wide as the height of the endpiece outboard edges to which they connect. The endpiece portions of the frame are preferably further enlarged to provide space for an elongate aperture, that serves as the entrance to the ventilation channel. The wide forward ends of the temples help define the outboard boundary of the ventilation channels. The shank portions of the temples are preferably less wide, to provide for air flow out of the ventilation channels.

The eyeglasses, resistant to fogging while being worn, function as follows. The wearer is typically traveling forward through relatively cool dry air at a relatively high speed. The wearer's body, through physical exertion, is generating heat, and the wearer's breathing is dispelling warm humid air in the vicinity of the goggles. In the chamber between the lenses and the wearer's face, condensation typically begins to form on the inside of the lenses. The cool outside air flows through the entrances in the frame front endpiece portions and is accelerated and flows through the ventilation channels. The air flow through the ventilation channels is immediately adjacent to the volume of air in the chambers. Warm humid air in the chambers is picked up and pulled along into the ventilation channels, reducing the pressure in the chambers. This pressure drop in the chambers causes cool drier outside air to be pulled into the chambers through the gaps. Improved ventilation, and the reduction or elimination of fogging on the lenses, accomplished through low cost and lightweight eyeglasses, is the desired result.

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These, as well as other advantages of the present invention will become more apparent from the following description and drawings. It is understood that changes in the specific structure shown and described may be made within the scope of the claims without departing from the spirit of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view illustrating the glasses of the present invention as placed on the wearer's face;

FIG. 2 is a side perspective view of the glasses of the present invention;

FIG. 3 is a side view of the ventilation channel entrance of the glasses of the present invention; and

FIG. 4 is a top section view of the ventilation channel of the glasses of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

The detailed discussion set forth below in connection with the appended drawings is intended as a description of the presently preferred embodiments of the invention, and is not intended to represent the only form in which the present invention may be constructed or utilized. The description sets forth the functions and sequence of steps for constructing and operating the invention in connection with the illustrated embodiments. It is to be understood, however, that the same or equivalent functions and sequences may be accomplished by different embodiments that are also intended to be encompassed within the spirit and scope of the invention.

Although the drawings show an embodiment of the invention wherein the lenses are mounted in a spectacle-type frame which does not seal against the user's face, it will be appreciated that the lenses may alternatively be mounted in a goggle-type frame which fits over the wearer's face about the orbital regions of the skull.

The glasses of the present invention are illustrated in FIGS. 1 through 4 which depict a presently preferred embodiment of the invention. FIG. 1 shows the glasses 10 as placed on the wearer's face, and the air flows approaching toward and departing from the glasses 10.

Referring now to FIG. 2, the glasses 10 may be described in more detail. The glasses 10 are preferably symmetrical about a center line Y, running approximately along the bridge of the wearer's nose. The glasses 10 are comprised of a frame front 20 having a forward side 22 and an aft side 24, and a bridge portion 26. Each side of the frame front 20 has a middle portion 28 and an endpiece portion 30. The glasses 10 have a pair of lenses 35, or alternatively a single conventional lens (not shown) could extend across the frame front 20 through the bridge portion 26. Preferably the frame front 20 and the lenses 35 are fabricated of a lightweight and shatter-proof plastic material. The lenses 35 may be transparent, darkly tinted, or of a tint that adjusts to brightness. Specialized lenses 35 may be used for specialized applications, e.g. night vision. The lenses 35 are preferably held in a "sandwich" construction between the forward and aft sides 22 and 24 of the frame front 20 (see FIG. 4). The inside edges of the forward and aft sides 22 and 24 of the frame front 20 are preferably rounded, to promote a smooth air flow. Alternatively, the lenses 35 could be supported only from above or below the lenses (not shown), though such a construction would be less structurally sound.

Each endpiece portion 30 of the frame front 20 is enlarged and has an outboard edge 32 of approximately 1 inch in

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height. The endpiece portion 30 of the frame 20 has material removed to form an aperture 34, more easily seen in FIGS. 3 and 4. The general shape of the glasses 10 is preferably concave around the wearer's face, providing the protection around the wearer's eyes and promoting the smooth flow of air around the glasses 10. Importantly, note that the apertures 34 are sufficiently outboard and aft that any debris entering therein should pass away from the wearer's eyes.

The preferred embodiment of the glasses 10 of the present invention further comprises a pair of temples 40, each temple 40 having a butt portion 42, a shank portion 46, and a bent earpiece portion 44. The temples 40 are also preferably fabricated of a plastic material. Alternatively, a conventional strap (not shown), preferably fabricated of an elastic material, the strap running around the back of the wearer's head, could be used instead of the temples 40. The temples 40 are of the greatest width at the butt portion 42, preferably of a gradually reduced width through the shank portion 46. The temples 40 at the butt portion 42 are each preferably connected by a pivot 48 (see FIG. 4) to a respective endpiece outboard edge 32 of the frame front 20, allowing the temples 40 to be folded when the glasses 10 are not in use. The forward side 22 of the frame front 20 is preferably substantially flush to the outboard sides 41 of the temples 40, to promote a smooth air flow around the glasses 10. The aft side 24 of the frame front 20 is also preferably substantially flush to the inboard sides 43 of the temples 40, for reasons that will become clear later in this discussion.

Now referring to FIGS. 3 and 4, the details of the apertures 34 may be described. Each aperture 34 is operative to create a ventilation channel, the function of which will be elaborated on in later paragraphs. Each aperture 34 is preferably of a rectangular or oval shape approximately 3/4-inch long and 1/4-inch wide, running vertically in a respective endpiece portion 30 of the frame front 20. The center line of each aperture 34 is preferably substantially parallel to the straight-ahead line of sight of the wearer of the glasses 10. Importantly, the forward and aft ends of each of the apertures 34 are partially defined by outwardly flared, vertically extending corners 36 of the forward and aft sides 22, 24 of the frame front 20, thus causing the forward and aft ends of each aperture 34 to be enlarged relative to the remainder thereof. In this respect, as best seen in FIG. 4, each aperture 34 has a generally "hourglass" shape, with the center thereof being narrowed in relation to its forward and aft ends. Advantageously, this configuration of each aperture 34 creates a "venturi" effect in the air flow therethrough. Additionally, as best seen in FIG. 3, formed in each endpiece portion 30 above and below the forward end of the aperture 34 are ramps 38 which are used to facilitate the flow of greater quantities of air into the aperture 34 to promote the creation of the venturi effect.

The term "venturi" is generally defined as a tube having a narrow region in the middle with flared or widened ends. The venturi effect is the result of the Bernoulli's Principle which says that the flow rate of the fluid will increase and pressure will decrease in the narrowed region of the venturi. This "venturi effect" occurring within the narrowed region of the ventilation channel facilitates circulation of air behind the lenses, thereby mitigating or preventing condensation.

Now referring to FIGS. 1, 2, and 4, the preferred mode of operation of the glasses 10, resistant to fogging while being worn, may be described. The partially enclosed volume bounded by each inboard side 43 of the temple 40 and a respective side of the wearer's head defines a ventilation channel, as was described above. Entering air 50 flows through the aperture 34 that defines the entrance to the

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ventilation channel, and becomes ventilating air 52 that flows from the aperture 34 through the ventilation channel. The smooth transition from the aft side 24 of the frame front 20 to the inboard side 43 of the temple 40 facilitates a smooth air flow. The ventilating air 52 becomes the exiting air 54, egressing from the ventilation channel both above and below the temple 40.

The partially enclosed volume bounded by each lens 35 and the wearer's face around one of the wearer's eyes defines a chamber, as was described above. The distance between the middle portions 28 of the frame front 20 and the wearer's face defines gaps, as was described above. Chamber air 56 adjacent to ventilating air 52 tends to get caught up in the flow of the ventilating air 52. This lowers the pressure in the chamber, drawing in outside air 58 around the middle portion 28 of the frame front 20 of the glasses 10. The exchange of the chamber air 56 for the outside air 58 provides sufficient air circulation to resist fogging of the inside of the lens 35.

It is understood that the glasses described herein and shown in the drawings represents only a presently preferred embodiment of the invention. Indeed, various modifications and additions may be made to the embodiment without departing from the spirit and scope of the invention. These modifications and additions may be obvious to those skilled in the art and may be implemented to adapt the present invention for use in a variety of different applications.

What is claimed is:

1. Protective eyeglasses resistant to fogging while being worn by a wearer, said eyeglasses comprising:
 - a frame front which spans across the wearer's face;
 - at least one lens attached to the frame front and positioned over the wearer's eyes, said lens defining front and back surfaces; and
 - at least one aperture disposed within the frame front, said aperture being forwardly directed and defining a ven-

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tilation channel for facilitating air flow through the frame front adjacent the lens;

wherein the ventilation channel defined by the aperture is sized and configured to facilitate the circulation of air over the back surface of the lens to resist the fogging thereof.

2. The protective eyeglasses of claim 1 wherein said at least one lens comprises a pair of lenses attached to the frame front in spaced relation to each other.

3. The protective eyeglasses of claim 1 wherein said at least one aperture comprises a pair of apertures disposed within the frame front and defining respective ones of a pair of ventilation channels.

4. The protective eyeglasses of claim 3 wherein the ventilation channels defined by the apertures each include a forward end, an aft end, and a central portion between the forward and aft ends, with the forward end being partially defined by a pair of ramps formed within the frame front to promote laminar air flow therethrough.

5. The protective eyeglasses of claim 4 wherein the forward end of each of the ventilation channels is partially defined by rounded corners formed within the frame front to promote laminar air flow therethrough.

6. The protective eyeglasses of claim 4 wherein the central portion of each of the ventilation channels is narrower than the forward and aft ends thereof.

7. The protective eyeglasses of claim 3 wherein the apertures each comprise an elongate, vertically oriented slot formed within the frame front.

8. The protective eyeglasses of claim 3 wherein the apertures each define a central axis which is substantially parallel to the forward line of site of the wearer.

9. The protective eyeglasses of claim 3 wherein the apertures are positioned within the frame front outwardly beyond the wearer's eyes to prevent debris passing there-through from entering the wearer's eyes.

* * * * *



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United States Patent [19][11] **Patent Number:** 5,898,468**Mage**[45] **Date of Patent:** *Apr. 27, 1999[54] **FOG-RESISTANT SUNGLASSES
INCORPORATING VENTILATION
CHANNELS**

(List continued on next page.)

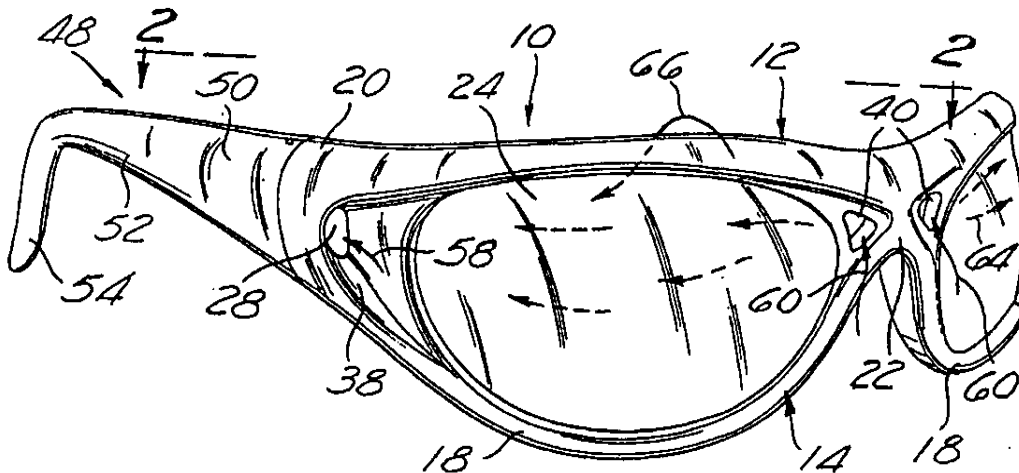
OTHER PUBLICATIONS[75] **Inventor:** Jerome Jacques Marie Mage,
Carlsbad, Calif.[73] **Assignee:** Spy Optic, Inc.[*] **Notice:** This patent is subject to a terminal disclaimer.[21] **Appl. No.:** 08/812,752[22] **Filed:** Mar. 6, 1997**Related U.S. Application Data**[63] **Continuation-in-part of application No. 08/565,623, Nov. 28, 1995, Pat. No. 5,610,668.**[51] **Int. Cl.⁶** G02B 11/08[52] **U.S. Cl.** 351/62; 351/41[58] **Field of Search** 351/62, 41, 158,
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Primary Examiner—Hung Xuan Dang*Attorney, Agent, or Firm*—Stetina Brunda Garred & Brucker[57] **ABSTRACT**

Protective eyeglasses resistant to fogging while being worn by a wearer. The eyeglasses comprise a frame front which spans across the wearer's face and includes a forward side, an aft side, at least one middle portion extending over the wearer's eyes, and a pair of end piece portions near the wearer's temples. Attached to the middle portion of the frame front is at least one lens which is positioned over the wearer's eyes and defines front and back surfaces. Additionally, disposed within the frame front is at least one forwardly directed aperture which defines a ventilation channel for facilitating airflow through the frame front adjacent the lens. The ventilation channel defined by the aperture is sized and configured to facilitate the circulation of air over the back surface of the lens to resist the fogging thereof.

33 Claims, 2 Drawing Sheets

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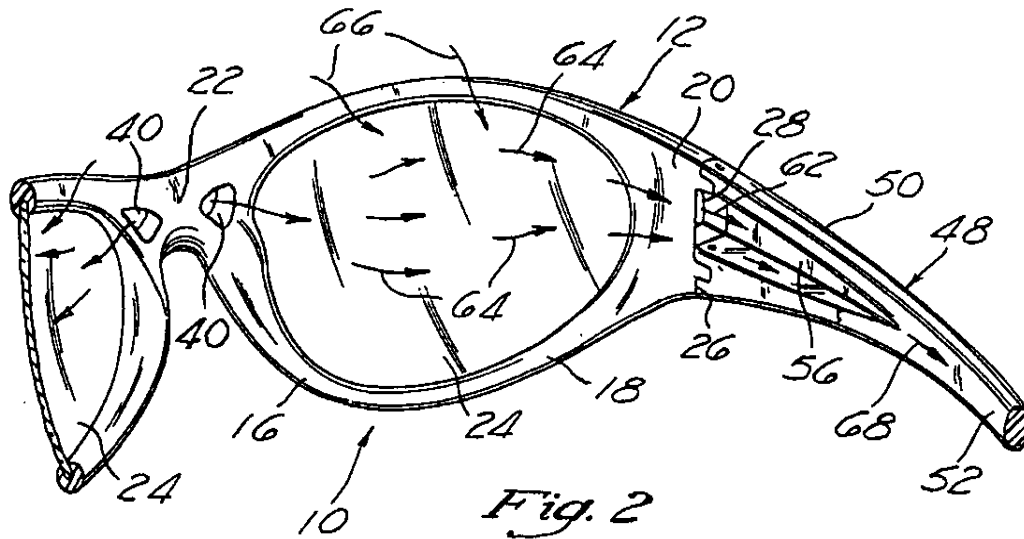
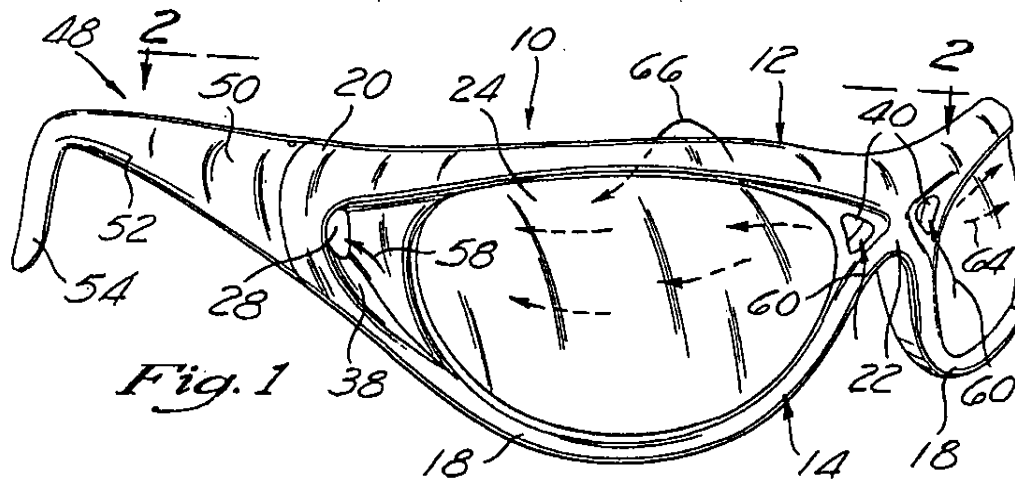
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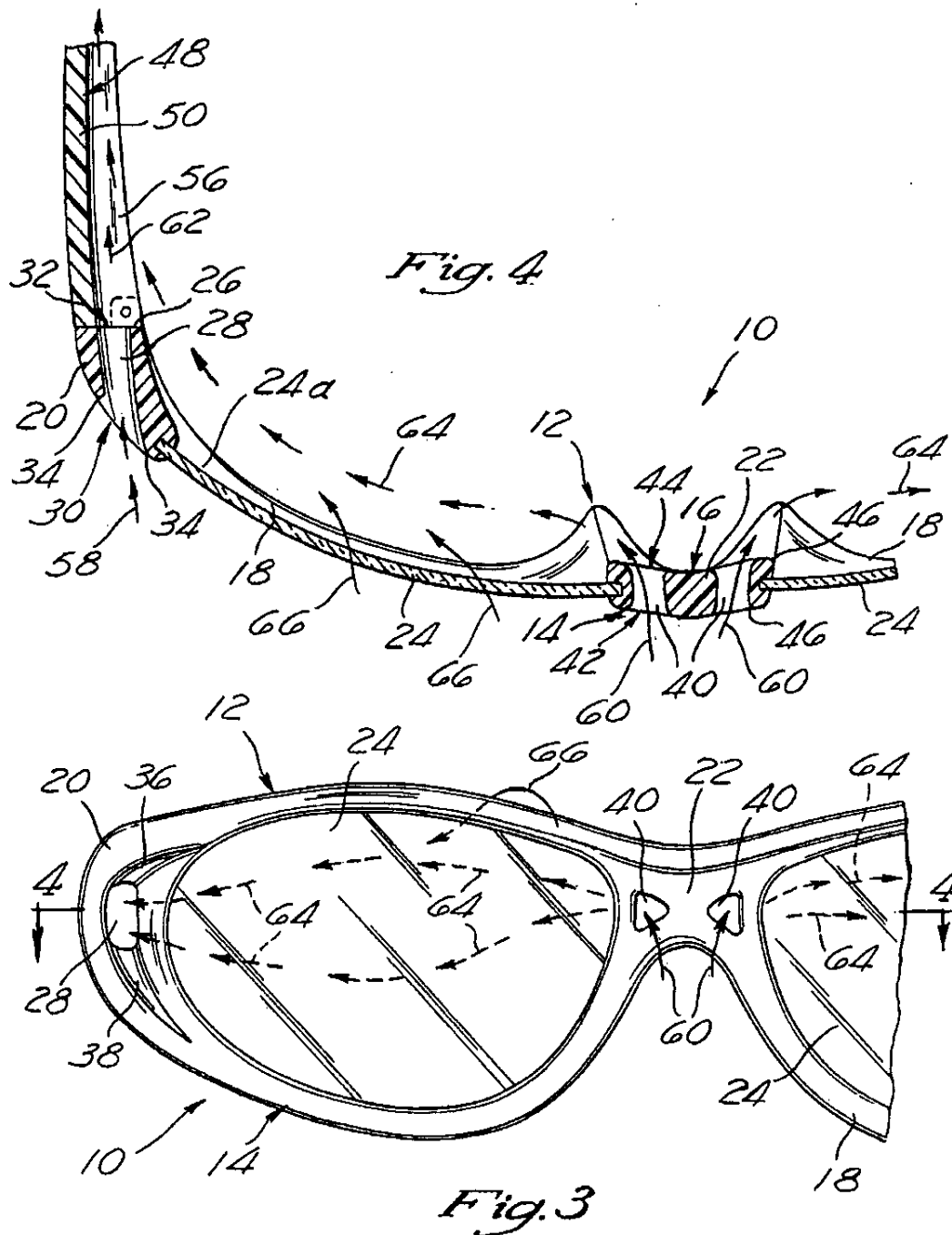


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FOG-RESISTANT SUNGLASSES INCORPORATING VENTILATION CHANNELS

The present application is a continuation-in-part of U.S. application Ser. No. 08/565,623 now U.S. Pat. No. 5,610,668 entitled FOG-RESISTANT SUNGLASSES INCORPORATING VENTILATION CHANNELS filed Nov. 28, 1995.

FIELD OF THE INVENTION

The present invention relates generally to protective eyeglasses, and more particularly to sunglasses which incorporate a ventilation channel to promote air circulation behind the lenses thereof so as to minimize or prevent the fogging of the lenses.

BACKGROUND OF THE INVENTION

Protective eyewear or eyeglasses (e.g., sunglasses) having tinted lenses are commonly used in connection with various sports and other activities to protect the participant's eyes. Eye protection is especially needed when the sport or other activity involves unshielded high-speed travel wherein the eyes are susceptible to being impacted by small particles of foreign matter at velocities which equal the rate of travel. Examples of such sporting activities wherein eye protection is recommended include downhill skiing, snowmobiling, cycling, jet skiing and motorcycle racing to keep snow, water, dust, insects, small rocks, etc., out of the participant's eyes.

When protective eyeglasses are used in relation to the above-identified activities, a well-known problem that is often encountered is the fogging or misting, i.e., the build-up of condensation, on the inside surfaces of the lenses. The fogging problem is particularly severe when the wearer is warm and/or perspiring, with the outdoor environment being cool and/or damp. As will be recognized, the fogging of the lenses of the eyeglasses interferes with the wearers vision, and thus presents a potentially hazardous condition.

The problem of lens fogging has been recognized in the prior art wherein several solutions have been proposed to prevent such fogging from occurring. More particularly, in the prior art there are thermal lenses which each consist of a single lens of increased thickness. The increased thickness of the thermal lenses is operative to isolate the outside surfaces of the lenses exposed to the cooler air from the warmer air. Also known in the prior art are double glass lenses, each of which consists of a pair of lens halves separated by an intermediate air-filled space or void. The double glass lenses are also operative to facilitate the isolation of the outermost and innermost surfaces of the lenses from each other. However, the prior art thermal and double glass lenses significantly add to the bulk and weight of the eyeglasses in which they are used, and thus are uncomfortable to wear and not desirable for use in relation to sports activities.

There is also known in the prior art various coatings which are applied to the inside surfaces of the lenses for purposes of immediately condensing or absorbing any mist or fog which accumulates on the inside surfaces. However, such coatings are only effective for an extremely limited duration of time, with the inside surfaces of the glasses periodically needing to be dried in some manner.

It has been recognized in the prior art that the most effective manner of preventing the fogging or misting of the lenses of eyeglasses is to improve air circulation behind the

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lenses thereof, i.e., exhausting the warm humid air and replacing it with cool drier air. To facilitate such air exchange, there has been developed in the prior art eyeglasses incorporating miniature fans powered by portable batteries carried by the user. However, the eyewear incorporating these miniature fans is extremely complex and costly to manufacture, and is also bulky and of high weight. There has also been developed in the prior art eyeglasses which include ventilation ports disposed within various locations about the periphery of the frame so as to surround the lenses thereof. However, in these prior art eyeglasses, because of the manner in which the ventilation ports are configured and/or oriented, they typically provide either too little or too great a rate of air flow therethrough. Insufficient air flow through the ventilation ports makes the inclusion of the ventilation ports in the frame largely ineffective for purposes of preventing the fogging of the lenses. At the other extreme, too great a rate of air flow through the ventilation ports results in a pressure build-up or in uncomfortably high "winds" across the wearer's eyes. Moreover, the ventilation ports included in the prior art eyeglasses are often sized and configured in a manner wherein foreign matter, e.g., dust, can pass therethrough into the wearer's eyes.

In view of the foregoing, there exists a need for eyeglasses which can safely and adequately protect a wearer's eyes and are resistant to fogging. Such eyeglasses should be simple in construction and thus inexpensive to manufacture, and should further be lightweight so as not to unduly interfere with the wearer's participation in a certain sports activity.

SUMMARY OF THE INVENTION

In accordance with the present invention, there is provided protective eyeglasses which are adapted to be resistant to fogging while being worn by a wearer. The eyeglasses comprise a frame front which spans across the wearer's face and includes forward and aft sides. The frame front further includes a pair of middle portions which extend over the wearer's eyes, and a pair of end piece portions adjacent the wearer's temples. Attached to respective ones of the middle portions of the frame front is a pair of lenses which are positioned over the wearer's eyes and define front and back surfaces. Additionally, disposed within respective ones of the end piece portions of the frame front is a pair of end piece apertures which are forwardly directed and define ventilation channels for facilitating airflow through the frame front adjacent the lenses. The ventilation channels defined by the end piece apertures are sized and configured to facilitate the circulation of air over the back surfaces of the lenses to resist the fogging thereof.

In the preferred embodiment, the middle portions of the frame front are integrally connected to each other by a bridge portion which includes a pair of bridge apertures disposed therein. The bridge apertures of the eyeglasses define additional ventilation channels within the frame front. Each of the ventilation channels defined by the end piece apertures and the bridge apertures includes a forward end at the forward side of the frame front, an aft end at the aft side of the frame front, and a central portion between the forward and aft ends. The forward end of each ventilation channel is partially defined by rounded corners formed within the frame front to promote laminar airflow therethrough. Additionally, the forward ends of those ventilation channels defined by the end piece apertures are further partially defined by a pair of ramps formed within the frame front to further promote laminar airflow therethrough.

In the present eyeglasses, the end piece apertures each comprise an elongate, vertically oriented slot which is

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formed within a respective one of the end piece portions of the frame front. Additionally, each of the end piece apertures defines a central axis which is substantially parallel to the forward line of sight of the wearer, with the end piece apertures further being positioned outwardly beyond the wearer's eyes to prevent debris passing therethrough from entering the wearer's eyes.

The eyeglasses constructed in accordance with the present invention further comprise a pair of elongate temple members which are pivotally connected to the frame front. The temple members each preferably comprise a butt portion which is pivotally connected to a respective one of the end piece portions of the frame front, with the butt portion itself defining inner and outer surfaces. The butt portion transitions into a shank portions of decreased width, with the shank portion in turn transitioning into a downwardly bent ear piece portion of decreased width. Each ear piece portion is sized and configured to rest upon one of the wearer's ears to maintain the eyeglasses in position upon the wearer's face. The maximum widths of the butt portions of the temple members are substantially equal to the widths of the outboard edges of the end piece portions to which the butt portions are pivotally connected. Additionally, the forward side of the frame front and the outer surfaces of the butt portions of the temple members are substantially flush with each other, as are the inner surfaces of the butt portions and the aft side of the frame front.

In the preferred embodiment, each of the temple members further comprises an elongate ventilation slot which is disposed within the inner surface of the butt portion and communicates with the ventilation channel defined by a respective one of the end piece apertures disposed within the frame front. Each ventilation slot is sized and configured to promote the laminar flow of air passing through the corresponding ventilation channel along the temple member. In this respect, each ventilation slot is of gradually decreasing width and depth as it extends toward the shank portion of the temple member.

In the preferred embodiment, the middle portions of the frame front are themselves arcuately contoured to facilitate airflow about the frame front. Additionally, both the frame front and the lenses preferably have generally concave configurations to facilitate the wrapping of the eyeglasses around the wearer's eyes and to promote laminar airflow around the wearer's face. The height of the end piece portions of the frame front is preferably at least half of the maximum height of the lenses, with the lenses themselves being darkly tinted and fabricated to be of sufficient thickness to prevent the inadvertent fracturing thereof when impacted by debris. The lenses may alternatively be transparent, or fabricated from a material which progressively darkens when exposed to ultraviolet radiation.

BRIEF DESCRIPTION OF THE DRAWINGS

These, as well as other features of the present invention, will become more apparent upon reference to the drawings wherein:

FIG. 1 is a partial front perspective view of the eyeglasses of the present invention, illustrating the manner in which air is circulated therethrough;

FIG. 2 is a partial rear perspective view of the eyeglasses of the present invention taken along line 2-2 of FIG. 1, illustrating the manner in which air is circulated therethrough;

FIG. 3 is a partial front elevational view of the eyeglasses of the present invention, illustrating the manner in which air is circulated therethrough; and

FIG. 4 is partial cross-sectional view taken along line 4-4 of FIG. 3, further illustrating the manner in which air is circulated through the eyeglasses of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawings wherein the showings are for purposes of illustrating a preferred embodiment of the present invention only, and not for purposes of limiting the same, FIGS. 1 and 2 perspective illustrate the protective eyeglasses 10 constructed in accordance with the present invention. As will be discussed in more detail below, the eyeglasses 10 of the present invention are specifically adapted to be resistant to fogging. Additionally, as shown in accompanying FIGS. 1-4, the eyeglasses 10 are preferably in the form of sunglasses. However, those of ordinary skill in the art will recognize that the present invention is also applicable to other types of eyeglasses or eyewear, including eyeglasses incorporating a single, unitary lens, as well as goggles.

Referring now to FIGS. 1-4, the eyeglasses 10 of the present invention comprise a frame front 12 which, when the eyeglasses 10 are worn by a wearer, are sized and configured to span across the wearer's face. The frame front 12 includes a front or forward side 14, a back or aft side 16, a pair of middle portions 18, and a pair of end piece portions 20. The middle portions 18 are integrally connected to each other by a bridge portion 22 of the frame front 12, with each of the middle portions 18 accommodating a lens 24 of the eyeglasses 10. As will be recognized, when the eyeglasses 10 are worn by the wearer, the middle portions 18 extend over the wearer's eyes, with the lenses 24 disposed therewithin, thus being positioned over the wearer's eyes. Additionally, the end piece portions 20 are positioned adjacent the wearer's temples, with each of the end piece portions 20 defining an outboard edge 26, the use of which will be described in more detail below.

In the preferred embodiment, the frame front 12 of the eyeglasses 10 further includes a pair of end piece apertures 28 which are disposed within respective ones of the end piece portions 20 thereof. The end piece apertures 28 each define a forward end 30 at the forward side 14 of the frame front 12, an aft end 32 at the aft side 16 of the frame front 12, and a central portion disposed between the forward and aft ends 30, 32.

As seen in FIGS. 1-4, each of the end piece apertures 28 comprises an elongate, vertically oriented slot defining a central axis which extends in substantially parallel relation to the forward line of sight of the wearer of the eyeglasses 10. As best seen in FIG. 4, the forward end 30 of each end piece aperture 28, and in particular the longitudinal edges thereof, is defined by rounded corner regions 34 formed within the frame front 12. Additionally, as seen in FIGS. 1 and 3, the lateral sides of each end piece aperture 28 are defined by a sloped upper surface or upper ramp 36 and a sloped lower surface or lower ramp 38. In this respect, the inclusion of the upper and lower ramps 36, 38 in the frame front 12 facilitates the gradual reduction in the cross-sectional area of each end piece aperture 28 as it extends toward its aft end 32 at the aft side of the frame front 12. Moreover, the inclusion of the rounded corner regions 34 and upper and lower ramps 36, 38 with each end piece aperture 28 promotes the laminar flow of air therethrough for reasons which will be discussed in more detail below.

In addition to the end piece apertures 28, disposed within the bridge portion 22 of the frame front 12 is a spaced pair

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of bridge apertures 40, each of which has a generally triangular configuration and defines a central axis which extends in substantially parallel relation to the forward line of sight of the wearer of the eyeglasses 10. Like the end piece apertures 28, each of the bridge apertures 40 defines a forward end 42, an aft end 44, and a central portion which is disposed between the forward and aft ends 42, 44. In the preferred embodiment, the forward and aft ends 42, 44 of each bridge aperture 40 are defined by rounded corner regions 46 of the frame front 12 which promote the laminar flow of air through the bridge apertures 40.

In the eyeglasses 10 of the present invention, the forwardly directed end piece apertures 28 and bridge apertures 40 define ventilation channels for facilitating airflow through the frame front 12 adjacent the lenses 24 thereof. As will also be discussed in more detail below, the ventilation channels defined by the end piece and bridge apertures 28, 40 are sized and configured to facilitate the circulation of air over the back surfaces 24a of the lenses 24 to resist the fogging thereof.

Referring now to FIGS. 1, 2 and 4, the eyeglasses 10 of the present invention further comprise an identically configured pair of elongate temple members 48 which are pivotally connected to the frame front 12, and more particularly to respective ones of the outboard edges 26 of the end piece portions 20. Each of the temple members 48 comprises a butt portion 50 which is pivotally connected to the outboard edge 26 of a respective end piece portion 20. In the preferred embodiment, the maximum width of the butt portion 50 is substantially equal to the width of the outboard edge 26 to which it is pivotally connected. Additionally, as best seen in FIGS. 2 and 4, when the butt portion 50 is pivotally connected to the outboard edge 26 of the end piece portion 20, the outer surface of the butt portion 50 is substantially flush with the forward side 14 of the frame front 12, with the inner surface of the butt portion 50 being substantially flush with the aft side 16 of the frame front 12. The butt portion 50 of each temple member 48 transitions into a reduced width shank portion 52 thereof. The shank portion 52 of each temple member 48 itself transitions into a reduced width earpiece portion 54 which has a downwardly bent configuration and is sized and configured to rest upon one of the wearer's ears to maintain the eyeglasses 10 in position upon the wearer's face.

As best seen in FIGS. 2 and 4, disposed within the inner surface of the butt portion 50 of each temple member 48 is an elongate ventilation slot 56 which, when the temple member 48 is pivotally connected to the outboard edge 26, communicates with the ventilation channel defined by a respective one of the end piece apertures 28 formed within the frame front 12. Each ventilation slot 56 has a generally triangular configuration, and is of gradually decreasing width and depth as it extends toward the shank portion 52 of the temple member 48. As will also be discussed in more detail below, the ventilation slots 56 are sized and configured to cooperate with the end piece apertures 28 in a manner promoting the laminar flow of air passing through the ventilation channels along the temple members 48.

As best seen in FIG. 4, in the preferred embodiment both the frame front 12 and the lenses 24 disposed therein have arcuate, generally concave configurations to create the effect of the eyeglasses 10 "wrapping" around the wearer's eyes and head when worn by the wearer. In addition to creating the wrapping effect, the arcuate contours of the frame front 12 and lenses 24 promotes the laminar flow of air around the wearer's face, as well as airflow about the middle portions 18 of the frame front 12 into the spaces or voids defined

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between the back surfaces 24a of the lenses 24 and the wearer's eyes. To further streamline the eyeglasses 10, the end piece portions 28 of the frame front 12 are preferably sized having a height which is at least half of the maximum height of the lenses 24.

As will be recognized, when the eyeglasses 10 are worn by the wearer, the bridge portion 22 of the frame front 12 is rested upon the bridge of the wearer's nose, with the lower edges of the middle portions 18 typically resting against the portions of the wearer's cheeks adjacent the eyes. Additionally, the downwardly bent eye piece portions 54 of the temple members 48 are rested upon respective ones of the wearer's ears. As previously indicated, when the eyeglasses 10 are worn in the proper manner, air filled spaces or voids are defined between the back surfaces 24a of the lenses 24 and the wearer's eyes.

In the preferred embodiment, the frame front 12 and temple members 48 are fabricated from a light weight, shatter-proof plastic material. The lenses 24 are themselves preferably darkly tinted, or fabricated from a material having a tint which adjusts in accordance with different brightness levels. Those of ordinary skill in the art will recognize that the lenses 24 may be fabricated from a variety of different materials, and may also be transparent rather than tinted. However, it is contemplated that the lenses 24 will be fabricated having a sufficient thickness to prevent the inadvertent fracturing thereof when impacted by debris. In this respect, the frame front 12 is sized such that the end piece apertures 28 disposed within the end piece portions 20 are oriented outwardly relative to the wearer's eyes so that any debris passing through the ventilation channels defined by the end piece apertures 28 will not directly enter the wearer's eyes.

Having thus described the components comprising the eyeglasses 10, the manner in which the eyeglasses 10 are resistant to fogging will now be described with reference to the arrows shown in FIGS. 1-4. As previously indicated, when the eyeglasses 10 are worn in the proper manner, spaces or voids are defined between the back surfaces 24a of the lenses 24 and the wearer's eyes. These spaces are partially enclosed by the contact of the lower edges of the middle portions 18 against the wearer's cheeks and the bridge portion 22 against the bridge of the wearer's nose. During the wearer's participation in a sports activity, the wearer's body, through physical exertion, is generating heat, with the wearer's breathing dispelling warm, humid air in the vicinity of the eyeglasses 10. As will be recognized, the increase in the wearer's body temperature and resultant perspiration tends to cause the air within the spaces between the wearer's eyes and the back surfaces 24a of the lenses 24 to increase both in temperature and moisture content. Such increase in temperature and moisture content of the air behind the lenses 24, when coupled with the presence of cool, drier air at the front surfaces of the lenses 24, results in the formation of condensation on the back surfaces 24a of the lenses 24, i.e., the "fogging" of the lenses 24.

When the wearer of the eyeglasses 10 is traveling forward through relatively cool, dry air at a relatively high rate of speed, the cool outside air flows through the ventilation channels defined by the end piece apertures 28 and bridge apertures 40. More particularly, as seen in FIGS. 1 and 4, air enters the end piece apertures 28 in the direction designated by the arrows 58, and enters the bridge apertures in the direction designated by the arrows 60. Air passing through the end piece apertures 28 flows into and through respective ones of the ventilation slots 56 in the direction designated by the arrows 62. The air within the spaces between the back

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surfaces 24a of the lenses 24 and the wearer's eyes tends to be drawn into the flow of air identified by the arrows 62, which in turn causes the air entering such spaces via the bridge apertures 40 to be drawn across the back surfaces 24a of respective ones of the lenses 24 in the direction designated by the arrows 64. Additionally, due to the streamlined configuration of the frame front 12, air is also drawn over the top edges of the middle portions 18 across the back surfaces 24a of the lenses 24 in the direction designated by the arrows 66. Due to the configuration of the ventilation slots 56, the air flowing outwardly within the spaces along the back surfaces 24a combines with the air flowing through the end piece apertures 28 into the ventilation slots 56, with such combined air ultimately flowing along respective ones of the temple members 48 in the direction designated by the arrow 68 shown in FIG. 2.

As will be recognized, the drawing of the air within the spaces between the lenses 24 and the wearer's eyes into the flow through the end piece apertures 28 and ventilation slots 56 effectively reduces the pressure in such spaces, thus facilitating the circulation of the air entering the spaces via the bridge apertures 40 and over the top edges of the middle portions 18 across the back surfaces 24a of the lenses 24 in the aforementioned manner. The exchange of the cool, drier air for the warm moist air in the spaces and circulation of the cool, drier air across the back surfaces 24a of the lenses 24 prevents the formation of condensation (i.e., the "fogging") of the lenses 24. As such, the reduction or elimination of fogging of the lenses 24 is provided, though the eyeglasses 10 are lightweight in construction and of relatively low cost to manufacture.

Though not shown, it is contemplated that the central portions of the end piece apertures 28 and/or bridge apertures 40 may be formed so as to be narrower than the forward and aft ends thereof. In this respect, the end piece apertures 28 and/or bridge apertures 40 may each have a generally "hourglass" shape. This particular configuration of each of the end piece apertures 28 and/or bridge apertures 40 aids in creating a "venturi" effect in the flow of air therethrough. The term "venturi" is generally defined as a tube having a narrow region in the middle with flared or widened ends. The venturi effect is the result of Bernoulli's Principle which establishes that the flow rate of a fluid will increase and pressure will decrease in the narrowed region of the venturi. This "venturi" effect occurring within the ventilation channels defined by the end piece apertures 28 and/or bridge apertures 40 could be used to facilitate even increased circulation of air behind the lenses 24.

Additional modifications and improvements of the present invention may also be apparent to those skilled in the art. Thus, the particular combination of parts described and illustrated herein is intended to represent only one embodiment of the present invention, and is not intended to serve as limitations of alternative devices within the spirit and scope of the invention.

What is claimed is:

1. Protective eyeglasses resistant to fogging while being worn by a wearer, said eyeglasses comprising:
a frame front which spans across the wearer's face, said frame front including a forward side, an aft side, at least one middle portion extending over the wearer's eyes, and a pair of end piece portions near the wearer's temples;
at least one lens attached to the middle portion of the frame front and positioned over the wearer's eyes, said lens defining front and back surfaces; and
at least one forwardly directed aperture disposed within the frame front and defining a central axis which

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extends in substantially parallel relation to the wearer's forward line of sight, said aperture forming a ventilation channel for facilitating air flow through the frame front adjacent the lens;

wherein the size and configuration of the ventilation channel and extension thereof along the central axis facilitates the circulation of air over the back surface of the lens to resist the fogging thereof.

2. The protective eyeglasses of claim 1 wherein said frame front includes a pair of middle portions connected by a bridge portion and said eyeglasses comprise a pair of lenses attached to respective ones of the middle portions.

3. The protective eyeglasses of claim 2 wherein said at least one aperture comprises a pair of end piece apertures disposed within respective ones of the end piece portions of the frame front for facilitating the circulation of air over the back surfaces of the lenses.

4. The eyeglasses of claim 3 wherein the ventilation channel defined by each of the end piece apertures defines a forward end at the forward side of the frame front, an aft end at the aft side of the frame front, and a central portion between the forward and aft ends, the forward end of each ventilation channel defined by the end piece apertures being front to promote laminar air flow therethrough.

5. The eyeglasses of claim 4 wherein the forward end of each ventilation channel defined by the end piece apertures is partially defined by rounded corners formed within the frame front to promote laminar air flow therethrough.

6. The protective eyeglasses of claim 3 wherein said at least one aperture further comprises at least one bridge aperture disposed within the bridge portion of the frame front.

7. The protective eyeglasses of claim 6 wherein said at least one bridge aperture comprises a pair of bridge apertures disposed within the bridge portion of the frame front.

8. The eyeglasses of claim 7 wherein each of the ventilation channels defined by the bridge apertures defines a forward end at the forward side of the frame front, and an aft end at the aft side of the frame front, and a central portion between the forward and aft ends, the forward end of each ventilation channel defined by the bridge apertures being front to promote laminar air flow therethrough.

9. The eyeglasses of claim 3 wherein the end piece apertures each comprise an elongate, vertically oriented slot formed within a respective one of the end piece portions of the frame front.

10. The eyeglasses of claim 3 wherein the end piece apertures are positioned outwardly beyond the wearer's eyes to prevent debris passing therethrough from entering the wearer's eyes.

11. The eyeglasses of claim 3 further comprising a pair of elongate temple members pivotally connected to said frame front, each of said temple members comprising:
a butt portion pivotally connected to a respective one of the end piece portions of the frame front, said butt portion defining inner and outer surface;

a shank portion; and
an ear piece portion sized and configured to rest upon one of the wearer's ears to maintain the eyeglasses in position upon the wearer's face.

12. The eyeglasses of claim 11 wherein the end piece portions of the frame front each define an outboard edge, with the widths of the butt portions of the temple members and the widths of the outboard edges of the end piece portions being substantially equal.

13. The eyeglasses of claim 12 wherein the widths of the butt portions of the temple member exceed the widths of the shank portions thereof.

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14. The eyeglasses of claim 13 wherein the widths of the shank portions of the temple members exceed the widths of the ear piece portions thereof.

15. The eyeglasses of claim 11 wherein the forward side of the frame front and the outer surfaces of the butt portions of the temple members are substantially flush with each other.

16. The eyeglasses of claim 11 wherein the aft side of the frame front and the inner surfaces of the butt portions of the temple members are substantially flush with each other.

17. The eyeglasses of claim 11 wherein the ear piece portion of each of the temple member has a downwardly bent configuration.

18. The eyeglasses of claim 11 wherein each of the temple members further comprises:

an elongate ventilation slot disposed within the inner surface of the butt portion and communicating with the ventilation channel defined by a respective one of the end piece apertures disposed within the frame front;

said ventilation slot being sized and configured to promote the laminar flow of air passing through the ventilation channel along the temple member.

19. The eyeglasses of claim 18 wherein said ventilation slot is of gradually decreasing width and depth as it extends toward the shank portion of the temple member.

20. The eyeglasses of claim 3 wherein the middle portions of the frame front are arcuately contoured to facilitate airflow about the frame front.

21. The eyeglasses of claim 3 wherein the height of the end piece portions of the frame front is at least half of the maximum height of the lenses.

22. The eyeglasses of claim 3 wherein the frame front and the lenses are generally concave to facilitate the wrapping of the eyeglasses around the wearer's eyes and promote laminar airflow around the wearer's face.

23. The eyeglasses of claim 3 wherein the lenses are darkly tinted.

24. The eyeglasses of claim 3 wherein the lenses are fabricated to be of sufficient thickness to prevent the inadvertent fracturing thereof when impacted by debris.

25. Protective eyeglasses resistant to fogging while being worn by a wearer, said eyeglasses comprising:

a frame front which spans across the wearer's face, said frame front including a forward side, an aft side, at least one middle portion extending over the wearer's eyes, and a pair of end piece portions near the wearer's temples;

at least one lens attached to the middle portion of the frame front and positioned over the wearer's eyes, said lens defining front and back surfaces; and

a pair of forwardly directed end piece apertures disposed within respective ones of the end piece portions of the frame front, said end piece apertures each defining a central axis which extends in generally parallel relation to the wearer's forward line of sight, and forming ventilation channels for facilitating airflow through the frame front adjacent the lens;

wherein the size and configuration of the ventilation channels and extension thereof along respective ones of the central axes facilitates the circulation of air over the back surface of the lens to resist the fogging thereof.

26. The protective eyeglasses of claim 25 wherein said frame front includes a pair of middle portions connected by a bridge portion and said eyeglasses comprise a pair of lenses attached to respective ones of the middle portions.

27. The protective eyeglasses of claim 26 further comprising a pair of bridge apertures disposed within the bridge portion of the frame front.

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28. The eyeglasses of claim 27 wherein the ventilation channels defined by the end piece apertures and the bridge apertures each define a forward end at the forward side of the frame front, an aft end at the aft side of the frame front, and a central portion between the forward and aft ends, the forward end of each ventilation channel being partially defined by rounded corners formed within the frame front to promote laminar airflow therethrough.

29. The eyeglasses of claim 27 wherein each of the ventilation channels defined by the end piece apertures each define a forward end at the forward side of the frame front, an aft end at the aft side of the frame front, and a central portion between the forward and aft ends, the forward end of each ventilation channel being partially defined by a pair of ramps formed within the frame front to promote laminar airflow therethrough.

30. The eyeglasses of claim 25 further comprising a pair of elongate temple members pivotally connected to said frame front, each of said temple members comprising:

a butt portion pivotally connected to a respective one of the end piece portions of the frame front, said butt portions defining inner and outer surfaces;

a shank portion; and

a ear piece portion sized and configured to rest upon one of the wearer's ears to maintain the eyeglasses in position upon the wearer's face.

31. The eyeglasses of claim 30 wherein each of the temple members further comprises:

an elongate ventilation slot disposed within the inner surface of the butt portion and communicating with the ventilation channel defined by a respective one of the end piece apertures disposed within the frame front;

said ventilation slot being sized and configured to promote the laminar flow of air passing through the corresponding ventilation channel along the temple member.

32. The eyeglasses of claim 31 wherein said ventilation slot is of gradually decreasing width and depth as it extends toward the shank portion of the temple member.

33. Protective eyeglasses resistant to fogging while being worn by a wearer, said eyeglasses comprising:

a frame front which spans across the wearers face, said frame front including a forward side, an aft side, a pair of middle portions extending over the wearer's eyes, a bridge portion connecting the middle portions, and a pair of end piece portions near the wearer's temples;

a pair of lenses attached to respective ones of the middle portions of the frame front and positioned over the wearer's eyes, said lenses each defining front and back surfaces;

a pair of end piece apertures disposed within respective ones of the end piece portions of the frame front, said end piece apertures defining ventilation channels for facilitating air flow through the frame front adjacent the lenses; and

at least one bridge aperture disposed within the bridge portion of the frame front and defining a ventilation channel for facilitating air flow through the frame front adjacent the lenses;

wherein the ventilation channels defined by the end piece apertures and the bridge aperture are sized and configured to facilitate the circulation of air over the back surfaces of the lenses to resist the fogging thereof.

* * * * *



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United States Patent [19][11] **Patent Number:** **6,050,684****Mage**[45] **Date of Patent:** ***Apr. 18, 2000**[54] **FOG-RESISTANT SUNGLASSES
INCORPORATING VENTILATION
CHANNELS**[75] **Inventor:** **Jerome Jacques Marie Mage,**
Carlsbad, Calif.[73] **Assignee:** **Spy Optic, Inc.,** Carlsbad, Calif.[*] **Notice:** This patent is subject to a terminal disclaimer.[21] **Appl. No.:** **09/238,457**[22] **Filed:** **Jan. 28, 1999****Related U.S. Application Data**

[63] Continuation of application No. 08/812,752, Mar. 6, 1997, Pat. No. 5,898,468, which is a continuation-in-part of application No. 08/565,623, Nov. 28, 1995, Pat. No. 5,610,668.

[51] **Int. Cl.⁷** **G02C 11/08**[52] **U.S. Cl.** **351/62; 351/41**[58] **Field of Search** **351/62, 41, 158;**
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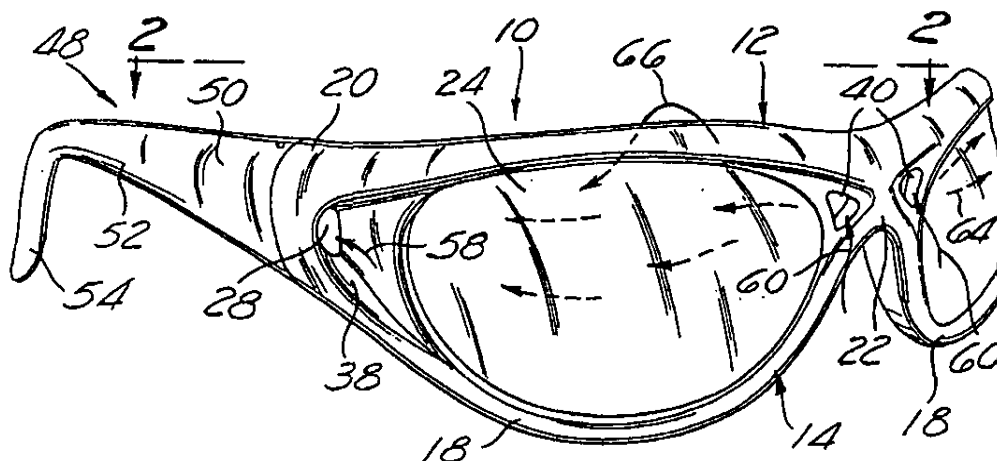
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[57] **ABSTRACT**

Protective eyeglasses resistant to fogging while being worn by a wearer. The eyeglasses comprise a frame front which spans across the wearer's face and includes a forward side, an aft side, at least one middle portion extending over the wearer's eyes, and a pair of end piece portions near the wearer's temples. Attached to the middle portion of the frame front is at least one lens which is positioned over the wearer's eyes and defines front and back surfaces. Additionally, disposed within the frame front is at least one forwardly directed aperture which defines a ventilation channel for facilitating airflow through the frame front adjacent the lens. The ventilation channel defined by the aperture is sized and configured to facilitate the circulation of air over the back surface of the lens to resist the fogging thereof.

33 Claims, 2 Drawing Sheets

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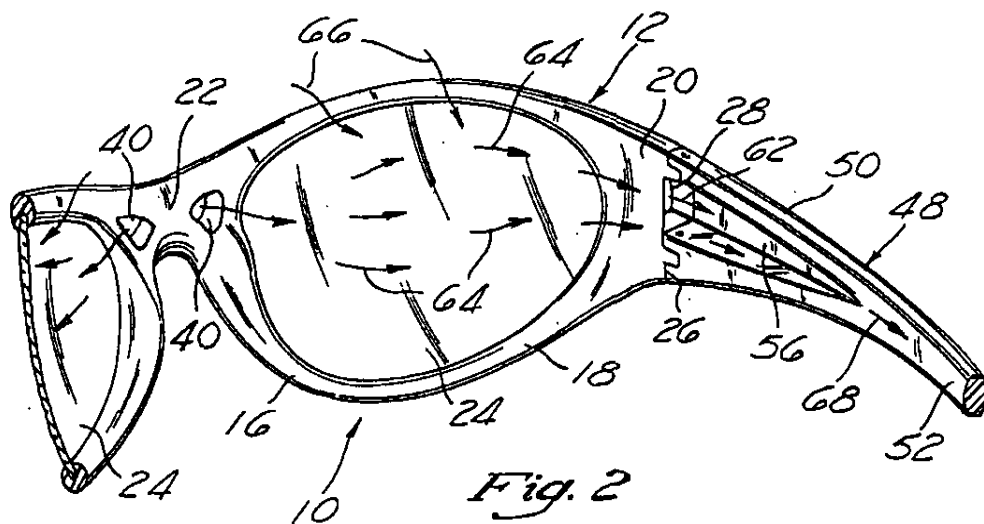
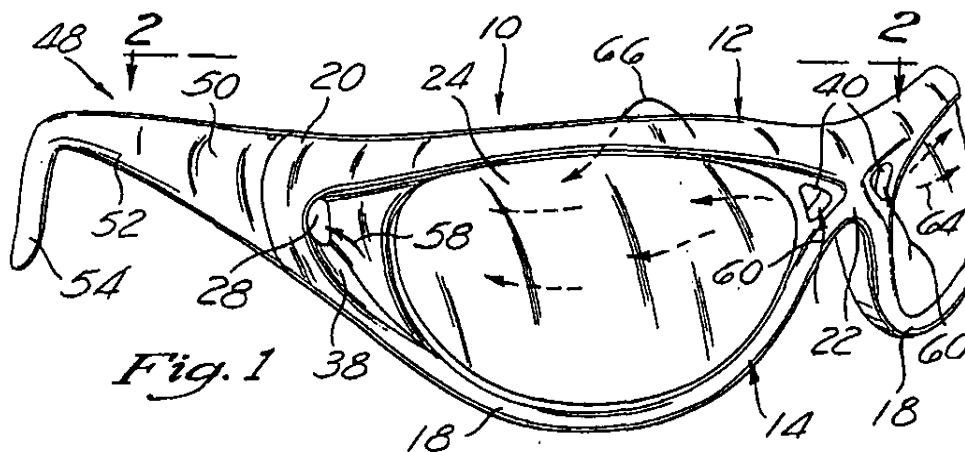
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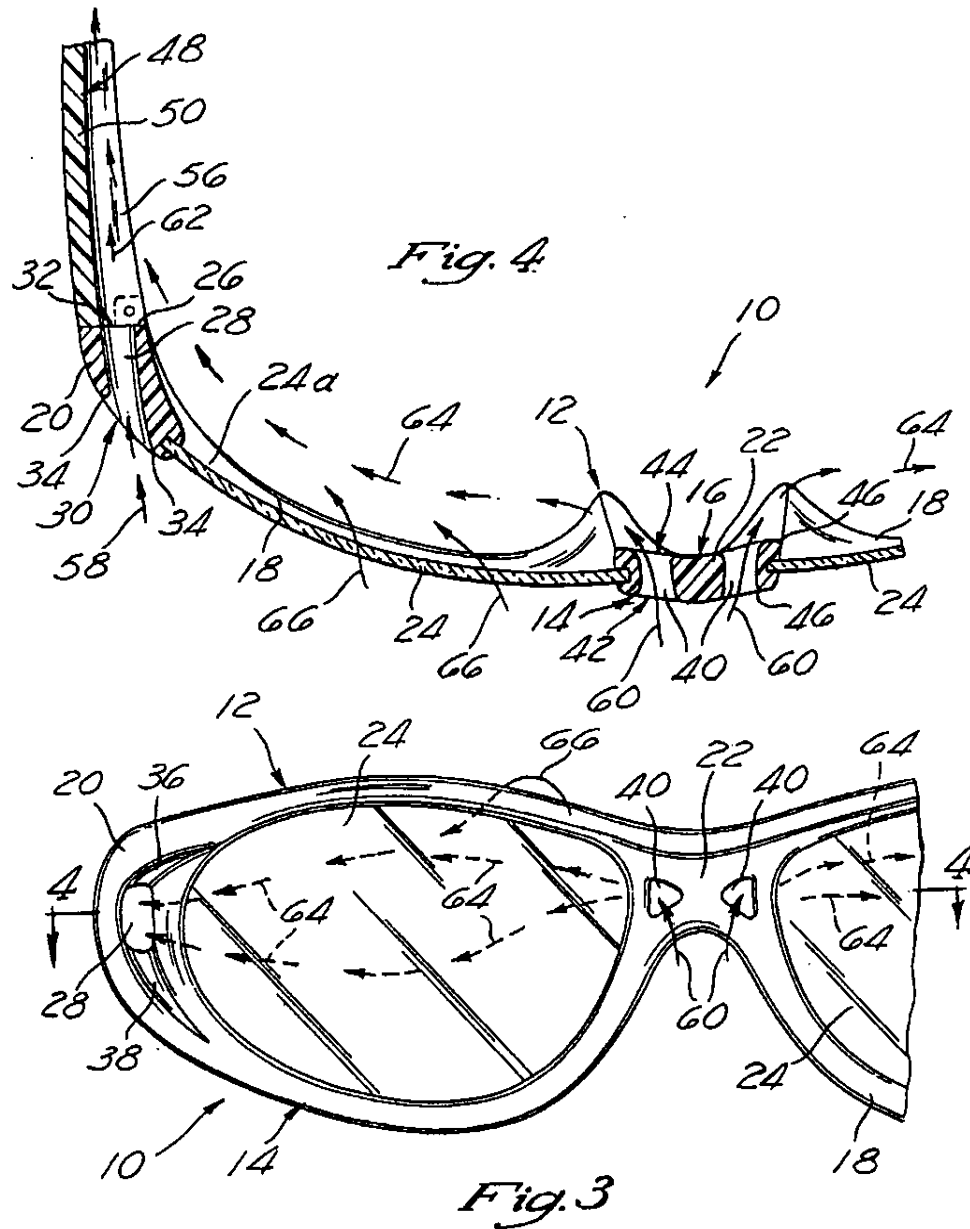


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FOG-RESISTANT SUNGLASSES INCORPORATING VENTILATION CHANNELS

The present application is a continuation of U.S. application Ser. No. 08/812,752 entitled FOG-RESISTANT SUNGLASSES INCORPORATING VENTILATION CHANNELS filed Mar. 6, 1997 now U.S. Pat. No. 5,898,468, which is a continuation-in-part of U.S. application Serial No. 08/565,623 entitled FOG-RESISTANT SUNGLASSES INCORPORATING VENTILATION CHANNELS filed November 28, 1995 now U.S. Pat. No. 5,610,668.

FIELD OF THE INVENTION

The present invention relates generally to protective eyeglasses, and more particularly to sunglasses which incorporate a ventilation channel to promote air circulation behind the lenses thereof so as to minimize or prevent the fogging of the lenses.

BACKGROUND OF THE INVENTION

Protective eyewear or eyeglasses (e.g., sunglasses) having tinted lenses are commonly used in connection with various sports and other activities to protect the participant's eyes. Eye protection is especially needed when the sport or other activity involves unshielded high-speed travel wherein the eyes are susceptible to being impacted by small particles of foreign matter at velocities which equal the rate of travel. Examples of such sporting activities wherein eye protection is recommended include downhill skiing, snowmobiling, cycling, jet skiing and motorcycle racing to keep snow, water, dust, insects, small rocks, etc., out of the participant's eyes.

When protective eyeglasses are used in relation to the above-identified activities, a well-known problem that is often encountered is the fogging or misting, i.e., the build-up of condensation, on the inside surfaces of the lenses. The fogging problem is particularly severe when the wearer is warm and/or perspiring, with the outdoor environment being cool and/or damp. As will be recognized, the fogging of the lenses of the eyeglasses interferes with the wearers vision, and thus presents a potentially hazardous condition.

The problem of lens fogging has been recognized in the prior art wherein several solutions have been proposed to prevent such fogging from occurring. More particularly, in the prior art there are thermal lenses which each consist of a single lens of increased thickness. The increased thickness of the thermal lenses is operative to isolate the outside surfaces of the lenses exposed to the cooler air from the inside surfaces of the lenses which are exposed to the warmer air. Also known in the prior art are double glass lenses, each of which consists of a pair of lens halves separated by an intermediate air-filled space or void. The double glass lenses are also operative to facilitate the isolation of the outermost and innermost surfaces of the lenses from each other. However, the prior art thermal and double glass lenses significantly add to the bulk and weight of the eyeglasses in which they are used, and thus are uncomfortable to wear and not desirable for use in relation to sports activities.

There is also known in the prior art various coatings which are applied to the inside surfaces of the lenses for purposes of immediately condensing or absorbing any mist or fog which accumulates on the inside surfaces. However, such coatings are only effective for an extremely limited

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duration of time, with the inside surfaces of the glasses periodically needing to be dried in some manner.

It has been recognized in the prior art that the most effective manner of preventing the fogging or misting of the lenses of eyeglasses is to improve air circulation behind the lenses thereof, i.e., exhausting the warm humid air and replacing it with cool drier air. To facilitate such air exchange, there has been developed in the prior art eyeglasses incorporating miniature fans powered by portable batteries carried by the user. However, the eyewear incorporating these miniature fans is extremely complex and costly to manufacture, and is also bulky and of high weight. There has also been developed in the prior art eyeglasses which include ventilation ports disposed within various locations about the periphery of the frame so as to surround the lenses thereof. However, in these prior art eyeglasses, because of the manner in which the ventilation ports are configured and/or oriented, they typically provide either too little or too great a rate of air flow therethrough. Insufficient air flow through the ventilation ports makes the inclusion of the ventilation ports in the frame largely ineffective for purposes of preventing the fogging of the lenses. At the other extreme, too great a rate of air flow through the ventilation ports results in a pressure build-up or in uncomfortably high "winds" across the wearer's eyes. Moreover, the ventilation ports included in the prior art eyeglasses are often sized and configured in a manner wherein foreign matter, e.g., dust, can pass therethrough into the wearer's eyes.

In view of the foregoing, there exists a need for eyeglasses which can safely and adequately protect a wearer's eyes and are resistant to fogging. Such eyeglasses should be simple in construction and thus inexpensive to manufacture, and should further be lightweight so as not to unduly interfere with the wearer's participation in a certain sports activity.

SUMMARY OF THE INVENTION

In accordance with the present invention, there is provided protective eyeglasses which are adapted to be resistant to fogging while being worn by a wearer. The eyeglasses comprise a frame front which spans across the wearer's face and includes forward and aft sides. The frame front further includes a pair of middle portions which extend over the wearer's eyes, and a pair of end piece portions adjacent the wearer's temples. Attached to respective ones of the middle portions of the frame front is a pair of lenses which are positioned over the wearer's eyes and define front and back surfaces. Additionally, disposed within respective ones of the end piece portions of the frame front is a pair of end piece apertures which are forwardly directed and define ventilation channels for facilitating airflow through the frame front adjacent the lenses. The ventilation channels defined by the end piece apertures are sized and configured to facilitate the circulation of air over the back surfaces of the lenses to resist the fogging thereof.

In the preferred embodiment, the middle portions of the frame front are integrally connected to each other by a bridge portion which includes a pair of bridge apertures disposed therein. The bridge apertures of the eyeglasses define additional ventilation channels within the frame front. Each of the ventilation channels defined by the end piece apertures and the bridge apertures includes a forward end at the forward side of the frame front, an aft end at the aft side of the frame front, and a central portion between the forward and aft ends. The forward end of each ventilation channel is partially defined by rounded corners formed within the frame front to promote laminar airflow therethrough.

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Additionally, the forward ends of those ventilation channels defined by the end piece apertures are further partially defined by a pair of ramps formed within the frame front to further promote laminar airflow therethrough.

In the present eyeglasses, the end piece apertures each comprise an elongate, vertically oriented slot which is formed within a respective one of the end piece portions of the frame front. Additionally, each of the end piece apertures defines a central axis which is substantially parallel to the forward line of sight of the wearer, with the end piece apertures further being positioned outwardly beyond the wearer's eyes to prevent debris passing therethrough from entering the wearer's eyes.

The eyeglasses constructed in accordance with the present invention further comprise a pair of elongate temple members which are pivotally connected to the frame front. The temple members each preferably comprise a butt portion which is pivotally connected to a respective one of the end piece portions of the frame front, with the butt portion itself defining inner and outer surfaces. The butt portion transitions into a shank portions of decreased width, with the shank portion in turn transitioning into a downwardly bent ear piece portion of decreased width. Each ear piece portion is sized and configured to rest upon one of the wearer's ears to maintain the eyeglasses in position upon the wearer's face. The maximum widths of the butt portions of the temple members are substantially equal to the widths of the outboard edges of the end piece portions to which the butt portions are pivotally connected. Additionally, the forward side of the frame front and the outer surfaces of the butt portions of the temple members are substantially flush with each other, as are the inner surfaces of the butt portions and the aft side of the frame front.

In the preferred embodiment, each of the temple members further comprises an elongate ventilation slot which is disposed within the inner surface of the butt portion and communicates with the ventilation channel defined by a respective one of the end piece apertures disposed within the frame front. Each ventilation slot is sized and configured to promote the laminar flow of air passing through the corresponding ventilation channel along the temple member. In this respect, each ventilation slot is of gradually decreasing width and depth as it extends toward the shank portion of the temple member.

In the preferred embodiment, the middle portions of the frame front are themselves arcuately contoured to facilitate airflow about the frame front. Additionally, both the frame front and the lenses preferably have generally concave configurations to facilitate the wrapping of the eyeglasses around the wearer's eyes and to promote laminar airflow around the wearer's face. The height of the end piece portions of the frame front is preferably at least half of the maximum height of the lenses, with the lenses themselves being darkly tinted and fabricated to be of sufficient thickness to prevent the inadvertent fracturing thereof when impacted by debris. The lenses may alternatively be transparent, or fabricated from a material which progressively darkens when exposed to ultraviolet radiation.

BRIEF DESCRIPTION OF THE DRAWINGS

These, as well as other features of the present invention, will become more apparent upon reference to the drawings wherein:

FIG. 1 is a partial front perspective view of the eyeglasses of the present invention, illustrating the manner in which air is circulated therethrough;

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FIG. 2 is a partial rear perspective view of the eyeglasses of the present invention taken along line 2--2 of FIG. 1, illustrating the manner in which air is circulated therethrough;

FIG. 3 is a partial front elevational view of the eyeglasses of the present invention, illustrating the manner in which air is circulated therethrough; and

FIG. 4 is partial cross-sectional view taken along line 4--4 of FIG. 3, further illustrating the manner in which air is circulated through the eyeglasses of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawings wherein the showings are for purposes of illustrating a preferred embodiment of the present invention only, and not for purposes of limiting the same, FIGS. 1 and 2 perspective illustrate the protective eyeglasses 10 constructed in accordance with the present invention. As will be discussed in more detail below, the eyeglasses 10 of the present invention are specifically adapted to be resistant to fogging. Additionally, as shown in accompanying FIGS. 1-4, the eyeglasses 10 are preferably in the form of sunglasses. However, those of ordinary skill in the art will recognize that the present invention is also applicable to other types of eyeglasses or eyewear, including eyeglasses incorporating a single, unitary lens, as well as goggles.

Referring now to FIGS. 1-4, the eyeglasses 10 of the present invention comprise a frame front 12 which, when the eyeglasses 10 are worn by a wearer, are sized and configured to span across the wearer's face. The frame front 12 includes a front or forward side 14, a back or aft side 16, a pair of middle portions 18, and a pair of end piece portions 20. The middle portions 18 are integrally connected to each other by a bridge portion 22 of the frame front 12, with each of the middle portions 18 accommodating a lens 24 of the eyeglasses 10. As will be recognized, when the eyeglasses 10 are worn by the wearer, the middle portions 18 extend over the wearer's eyes, with the lenses 24 disposed therewithin thus being positioned over the wearer's eyes. Additionally, the end piece portions 20 are positioned adjacent the wearer's temples, with each of the end piece portions 20 defining an outboard edge 26, the use of which will be described in more detail below.

In the preferred embodiment, the frame front 12 of the eyeglasses 10 further includes a pair of end piece apertures 28 which are disposed within respective ones of the end piece portions 20 thereof. The end piece apertures 28 each define a forward end 30 at the forward side 14 of the frame front 12, an aft end 32 at the aft side 16 of the frame front 12, and a central portion disposed between the forward and aft ends 30, 32.

As seen in FIGS. 1-4, each of the end piece apertures 28 comprises an elongate, vertically oriented slot defining a central axis which extends in substantially parallel relation to the forward line of sight of the wearer of the eyeglasses 10. As best seen in FIG. 4, the forward end 30 of each end piece aperture 28, and in particular the longitudinal edges thereof, is defined by rounded corner regions 34 formed within the frame front 12. Additionally, as seen in FIGS. 1 and 3, the lateral sides of each end piece aperture 28 are defined by a sloped upper surface or upper ramp 36 and a sloped lower surface or lower ramp 38. In this respect, the inclusion of the upper and lower ramps 36, 38 in the frame front 12 facilitates the gradual reduction in the cross-sectional area of each end piece aperture 28 as it extends

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toward the aft end 32 of the frame front 12. Moreover, the inclusion of the rounded corner regions 34 and upper and lower ramps 36, 38 with each end piece aperture 28 promotes the laminar flow of air therethrough for reasons which will be discussed in more detail below.

In addition to the end piece apertures 28, disposed within the bridge portion 22 of the frame front 12 is a spaced pair of bridge apertures 40, each of which has a generally triangular configuration and defines a central axis which extends in substantially parallel relation to the forward line of sight of the wearer of the eyeglasses 10. Like the end piece apertures 28, each of the bridge apertures 40 defines a forward end 42, an aft end 44, and a central portion which is disposed between the forward and aft ends 42, 44. In the preferred embodiment, the forward and aft ends 42, 44 of each bridge aperture 40 are defined by rounded corner regions 46 of the frame front 12 which promote the laminar flow of air through the bridge apertures 40.

In the eyeglasses 10 of the present invention, the forwardly directed end piece apertures 28 and bridge apertures 40 define ventilation channels for facilitating airflow through the frame front 12 adjacent the lenses 24 thereof. As will also be discussed in more detail below, the ventilation channels defined by the end piece and bridge apertures 28, 40 are sized and configured to facilitate the circulation of air over the back surfaces 24a of the lenses 24 to resist the fogging thereof.

Referring now to FIGS. 1, 2 and 4, the eyeglasses 10 of the present invention further comprise an identically configured pair of elongate temple members 48 which are pivotally connected to the frame front 12, and more particularly to respective ones of the outboard edges 26 of the end piece portions 20. Each of the temple members 48 comprises a butt portion 50 which is pivotally connected to the outboard edge 26 of a respective end piece portion 20. In the preferred embodiment, the maximum width of the butt portion 50 is substantially equal to the width of the outboard edge 26 to which it is pivotally connected. Additionally, as best seen in FIGS. 2 and 4, when the butt portion 50 is pivotally connected to the outboard edge 26 of the end piece portion 20, the outer surface of the butt portion 50 is substantially flush with the forward side 14 of the frame front 12, with the inner surface of the butt portion 50 being substantially flush with the aft side 16 of the frame front 12. The butt portion 50 of each temple member 48 transitions into a reduced width shank portion 52 thereof. The shank portion 52 of each temple member 48 itself transitions into a reduced width earpiece portion 54 which has a downwardly bent configuration and is sized and configured to rest upon one of the wearer's ears to maintain the eyeglasses 10 in position upon the wearer's face.

As best seen in FIGS. 2 and 4, disposed within the inner surface of the butt portion 50 of each temple member 48 is an elongate ventilation slot 56 which, when the temple member 48 is pivotally connected to the outboard edge 26, communicates with the ventilation channel defined by a respective one of the end piece apertures 28 formed within the frame front 12. Each ventilation slot 56 has a generally triangular configuration, and is of gradually decreasing width and depth as it extends toward the shank portion 52 of the temple member 48. As will also be discussed in more detail below, the ventilation slots 56 are sized and configured to cooperate with the end piece apertures 28 in a manner promoting the laminar flow of air passing through the ventilation channels along the temple members 48.

As best seen in FIG. 4, in the preferred embodiment both the frame front 12 and the lenses 24 disposed therein have

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arcuate, generally concave configurations to create the effect of the eyeglasses 10 "wrapping" around the wearer's eyes and head when worn by the wearer. In addition to creating the wrapping effect, the arcuate contours of the frame front 12 and lenses 24 promotes the laminar flow of air around the wearer's face, as well as airflow about the middle portions 18 of the frame front 12 into the spaces or voids defined between the back surfaces 24a of the lenses 24 and the wearer's eyes. To further streamline the eyeglasses 10, the end piece portions 28 of the frame front 12 are preferably sized having a height which is at least half of the maximum height of the lenses 24.

As will be recognized, when the eyeglasses 10 are worn by the wearer, the bridge portion 22 of the frame front 12 is rested upon the bridge of the wearer's nose, with the lower edges of the middle portions 18 typically resting against the portions of the wearer's cheeks adjacent the eyes. Additionally, the downwardly bent eye piece portions 54 of the temple members 48 are rested upon respective ones of the wearer's ears. As previously indicated, when the eyeglasses 10 are worn in the proper manner, air filled spaces or voids are defined between the back surfaces 24a of the lenses 24 and the wearer's eyes.

In the preferred embodiment, the frame front 12 and temple members 48 are fabricated from a light weight, shatter-proof plastic material. The lenses 24 are themselves preferably darkly tinted, or fabricated from a material having a tint which adjusts in accordance with different brightness levels. Those of ordinary skill in the art will recognize that the lenses 24 may be fabricated from a variety of different materials, and may also be transparent rather than tinted. However, it is contemplated that the lenses 24 will be fabricated having a sufficient thickness to prevent the inadvertent fracturing thereof when impacted by debris. In this respect, the frame front 12 is sized such that the end piece apertures 28 disposed within the end piece portions 20 are oriented outwardly relative to the wearer's eyes so that any debris passing through the ventilation channels defined by the end piece apertures 28 will not directly enter the wearer's eyes.

Having thus described the components comprising the eyeglasses 10, the manner in which the eyeglasses 10 are resistant to fogging will now be described with reference to the arrows shown in FIGS. 1-4. As previously indicated, when the eyeglasses 10 are worn in the proper manner, spaces or voids are defined between the back surfaces 24a of the lenses 24 and the wearer's eyes. These spaces are partially enclosed by the contact of the lower edges of the middle portions 18 against the wearer's cheeks and the bridge portion 22 against the bridge of the wearer's nose. During the wearer's participation in a sports activity, the wearer's body, through physical exertion, is generating heat, with the wearer's breathing dispelling warm, humid air in the vicinity of the eyeglasses 10. As will be recognized, the increase in the wearer's body temperature and resultant perspiration tends to cause the air within the spaces between the wearer's eyes and the back surfaces 24a of the lenses 24 to increase both in temperature and moisture content. Such increase in temperature and moisture content of the air behind the lenses 24, when coupled with the presence of cool, drier air at the front surfaces of the lenses 24, results in the formation of condensation on the back surfaces 24a of the lenses 24, i.e., the "fogging" of the lenses 24.

When the wearer of the eyeglasses 10 is traveling forward through relatively cool, dry air at a relatively high rate of speed, the cool outside air flows through the ventilation channels defined by the end piece apertures 28 and bridge

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apertures 40. More particularly, as seen in FIGS. 1 and 4, air enters the end piece apertures 28 in the direction designated by the arrows 58, and enters the bridge apertures in the direction designated by the arrows 60. Air passing through the end piece apertures 28 flows into and through respective ones of the ventilation slots 56 in the direction designated by the arrows 62. The air within the spaces between the back surfaces 24a of the lenses 24 and the wearer's eyes tends to be drawn into the flow of air identified by the arrows 62, which in turn causes the air entering such spaces via the bridge apertures 40 to be drawn across the back surfaces 24a of respective ones of the lenses 24 in the direction designated by the arrows 64. Additionally, due to the streamlined configuration of the frame front 12, air is also drawn over the top edges of the middle portions 18 across the back surfaces 24a of the lenses 24 in the direction designated by the arrows 66. Due to the configuration of the ventilation slots 56, the air flowing outwardly within the spaces along the back surfaces 24a combines with the air flowing through the end piece apertures 28 into the ventilation slots 56, with such combined air ultimately flowing along respective ones of the temple members 48 in the direction designated by the arrow 68 shown in FIG. 2.

As will be recognized, the drawing of the air within the spaces between the lenses 24 and the wearer's eyes into the flow through the end piece apertures 28 and ventilation slots 56 effectively reduces the pressure in such spaces, thus facilitating the circulation of the air entering the spaces via the bridge apertures 40 and over the top edges of the middle portions 18 across the back surfaces 24a of the lenses 24 in the aforementioned manner. The exchange of the cool, drier air for the warm moist air in the spaces and circulation of the cool, drier air across the back surfaces 24a of the lenses 24 prevents the formation of condensation (i.e., the "fogging") of the lenses 24. As such, the reduction or elimination of fogging of the lenses 24 is provided, though the eyeglasses 10 are lightweight in construction and of relatively low cost to manufacture.

Though not shown, it is contemplated that the central portions of the end piece apertures 28 and/or bridge apertures 40 may be formed so as to be narrower than the forward and aft ends thereof. In this respect, the end piece apertures 28 and/or bridge apertures 40 may each have a generally "hourglass" shape. This particular configuration of each of the end piece apertures 28 and/or bridge apertures 40 aids in creating a "venturi" effect in the flow of air therethrough. The term "venturi" is generally defined as a tube having a narrow region in the middle with flared or widened ends. The venturi effect is the result of Bernoulli's Principle which establishes that the flow rate of a fluid will increase and pressure will decrease in the narrowed region of the venturi. This "venturi" effect occurring within the ventilation channels defined by the end piece apertures 28 and/or bridge apertures 40 could be used to facilitate even increased circulation of air behind the lenses 24.

Additional modifications and improvements of the present invention may also be apparent to those skilled in the art. Thus, the particular combination of parts described and illustrated herein is intended to represent only one embodiment of the present invention, and is not intended to serve as limitations of alternative devices within the spirit and scope of the invention.

What is claimed is:

1. Protective eyeglasses resistant to fogging while being worn by a wearer, the eyeglasses comprising:

a frame front which spans across the wearer's face, the frame front including a forward side, an aft side, at least

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one middle portion extending over the wearer's eyes, and a pair of end piece portions near the wearer's temples;

at least one lens attached to the middle portion of the frame front and positioned over the wearer's eyes, the lens defining front and back surfaces; and

at least one forwardly directed aperture disposed within the frame front and defining a central axis which extends in substantially parallel relation to the wearer's forward line of sight, the aperture forming a ventilation channel for facilitating air flow through the frame front adjacent the lens;

wherein the location of the ventilation channel and extension thereof along the central axis facilitates the circulation of air over the back surface of the lens to resist the fogging thereof.

2. The protective eyeglasses of claim 1 wherein said frame front includes a pair of middle portions connected by a bridge portion and said eyeglasses comprise a pair of lenses attached to respective ones of the middle portions.

3. The protective eyeglasses of claim 2 wherein said at least one aperture comprises a pair of end piece apertures disposed within respective ones of the end piece portions of the frame front for facilitating the circulation of air over the back surfaces of the lenses, each of the end piece apertures defining a central axis which extends in substantially parallel relation to the wearer's forward line of sight.

4. The eyeglasses of claim 2 wherein the ventilation channel defined by each of the end piece apertures defines a forward end at the forward side of the frame front, an aft end at the aft side of the frame front, and a central portion between the forward and aft ends, the forward end of each ventilation channel defined by the end piece apertures being partially defined by a pair of ramps formed within the frame front to promote laminar air flow therethrough.

5. The eyeglasses of claim 4 wherein the forward end of each ventilation channel defined by the end piece apertures is partially defined by rounded corners formed within the frame front to promote laminar air flow therethrough.

6. The protective eyeglasses of claim 3 wherein said at least one aperture further comprises at least one bridge aperture disposed within the bridge portion of the frame front.

7. The protective eyeglasses of claim 6 wherein said at least one bridge aperture comprises a pair of bridge apertures disposed within the bridge portion of the frame front.

8. The eyeglasses of claim 7 wherein each of the ventilation channels defined by the bridge apertures defines a forward end at the forward side of the frame front, an aft end at the aft side of the frame front, and a central portion between the forward and aft ends, the forward end of each ventilation channel defined by the bridge apertures being partially defined by rounded corners formed within the frame front to promote laminar air flow therethrough.

9. The eyeglasses of claim 3 wherein the end piece apertures each comprise an elongate, vertically oriented slot formed within a respective one of the end piece portions of the frame front.

10. The eyeglasses of claim 3 wherein the end piece apertures are positioned outwardly beyond the wearer's eyes to prevent debris passing therethrough from entering the wearer's eyes.

11. The eyeglasses of claim 3 further comprising a pair of elongate temple members pivotally connected to said frame front, each of said temple members comprising:

a butt portion pivotally connected to a respective one of the end piece portions of the frame front, said butt portion defining inner and outer surface;

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a shank portion; and

a ear piece portion sized and configured to rest upon one of the wearer's ears to maintain the eyeglasses in position upon the wearer's face.

12. The eyeglasses of claim 11 wherein the end piece portions of the frame front each define an outboard edge, with the widths of the butt portions of the temple members and the widths of the outboard edges of the end piece portions being substantially equal.

13. The eyeglasses of claim 12 wherein the widths of the butt portions of the temple member exceed the widths of the shank portions thereof.

14. The eyeglasses of claim 13 wherein the widths of the shank portions of the temple members exceed the widths of the ear piece portions thereof.

15. The eyeglasses of claim 11 wherein the forward side of the frame front and the outer surfaces of the butt portions of the temple members are substantially flush with each other.

16. The eyeglasses of claim 11 wherein the aft side of the frame front and the inner surfaces of the butt portions of the temple members are substantially flush with each other.

17. The eyeglasses of claim 11 wherein the ear piece portion of each of the temple member has a downwardly bent configuration.

18. The eyeglasses of claim 11 wherein each of the temple members further comprises:

an elongate ventilation slot disposed within the inner surface of the butt portion and communicating with the ventilation channel defined by a respective one of the end piece apertures disposed within the frame front; said ventilation slot being sized and configured to promote the laminar flow of air passing through the ventilation channel along the temple member.

19. The eyeglasses of claim 18 wherein said ventilation slot is of gradually decreasing width and depth as it extends toward the shank portion of the temple member.

20. The eyeglasses of claim 3 wherein the middle portions of the frame front are arcuately contoured to facilitate airflow about the frame front.

21. The eyeglasses of claim 3 wherein the height of the end piece portions of the frame front is at least half of the maximum height of the lenses.

22. The eyeglasses of claim 3 wherein the frame front and the lenses are generally concave to facilitate the wrapping of the eyeglasses around the wearer's eyes and promote laminar airflow around the wearer's face.

23. The eyeglasses of claim 3 wherein the lenses are darkly tinted.

24. The eyeglasses of claim 3 wherein the lenses are fabricated to be of sufficient thickness to prevent the inadvertent fracturing thereof when impacted by debris.

25. Protective eyeglasses resistant to fogging while being worn by a wearer, the eyeglasses comprising:

a frame front which spans across the wearer's face, the frame front including a forward side, and aft side, at least one middle portion extending over the wearer's eyes, and a pair of end piece portions near the wearer's temples;

at least one lens attached to the middle portion of the frame front and positioned over the wearer's eyes, the lens defining front and back surface; and

a pair of forwardly directed end piece apertures disposed within respective ones of the end piece portions of the frame front, the end piece apertures each defining a central axis which extends in generally parallel relation

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to the wearer's forward line of sight, and forming ventilation channels for facilitating air flow through the frame front adjacent the lens;

wherein the locations of the ventilation channels and extension thereof along respective ones of the central axes facilitates the circulation of air over the back surface of the lens to resist the fogging thereof.

26. The protective eyeglasses of claim 25 wherein said frame front includes a pair of middle portions connected by a bridge portion and said eyeglasses comprise a pair of lenses attached to respective ones of the middle portions.

27. The protective eyeglasses of claim 26 further comprising a pair of bridge apertures disposed within the bridge portion of the frame front.

28. The eyeglasses of claim 27 wherein the ventilation channels defined by the end piece apertures and the bridge apertures each define a forward end at the forward side of the frame front, an aft end at the aft side of the frame front, and a central portion between the forward and aft ends, the forward end of each ventilation channel being partially defined by rounded corners formed within the frame front to promote laminar airflow therethrough.

29. The eyeglasses of claim 27 wherein each of the ventilation channels defined by the end piece apertures each define a forward end at the forward side of the frame front, an aft end at the aft side of the frame front, and a central portion between the forward and aft ends, the forward end of each ventilation channel being partially defined by a pair of ramps formed within the frame front to promote laminar airflow therethrough.

30. The eyeglasses of claim 25 further comprising a pair of elongate temple members pivotally connected to said frame front, each of said temple members comprising:

a butt portion pivotally connected to a respective one of the end piece portions of the frame front, said butt portions defining inner and outer surfaces;

a shank portion; and

a ear piece portion sized and configured to rest upon one of the wearer's ears to maintain the eyeglasses in position upon the wearer's face.

31. The eyeglasses of claim 30 wherein each of the temple members further comprises:

an elongate ventilation slot disposed within the inner surface of the butt portion and communicating with the ventilation channel defined by a respective one of the end piece apertures disposed within the frame front;

said ventilation slot being sized and configured to promote the laminar flow of air passing through the corresponding ventilation channel along the temple member.

32. The eyeglasses of claim 31 wherein said ventilation slot is of gradually decreasing width and depth as it extends toward the shank portion of the temple member.

33. Protective eyeglasses resistant to fogging while being worn by a wearer, the eyeglasses comprising:

a frame front which spans across the wearer's face, the frame front including a forward side, an aft side, a pair of middle portions extending over the wearer's eyes, a bridge portion connecting the middle portions, and a pair of end piece portions near the wearer's temples;

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a pair of lenses attached to respective ones of the middle portions of the frame front and positioned over the wearer's eyes, the lenses each defining front and back surfaces;

a pair of end piece apertures disposed within respective 5
ones of the end piece portions of the frame front, the end piece apertures defining ventilation channels for facilitating air flow through the frame front adjacent the lenses; and

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at least one bridge aperture disposed within the bridge portion of the frame front and defining a ventilation channel for facilitating air flow through the frame front adjacent the lenses;

wherein the locations of the ventilation channels defined by the end piece apertures and the bridge aperture facilitate the circulation of air over the back surfaces of the lenses to resist the fogging thereof.

* * * * *



US00D397133S

United States Patent [19]

Mage

[11] Patent Number: Des. 397,133

[45] Date of Patent: **Aug. 18, 1998

[54] SUNGLASS

[75] Inventor: Jerome Jacques Marie Mage.
Carlsbad, Calif.

[73] Assignee: Spy Optic, Inc., Carlsbad, Calif.

[**] Term: 14 Years

[21] Appl. No.: 63,968

[22] Filed: Dec. 19, 1996

[51] LOC (6) Cl. 16-06

[52] U.S. Cl. D16/321; D16/326

[58] Field of Search D16/101, 300,
D16/306, 311, 315-317, 319-329, 335;
351/41, 44, 51, 52, 158; 2/447, 448

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Primary Examiner—Raphael Barkai

Attorney, Agent, or Firm—Stetina Brunda Garred & Brucker

[57] CLAIM

The ornamental design for a sunglass, as shown and described.

DESCRIPTION

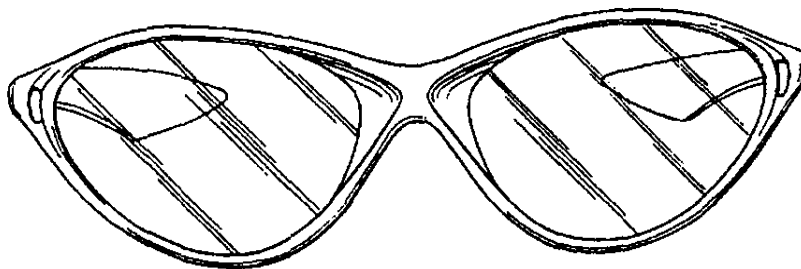
FIG. 1 is a front elevational view of the sunglass of the present invention showing my new design;

FIG. 2 is a top plan view thereof; and,

FIG. 3 is a side elevational view thereof, with the opposite side elevational view thereof being identical.

The portions of the interior surfaces not shown or described of the sunglass form no part of the claimed design.

1 Claim, 1 Drawing Sheet



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Page 2

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U.S. Patent

Aug. 18, 1998

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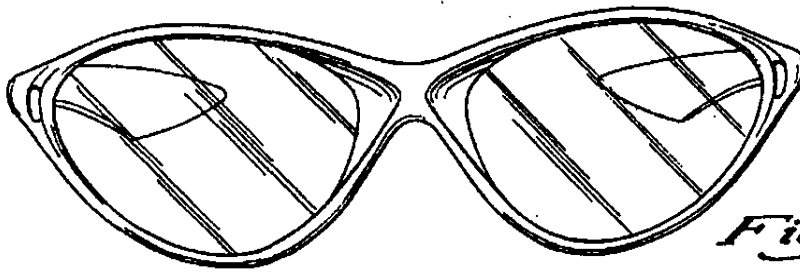


Fig. 1

Fig. 2

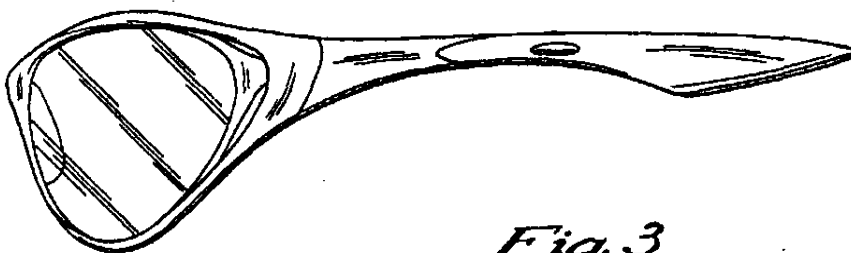
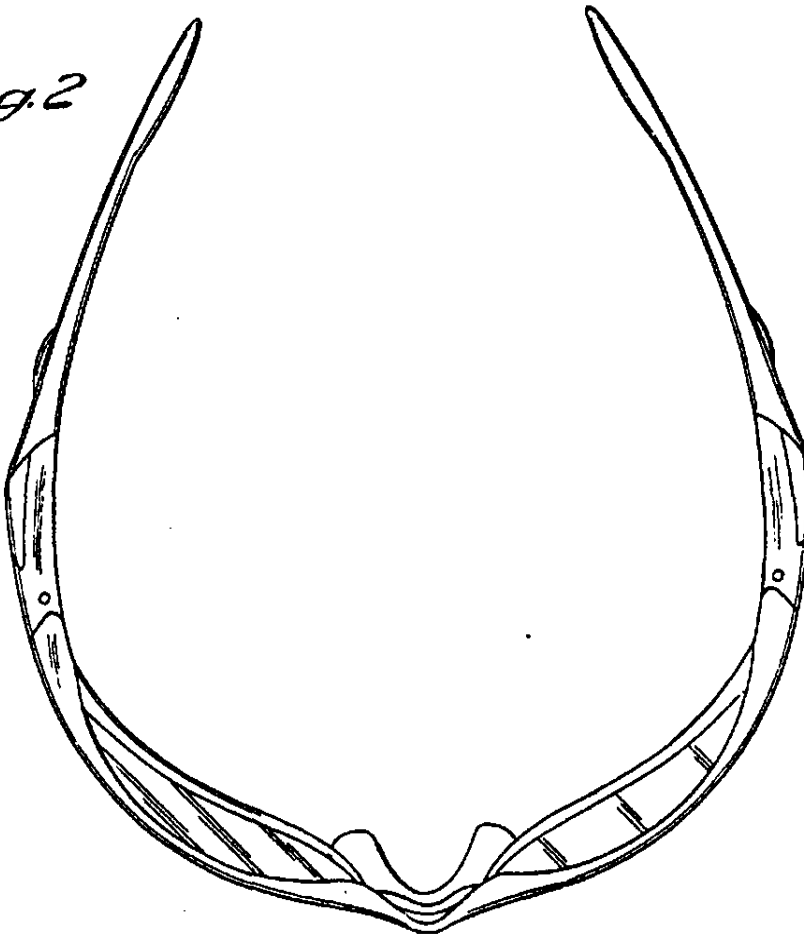
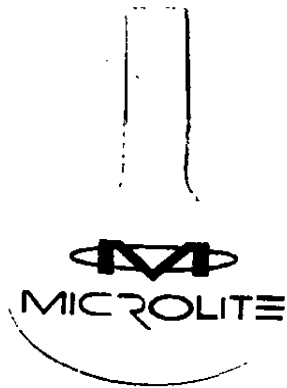
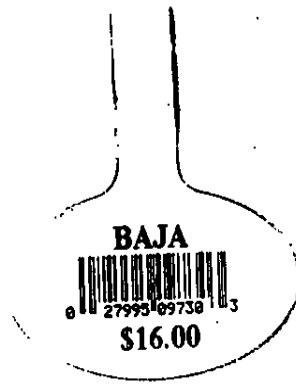
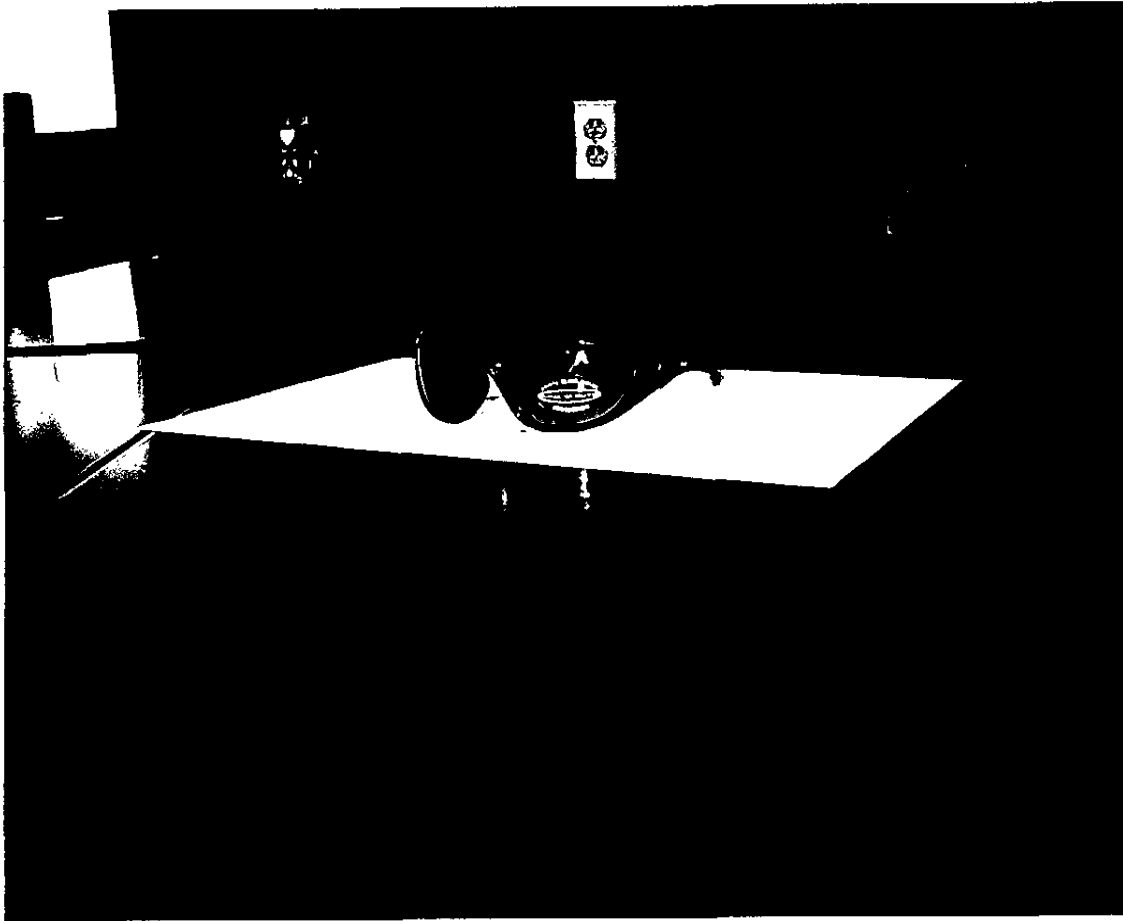
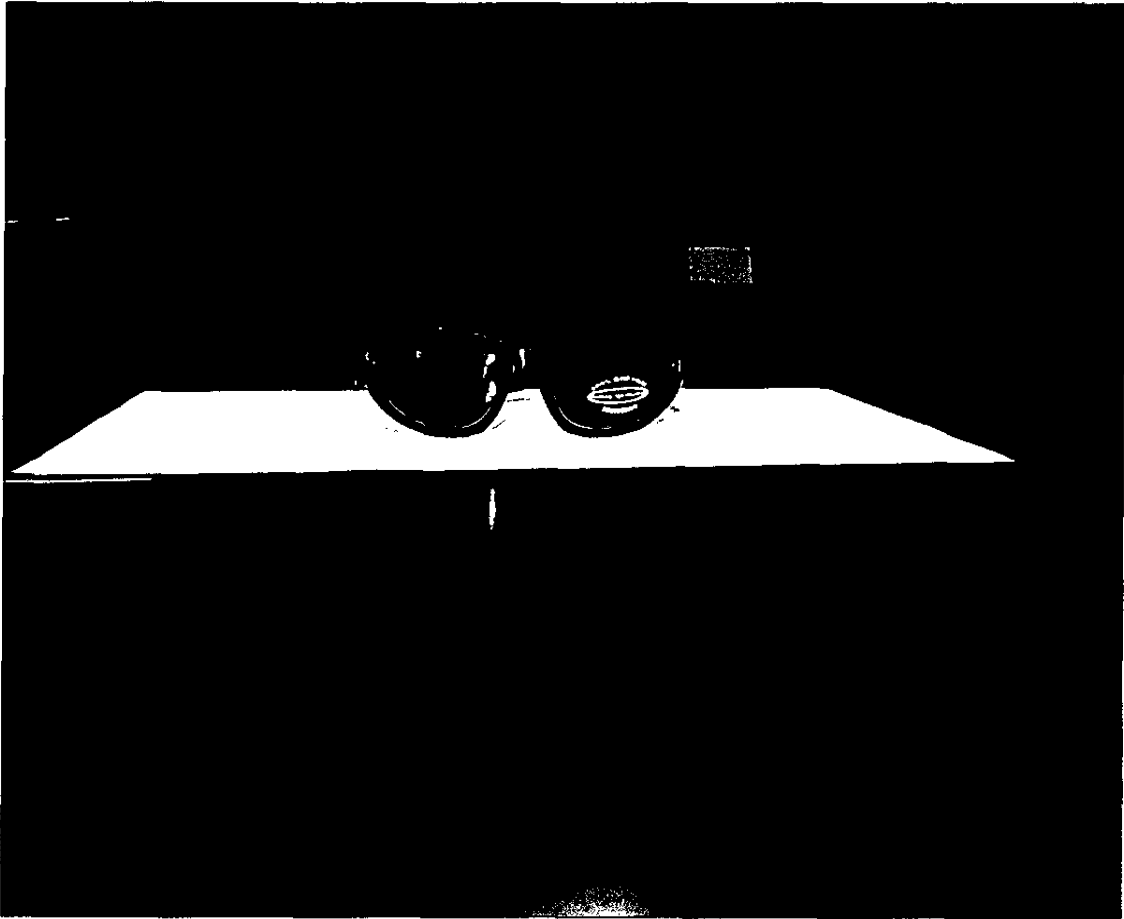


Fig. 3



no





AO 120 (Rev. 2/99)

TO: Commissioner of Patents and Trademarks Washington, DC 20231	REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK
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In Compliance with 35 § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been
 filed in the U.S. District Court Southern District of California on the following ☒ Patents or ☐ Trademarks:

DOCKET NO.	DATE FILED	U.S. DISTRICT COURT SOUTHERN DISTRICT OF CALIFORNIA
PLAINTIFF SPY OPTIC, INC., a California corporation		DEFENDANT STYLE EYES, INC., a California corporation; and DOES 1 through 10, inclusive <div style="text-align: center; font-size: 1.2em; font-weight: bold;">'04 CV 00417 LAB (LSP)</div>
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1 5,610,668	3/11/97	SPY OPTIC, INC.
2 5,801,805	9/1/98	SPY OPTIC, INC.
3 5,898,468	4/27/99	SPY OPTIC, INC.
4 6,050,684	4/18/00	SPY OPTIC, INC.
5 DES 397,133	8/18/98	SPY OPTIC, INC.

In the above—entitled case, the following patent(s) have been included:

DATE INCLUDED	INCLUDED BY <input type="checkbox"/> Amendment <input type="checkbox"/> Answer <input type="checkbox"/> Cross Bill <input type="checkbox"/> Other Pleading		
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK	
1			
2			
3			
4			
5			

In the above—entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT

CLERK	(BY) DEPUTY CLERK	DATE
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Copy 1—Upon initiation of action, mail this copy to Commissioner Copy 3—Upon termination of action, mail this copy to Commissioner
 Copy 2—Upon filing document adding patent(s), mail this copy to Commissioner Copy 4—Case file copy

ORIGINAL

JS44

(Rev. 07/89)

The JS-44 civil cover sheet and the information contained herein neither replace nor supplement the filing and service of pleadings or other papers as required by law, except as provided by local rules of court. This form, approved by the Judicial Conference of the United States in September 1974, is required for the use of the Clerk of Court for the purpose of initiating the civil docket sheet. (SEE INSTRUCTIONS ON THE SECOND PAGE OF THIS FORM.)

I (a) PLAINTIFFS

SPY OPTIC, INC., a California corporation

(b) COUNTY OF RESIDENCE OF FIRST LISTED PLAINTIFF
(EXCEPT IN U.S. PLAINTIFF CASES)

San Diego

DEFENDANTS

04 FEB 26 PM 2:23
STYLE EYES, INC., a California corporation;
and DOES 1 through 10, inclusive
JUDICIAL DISTRICT OF CALIFORNIA

COUNTY OF RESIDENCE OF FIRST LISTED DEFENDANT
(IN U.S. PLAINTIFF CASES ONLY)

DEPUTY

NOTE: IN LAND CONDEMNATION CASES, USE THE LOCATION OF THE TRACT OF LAND INVOLVED

(c) ATTORNEYS (FIRM NAME, ADDRESS, AND TELEPHONE NUMBER)

Kit M. Stetina / William J. Brucker 949-855-1246
STETINA BRUNDA GARRED & BRUCKER
75 Enterprise, Suite 250
Aliso Viejo, CA 92656

ATTORNEYS (IF KNOWN)

'04 CV 00417 LAB (LSP)

II. BASIS OF JURISDICTION (PLACE AN X IN ONE BOX ONLY)

- ☐ 1 U.S. Government Plaintiff ☒ 3 Federal Question
(U.S. Government Not a Party)
- ☐ 2 U.S. Government Defendant ☐ 4 Diversity (Indicate Citizenship of Parties in Item III)

III. CITIZENSHIP OF PRINCIPAL PARTIES (PLACE AN X IN ONE BOX FOR PLAINTIFF AND ONE BOX FOR DEFENDANT)

- | | PT | DEF | | PT | DEF |
|---|----------------------------|----------------------------|---|----------------------------|----------------------------|
| Citizen of This State | <input type="checkbox"/> 1 | <input type="checkbox"/> 1 | Incorporated or Principal Place of Business in This State | <input type="checkbox"/> 4 | <input type="checkbox"/> 4 |
| Citizen of Another State | <input type="checkbox"/> 2 | <input type="checkbox"/> 2 | Incorporated and Principal Place of Business in Another State | <input type="checkbox"/> 5 | <input type="checkbox"/> 5 |
| Citizen or Subject of a Foreign Country | <input type="checkbox"/> 3 | <input type="checkbox"/> 3 | Foreign Nation | <input type="checkbox"/> 6 | <input type="checkbox"/> 6 |

IV. CAUSE OF ACTION (CITE THE U.S. CIVIL STATUTE UNDER WHICH YOU ARE FILING AND WRITE A BRIEF STATEMENT OF CAUSE. DO NOT CITE JURISDICTIONAL STATUTES UNLESS DIVERSITY).

Patent Infringement - 35 U.S.C. §271 and §§ 281-285

V. NATURE OF SUIT (PLACE AN X IN ONE BOX ONLY)

CONTRACT	TORTS	FORFEITURE/PENALTY	BANKRUPTCY	OTHER STATUTES	
<input type="checkbox"/> 110 Insurance <input type="checkbox"/> 120 Marine <input type="checkbox"/> 130 Miller Act <input type="checkbox"/> 140 Negotiable Instrument <input type="checkbox"/> 150 Recovery of Overpayment & Enforcement of Judgment <input type="checkbox"/> 151 Medicare Act <input type="checkbox"/> 152 Recovery of Defaulted Student Loans (Excl. Veterans) <input type="checkbox"/> 153 Recovery of Overpayment of Veterans Benefits <input type="checkbox"/> 160 Stockholders Suits <input type="checkbox"/> 190 Other Contract <input type="checkbox"/> 195 Contract Product Liability	PERSONAL INJURY <input type="checkbox"/> 310 Airplane <input type="checkbox"/> 315 Airplane Product Liability <input type="checkbox"/> 320 Assault, Libel & Slander <input type="checkbox"/> 330 Federal Employers' Liability <input type="checkbox"/> 340 Marine <input type="checkbox"/> 345 Marine Product Liability <input type="checkbox"/> 350 Motor Vehicle <input type="checkbox"/> 355 Motor Vehicle Product Liability <input type="checkbox"/> 360 Other Personal Injury	<input type="checkbox"/> 362 Personal Injury-Medical Malpractice <input type="checkbox"/> 365 Personal Injury - Product Liability <input type="checkbox"/> 368 Asbestos Personal Injury Product Liability PERSONAL PROPERTY <input type="checkbox"/> 370 Other Fraud <input type="checkbox"/> 371 Truth in Lending <input type="checkbox"/> 380 Other Personal Property Damage <input type="checkbox"/> 385 Property Damage Product Liability	<input type="checkbox"/> 610 Agriculture <input type="checkbox"/> 620 Other Food & Drug <input type="checkbox"/> 625 Drug Related Seizure of Property 21 USC881 <input type="checkbox"/> 630 Liquor Laws <input type="checkbox"/> 640 RR & Truck <input type="checkbox"/> 650 Airline Regs <input type="checkbox"/> 660 Occupational Safety/Health <input type="checkbox"/> 690 Other LABOR <input type="checkbox"/> 710 Fair Labor Standards Act <input type="checkbox"/> 720 Labor/Mgmt. Relations <input type="checkbox"/> 730 Labor/Mgmt. Reporting & Disclosure Act <input type="checkbox"/> 740 Railway Labor Act <input type="checkbox"/> 790 Other Labor Litigation <input type="checkbox"/> 791 Empl. Ret. Inc. Security Act	<input type="checkbox"/> 422 Appeal 28 USC 158 <input type="checkbox"/> 423 Withdrawal 28 USC 157 PROPERTY RIGHTS <input type="checkbox"/> 820 Copyrights <input checked="" type="checkbox"/> 830 Patent <input type="checkbox"/> 840 Trademark SOCIAL SECURITY <input type="checkbox"/> 861 HIA (13958) <input type="checkbox"/> 862 Black Lung (923) <input type="checkbox"/> 863 DIWC/DIWW (405(g)) <input type="checkbox"/> 864 SSID Title XVI <input type="checkbox"/> 865 RSI (405(e)) FEDERAL TAX SUITS <input type="checkbox"/> 870 Taxes (U.S. Plaintiff or Defendant) <input type="checkbox"/> 871 IRS - Third Party 26 USC 7609	<input type="checkbox"/> 400 State Reappointment <input type="checkbox"/> 410 Antitrust <input type="checkbox"/> 430 Banks and Banking <input type="checkbox"/> 450 Commerce/ICC Rates/etc. <input type="checkbox"/> 460 Deportation <input type="checkbox"/> 470 Racketeer Influenced and Corrupt Organizations <input type="checkbox"/> 810 Selective Service <input type="checkbox"/> 850 Securities/Commodities Exchange <input type="checkbox"/> 875 Customer Challenge 12 USC <input type="checkbox"/> 891 Agricultural Acts <input type="checkbox"/> 892 Economic Stabilization Act <input type="checkbox"/> 893 Environmental Matters <input type="checkbox"/> 894 Energy Allocation Act <input type="checkbox"/> 895 Freedom of Information Act <input type="checkbox"/> 900 Appeal of Fee Determination Under Equal Access to Justice <input type="checkbox"/> 950 Constitutionality of State <input type="checkbox"/> 890 Other Statutory Actions
REAL PROPERTY <input type="checkbox"/> 210 Land Condemnation <input type="checkbox"/> 220 Foreclosure <input type="checkbox"/> 230 Rent Lease & Ejectment <input type="checkbox"/> 240 Tort to Land <input type="checkbox"/> 245 Tort Product Liability <input type="checkbox"/> 290 All Other Real Property	CIVIL RIGHTS <input type="checkbox"/> 441 Voting <input type="checkbox"/> 442 Employment <input type="checkbox"/> 443 Housing/Accommodations <input type="checkbox"/> 444 Welfare <input type="checkbox"/> 440 Other Civil Rights	PRISONER PETITIONS <input type="checkbox"/> 510 Motions to Vacate Sentence Habeas Corpus <input type="checkbox"/> 530 General <input type="checkbox"/> 535 Death Penalty <input type="checkbox"/> 540 Mandamus & Other <input type="checkbox"/> 550 Civil Rights <input type="checkbox"/> 555 Prisoner Conditions			

VI. ORIGIN (PLACE AN X IN ONE BOX ONLY)

- ☒ 1 Original Proceeding ☐ 2 Removal from State Court ☐ 3 Remanded from Appellate Court ☐ 4 Reinstated or Recopened ☐ 5 Transferred from another district (specify) ☐ 6 Multidistrict Litigation ☐ 7 Appeal to District Judge from Magistrate Judgment

VII. REQUESTED IN COMPLAINT:

☐ CHECK IF THIS IS A CLASS ACTION UNDER f.r.c.p. 23

DEMAND \$
Proof at Trial

Check YES only if demanded in complaint:

JURY DEMAND: ☒ YES ☐ NO

VIII. RELATED CASE(S) IF ANY (See Instructions):

JUDGE

Docket Number

DATE

2/25/04

SIGNATURE OF ATTORNEY OF RECORD

or
FD #150.00 2/26/04 #101464 1B