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## Patent title: Face Shield for Safety Helmet

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### Abstract:

A substantially clear cycle face shield adapted for use with a cycle helmet comprised of: a mesh face cover adapted to be secured to the cycle helmet, either temporarily or permanently, for protecting the user's face when bicycling, which is manufactured using a process having a bleed rate of no more than 0.1 centimeter and which is anthropometrically designed to conform to the face and head of a user. The cycle face shield can be rigid or flexible, flat or arcuate, and can cover just the face or extend downward to protect the throat and/or extend rearward along the sides of the helmet to protect the ears and neck.

### Claims:

1. A cycle face shield comprising a mesh material adapted for selective attachment to a cycle helmet and allowing air to pass through said wherein said mesh material is contoured and constructed from a process having an acceptable bleed rate so that the face shield does not interfere with the peripheral vision of the user; a molded frame which seals the ends of the mesh material; and an adherent.
2. A cycle face shield as in claim 1 wherein said adherent consists of corresponding adhesive packed Velcro strips which securely bind said molded frame to the contours of a helmet.
3. A cycle face shield as in claim 1 wherein said shield includes at least one indicia selected from a group consisting of a label, decorative coloration, a phosphorescent material, an image, a logo, a symbol, a glitter effect, or an object.
4. A cycle face shield as in claim 1 wherein said shield is tapered and proportionate in size to said helmet and said user.

5. A cycle face shield as in claim 1 wherein said mesh is comprised of a material selected from a group consisting of aluminum, plastic, carbon fiber, fiber glass, polymer resin, polyolefin elastomeric material, and metal.
6. A cycle face shield as in claim 1 wherein said molded frame is comprised of a material selected from a group consisting of aluminum, plastic, carbon fiber, fiber glass, polymer resin, polyolefin elastomeric material, and metal.
7. A cycle helmet and face shield protection system comprising a mesh face shield; a molded frame; and an adherent.
8. A cycle helmet protection system as in claim 7 wherein said face shield is adapted for selective attachment along a forward portion of said helmet using a means of attachment selected from a group consisting of Velcro, adhesive, adhesive strips, snaps, hooks, bolts, welding, heat sealing, single molding design, contouring, suction, screws, specially constructed components to fit within corresponding apertures
9. A cycle helmet protection system as in claim 7 wherein at least a portion of said face shield is arcuate to conform to the contours of a user's head.
10. A cycle helmet protection system as in claim 7 said face shield is anthropometrically designed so as not to affect a user's peripheral vision.
11. A cycle helmet protection system as in claim 7 wherein said face shield utilizes adhesive backed Velcro strips as a means for secure attachment of said face shield to said helmet.
12. A method of manufacturing a cycle face shield comprising creating an anthropometrically proportioned die-cut mesh face screen; placing said die cut mesh face screen in an injection mold; injecting a molded substance in said injection mold to create a frame which frames said die cut mesh face screen; and affixing an adherent to said face shield to a cycle helmet using an adherent.
13. The method of claim 12 wherein said molded substance has an acceptable bleed rate.
14. The method of claim 12 wherein said adherent comprised of a Velcro strip which adheres to a bike helmet and a Velcro strip which adheres to said face shield.
15. The method of claim 12 wherein said adherent is affixed to the non-visible upper surface of said face shield and said helmet.
16. The method of claim 12 wherein said face shield is selectively attached to said cycle helmet.
17. The method of claim 12 wherein said face shield is permanently affixed to said cycle helmet.
18. The method of claim 12 wherein said face shield is anthropometrically proportioned so as not to interfere with the peripheral vision of a wearer.
19. A cycle helmet shield device comprising: a face shield constructed of singly molding a frame around an anthropometrically proportioned piece of mesh; a molded frame constructed from a process having an acceptable bleed rate so that the outer border of the mesh material does not impair the vision of the user; and an adherent for attaching said face shield to said helmet wherein said adherent is sufficiently flexible to conform to the contours of various helmets and of withstanding vibrations and motions of a cycle.
20. The cycle helmet shield system of claim 19 wherein said face shield is tapered and anthropometrically proportioned so as not to impair the peripheral vision of a user during the act of riding a cycle and which is tapered to remain in place when wind force is encountered during cycling.

## Description:

### CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority, in part, to U.S. Provisional Application No. 60/952,756 filed Jul. 30, 2007.

### FIELD OF INVENTION

[0002] This invention relates generally to the field of protective sports equipment for a cycle rider, and specifically an accessory for a cycle helmet to protect a rider's face from insects and debris.

### BACKGROUND OF THE INVENTION

[0003] It is well known in the art for motorcyclists to use helmets with face shields. Motorcycle helmets commonly include some sort of face shield to protect motorcycle riders (i.e., an enclosed helmet, a full face guard, or a partial face guard). However, the use of helmets by cycle riders has only relatively recently become common.

[0004] Cycle safety helmets are commonly molded with a hard plastic material having an inner close fitting foamed polymer liner. In case of an accident, the helmet is capable of withstanding the shock loads by the hard plastic shell of the helmet along with the resilience in the foam lining so that the force of the impact is distributed over a wider area to reduce the dangers of concussion and other head injuries. Indeed, the wearing of a regulation cycling-helmet of some type is now mandatory in many states. Thus, cyclists are becoming more accustomed to the use of helmets.

[0005] However, cycle helmets do not typically include face shields. Moreover, purchasers of cycle helmets may vary in their preferences as to whether or not they would like to wear a face shield.

[0006]It is thus desirable to have a face shield that is selectively attachable to a cycle helmet and which can be securely attached to a helmet without remanufacturing or specialized tools or processes, and which is proportioned to be used on helmets of varying sizes and shapes.

[0007]It is further desirable to have a face shield which can be inexpensively, safely and reliably manufactured and that such method of manufacture result in a device which will not impact the user's peripheral vision.

[0008]It is also desirable to have a flexible face shield which can be adapted to various size helmets and withstand the impact of the wind when a cycle is in motion, which allows the passage of air through the structure and which retains its shape and position under such conditions.

## SUMMARY OF THE INVENTION

[0009]It is an object of this invention to provide a cycle face shield for selective attachment to a cycle helmet which allows air to pass through the shield without obstructing a cyclist's view or affecting the cyclist's peripheral vision.

[0010]It is further an object of this invention to provide a cycle helmet and face shield protection system comprising a cycle helmet and a mesh face shield adapted for selective attachment to the helmet, using a method of manufacture which results in economic replication of a device with minimal "bleeding" of the molded material onto the viewable surface of the shield ("acceptable bleed rate").

[0011]The invention can be adapted for varying size helmets, and for male, female and adult helmet proportions. It may also be constructed of varying sizes of mesh (weave density) to provide varying levels of air flow and protection from insect and debris.

## BRIEF DESCRIPTION OF THE DRAWINGS

[0012]FIG. 1 shows a side view of a cyclist wearing one embodiment of a cycle helmet with the cycle face shield.

[0013]FIG. 2 shows a side perspective view of one embodiment of the cycle face shield secured to a helmet.

[0014]FIG. 3 shows a side perspective view of an alternate embodiment of the cycle face shield secured to a helmet.

[0015]FIG. 4 shows a side perspective view of an alternate embodiment of the cycle face shield with a black rubber border.

[0016]FIG. 5 shows a side perspective view of an alternate embodiment of the cycle face shield having ornamentation.

## GLOSSARY

[0017]As used herein, the term "helmet" refers to any head covering worn by a cyclist, regardless of the material, the extent of the head/face covered, and whether it contains aerodynamic features.

[0018]As used herein, the term "mesh" means a material constructed of a material having the appearance of a net through which air can pass, but which impedes the passage of bugs and debris. As used herein, mesh refers to any netting, screen or mesh-like material having any weave density or proportion known in the art and typically associated with mesh. Mesh may be constructed from plastic, cloth, metal alloys, aluminum or any other material known in the art for forming mesh.

[0019]As used herein, the term "cycle" refers to a cycle or motorized transportation device for which a helmet is traditionally worn to protect a rider. A cycle may include a cycle, a motor scooter, a motor cycle, a moped or any other motorized or non-motorized transportation device know in the art.

[0020]As used herein, the term "bleed rate" refers to excess plastic or other material known in the art which leaches or escapes from a defined mold cavity during a manufacturing process. For example, a bleed rate may refer to plastic or rubber which leaches from a mold used to construct a frame or mesh, in particular the frame used to seal the aluminum fiber ends. A bleed rate may refer to the rate at which a plastic, rubber, polyolefin elastomeric Thermoplastic Elastomer or any other material known in the art may leach or bleed from within the contours of a mold, and in particular, the rate at which an injection molded frame constructed around a piece of die-cut mesh bleeds into the mesh, leaching from the frame mold.

[0021]As used herein, an "acceptable bleed rate" is less than  $0\frac{1}{16}$ <sup>th</sup> of an inch to 0.1 cm or one square of mesh, depending upon the mesh density.

[0022]As used herein, the term "face shield" refers to a mesh or functionally similar material adapted to shield the face of a cyclist from mesh and debris.

[0023]As used herein, the term "adherent" means a means of affixing a face shield to a cycle helmet and may include Velcro, adhesive, adhesive strips, snaps, hooks, bolts, welding, heat sealing, single molding design, contouring, suction, screws, specially constructed components to fit within corresponding apertures or any other means of attachment known in the art.

[0024]As used herein, the term "arcuate" means curved or contoured, for example to complement the shape of a helmet or dimensions of a user's face, or to overcome wind resistance.

[0025]As used herein, the term "anthropometrically" means in accordance with or taking into account human proportions (e.g., male, female, adult, child) in a design, particularly with respect to the proportions of the face and head.

[0026]As used herein, the term "non-visible surface" means the surface of a face shield which faces inwardly toward the user's face.

## DETAILED DESCRIPTION OF EMBODIMENTS OF THE INVENTION

[0027]For the purpose of promoting an understanding of the present invention, references are made in the text hereof to embodiments of a cycle face shield, only some of which are depicted in the figures. It should nevertheless be understood that no limitations on the scope of the invention are thereby intended. One of ordinary skill in the art will readily appreciate that modifications such as the dimensions, size, and shape of the components, alternate but functionally similar materials (e.g., mesh) from which the cycle face shield is made, and the inclusion of additional elements are deemed readily apparent and obvious to one of ordinary skill in the art, and all equivalent relationships to those illustrated in the drawings and described in the written description do not depart from the spirit and scope of the present invention. Some of these possible modifications are mentioned in the following description. Therefore, specific details disclosed herein are not to be interpreted as limiting, but rather as a basis for the claims and as a representative basis for teaching one of ordinary skill in the art to employ the present invention in virtually any appropriately detailed apparatus or manner.

[0028]It should be understood that the drawings are not necessarily to scale, emphasis instead being placed upon illustrating the principles of the invention. In addition, in the embodiments depicted herein, like reference numerals in the various drawings refer to identical or near identical structural elements. For example the face shield described herein may be of varying shapes and proportions to accommodate various size users and helmets and levels of wind resistance, and to accommodate users wearing glasses or other facial accessories.

[0029]Moreover, the term "substantially" or "approximately" as used herein may be applied to modify any quantitative representation that could permissibly vary without resulting in a change in the basic function to which it is related. For example, one embodiment of the cycle face shield is disclosed herein as being oriented substantially parallel to a cyclist's face when secured to a cycle helmet and worn. The cycle face shield might permissibly be oriented substantially non-parallel to the user's face when secured to a helmet and worn by the cyclist and still be within the scope of the invention if its functionality is in a non parallel not materially altered.

[0030]Referring now to the drawings, FIG. 1 shows a side view of cyclist 50 wearing one (1) embodiment of cycle helmet 55 with cycle face shield 100 attached thereto. As can be appreciated, cycle helmet 55 is temporarily secured to cyclist's 50 head 52 by chin strap 56, and cycle face shield 100 is secured to the front of cycle helmet 55 to protect the face of cyclist 50.

[0031]FIG. 2 shows a top perspective view of the embodiment of cycle face shield 100 secured to cycle helmet 55 shown in FIG. 1. As can be appreciated, cycle face shield 100 is secured to forward portion 59 of cycle helmet 55 to protect a cyclist's face (not shown). In the embodiment shown, cycle face shield 100 is made of a substantially rigid mesh 105 shaped by die-cutting or any other method, and may be a plastic or metal mesh sealed with a thermoplastic elastomeric rubber a to create frame 110 which seals the ends of the mesh. In the embodiment shown, face shield 100 is affixed to cycle helmet 55 by adherent 60, which in the embodiment shown is a set of complementary adhesive-backed Velcro strips. In such an embodiment, cycle face shield 100 protects the cyclist's forehead, eyes, ears cheeks, nose, and chin. However, it should be understood that alternate embodiments of cycle face shield 100 could extend lower (See FIG. 3) to protect the cyclist's ears, neck and throat and/or outward to provide some protection to the cyclist's ears of speeds of between four and forty miles per hour.

[0032]In the embodiment shown adherent 60 are Velcro strips having a non water-soluble adhesive backing. In the embodiment shown, the Velcro strips used as adherent 60 are approximately one to one inches wide by 6-8 inches and of sufficient flexibility to accommodate varying sizes of helmets, and helmet contours, while providing a sufficient adhesive surface to withstand winds of up to 40 mph on a bicycle helmet and substantially higher speed for motorcycles.

[0033]In various other embodiments, adherents may include adhesive strips, snaps, hooks, bolts, welding, heat sealing, single molding design, contouring, suction, screws, specially constructed components to fit within corresponding apertures or any other means of attachment known in the art.

[0034]In the embodiment shown, face screen 100 is created by suspending die-cut mesh 105 in an injection mold, into which polyolefin elastomeric (Thermoplastic Elastomer) or any other material known in the art having an acceptable bleed rate is injected to form frame 110 which seal the mesh fiber ends of mesh 105 and prevents them from irritating a user's face. The fibers of the mesh are vertically suspended within a mold, and centered to minimize the bleed rate during the injection process, and minimize the movement of the fibers within the frame. The mesh ends are sealed and coated within the molded frame to prevent movement of the fibers and protect a users face from the ends of the fibers.

[0035]The cycle face shield is desirably formed of a single molding process having an acceptable bleed rate (i.e., the amount of plastic which leaches or escapes from a defined mold cavity during the manufacturing process), e.g., of no more than 0.1 cm.

[0036]This embodiment of cycle face shield 100 is substantially flat vertically, but has in other embodiments could be sloped or have an arcuate curve. It should be understood that cycle face shield 100 can be rigidly constructed and custom-curved for a specific make and/or model of cycle helmet 55, or cycle face shield 100 can be somewhat flexible, allowing it to be bent horizontally vertically or horizontally for use with a variety of cycle helmets 55, and for users having adult, juvenile, male or female anthropometric proportions. Further alternate embodiments of cycle face shield 100 can be more or less horizontally arcuate along arrow A, be multi-faceted, or be substantially flat.

[0037]In the embodiment shown, cycle face shield 100 has tapered edges 69a and 69b, and flattened edge 71 to minimize wind resistance and conform. In the embodiment shown, edges 69a and 69b are tapered at an approximate 12-20 degree angle. The embodiment of cycle face shield 100 shown in FIG. 3 is secured to cycle helmet 55 by a Velcro® strip 60, thus creating a selectively removable, attachment of cycle face shield 100 to cycle helmet 55, whereby the face 100 can be disengaged by separating the complementary Velcro strips.

[0038]FIG. 3 shows an alternate embodiment in which cycle face shield 100 is permanently secured to cycle helmet 55 via apertures 55a, 55b

and 55c created during the molding process. Other embodiments may have varying numbers, shapes and sizes of apertures for affixation. Thus, it should be understood that cycle face shield 100 can be secured to cycle helmet 55 by any mechanism known and commonly used in the art, including but not limited to snaps, an adhesive, a hook and latch mechanism, buttons, the use of one (1) or more hooks on either cycle helmet 55 or, cycle face shield 100 and corresponding apertures on the other, or a band that encircles cycle helmet 55.

[OO39]Furthermore, the mechanism by which cycle face shield 100 is secured to cycle helmet 55 should not be limited to any particular number of attachment points. For example, the embodiment of cycle face shield 100 shown in FIG. 2 is secured to cycle helmet 55 by four (4) Velcro® strip 60, but can be secured by any number of Velcro® strip 60. It should also be understood that the same is true for the other attachment mechanisms, whether permanent or temporary.

[OO40]The embodiment of cycle face shield 100 shown in FIGS. 1 through 2 is made of a substantially clear and rigid or semi metal or plastic mesh plastic which air allows air to pass through. This provides sufficient protection against dirt, debris, and insects for the cyclist as well as not obstructing the cyclist's view and permitting air flow. It also allows easy cleaning of cycle face shield 100. However, one of ordinary skill in the art that other materials that provide similar advantages and have similar characteristics can be used so long as the materials are substantially clear to permit ease of viewing through cycle face shield 100.

[OO41]FIG. 4 shows a top perspective view of an alternate embodiment of cycle face shield 100 secured to cycle helmet 55. In the embodiment shown, cycle face shield 100 is aerodynamically shaped to minimize wind resistance, being wider at the top and tapered on the sides. In other embodiments, faces shield 100 may be of varying dimensions to accommodate male, female, adult and juvenile uses and/or to provide additional protection for the cyclist's neck. FIG. 4 shows tapered edges 69a and 69b, and flattened edge 71 which is narrower than upper edge 73 to minimize wind resistance and conform. In the embodiment shown, edges 69a and 69b are tapered at an approximate 12-20 degree angle.

[OO42]In the embodiment shown in FIG. 4, cycle face shield 100 is made of a die cut me metallic mesh 105 which has been suspended in a plastic injection mold into which plastic as been injected to seal the ends of the mesh and create a frame 110. In the embodiment shown, the acceptable bleed rate from the frame portion of the mold is no more than 0.1 cm. The aerodynamic design of the face shield allows the face shield 100 to hang vertically whether the cyclist is looking forward or downward. Such a construction will also provide greater comfort for some users. In this embodiment the mesh is clear in color, but in other embodiments the mesh may be of another color or may be constructed of aluminum, plastic, carbon fiber, fiber glass, polymer, resin, metal or any other substance capable of being formed into a lightweight mesh which may be attached to a cycle helmet.

[OO43]In still other alternate embodiments of cycle face shield 100, cycle face shield 100 can extend substantially around the sides of cycle helmet 55 or even extend entirely around cycle helmet 55. Such an alternate embodiment of cycle face shield 100 will provide additional protection to the cyclist's ears and/or back of the neck. Especially for those embodiments of cycle face shield 100 using the flexible mesh shown in and described with respect to FIG. 3, such an embodiment will also provide protection against insects.

[OO44]While the cycle face shield has been shown and described with respect to several embodiments and uses in accordance with the present invention, it is to be understood that the same is not limited thereto, but is susceptible to numerous changes and modifications as known to a person of ordinary skill in the art, and it is intended that the present invention not be limited to the details shown and described herein, but rather cover all such changes and modifications obvious to one of ordinary skill in the art.

[OO45]In the embodiment shown, face shield mesh 105 is constructed from a coated aluminum screen cloth known in the art as Goldstrand, but may be constructed of any other material such as plastic, rubber, resin, metal alloys, fabric or other metals. For example, ingredients such as chromium, magnesium, and manganese may be added or used in any proportion.

[OO46]Various exemplary embodiments may have a frame constructed of a clear or visually minimized frame 110, with approximate dimensions of one-fourth to one-eighth inch, sealing the edges of the mesh and one or more bonded layers of mesh, Velcro®, labels or other layers of materials at the top and sealing or locking the mesh ends together for strength and to prevent the user's face from becoming scratched or irritated. A plastic, clear polymer or other material capable of molding and sealing may be used.

[OO47]In various embodiments mesh screen 105 alternately colored aluminum mesh fibers, created by painting or screening or by interweaving of alternately colored fibers, for example to create a whimsical mask-like effect or holographic visual effect (not shown).

[OO48]FIG. 5 shows an alternative embodiment which includes ornamentation 150 consisting of painting, screening and/or imaging. Other ornamentation may include holographic images, phosphorescent areas, sports logos, symbols, colors, objects, glow-in-the dark or glitter effect. Ornamentation may be achieved a screening process, painting, molding, machining or by affixing ornamentation with and adhesive

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