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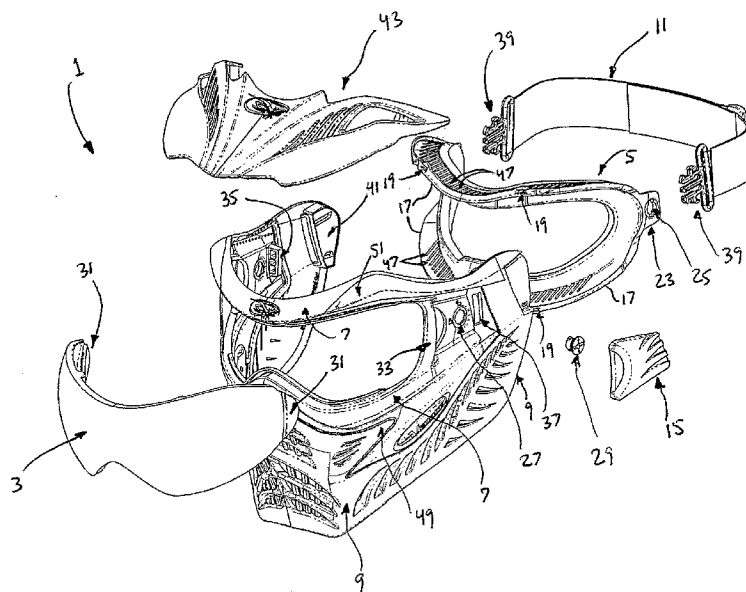
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(54) Title: PROTECTIVE FACE MASK



(57) Abstract: The present invention relates to a protective mask adapted to be worn by a person engaging in the game of paintball. The mask has a main body to cover the front, sides, mouth and ears of a user's face. It also has a removable flexible transparent lens that locks into a rigid support frame formed in the mask. The mask also has a strap to securely support the mask on a wearer's head, and a removable face engaging element provided to accommodate a face of the wearer. This face engagement element evenly engages around the wearer's face in a cushioned manner because its face engagement portion is made of foam that engages the user's face along the entire perimeter of the face engagement element. The face engagement element is securely locked onto the mask by locking clips that fit into openings on both sides of the face engagement element.

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## **PROTECTIVE FACE MASK**

### **Field of the invention:**

The present invention relates to a protective face mask. More particularly, the preferred embodiment of the present invention relates to a protective face mask for activities such as paintball and the like. The present invention also relates to a kit for assembling a protective face mask, and to a method of use.

### **Background of the invention:**

It is well known in the art that sports such as paintball and the like are activities where the participants use a gun or a marker in the form of a firearm that shoots paintball capsules, generally spherical in shape, at very high velocity such as 250 to 300 feet per second. Thus, the players of such sports require appropriate protective gear to protect their eyes and faces for safety and to minimize injuries.

Protective face masks used for applications such as paintball and the like are known in the art. Most face masks on the market comprise an inner face open-cell foam portion mounted onto the frame of the mask by means of an adhesive. Considering that the foam is glued into the frame itself, it is impossible to easily replace it. The reason one would desire to replace said foam is because during game play, a player will sweat profusely thus causing the foam to become soiled, moist, and unpleasant to the wearer.

Another substantial drawback associated with conventional face masks is the fact that since the foam cannot be easily interchanged, masks rented on paintball fields pose sanitary and hygienic concerns for subsequent players.

Yet another drawback of conventional masks is the fact that glued foam portions cannot be adapted to various physical traits of a player's face. It is known in the art that maximum safety and enjoyment can only be attained if the mask fits the player snugly and securely.

There are also known in the art protective paintball face masks that comprise interchangeable face foams. For example, some face masks commercialized by the company JT™ (see [www.jtusa.com](http://www.jtusa.com)) comprise a paintball mask with the option of an interchangeable foam, but this foam is generally retained in place by a hook and loop assembly (i.e. Velcro™) on the frame of the mask rather than being glued. However, there are substantial drawbacks associated with this manner of mounting the face foam onto the given mask: the Velcro™ bands will eventually cause noticeable ridges along their contours through the foam that can be felt by the user thus causing discomfort. Furthermore, the Velcro™ bands are not provided along the entire surface of the face foam; during game play, the foam can easily dislodge or slip off the intermittent Velcro™ bands thus necessitating the user to stop game play, remove the mask and properly reposition the foam. Finally, even when the foam is properly adhered using the hooks and loops, the fact that the bands are intermittent will never translate into an optimal fit to the user's face.

Hence, in light of all the aforementioned, there is a need for a mask, which by virtue of its design and components, would be able to overcome some of the above-discussed prior art problems.

**Summary of the invention:**

The object of the present invention is to provide a mask that provides an improvement over the prior art. The preferred embodiment of the present invention is a protective face mask for sports such as paintball and the like as well as military uses. This mask is adapted to be worn by a person, and comprises a main body adapted to cover a front, sides, a mouth and ear portions, a removable flexible transparent lens adapted to be locked into a support frame formed in the mask, the support frame being made of rigid material. The mask also comprises a strap adapted to securely support the mask on a wearer's head, a face engaging element having a configuration provided to accommodate a face of the wearer, the face engaging element adapted to be removably mounted within the mask and wherein the element has a face engaging portion adapted to be evenly engaged around the face of the wearer in a cushioned manner.

The face engaging element is made of rigid material and provided with an engagement means adapted to cooperate with corresponding engagement means formed within the support frame of the mask. The face engagement portion is made of foam, adapted to engage the face along the entire perimeter of the face engagement element. The face engagement element is securely locked on the mask by means of a face engagement locking means adapted to fit into openings formed on both sides of the face engagement element. The locking means are further adapted to fit into corresponding openings formed on both sides of the support frame.

The lens is securely locked on the support frame of the mask by lens locking clips that are adapted to cooperate with lens extremities formed on both

sides of the lens. These clips are provided with protrusions adapted to fit into corresponding orifices formed in the support frame, and the strap is provided with strap clips located on both sides of the strap, these clips adapted to be securely locked within corresponding openings formed within the protrusions of the lens locking clips in a male-female manner.

The mask is further provided with removable temple support elements mounted on both sides of the support frame that are adapted to provide an additional cushioning comfort to the wearer of this mask. The mask further comprises a removably-mounted visor portion.

The objects, advantages and other features of the present invention will become more apparent upon reading of the following non-restrictive description of preferred embodiments, given for the purpose of exemplification only with reference to the accompanying drawings.

**Brief description of the drawings:**

Figure 1 is a front perspective view of a protective face mask according to a preferred embodiment of the present invention.

Figure 2 is an exploded view of Figure 1.

Figure 2a is a front view of replaceable foam portion.

Figure 2b is a cross-section of Figure 2a along line A-A.

Figure 2c is a perspective view of lens lock clip.

Figure 2d is a front view of Figure 2c.

Figure 3 is a front view of Figure 1.

Figure 3a is a back view of temple support.

Figure 3b is a right view of Figure 3a.

Figure 3c is a back view of Figure 3a.

Figure 3d is a left side view of Figure 3a.

Figure 3e is a perspective view of Figure 3a.

Figure 4 is a left view of Figure 1.

Figure 5 is a back view of Figure 1 without the fastening strap.

Figure 5a is rear view of Figure 1 without replaceable foam portion.

Figure 6 is a right view of Figure 5.

Figure 7 is a top view of Figure 1.

Figure 8 is a bottom view of Figure 1.

Figure 9 is a front perspective view of a protective face mask according to another preferred embodiment of the present mask with a visor.

Figure 10 is an exploded view of what is shown in Figure 9.

Figure 10a is a top view of the visor.

Figure 10b is a rear perspective view of a face engagement element.

Figure 11 is a front view of Figure 9.

Figure 11a is a top view of the visor.

Figure 11b is a front view of Figure 11a.

Figure 11c is a bottom view of Figure 11a.

Figure 11d is a perspective view of Figure 11a.

Figure 11e is a left view of Figure 11a.

Figure 11f is a cross-section view of Figure 11b along line A-A.

Figure 11g is a view of a fragment cross-section of a visor protrusion.

Figure 12 is a left view of Figure 9.

Figure 13 is a rear view of Figure 9 without the fastening strap.

Figure 14 is a right view of Figure 13.

Figure 15 is a top view of Figure 9.

Figure 16 is a bottom view of Figure 9.

Figures 17-20 are partial schematic representations of the removal of a lens of a protective face mask according to a preferred embodiment of the present invention.

Figures 21-23 are schematic representations of the installation of a lens.

Figures 24 to 25 are schematic representations of installation of a visor.

Figures 26 – 30 are a schematic representation of removal of replaceable foam portion.

Figures 31 – 35 are a schematic representation of installation of replaceable foam portion.

**Detailed description of preferred embodiments of the invention:**

In the following description, the same numerical references refer to similar elements. The embodiments shown in the figures are preferred, and are namely used for exemplification purposes only.

The present invention was primarily designed as a protective face mask 1 for sports such as paintball; it also has other applications such as military and the like. Thus, the following description should not be construed as limiting only to the enumerated applications, and should be considered on a broader spectrum.

Referring now to drawings, Figure 1 illustrates mask 1 according to a preferred embodiment of the present invention. As seen on Figure 2, mask 1 comprises a substantially rigid support frame 7 and a complementary mouth and ear portion 9 that is substantially flexible, and which is either glued on or overmolded onto the substantially rigid support frame 7 via a suitable manufacturing process. The substantially rigid support frame 7 is generally provided for protecting the user and for mounting different components of the face mask, while the more substantially flexible mouth and ear complementary portion 9 protects the mouth and the ear regions of the user.

The substantially rigid support frame 7 is operatively rested against the face of a user, and is appropriately fastened on user's face via a corresponding fastening strap 11, as seen on Figures 2 and 9. Moreover, as can be easily understood when referring to Figures 2, 9 and Figures 17-23, a lens 3 is preferably provided, and is preferably removably mountable onto the substantially rigid frame 7. According to the preferred embodiment of the present invention, lens 3 is

transparent to enable a user to properly see through it, and is made of a suitable material such as polycarbonate or other strong materials known in the art.

Lens 3 and frame 7 should be preferably designed so as to comply with ASTM and other norms required in the industry in terms of impact and the like, as required by the given sport for which the protective face mask is intended for. Indeed, generally, a series of tests are carried out on the protective face mask, and the latter is preferably designed so as to ensure a proper retention of the lens, without the penetration of paint from the paintballs, or any other projectile in other applications such as military applications, in the region of the eyes of the wearer as well as other sensitive regions of the wearer's head. The protective face mask according to the present invention should also be designed so as to properly withstand different ranges of temperatures.

As can be also easily understood when referring to Figures 2 and 9, the protective face mask according to the present invention is preferably shaped and sized so as to properly cover and shield the face of a given user, namely in the region of the eyes, such as the eyes, the eyebrows, the cheekbones, and other adjacent regions, such as the ears, the temples, and other regions of the face or of the head of the user which may be subject to the impact of paintballs and the like or the penetration of other projectiles in other applications.

As better shown in Figures 2 and 9, as well as in Figures 26-35, the protective face mask preferably comprises a face engaging element or foam support 5, provided with a corresponding face engaging portion or foam 13, which preferably acts as a cushion between the face of the given user and the substantially rigid support frame 7 of the face mask, and also preferably comprises, as aforementioned, a substantially elastic fastening strap 11 so as to properly and adequately retain the protective face mask in place about the face and/or head of the corresponding user.

Lens 3 is preferably locked into place with a pair of lens lock clips 15. These lens lock clips 15, provided on preferably the left and right sides of the protective face mask 1, respectively lock the lens 3 into place onto the substantially rigid support frame 7. Substantially rigid support frame 7 of the mask is preferably made of nylon or any other suitable material known in the art for its characteristics, and mouth and ear portion 9 is preferably made of Santoprene™ and other material known in the art for elastic characteristics.

An important aspect of the present invention is that the protective face mask also comprises a face engaging element or foam support 5 which is removably mountable onto the protective face mask, preferably onto the substantially rigid support frame 7. Foam support 5 is removably connectable and kept in place on the frame 7 to act as an interface between the mask (and more particularly, the frame thereof) and the face of a user.

Removable and detachable foam support 5 preferably comprises rims 17 shaped and sized so as to be received into corresponding complementary recesses 20 provided along an inner portion of the substantially rigid support frame 7 (Fig. 5). Face engaging element 5 is provided with an engagement means such as orifices 19 to be introduced into corresponding engagement means formed in the support frame 7, such as alignment pins 21 (Fig. 5) projecting from said inner portion of said support frame 7. Face engagement element 5 is provided with face engagement locking means comprising side tabs 23 provided with corresponding holes 25 intended to cooperate with corresponding side holes 27 of the support frame 7 and intended to be securely affixed thereto via corresponding lock buttons 29, so as to securely maintain the foam support 5 in place when it has been properly positioned about the protective face mask, and more particularly the substantially rigid support frame 7. As can be easily understood by a person skilled in the art when referring to the accompanying drawings, and more particularly Figures 2 and 9, as well as Figures 26-35, once the lock buttons 29 have been used to properly secure the foam support 5 about

the mask frame, a pair of lens lock clips 15 are clipped onto the mask, one on each side of said mask 1, so as to properly cover access to said lock buttons 29, and securely maintain the lens 3 in place, as a result of the lens lock clips 15 being shaped and sized so as to cover not only the lock buttons 29, but also cooperate with a corresponding extremity 31 of the lens 3 projecting from a side bar 33 of the mask when appropriately mounted onto the substantially rigid support frame 7, as better shown in Figures 2 and 9, as well as in Figures 17-23.

According to the preferred embodiment of the present invention, the lens lock clips 15 (Figs. 2c,d) are provided with corresponding protrusions 35 intended to be inserted through corresponding side slits 37 of the protective face mask, so as to protrude from an inner portion of said mask, and so as to receive corresponding strap clips 39 located on both ends of the fastening strap 11. Protrusions 35 of the lens lock clips 15 comprise female recesses 35a intended to receive corresponding male protrusions 39a extending from the strap clips 39. As can be easily understood by a person skilled in the art when referring to the accompanying drawings and the present description, the design of such lens lock clips 15 and their interaction with the other components of the protective face mask are intended so that a user first requires to properly install and secure the foam support 5 and/or lens 3 onto the support frame 7 before being able to properly connect the strap 11 onto the mask and mounting said mask 1 onto the corresponding user, which is particularly advantageous, in that the mask is intended to ensure that the proper safety features are in place before enabling the user to use said mask. Indeed, for example, if the lock clips 15 are not properly mounted onto the protective face mask, then a user would not be able to clip the corresponding fastening straps clips 39 into said lock clips 15, and to be able to use the protective face mask with corresponding fastening strap.

Furthermore, the provision of such lens lock clips 15 is also particularly advantageous in that they are preferably intended so as to prevent the lens from being dislodged during impact of paintballs and the like.

As previously mentioned, a main function of the lens lock clips 15 is to retain the lens 3 onto the protective face mask, in the preferred manner described above, but also to retain and ensure that the lens 3 remains in place during the impact, or the repeated impacts of paintballs and the like. Without the lens lock clips 15 mounted onto the protective face mask (as seen on Figures 17-35), the fastening strap 11 cannot be removably connected onto the protective face mask, and the user would not be able to use the protective face mask. This procedure ensures that the user has undertaken certain preliminary safety measures regarding the mask before using it.

In addition to the above-mentioned foam support 5, the protective face mask according to the present invention comprises temple foam supports 41, as better shown in Figures 2, 2a-2e, which are preferably intended so as to ensure also a greater comfort and stability of the mask. More particularly, the protective face mask preferably comprises a pair of temple foam supports 41 (Figs. 3a-3e), one on each side of mask 1. Temple foam supports 41 are preferably removably mounted onto the mask 1, and more particularly onto a rear extremity of the mouth and ear complementary assembly 9. Each temple foam support 41 comprises a pair of pins 42 projecting from a rear portion thereof, said pair of pins 42 as seen on Figures 3a to 3e being removably insertable and clipped into corresponding holes 44 provided along a rear portion of the mouth and ear protective overmolded assembly 9, as can be easily understood when referring to Figures 2 and 9. Foam 40 is glued to the face-engaging surface of temple foam supports 41. Other attachment methods of temple foam supports 41 are available to the skilled in the art.

Different suitable materials or foams known in the art can be used for the foam 13 of the foam support 5, and/or on the temple foam supports 41. Preferably, foam 13 and foam of temple support 41 is attached by gluing.

According to another preferred embodiment of the present invention, and as better illustrated in Figures 10, 10a and 10b, the protective face mask may be provided with a corresponding visor 43, which is preferably mechanically attached to the foam support 5 by means of protrusions 42 extending from inner surface of visor 43. Said protrusions 42 are adapted to be locked into corresponding slots 47 formed in the face engagement element 5. Visor 43 is not only functional, in that it is intended to protect or shade the eyes of the mask user from sunlight and the like, but also provides the mask with a certain aesthetic style. Furthermore, the provision of such visor 43 can also be intended to protect the lens 3: if the mask is dropped incorrectly onto a surface, visor 43 is shaped in such a way that it will deflect any deleterious blow to lens 3, and is thus intended to protect the lens against scratching and other undesirable effects.

The material used for the frame 45 of the foam support 5 is preferably nylon, or any other suitable material, so as to provide for a substantially rigid frame 45 of the foam support. Visor 43 is preferably made of a more flexible material such as a thermoplastic elastomer or Santoprene™, but may be made of other suitable materials.

An important advantage resulting from the present invention resides in that the foam support 5 is a separate piece that is removably mountable onto the protective face mask, and more particularly the support frame 7. It can be easily interchanged not only to replace foam 13 for either wear or hygienic reasons, but to customize mask 1 for any characteristic trait of a person's face. For example, the same mask 1 can be used during the transition from child to adult by simply swapping foam support 5 from a smaller to a larger size. Removable foam support 5 is advantageous for a same user during one day of use: if one foam support 5 becomes moist due to excessive perspiration, the user may easily replace a wet foam support 5 with a dry foam support 5, thereby resulting in a more enjoyable day of sports.

The foam support 5 and lens 3 according to the present invention are preferably designed so as to be removably mountable and fastened/clipped onto the mask in a "user friendly" manner so as to enable for an easier part replacement without the need of tools except a coin (see Figures 17-35).

Figures 17-20 illustrate partial schematic representations of a removal of a lens from a protective face mask according to a preferred embodiment of the present invention, wherein Figure 17 illustrates the declipping of the strap, Figure 18 illustrates the removal of the lock clip 15, Figure 19 illustrates the removal of one side at a time of the lens 3, and Figure 20 illustrates the pushing of the lens 3 out of the frame.

Figures 21-23 are partial schematic representations of the installation of the lens onto the protective face mask according to a preferred embodiment of the present invention, wherein Figure 21 illustrates the insertion of the lens 3 onto the mask, Figure 22 illustrates the insertion of the lock clip 15 back into place, a portion of the lock clip 15 being inserted behind an extremity 31 of the lens 3 so as to fasten and abut said extremity against the sidebar 33 of the support frame 7, and Figure 23 illustrates the clipping of the strap 11 back into a corresponding protrusion 35a of the corresponding lock clip 15.

Figures 24 and 25 are schematic representations of the installation of a visor 43 onto the protective face mask according to a preferred embodiment of the present invention, wherein Figure 24 illustrates the insertion of the visor, and more particularly the insertion of corresponding protrusions 42 of said visor 43 into corresponding slots 47 of the foam support 5, and Figure 25 illustrates the insertion of corresponding o-rings 28 so as to properly attach and secure the visor 43 to said foam support 5, as can be easily understood by a person skilled in the art.

Figures 26-30 are partial schematic representations of a removal of a foam support 5 onto a protective face mask according to a preferred embodiment of the present invention, wherein Figure 26 illustrates the declipping of the strap 11, Figure 27 illustrates the removal of the lock clip 15, Figure 28 illustrates the turning of the lock button 29 clockwise into the "unlocked" position, Figure 29 illustrates the pulling of the foam support 5 on one side at a time from the support frame 7 of the mask, and Figure 30 illustrates the removing of the foam 5 support from the frame 7.

Figures 31-35 are partial schematic representations of the installation of a foam support 5 onto a protective face mask according to a preferred embodiment of the present invention, wherein Figure 31 illustrates the insertion of the foam support 5 into the preferred corresponding four pins 21 projecting from an inner portion of the substantially rigid support frame 7 of the mask, Figures 32 illustrates putting the foam support 5 back onto the support frame 7, one side at a time, Figure 33 illustrates turning the lock button 29 counterclockwise into the "locked position", Figure 34 illustrates the removing of the lock clip 15, and Figure 35 illustrates the declipping of the strap 11.

Thus, in view of the above, it can be easily understood that the installation or removable of the foam support 5, and other components of the protective face mask, such as the lens 3, the visor 43, and the like, are easily carried out in a "user friendly" manner, without the use of specialized tools. For example, a user only requires to remove the strap 11 to be able to remove the corresponding lock clip 15, and thus operate the corresponding lock buttons 29 to properly remove the foam support 5 from the substantially rigid support frame 7 of the mask 1. The operation of the lock buttons 29, namely the operation between the corresponding locked and unlocked positions, can be carried out via a coin-shaped element (not shown) shaped to be insertable into a corresponding recess of the lock button 29. Preferably, the lock buttons 29 are designed so that each one of them be turned in a proper direction, along one quarter of a turn preferably, between

corresponding demonstrative icons (see Fig. 28) representing the "unlocked" and "locked" positions.

Foam support 5 can be modified with casings or housings that would enable greater or improved ventilation or that can receive electronics to enable a system of communication with other protective face masks 1. Other applications for foam support 5 are possible as conceived by the skilled in the art.

As better shown in Figures 2 and 9, the foam support 5 is preferably provided with a corresponding frame 45 being shaped and sized accordingly to somewhat distance the face and eyes of a given user from the support frame 7 of the mask. Corresponding slots 47 on upper and lower portions of said support frame 45 of the foam support 5 enable improved air circulation between the face of the user and the lens to prevent condensation on the lens, and provide for more comfort. Upper slots 47 of the corresponding frame 45 of the foam support 5 are also intended to receive the projecting fastening pins 42 of a visor 43 according to a preferred embodiment of the present invention, seen on Figures 9-16, and the installation of said visor 43 as seen on Figures 24 and 25.

Considering that the material used for frame 45 of the foam support 5 is substantially rigid, frame 45 of said foam support 5 is preferably provided with a series of longitudinal slits 48 (Fig. 2a) on an inner portion thereof to provide the foam 5 support with a certain curvature flexibility.

Overmolded complementary mouth and ear portion 9 of the protective face mask is preferably provided with corresponding orifices and grilled portions so as to enable a proper breathing and/or hearing capability to the user of the mask, and preferably comprises distinguishing features so as to provide the mask with a corresponding esthetic profile. For example, the overmolded complementary portion of the mask preferably comprises a pair of rearwardly projecting horns 49 on the front mouth portion of the mask, and also preferably comprises

corresponding upper intrusions 51 in the upper portion of the mask so as to be representative of "eyebrows", or other like features. Preferably also, the color of the material of the substantially rigid support frame 7 of the mask and that of the overmolded complementary portion 9 are different so as to create a visual contrast between the support frame and the corresponding overmolded portion. Thus, it can be easily understood by a person skilled in the art that one may use the technology of overmolding so as to provide the present protective face mask with corresponding overmolded complementary portions which would provide the mask with distinguishable esthetic features, so as to give a particular look to the mask, or to a corresponding family of masks, of a given manufacturer (distributor, wholesaler, etc.) of masks according to the present invention.

Finally, and according to the present invention, the mask and corresponding parts are preferably made of substantially rigid materials, such as hardened polymers, composite materials, and/or the like, whereas other components thereof according to the present invention, in order to achieve the resulting advantages briefly discussed herein, are preferably made of a suitably malleable and resilient material, such as a polymeric material (plastic, etc.), and/or the like, depending on the particular applications for which the mask is intended for and the different parameters in cause, as apparent to a person skilled in the art.

Furthermore, the present invention is a substantial improvement over the prior art in that, by virtue of its design and components, the mask 1 and corresponding parts are simple and easy to use, as well as are simple and easy to manufacture and/or assemble, without compromising the reliability of its functions. Hence, it may now be appreciated that the present invention represents important advantages over other masks and systems known in the prior art, as briefly explained hereinabove.

Thus, it can be seen that the objects of the present invention have been satisfied by the structure presented hereinabove. While in accordance with the Patent Statutes, only the best mode and preferred embodiments of the present invention have been presented and described in detail, it is to be understood that the invention is not limited thereto or thereby. Accordingly, for an appreciation of the true scope and breadth of the invention, references should be made to the following claims.

1. A facial protective mask (1) adapted to be worn by person engaging in paint ball game or the like comprising:

a main body,

a removable flexible transparent lens (3) adapted to be locked within said main body;

a strap (11) supporting said mask on a wearer's head in secure manner;

said mask characterized that it comprises

a face engaging element (5) having a configuration provided to accommodate a face of said wearer, said face engaging element adapted to be removably mounted within said mask and

wherein said face engaging element (5) is provided with a face engaging portion (13) adapted to be evenly engaged around the face of said wearer in a cushioned manner.

2. Protective mask (1) according to claim 11, wherein said face engaging element (5) is provided with an engagement means (19) adapted to cooperate with corresponding engagement means (21) formed within the main body of said mask.

3. Protective mask (1) according to claim 1, wherein said face engagement portion (13) is made of a foam, wherein said foam is adapted to engage said face along the entire perimeter of said face engagement element (5).

4. Protective mask (1) according to claim 1, wherein said face engagement element (5) is securely locked on said mask by means of a face engagement locking means (29), said face engagement locking means (29) are adapted to fit into openings (25) formed on both sides of said face engagement element (5), and wherein said locking means (29) are further adapted to fit into corresponding openings (27) formed on both sides of said mask (1).

5. Protective mask (1) according to claim 1, said mask is further provided with a support frame (7) formed within said mask (1), said support frame (7) is made of rigid material, and wherein said lens (3) is securely locked on said support frame (7) of said mask (1) by a lens locking clips (15), said lens locking clips (15) are adapted to cooperate with lens extremities (31) formed on both sides of said lens (3).

6. Protective mask (1) according to claim 5, wherein said lens locking clips (15) are provided with protrusions (35) adapted to fit into corresponding orifices (27) formed in said support frame (7), and wherein said strap (11) is provided with strap clips (39) located on both ends of said strap (11), said strap clips (39) are adapted to be securely locked within corresponding openings (35a) formed within said protrusions (35) in a male-female manner.

7. Protective mask (5) according to claim 5, wherein said mask is further provided with a removable temple support elements (41) mounted on both sides of said support frame (7), said temple support elements (41) are adapted to provide an additional cushioning comfort to the wearer of said mask.

8. Protective mask (1) according to claim 5, wherein said mask further comprises a visor portion (43), said visor portion (43) is removably mounted on said support frame (7).

9. Protective mask (1) according to claim 5, wherein said engagement means of said face engagement element (5) are a number of orifices (19) formed around an outer perimeter of said face engagement element (5), said orifices are adapted to cooperate with corresponding alignment pins (21) projecting from an inner portion of said support frame (7).

10. Protective mask (1) according to claim 1, wherein said main body is made of rigid material, such as plastic, said main body is provided to cover a front and sides of said mask, and wherein said mask further comprises a mouth and ear portion (9) mounted on said main body, said mouth and ear portion (9) is made of substantially flexible material.

11. Protective mask (1) according to claim 8, wherein said visor portion (43) is mounted on said support frame by means of a number of protrusions (42) extending from a lower edge of said visor portion (43).

12. Protective mask (1) according to claim 11, wherein said protrusions (42) are adapted to securely lock in corresponding slots (47) formed along an upper edge of said face engaging element (5).

13. Protective mask (1) according to claim 5, wherein said face engaging element (5) is adapted to be accommodated within a recess (20) formed along an inner perimeter of said support element (5).

14. Protective mask (1) according to claim (7), wherein said temple support elements (41) are adapted to be locked on said support frame (7) by means of protrusions (42) formed on inner surface of said temple support elements (41), wherein said protrusions (42) are adapted to be locked within corresponding orifices (44) formed in said support frame (7).

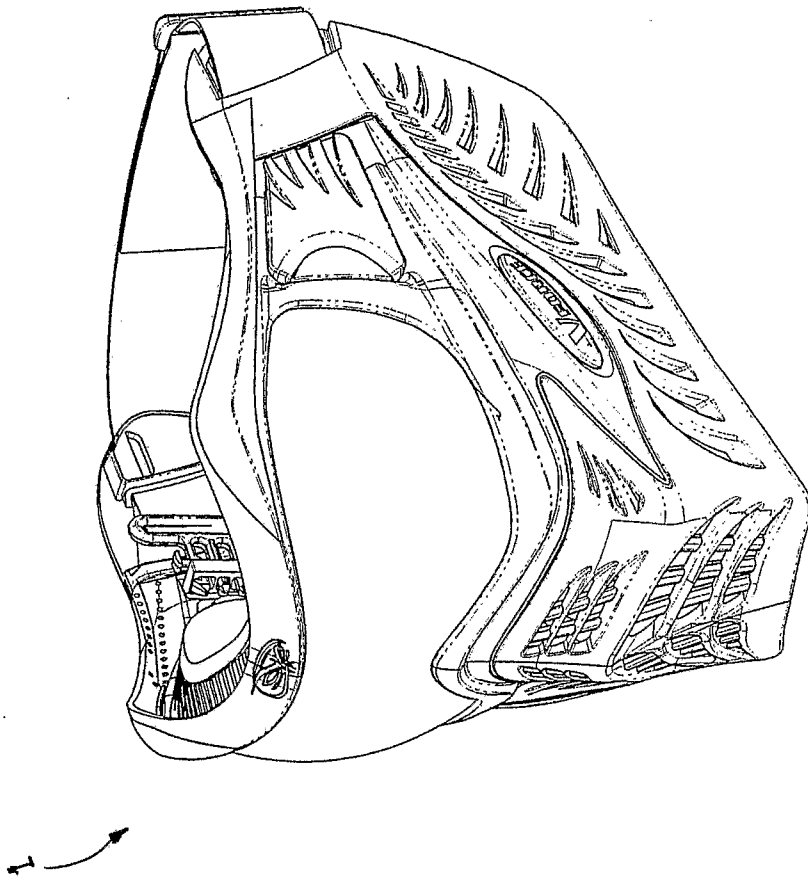
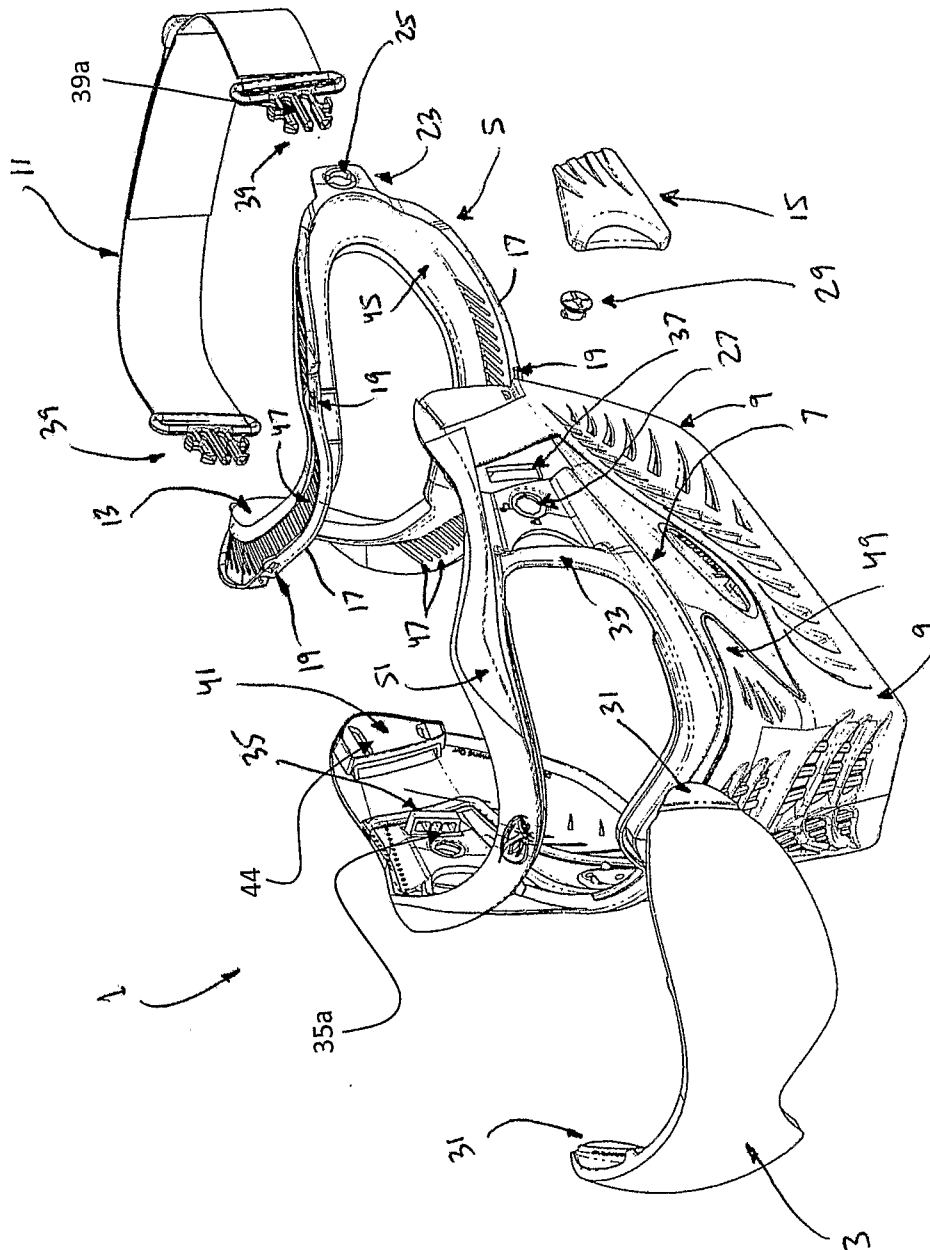


Figure 1



## Figure 2

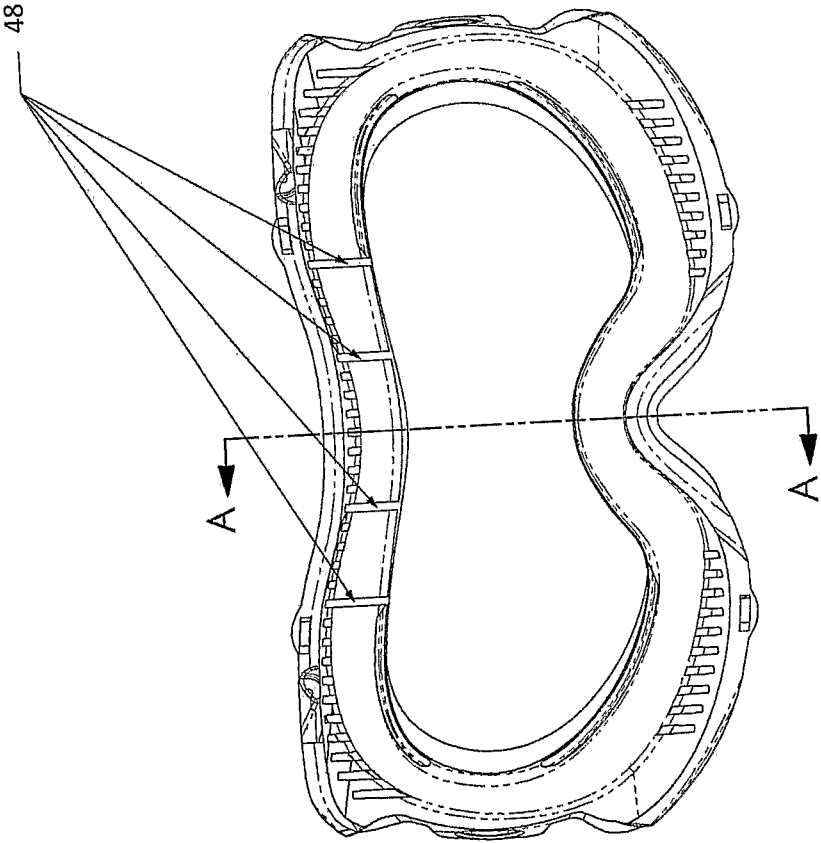


Figure 2a

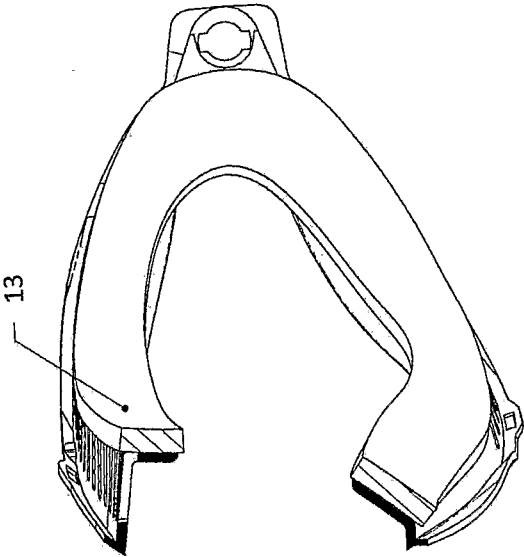


Figure 2b

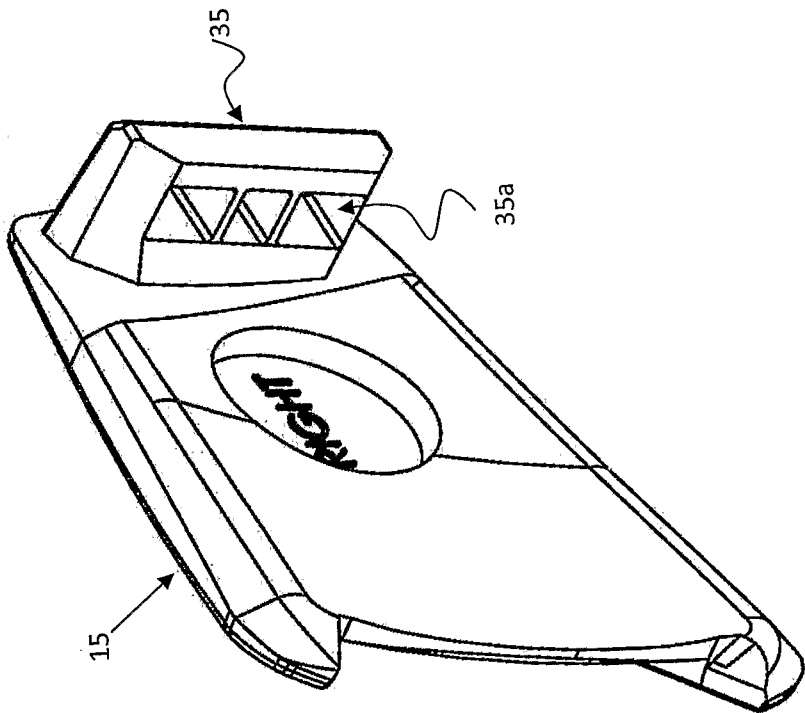


Figure 2c

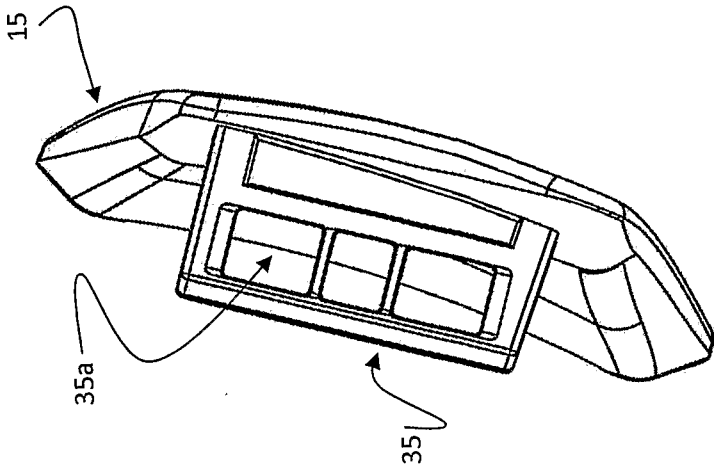


Figure 2d

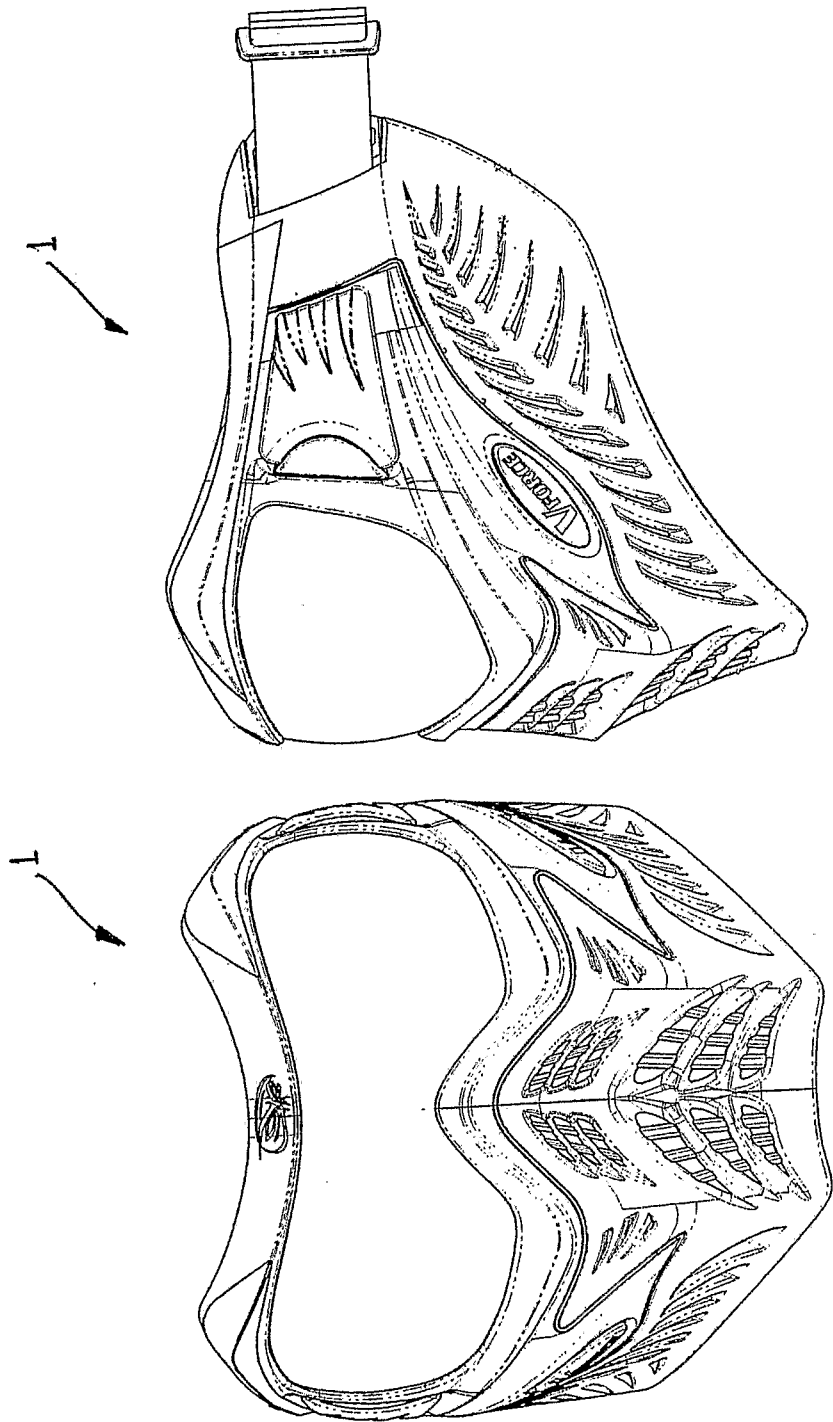
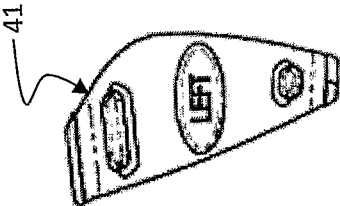
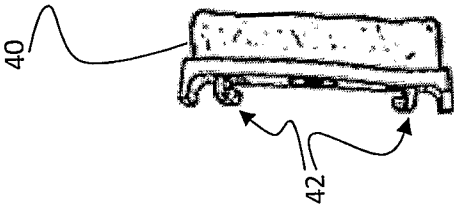
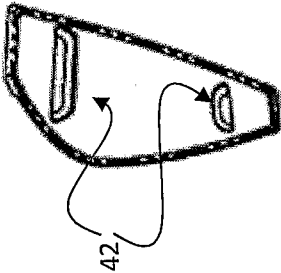
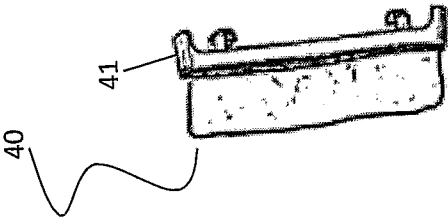
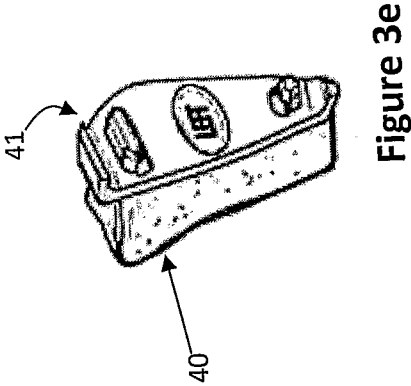


Figure 4

Figure 3



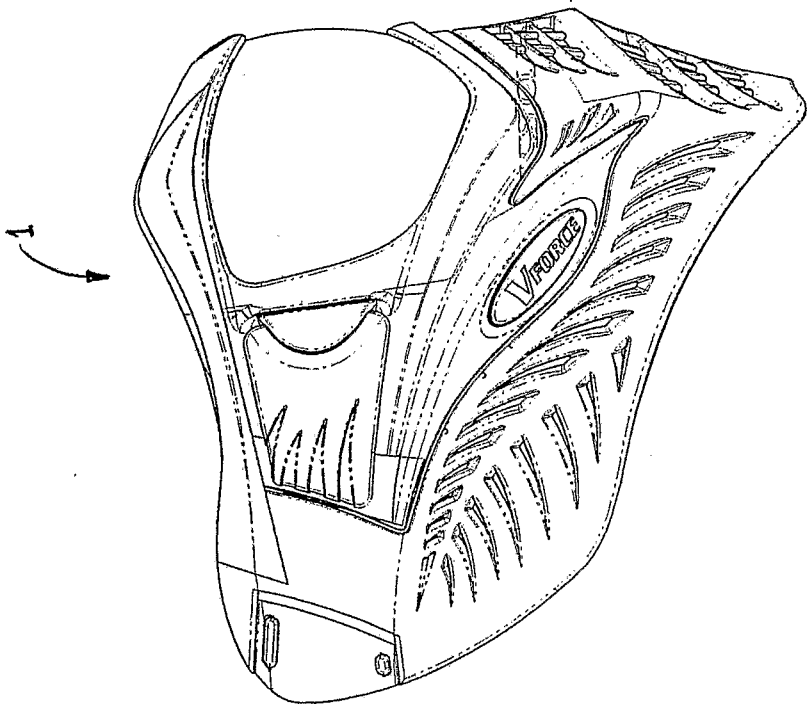


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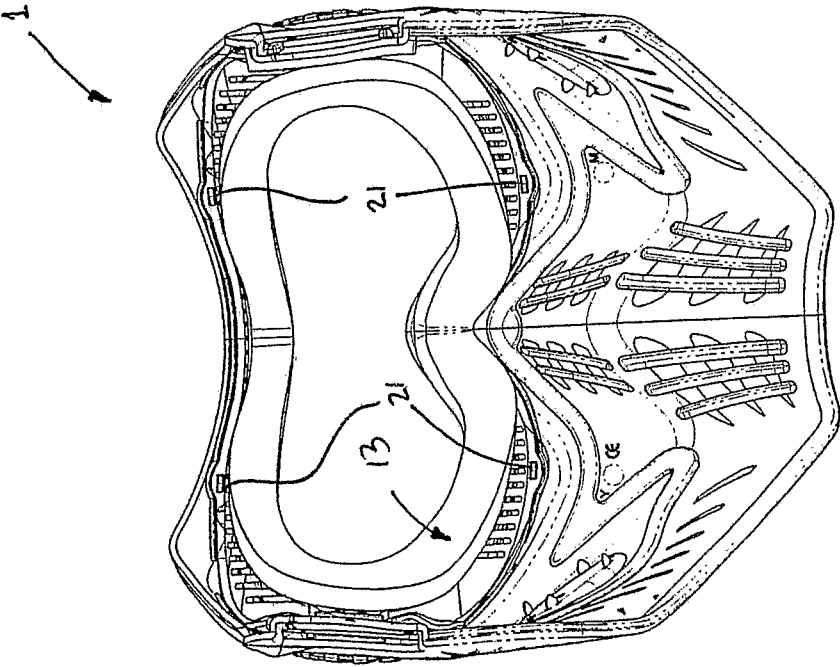


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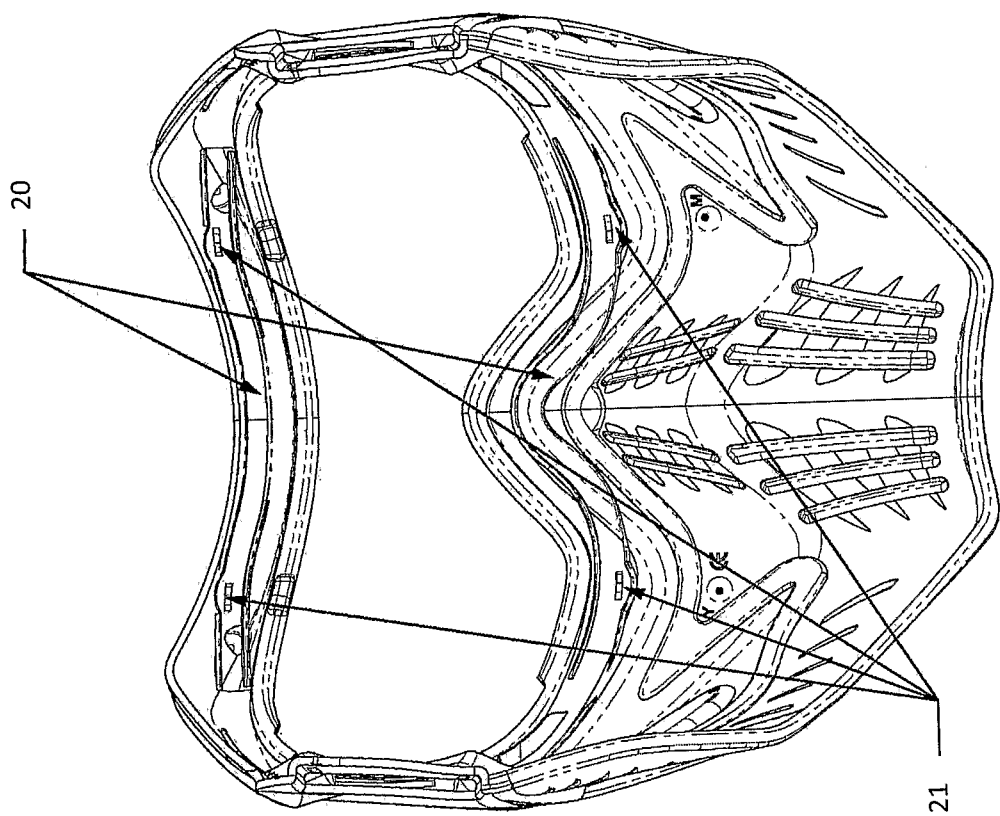


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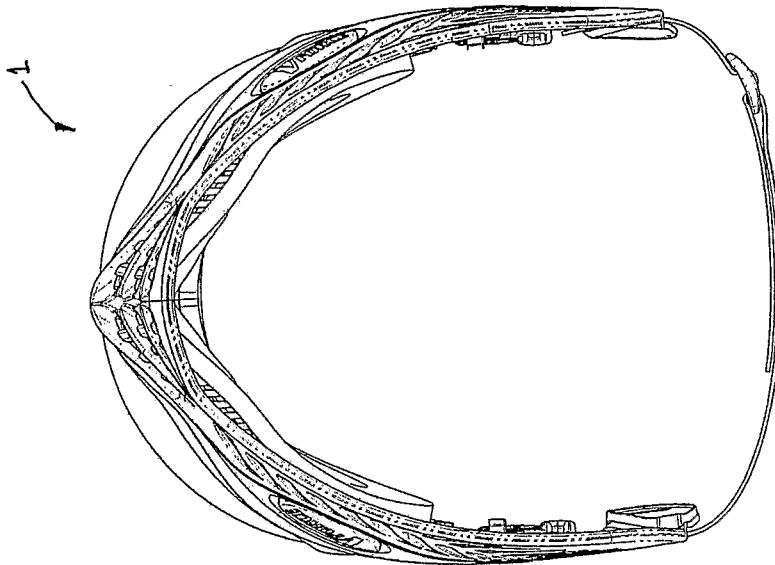


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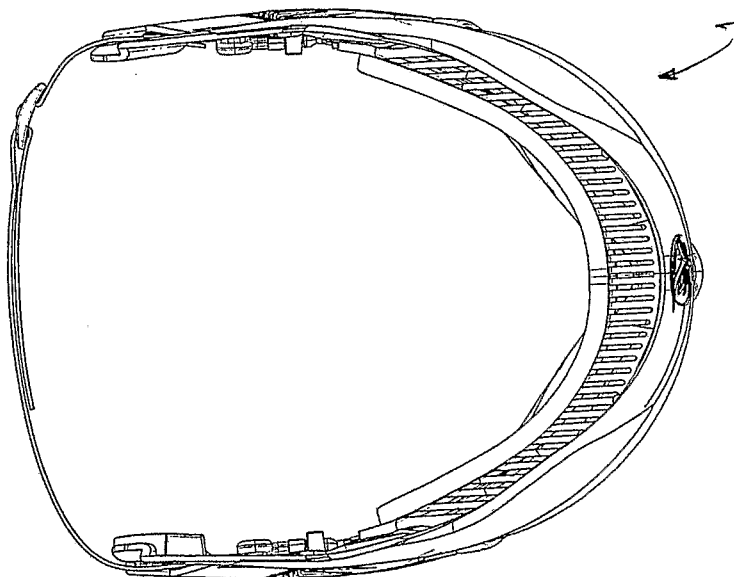


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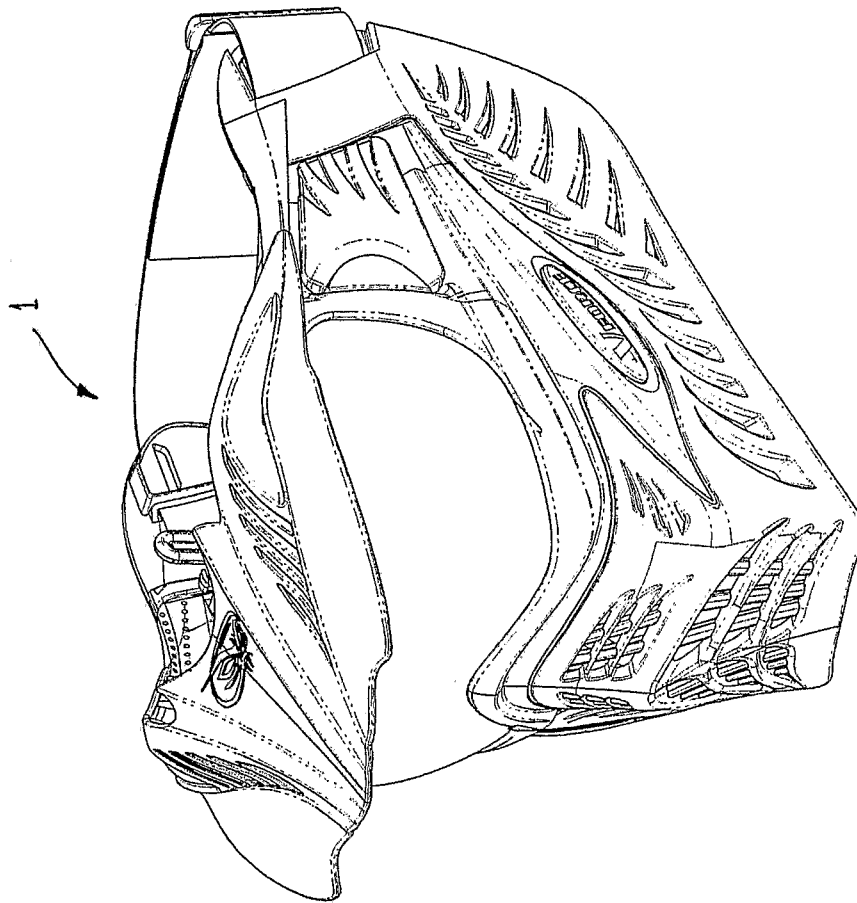


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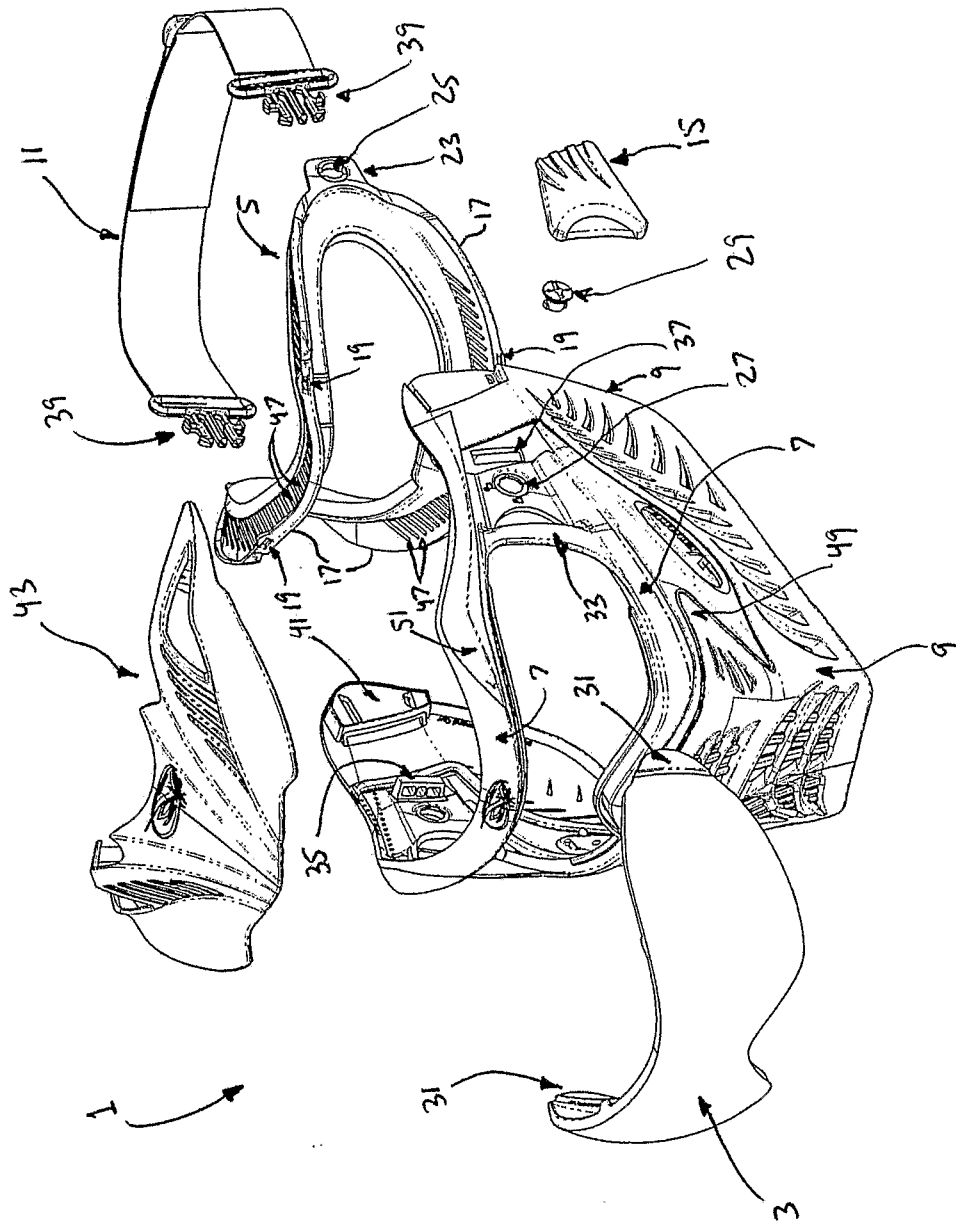


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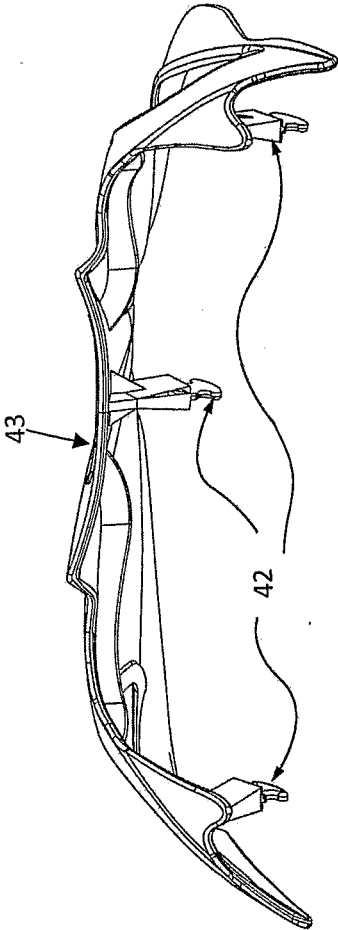


Figure 10a

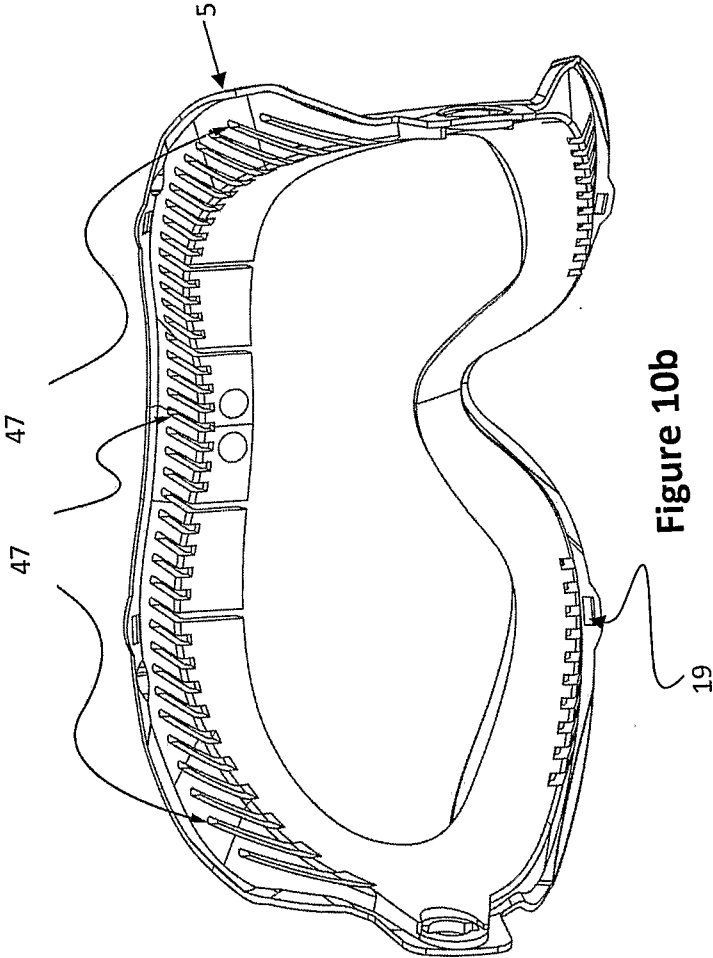


Figure 10b

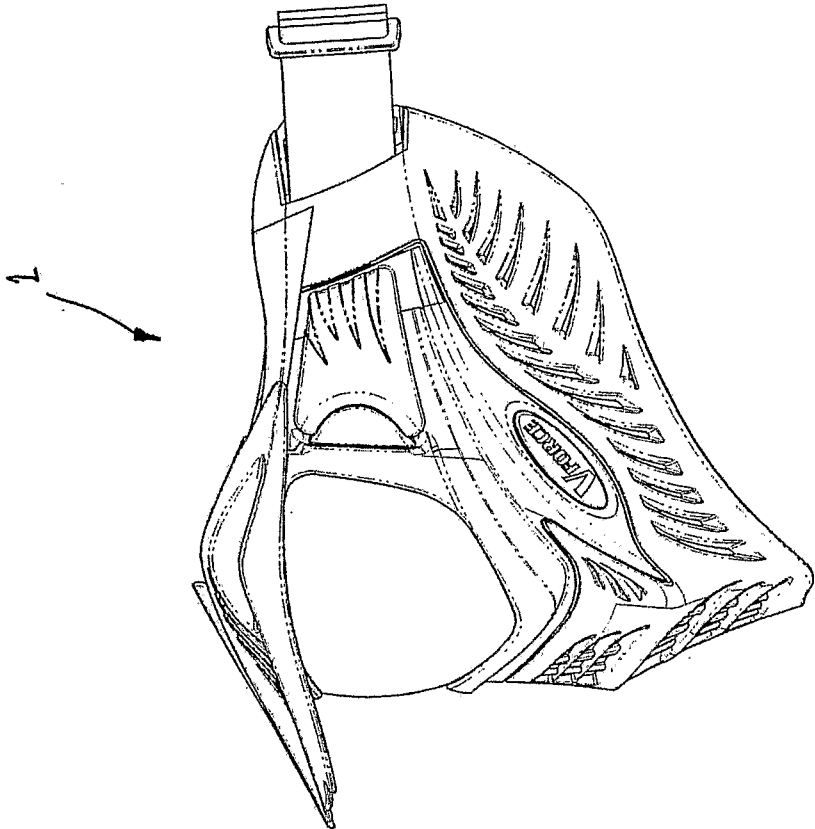


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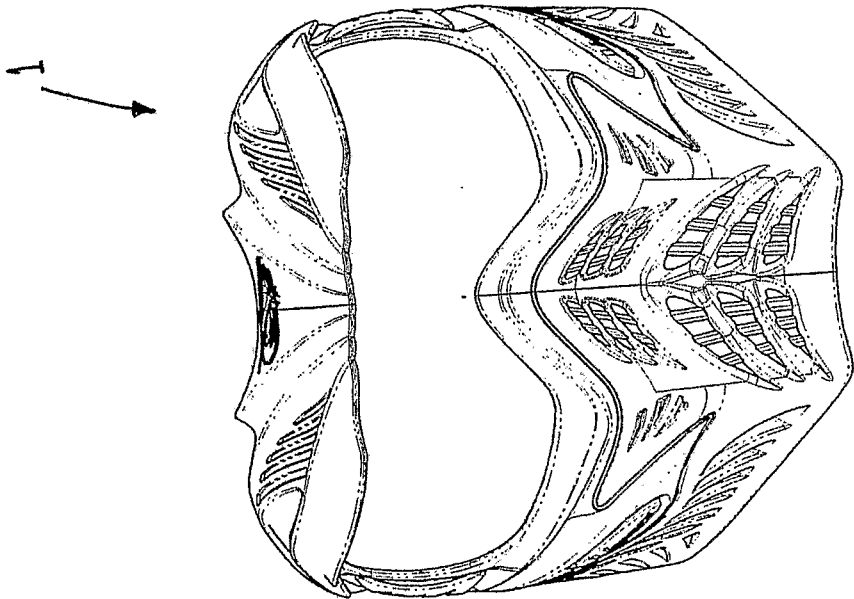


Figure 11

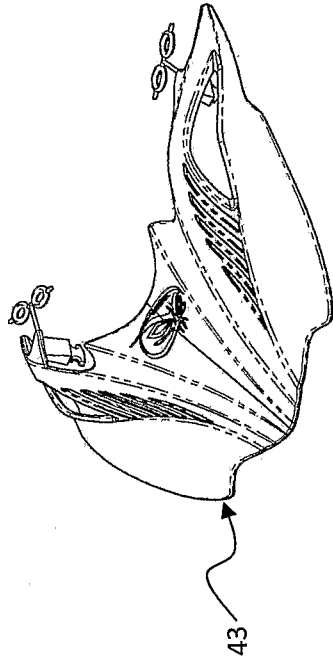


Figure 11d

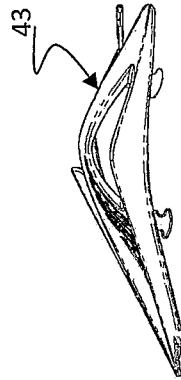


Figure 11e

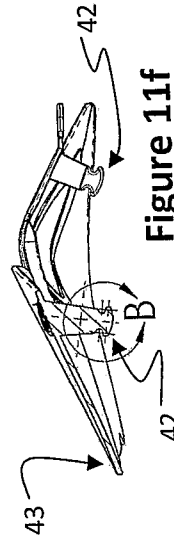


Figure 11f



Figure 11g

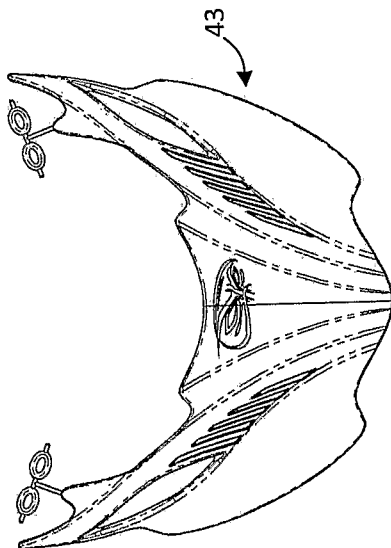


Figure 11a

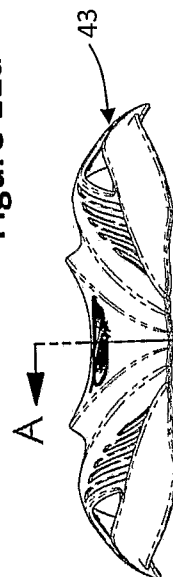


Figure 11b

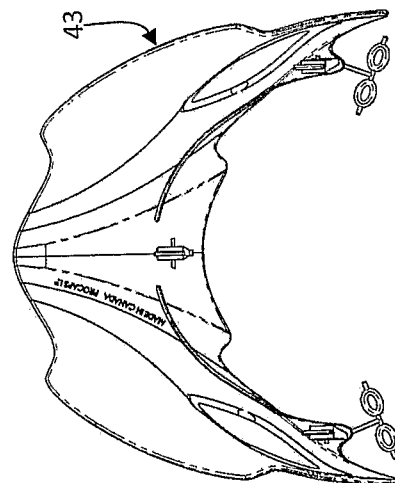


Figure 11c

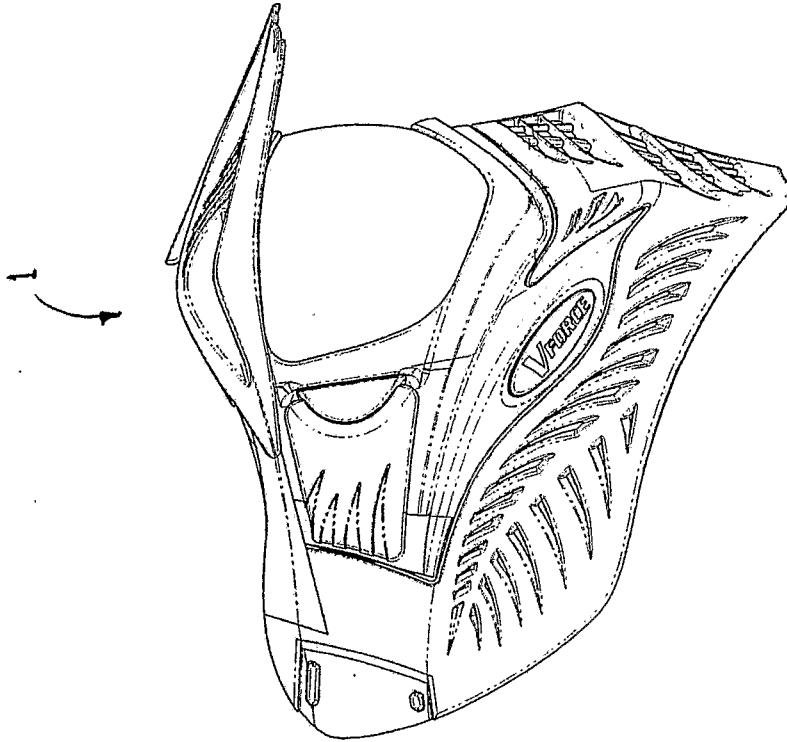


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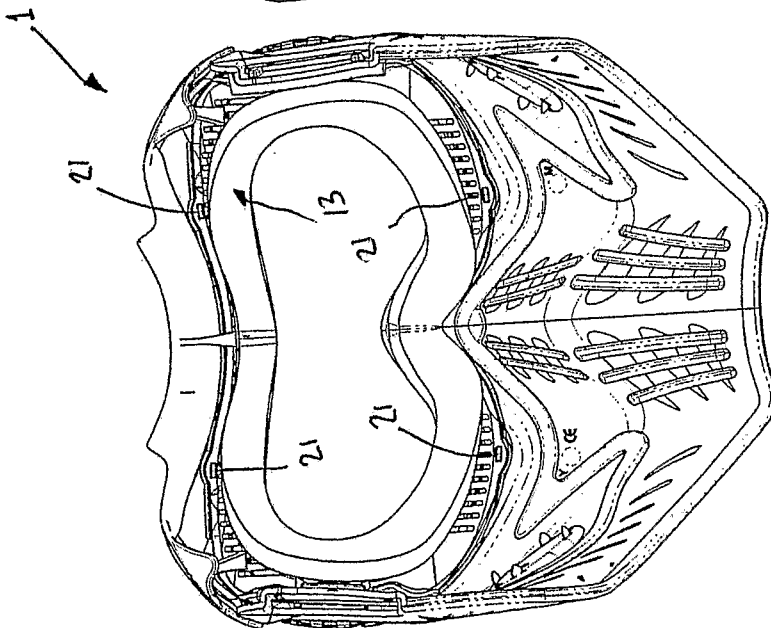


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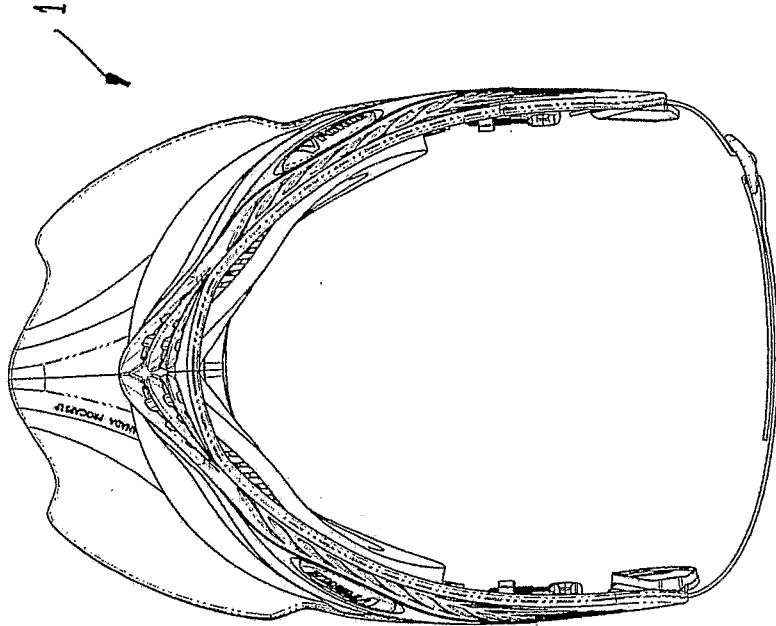


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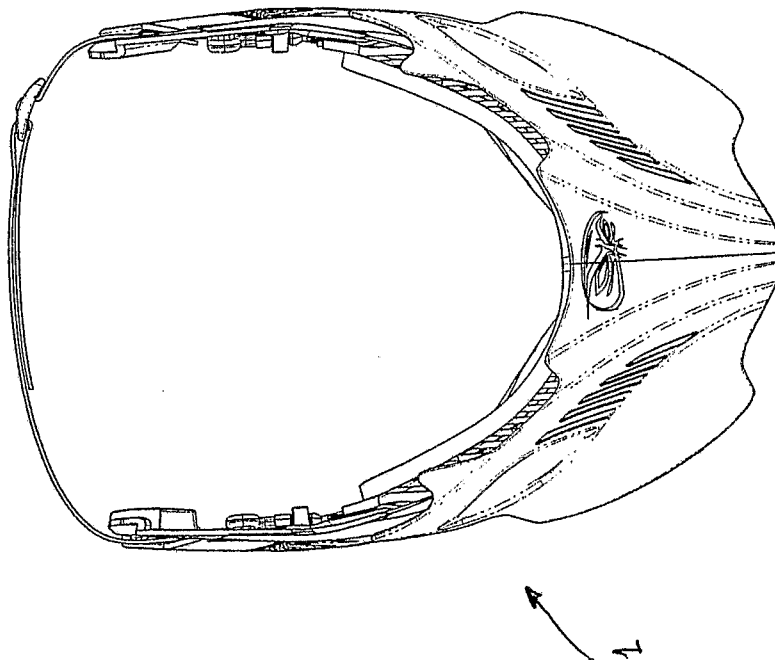


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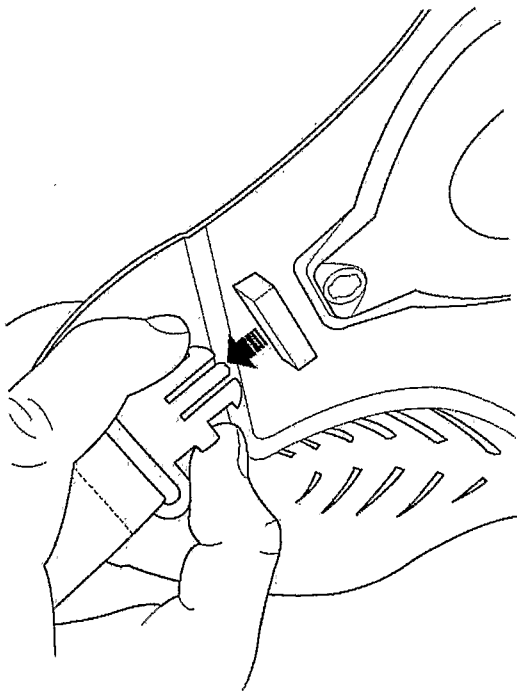


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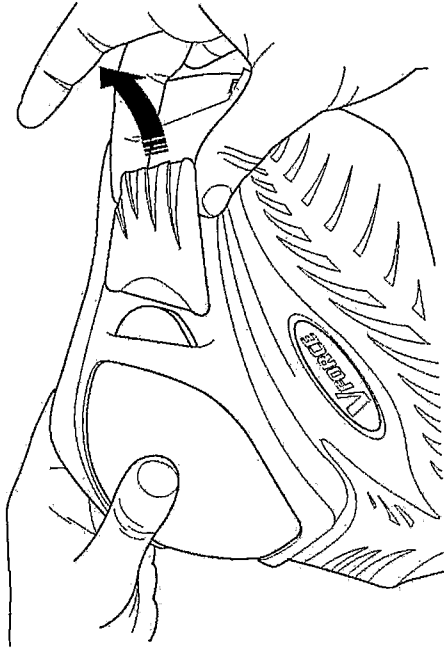


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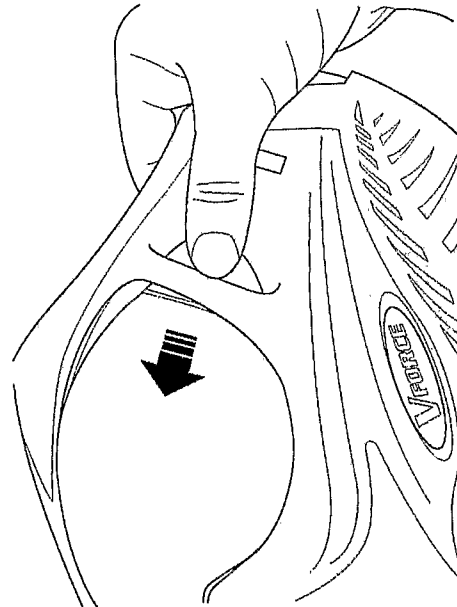


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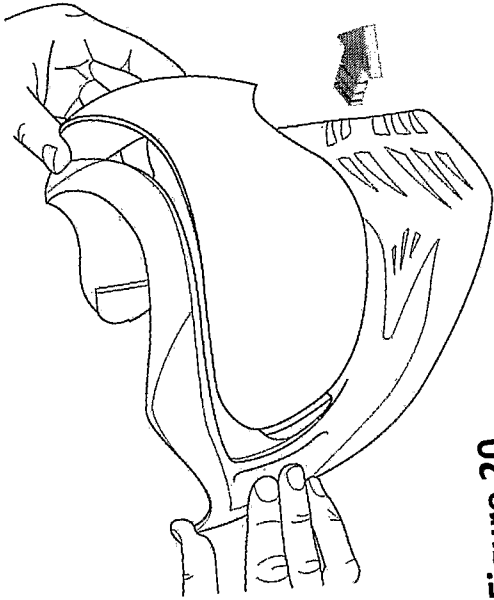


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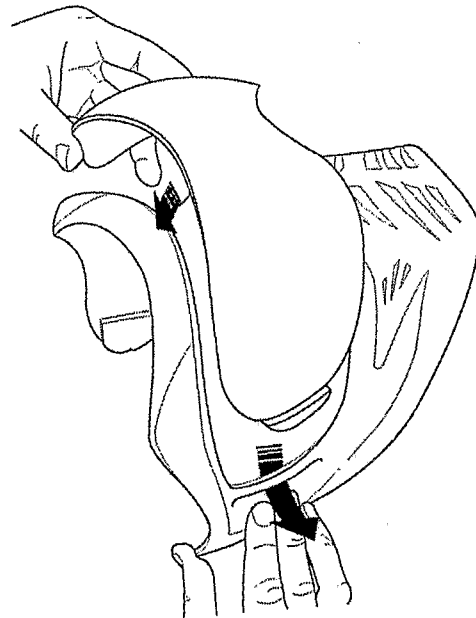


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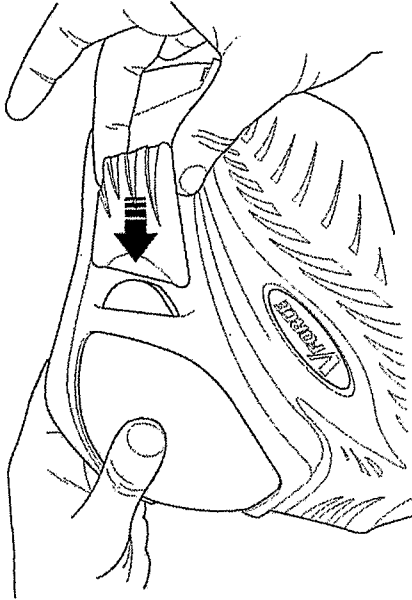


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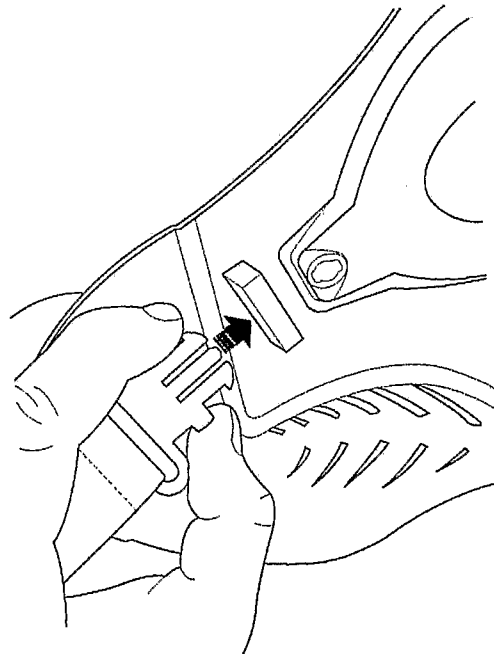


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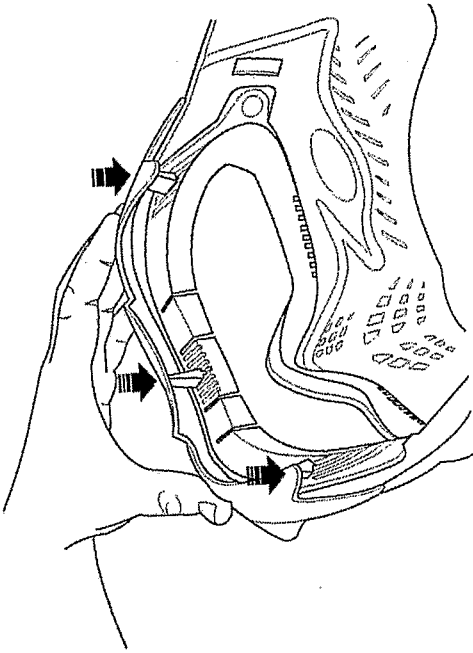


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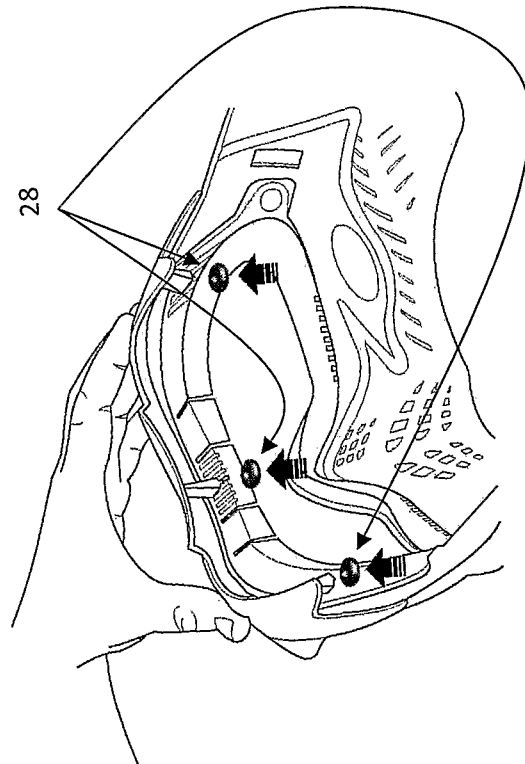


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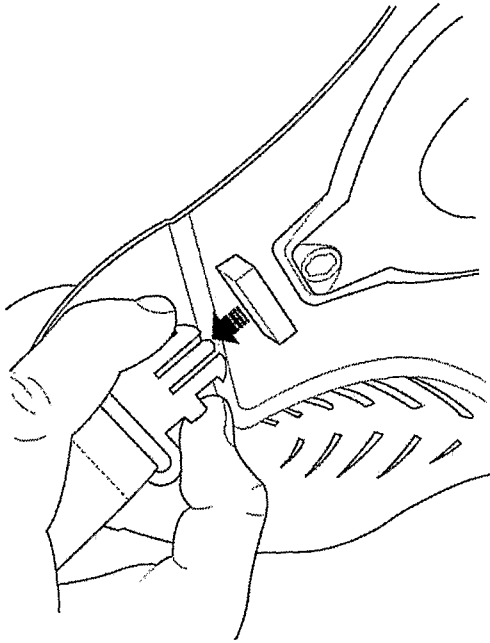


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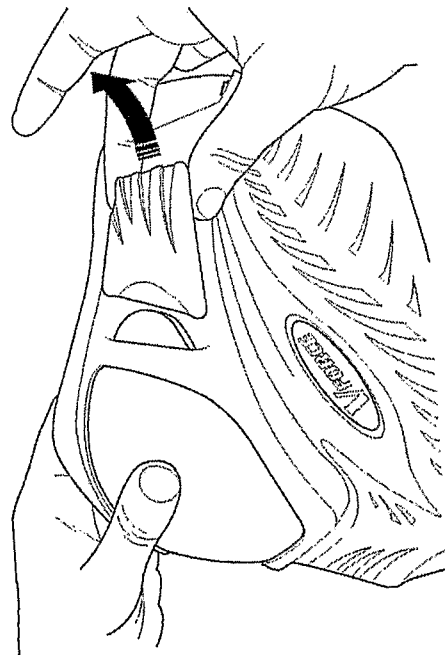


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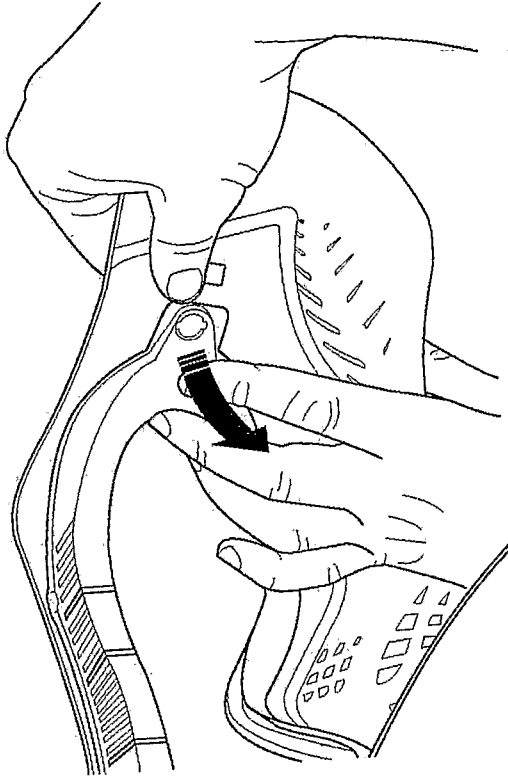


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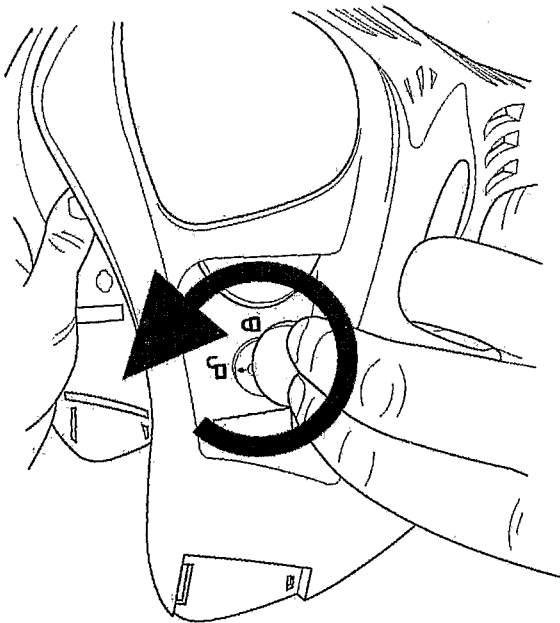


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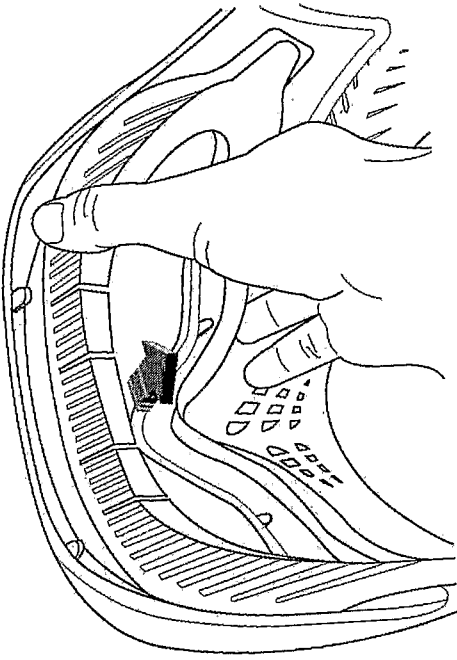


Figure 30

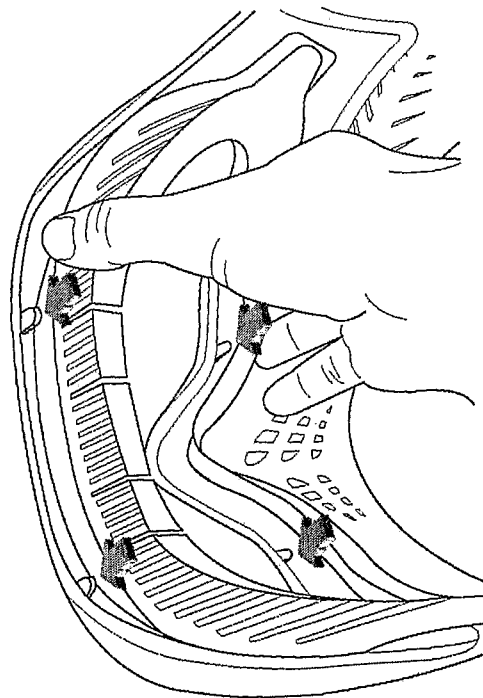


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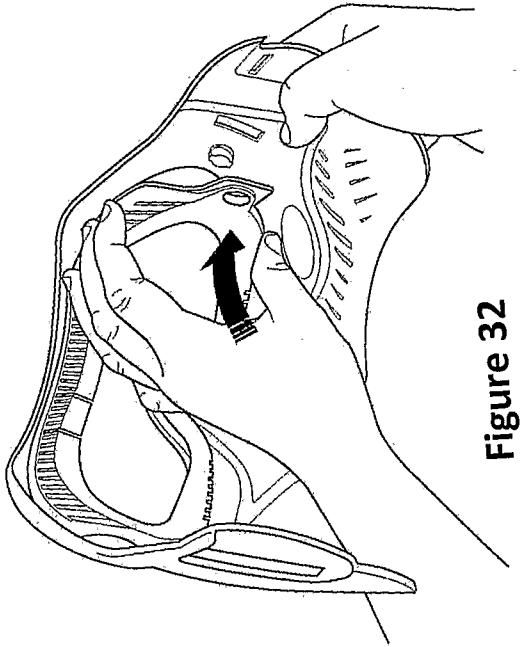


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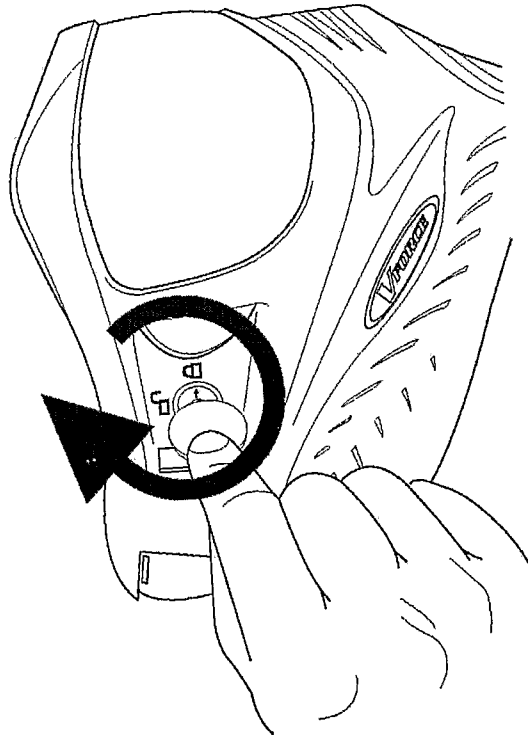


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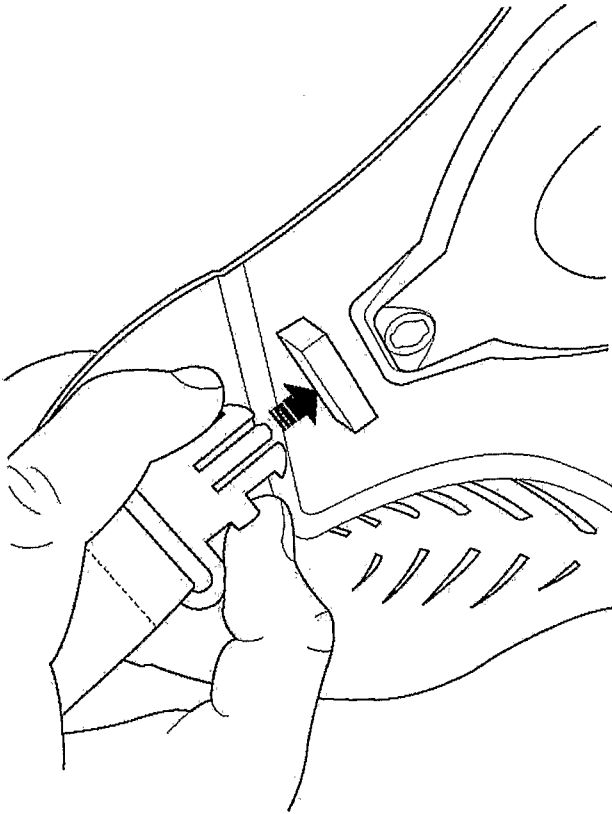


Figure 34

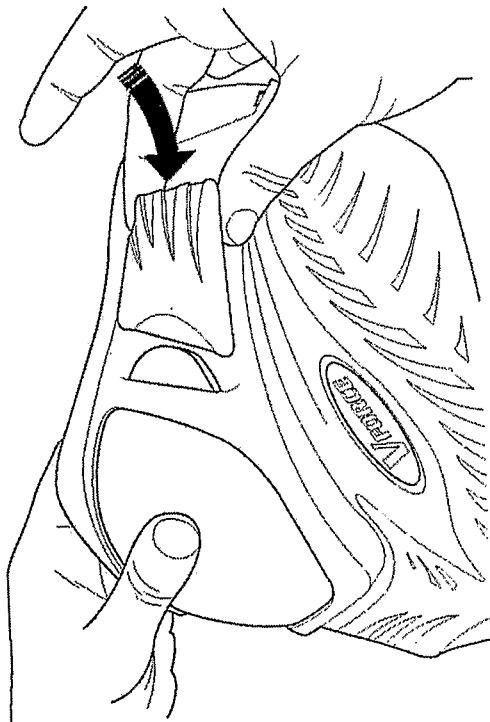


Figure 35

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/CA2007/001644

| <p>A. CLASSIFICATION OF SUBJECT MATTER<br/> IPC: <b>A42B 3/18</b> (2006.01) , <b>A42B 3/10</b> (2006.01)<br/> According to International Patent Classification (IPC) or to both national classification and IPC</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                  |                                                                                            |                                           |                                                                                                                                                                                                     |                                                                                                          |                                                                                                                                                                              |                                                                                           |                                                                                                                                                                                                                                                  |                                                                                                                                                                         |                                                                         |                                                                              |   |                                                                                                        |      |   |                                                                         |      |
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| <p>B. FIELDS SEARCHED</p> <p>Minimum documentation searched (classification system followed by classification symbols)<br/> <b>IPC(2006.01) &amp; ECLA:</b> A42B 3/04,10,18-22 A61F 9/04<br/> <b>USPC:</b> 2/6.1-6.7,9,15,206,425-429,431,448,449,452      <b>CPC:</b> 2/72-73.2,79</p> <p>Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched</p> <p>Electronic database(s) consulted during the international search (name of database(s) and, where practicable, search terms used)<br/> Databases: WEST, IPA(Australia), Canadian Patent Database<br/> Keywords: helmet, facemask, face, mask, paintball, paint, ball, foam, padding, cushion*, seal*, removable, conform, goggle</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                  |                                                                                            |                                           |                                                                                                                                                                                                     |                                                                                                          |                                                                                                                                                                              |                                                                                           |                                                                                                                                                                                                                                                  |                                                                                                                                                                         |                                                                         |                                                                              |   |                                                                                                        |      |   |                                                                         |      |
| <p>C. DOCUMENTS CONSIDERED TO BE RELEVANT</p> <table border="1"> <thead> <tr> <th>Category*</th> <th>Citation of document, with indication, where appropriate, of the relevant passages</th> <th>Relevant to claim No.</th> </tr> </thead> <tbody> <tr> <td>A, P</td> <td>US2007/0050896-A1 (STEVENS) 8 March 2007 (08-03-2007)<br/>*Whole document*</td> <td>1-14</td> </tr> <tr> <td>A</td> <td>US6948813-B2 (PARKS) 27 September 2005 (27-09-2005)<br/>*Whole document*</td> <td>1-14</td> </tr> <tr> <td>A</td> <td>US6626178-B2 (MORGAN et al.) 30 September 2003 (30-09-2003)<br/>*Whole document*</td> <td>1-14</td> </tr> <tr> <td>A</td> <td>US5711035-A (HASLBECK) 27 January 1998 (27-01-1998)<br/>*Whole document*</td> <td>1-14</td> </tr> </tbody> </table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                  |                                                                                            | Category*                                 | Citation of document, with indication, where appropriate, of the relevant passages                                                                                                                  | Relevant to claim No.                                                                                    | A, P                                                                                                                                                                         | US2007/0050896-A1 (STEVENS) 8 March 2007 (08-03-2007)<br>*Whole document*                 | 1-14                                                                                                                                                                                                                                             | A                                                                                                                                                                       | US6948813-B2 (PARKS) 27 September 2005 (27-09-2005)<br>*Whole document* | 1-14                                                                         | A | US6626178-B2 (MORGAN et al.) 30 September 2003 (30-09-2003)<br>*Whole document*                        | 1-14 | A | US5711035-A (HASLBECK) 27 January 1998 (27-01-1998)<br>*Whole document* | 1-14 |
| Category*                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Citation of document, with indication, where appropriate, of the relevant passages                                                                                                                                                               | Relevant to claim No.                                                                      |                                           |                                                                                                                                                                                                     |                                                                                                          |                                                                                                                                                                              |                                                                                           |                                                                                                                                                                                                                                                  |                                                                                                                                                                         |                                                                         |                                                                              |   |                                                                                                        |      |   |                                                                         |      |
| A, P                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | US2007/0050896-A1 (STEVENS) 8 March 2007 (08-03-2007)<br>*Whole document*                                                                                                                                                                        | 1-14                                                                                       |                                           |                                                                                                                                                                                                     |                                                                                                          |                                                                                                                                                                              |                                                                                           |                                                                                                                                                                                                                                                  |                                                                                                                                                                         |                                                                         |                                                                              |   |                                                                                                        |      |   |                                                                         |      |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | US6948813-B2 (PARKS) 27 September 2005 (27-09-2005)<br>*Whole document*                                                                                                                                                                          | 1-14                                                                                       |                                           |                                                                                                                                                                                                     |                                                                                                          |                                                                                                                                                                              |                                                                                           |                                                                                                                                                                                                                                                  |                                                                                                                                                                         |                                                                         |                                                                              |   |                                                                                                        |      |   |                                                                         |      |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | US6626178-B2 (MORGAN et al.) 30 September 2003 (30-09-2003)<br>*Whole document*                                                                                                                                                                  | 1-14                                                                                       |                                           |                                                                                                                                                                                                     |                                                                                                          |                                                                                                                                                                              |                                                                                           |                                                                                                                                                                                                                                                  |                                                                                                                                                                         |                                                                         |                                                                              |   |                                                                                                        |      |   |                                                                         |      |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | US5711035-A (HASLBECK) 27 January 1998 (27-01-1998)<br>*Whole document*                                                                                                                                                                          | 1-14                                                                                       |                                           |                                                                                                                                                                                                     |                                                                                                          |                                                                                                                                                                              |                                                                                           |                                                                                                                                                                                                                                                  |                                                                                                                                                                         |                                                                         |                                                                              |   |                                                                                                        |      |   |                                                                         |      |
| <p><input type="checkbox"/> Further documents are listed in the continuation of Box C.      <input checked="" type="checkbox"/> See patent family annex.</p> <table border="1"> <tbody> <tr> <td>* Special categories of cited documents :</td> <td>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</td> </tr> <tr> <td>"A" document defining the general state of the art which is not considered to be of particular relevance</td> <td>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</td> </tr> <tr> <td>"E" earlier application or patent but published on or after the international filing date</td> <td>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</td> </tr> <tr> <td>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</td> <td>"&amp;" document member of the same patent family</td> </tr> <tr> <td>"O" document referring to an oral disclosure, use, exhibition or other means</td> <td></td> </tr> <tr> <td>"P" document published prior to the international filing date but later than the priority date claimed</td> <td></td> </tr> </tbody> </table> |                                                                                                                                                                                                                                                  |                                                                                            | * Special categories of cited documents : | "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention | "A" document defining the general state of the art which is not considered to be of particular relevance | "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone | "E" earlier application or patent but published on or after the international filing date | "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art | "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) | "&" document member of the same patent family                           | "O" document referring to an oral disclosure, use, exhibition or other means |   | "P" document published prior to the international filing date but later than the priority date claimed |      |   |                                                                         |      |
| * Special categories of cited documents :                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention                                              |                                                                                            |                                           |                                                                                                                                                                                                     |                                                                                                          |                                                                                                                                                                              |                                                                                           |                                                                                                                                                                                                                                                  |                                                                                                                                                                         |                                                                         |                                                                              |   |                                                                                                        |      |   |                                                                         |      |
| "A" document defining the general state of the art which is not considered to be of particular relevance                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone                                                                     |                                                                                            |                                           |                                                                                                                                                                                                     |                                                                                                          |                                                                                                                                                                              |                                                                                           |                                                                                                                                                                                                                                                  |                                                                                                                                                                         |                                                                         |                                                                              |   |                                                                                                        |      |   |                                                                         |      |
| "E" earlier application or patent but published on or after the international filing date                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art |                                                                                            |                                           |                                                                                                                                                                                                     |                                                                                                          |                                                                                                                                                                              |                                                                                           |                                                                                                                                                                                                                                                  |                                                                                                                                                                         |                                                                         |                                                                              |   |                                                                                                        |      |   |                                                                         |      |
| "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | "&" document member of the same patent family                                                                                                                                                                                                    |                                                                                            |                                           |                                                                                                                                                                                                     |                                                                                                          |                                                                                                                                                                              |                                                                                           |                                                                                                                                                                                                                                                  |                                                                                                                                                                         |                                                                         |                                                                              |   |                                                                                                        |      |   |                                                                         |      |
| "O" document referring to an oral disclosure, use, exhibition or other means                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                  |                                                                                            |                                           |                                                                                                                                                                                                     |                                                                                                          |                                                                                                                                                                              |                                                                                           |                                                                                                                                                                                                                                                  |                                                                                                                                                                         |                                                                         |                                                                              |   |                                                                                                        |      |   |                                                                         |      |
| "P" document published prior to the international filing date but later than the priority date claimed                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                  |                                                                                            |                                           |                                                                                                                                                                                                     |                                                                                                          |                                                                                                                                                                              |                                                                                           |                                                                                                                                                                                                                                                  |                                                                                                                                                                         |                                                                         |                                                                              |   |                                                                                                        |      |   |                                                                         |      |
| <p>Date of the actual completion of the international search<br/>20 December 2007 (20-12-2007)</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                  | <p>Date of mailing of the international search report<br/>21 January 2008 (21-01-2008)</p> |                                           |                                                                                                                                                                                                     |                                                                                                          |                                                                                                                                                                              |                                                                                           |                                                                                                                                                                                                                                                  |                                                                                                                                                                         |                                                                         |                                                                              |   |                                                                                                        |      |   |                                                                         |      |
| <p>Name and mailing address of the ISA/CA<br/> Canadian Intellectual Property Office<br/> Place du Portage I, C114 - 1st Floor, Box PCT<br/> 50 Victoria Street<br/> Gatineau, Quebec K1A 0C9<br/> Facsimile No.: 001-819-953-2476</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                  | <p>Authorized officer<br/><br/> <b>Eric E. Breton 819- 997-5209</b></p>                    |                                           |                                                                                                                                                                                                     |                                                                                                          |                                                                                                                                                                              |                                                                                           |                                                                                                                                                                                                                                                  |                                                                                                                                                                         |                                                                         |                                                                              |   |                                                                                                        |      |   |                                                                         |      |

**INTERNATIONAL SEARCH REPORT**  
Information on patent family members

International application No.  
**PCT/CA2007/001644**

| Patent Document<br>Cited in Search Report | Publication<br>Date | Patent Family<br>Member(s)                                                                                                                                                                                                           | Publication<br>Date                                                                                                                                                                              |
|-------------------------------------------|---------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| US 2007050896A1                           | 08-03-2007          | N/A                                                                                                                                                                                                                                  | N/A                                                                                                                                                                                              |
| US 6948813B2                              | 27-09-2005          | US 2004139532A1                                                                                                                                                                                                                      | 22-07-2004                                                                                                                                                                                       |
| US 6626178B2                              | 30-09-2003          | AT 283193T<br>AU 2002253853B2<br>CA 2434457A1<br>DE 60202047D1<br>DE 60202047T2<br>EP 1349776A2<br>EP 1349776B1<br>ES 2231686T3<br>JP 3908666B2<br>JP 2004520995T<br>NZ 527008A<br>US 2002129818A1<br>WO 02055379A2<br>WO 02055379A3 | 15-12-2004<br>16-08-2007<br>18-07-2002<br>30-12-2004<br>02-03-2006<br>08-10-2003<br>24-11-2004<br>16-05-2005<br>25-04-2007<br>15-07-2004<br>24-12-2004<br>19-09-2002<br>18-07-2002<br>26-09-2002 |
| US 5711035A                               | 27-01-1998          | AU 1863997A<br>CA 2246263A1<br>DE 19781633T0<br>WO 9732550A1                                                                                                                                                                         | 22-09-1997<br>12-09-1997<br>25-03-1999<br>12-09-1997                                                                                                                                             |