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1 Attorney Docket No. 79453

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3 A SUBMARINE PERISCOPE EYEGUARD HOUSING ASSEMBLY

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5 STATEMENT OF GOVERNMENT INTEREST

6 The invention described herein may be manufactured and used  
7 by and for the Government of the United States of America for  
8 Governmental purposes without the payment of any royalties  
9 thereon or therefor.

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11 CROSS-REFERENCE TO RELATED PATENT APPLICATIONS

12 Not applicable.

13  
14 BACKGROUND OF THE INVENTION

15 (1) Field of the Invention

16 The invention relates to submarine periscopes and is  
17 directed more particularly to an improved periscope eyeguard  
18 housing assembly.

19 (2) Description of the Prior Art

20 It is known to provide submarine periscope systems having  
21 one optical lens for viewing above sea level and two "blindners",  
22 which obstruct viewing and block out light. The purpose of a  
23 blinder is to enable the viewer to leave both eyes open during

1 operation, while utilizing only one eye for viewing. An eyeguard  
2 housing is provided with a left eye and a right eye blinder. The  
3 entire eyeguard assembly can be oriented in two positions, right  
4 and left. In the left position, the viewer's left eye is at the  
5 blinder location. Similarly, in the right position the viewer's  
6 right eye is at the blinder location. The positions are achieved  
7 by rotating the entire eyeguard housing assembly 180°, with the  
8 center of rotation being the center of the one optical, or  
9 viewing, lens. The two positions are established to accommodate  
10 left or right eye dominant personnel. Experience has shown that  
11 in time the rotation of the assembly becomes rough and sometimes  
12 binding. Alternatively, the assembly sometimes loosens and fails  
13 to hold at the left or right position, or both.

14 The blinders are connected by arms to the optical lens  
15 housing and are fixed in place on the arms by a screw. To adjust  
16 the location of a blinder relative to the center of the viewing  
17 lens, it is necessary to loosen the screw, move the blinder on  
18 the arm, and reset the screw. The operation requires a screw  
19 driver, which often is not readily available, and some operator  
20 dexterity in accurately positioning and setting the blinder. The  
21 operation further is time consuming, which can be problematic in  
22 a target viewing situation.

1           The viewing lens housing often is provided with a sun  
2 filter. When the filter is not in use, there is no storage  
3 facility on the assembly therefor. Often, the small filters  
4 (about 1 1/4 inch in diameter) are set aside and eventually lost.

5           Accordingly, there is a need for an eyeguard housing  
6 assembly wherein it is unnecessary to rotate the entire assembly  
7 to switch between left and right eye operations. Further, there  
8 is a need for means in the assembly for effecting adjustments of  
9 viewing lens-to-blinder distances without the need of tools and  
10 screw loosening and tightening operations. Still further, there is  
11 a need for means on the assembly for storing filters when not in  
12 use.

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#### SUMMARY OF THE INVENTION

15           An object of the invention is, therefore, to provide an  
16 improved submarine periscope eyeguard housing assembly having  
17 provision for switching between left and right eye operations  
18 without rotating the entire assembly.

19           A further object of the invention is to provide improved  
20 means for effecting adjustments of the distances between the  
21 viewing lens and the respective blinders without the need of a  
22 tool.

1           A still further object of the invention is to provide  
2 storage space in the eyeguard housing assembly for filters not in  
3 use.

4           With the above and other objects in view, as will  
5 hereinafter appear, there is provided a submarine periscope  
6 eyeguard housing assembly comprising a viewing lens housing  
7 having a viewing lens aperture and viewing lens therein, first  
8 and second arm members fixed to the viewing lens housing and  
9 extending therefrom in opposite directions and in lengthwise  
10 alignment with each other, a first blinder mounted on the first  
11 arm member, and a second blinder mounted on the second arm  
12 member. A first eyeguard is mounted on the first blinder for  
13 engagement by a left eye area of a viewer's head, and a second  
14 eyeguard is mounted on the second blinder for engagement by a  
15 right eye area of the viewer's head. A third eyeguard is  
16 rotatably mounted on the viewing lens housing and is adapted to  
17 be rotated into a selected one of a first position complementary  
18 to the first eyeguard and a second position complementary to the  
19 second eyeguard.

20           In accordance with a further feature of the invention, there  
21 is provided a submarine periscope eyeguard housing assembly  
22 comprising a viewing lens housing having a viewing lens aperture  
23 and viewing lens therein, an arm member fixed to the viewing lens

1 housing and extending therefrom, and a blinder mounted at a  
2 selected location on the arm. A locking means is disposed on the  
3 blinder and is engageable with the arm to lock the blinder in a  
4 selected position on the arm, the locking means being releasable  
5 to permit movement of the blinder along the arm, and reengageable  
6 with the arm to lock the blinder in another selected location on  
7 the arm, to selectively determine a distance between the viewing  
8 lens housing and the blinder.

9 In accordance with a still further feature of the invention,  
10 there is provided a submarine periscope eyeguard housing assembly  
11 comprising a viewing lens housing having a viewing lens aperture  
12 and viewing lens therein, the viewing lens housing further having  
13 a filter retaining portion and defining a slot in communication  
14 with the filter retaining portion, such that a generally planar  
15 filter may be moved through the slot and into position in the  
16 filter retaining portion, the position being adjacent the viewing  
17 lens. An arm member is fixed to the viewing lens housing and  
18 extends therefrom. A blinder is mounted on the arm member and is  
19 provided with at least one slot for receiving and retaining the  
20 filter and other filters of like configuration. The filters may  
21 be stored in the blinder and removed therefrom and inserted into  
22 the viewing lens housing and vice-versa.

1           The above and other features of the invention, including  
2 various novel details of construction and combinations of parts,  
3 will now be more particularly described with reference to the  
4 accompanying drawings and pointed out in the claims. It will be  
5 understood that the particular device embodying the invention is  
6 shown by way of illustration only and not as a limitation of the  
7 invention. The principles and features of this invention may be  
8 employed in various and numerous embodiments without departing  
9 from the scope of the invention.

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#### BRIEF DESCRIPTION OF THE DRAWINGS

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Reference is made to the accompanying drawings in which is shown an illustrative embodiment of the invention, from which its novel features and advantages will be apparent, and wherein corresponding reference characters indicate corresponding parts throughout the several views of the drawings and wherein:

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FIG. 1 is a rear elevational view of one form of submarine periscope eyeguard housing assembly illustrative of an embodiment of the invention;

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FIG. 2 is a top view thereof;

FIG. 2A is an enlarged illustration of a portion of FIG. 2;

FIG. 3 is a front elevational view of a central eyeguard assembly;

1 FIG. 4 is a sectional view taken along line IV-IV of FIG. 3;

2 FIG. 5 is similar to FIG. 4 but showing a blinder eyeguard  
3 assembly;

4 FIG. 6 is a perspective view of the assembly of FIGS. 1 and  
5 2, with some parts removed for illustration of internal features;

6 FIG. 7 is a front elevational view of a portion of the  
7 assembly of FIG. 1;

8 FIG. 8 is a top view of the assembly portion of FIG. 7;

9 FIG. 9 is a perspective view of a portion of a blinder  
10 assembly;

11 FIG. 10 is a perspective view of a blinder with parts  
12 removed to show an internal feature;

13 FIG. 11 is a front elevational view of a lens used in  
14 conjunction with the eyeguard housing assembly;

15 FIG. 12 is a sectional view taken along line XII-XII of FIG.  
16 11; and

17 FIG. 13 is a perspective view showing the cooperation  
18 between the lens of FIGS. 8 and 9 and a blinder assembly.

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#### 20 DESCRIPTION OF THE PREFERRED EMBODIMENT

21 Referring to FIGS. 1 and 2, it will be seen that a submarine  
22 periscope eyeguard housing assembly 10 includes a viewing lens  
23 housing 12, which is fixed to a periscope eyebox (not shown).



1 The viewing lens housing 12 is provided with a viewing lens  
2 aperture 14 in which is disposed a viewing lens 16.

3 First and second arm members 20, 22 are fixed to the viewing  
4 lens housing 12 and extend therefrom in opposite directions and  
5 in lengthwise alignment with each other. A first blinder 24 is  
6 mounted on first arm member 20 and a second blinder 26 is mounted  
7 on second arm member 22.

8 A first eyeguard 30 is mounted on first blinder 24 for  
9 engagement by a left eye area of a viewer's head, and a second  
10 eyeguard 32 is mounted on second blinder 26 for engagement by a  
11 right eye area of the viewer's head. A third eyeguard 34 is  
12 rotatably mounted on the viewing lens housing 12 for rotative  
13 movement into a selected first position, shown in FIGS. 1 and 2,  
14 wherein the third eyeguard 34 is complementary to first eyeguard  
15 30, for right eye viewing. The third eyeguard 34 is further  
16 rotatable to a second position in which third eyeguard 34 is  
17 complementary to second eyeguard 32, for left eye viewing.

18 Each eyeguard includes an annularly-shaped ring 38 (FIG. 4)  
19 having a multiplicity of holes 40 extending therethrough and  
20 adapted to receive screws 42 for securing the eyeguard assembly  
21 to a viewing lens housing annular cover member 36. The ring 38  
22 defines a central viewing opening 44.

1           The flexible eyeguard 34 is integral with the ring 38 and is  
2 configured to conform generally to an eye area of a viewer's  
3 head. The eyeguard 34 is provided with a plurality of vent holes  
4 46. The vent holes 46 prevent a vacuum from developing when the  
5 operator presses against flexible eyeguard 34.

6           A rigid annulus 48 overlies ring 38 and is provided with  
7 apertures 40a aligned with the ring holes 40, such that heads of  
8 screws 42 received by apertures 40a engage rigid annulus 48 and  
9 not the flexible ring 38.

10          The ring 38 and eyeguard 34 preferably are of durable  
11 neoprene rubber of high durometer.

12          Referring to FIGS. 2 and 2A, it will be seen that extending  
13 from the annular member 36 is a barrel portion 31 having a slot  
14 33 therein. The barrel portion 31 is further provided with an  
15 annular groove 35 in which are disposed opposed recesses 37 for  
16 receiving spring-biased detents 39. The barrel portion 31 is  
17 rotatably disposed in lens housing 12.

18          Referring to FIG. 5, it will be seen that the blinder  
19 assemblies 24, 26 are constructed similarly to the viewing lens  
20 assembly of FIGS. 3 and 4, the principal differences being that  
21 instead of the rigid annulus 48, the blinder assemblies are  
22 provided with a plate 50 which prevents the passage of light  
23 through the blinder assembly.

1           In operation, when it is desired to convert the periscope  
2 eyeguard housing assembly 10 from one selected eye configuration  
3 to the other, an operator merely grasps annular member 36 and  
4 rotates the same 180°. In both left and right eye positions, the  
5 spring biased detents 39 engage the groove recesses 37 to hold  
6 the third eyeguard 34 in place. When it is desired to reverse  
7 the position of the eyeguard 34, the detents 39 readily retract  
8 under pressure to permit rotation of the barrel portion 31, the  
9 dents 39 riding in the groove 35 until again engaging the  
10 recesses 37. The blinders 24, 26 remain stationary, being held  
11 in place on their respective arm members 20, 22 by spring-biased  
12 plungers mounted in the blinders and engageable with teeth on the  
13 arm members, as described hereinbelow. Rotation of the annular  
14 member 36 carries with it rotation of the viewing eyeguard 34,  
15 such that eyeguard 34 is switched from a position complementary  
16 to one of eyeguards 30, 32 to the other of eyeguards 30, 32, as  
17 from a right eye arrangement (FIGS. 1 and 2) to a left eye  
18 arrangement (FIG. 6).

19           Referring to FIGS. 7 and 8, it will be seen that a frame  
20 member 52 includes the arm members 20, 22, which are each  
21 provided with teeth 54 on a surface thereof. Each blinder  
22 assembly 24, 26 includes a cover member 56 (FIG. 9) in which is  
23 formed a channel 58. An arm member 20, 22 is slidingly moveable

1 in the channel 58. The cover member 56 is further provided with  
2 a spring-biased plunger 60 having an end portion 62 engageable  
3 with teeth 54 to lock the blinder in place on the arm member.

4 When a change in interpupillary distance is desired, a  
5 blinder is firmly urged by an operator in the desired direction.  
6 The spring bias of plunger 60 is such as to permit plunger end  
7 portion 62 to ride over teeth 54 until the blinder movement  
8 stops, whereupon the plunger end portion again lockingly engages  
9 teeth 54 to hold the blinder in a selected position. Thus, the  
10 distance from each blinder to the viewing lens housing is easily  
11 adjusted without the need of a tool.

12 As is shown in FIGS. 2 and 8, the viewing lens housing 12 is  
13 provided with a slot 64. The slots 64 and 33 are adapted to  
14 receive a lens holder 66 of the type shown in FIGS. 11 and 12.  
15 The lens holder 66 includes a generally planar frame 68 defining  
16 a window 70 having a lip 71 therein disposed along a periphery of  
17 window 70. The frame 68 is provided with first and second planar  
18 side surfaces 72, 74. The lip 71 is an extension of first side  
19 surface 72. The frame 12 preferably is of metal, such as  
20 aluminum.

21 A lens 76 is disposed in window 70 and is adjacent lip 71.  
22 The lens 76 is of a thickness such that a peripheral portion of a  
23 first major surface 78 of lens 76 is fixed to lip 71. A second

1 major surface 80 of lens 76 is flush with frame second surface  
2 74. The lens 76 preferably is fixed to lip 71 by adhesive, or  
3 the like. As seen in FIG. 11, lens 76 preferably is circular and  
4 lip 71 is an annulus, as shown, or one or more portions of an  
5 annulus. The lens preferably is of glass or a plastics material,  
6 or a composite thereof. The lens may be of clear glass, or of a  
7 prescription-type glass for enhancing eyesight, or increasing the  
8 focus range of the periscope at both ends of the usual periscope  
9 range of focus, or a filter of darkened glass, similar to sun-  
10 glasses, or a mirrored glass for substantial sun filtering, or  
11 may be omitted altogether, such that viewing occurs through the  
12 lens assembly without benefit of a lens of any type.

13 The frame 68 is further provided with at least one opening  
14 82 (two shown in FIG. 11) in which is fixed a magnet 84. When  
15 two magnets 84 are provided, the magnets preferably are disposed,  
16 respectively, on opposite sides of a lengthwise axis a-a (FIG.  
17 11) and are in substantial alignment widthwise.

18 A grip 86 extends from frame 68 and preferably comprises a  
19 protrusion integral with frame 68. The grip 86 is provided with  
20 opposed recessed portions 88 (FIG. 11) to facilitate gripping  
21 thereof by an operator. The lens holder 66 may be inserted into  
22 and withdrawn from the lens holder slot 64 and the barrel portion  
23 slot 33 aligned with the lens holder slot 64, as desired. In

1 FIG. 6 there is shown a lens holder 66 in place in the viewing  
2 lens housing 12.

3 When not in use, the lens holder 66 and/or other lens  
4 holders 66', having grips 86 (FIG. 1), may be disposed in slots  
5 90 in blinders 24, 26. In FIG. 10 there is shown a portion of  
6 one of the slots 90 configured to receive a lens holder 66. In  
7 FIG. 13, a back plate 92 has covered a side of the slot 90 shown  
8 exposed in FIG. 10 and a lens holder 66 is shown in a partially  
9 inserted position. Further movement of the lens holder 66 into  
10 the slot 90 carries the lens holder 66 fully into the slot 90, as  
11 shown in FIGS. 1 and 6.

12 Thus, when a lens holder 66 is not in use in the viewing  
13 lens housing slot 64, it may be slid into a blinder slot 90 for  
14 safe keeping.

15 There is thus provided an improved submarine periscope  
16 eyeguard housing assembly wherein shifting between left and right  
17 eye operation requires minimal movement of parts, wherein lens-  
18 to-blinder distances may be modified quickly and without the need  
19 of a tool, and wherein lenses not in use may be stored safely and  
20 within convenient reach of an operator.

21 It will be understood that many additional changes in the  
22 details, materials, and arrangement of parts, which have been  
23 herein described and illustrated in order to explain the nature

1 of the invention, may be made by those skilled in the art within  
2 the principles and scope of the invention.

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1 Attorney Docket No. 79453

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A SUBMARINE PERISCOPE EYEGUARD HOUSING ASSEMBLY

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ABSTRACT OF THE DISCLOSURE

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A submarine periscope eyeguard housing assembly includes a viewing lens housing having a viewing lens aperture and viewing lens therein, first and second arm members fixed to the viewing lens housing and extending therefrom, a first blinder mounted on the first arm member, and a second blinder mounted on the second arm member. A first eyeguard is mounted on the first blinder for engagement by a left eye area of a viewer's head, and a second eyeguard is mounted on the second blinder for engagement by a right eye area of the viewer's head. A third eyeguard is rotatably mounted on the viewing lens housing and is adapted to be rotated into a selected one of a first position complementary to the first eyeguard and a second position complementary to the second eyeguard.



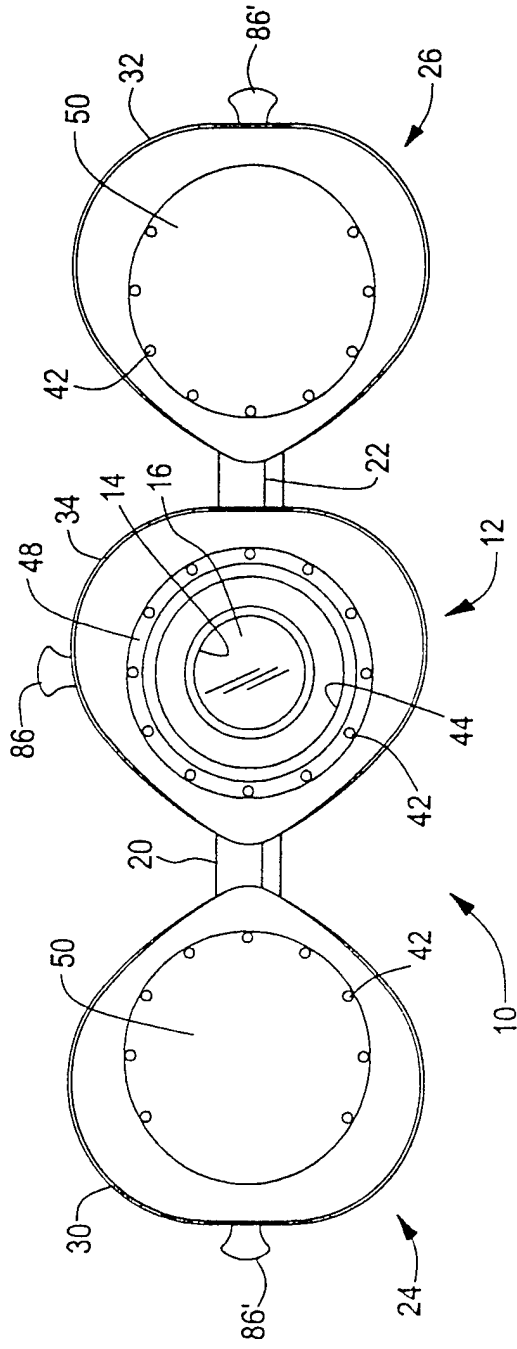


FIG. 1

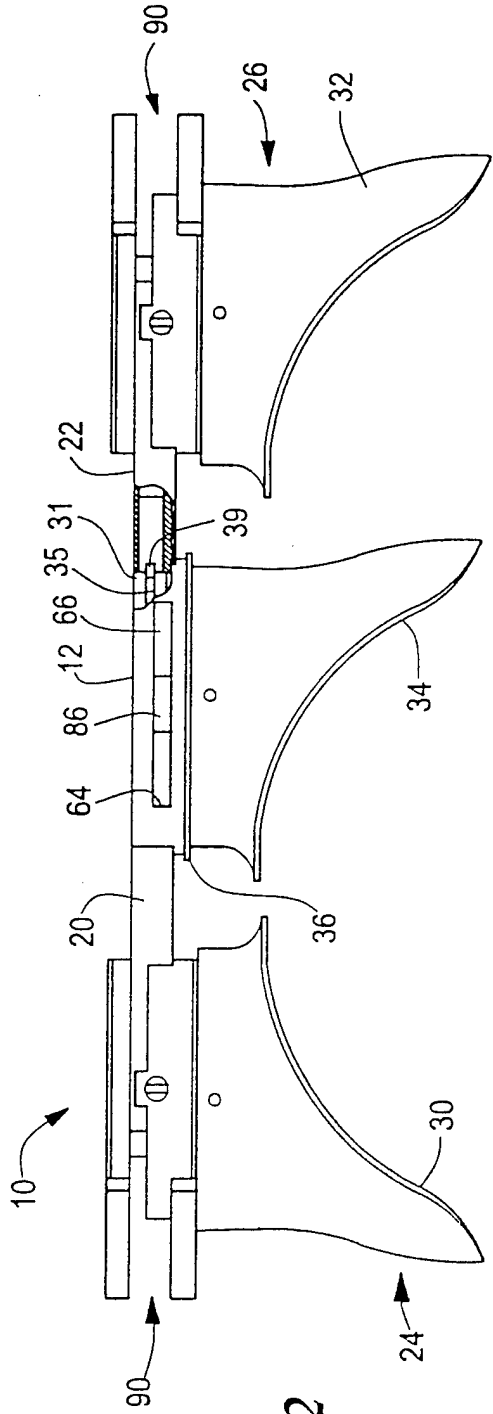
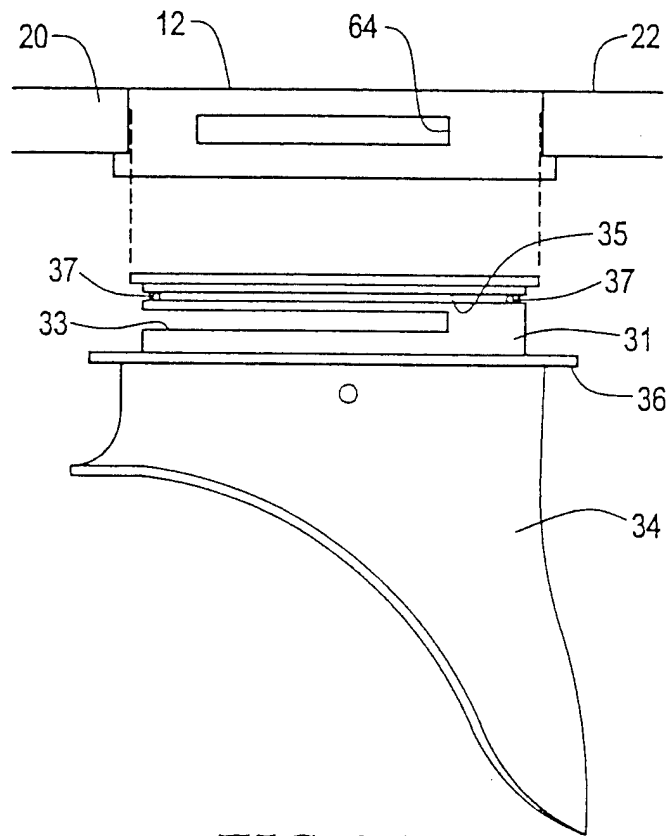
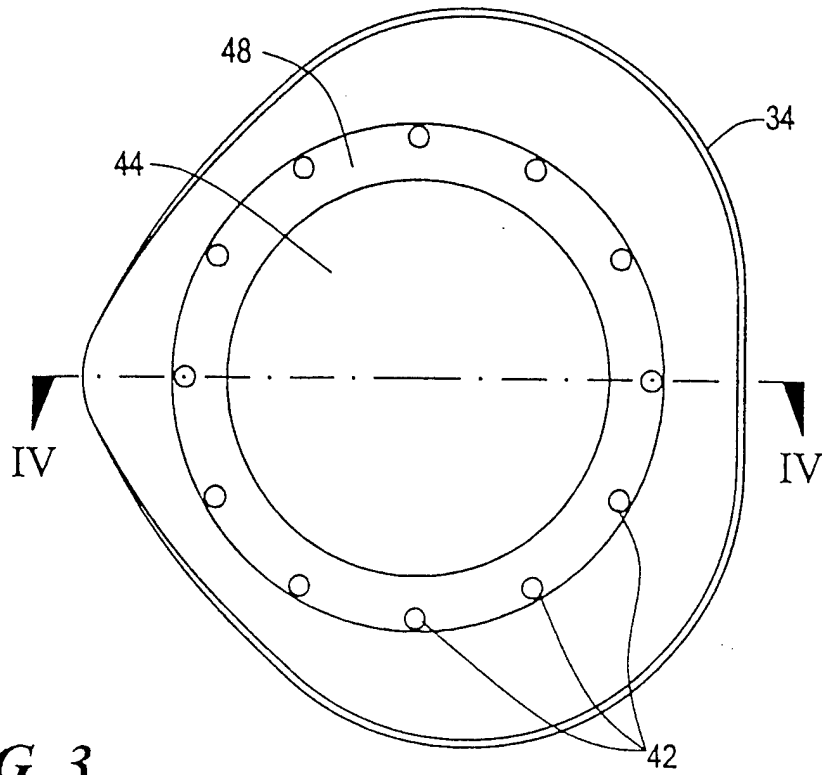


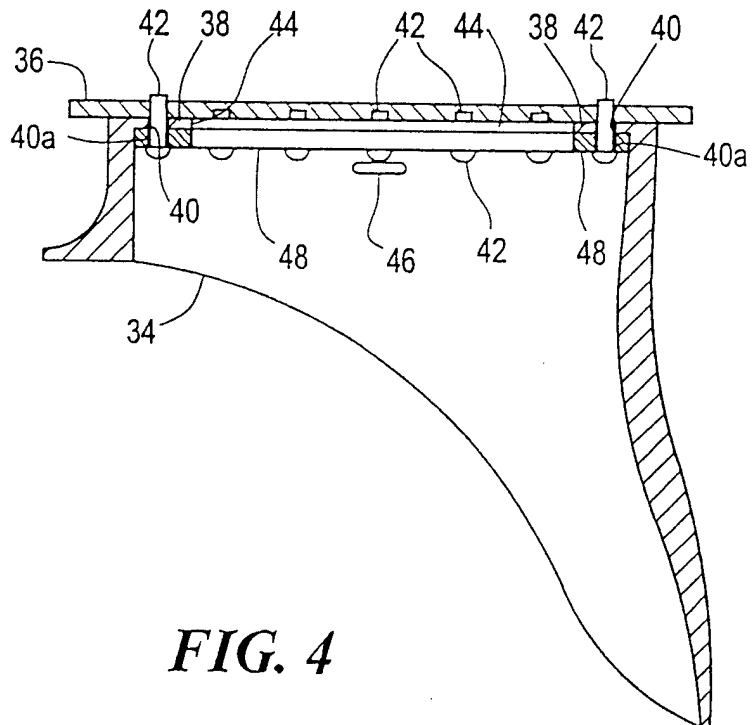
FIG. 2



**FIG. 2A**

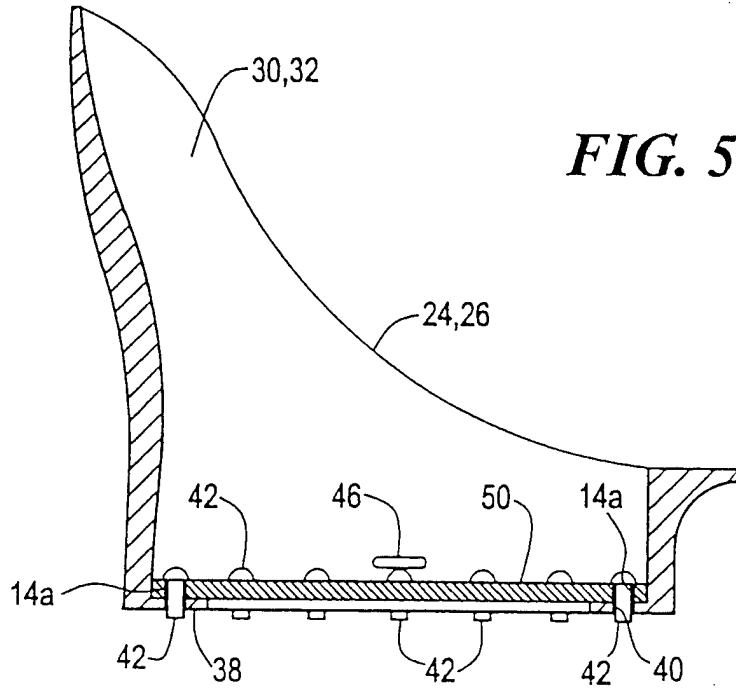


**FIG. 3**

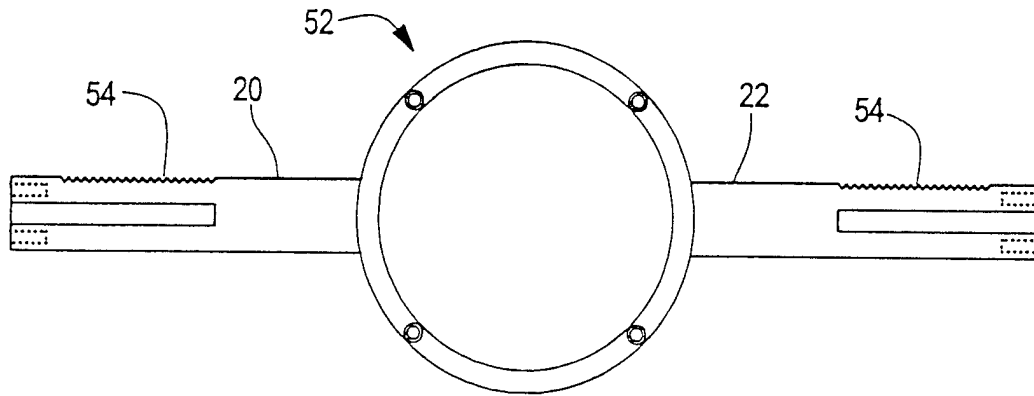


**FIG. 4**

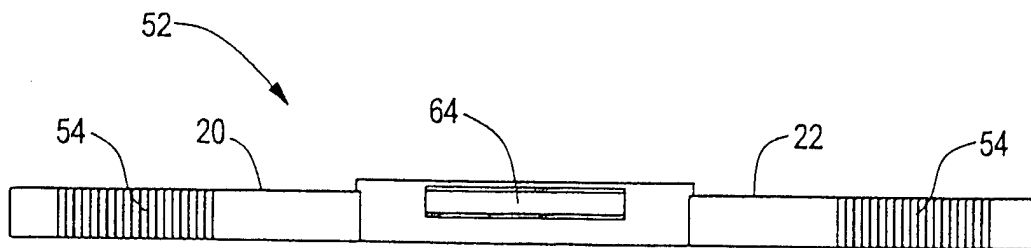
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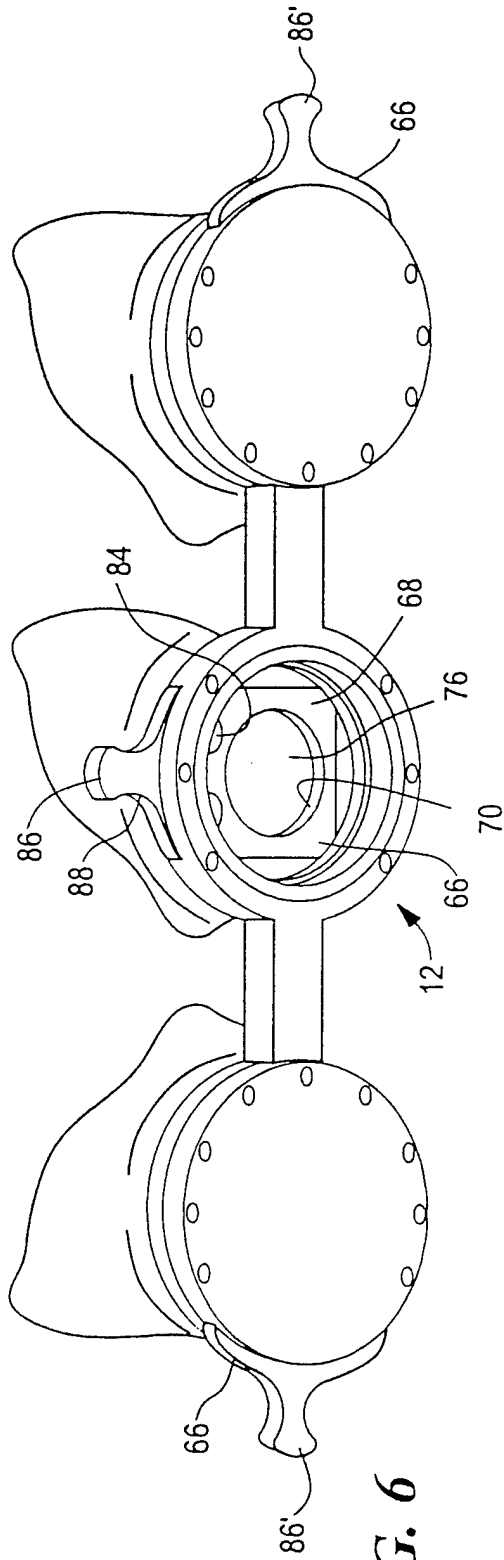
**FIG. 5**



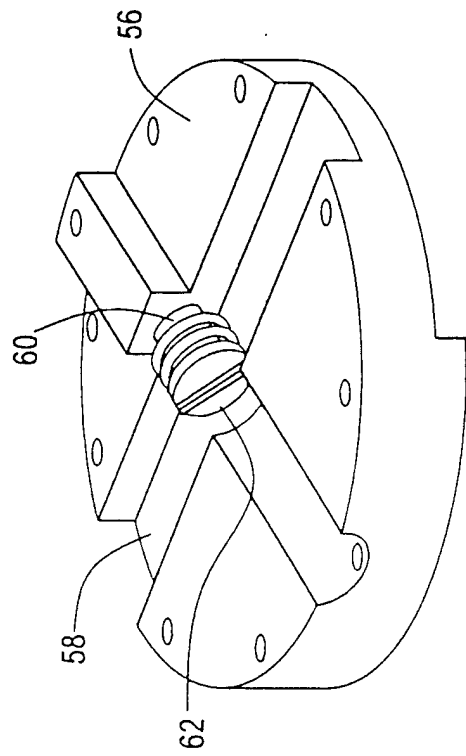
**FIG. 7**



**FIG. 8**

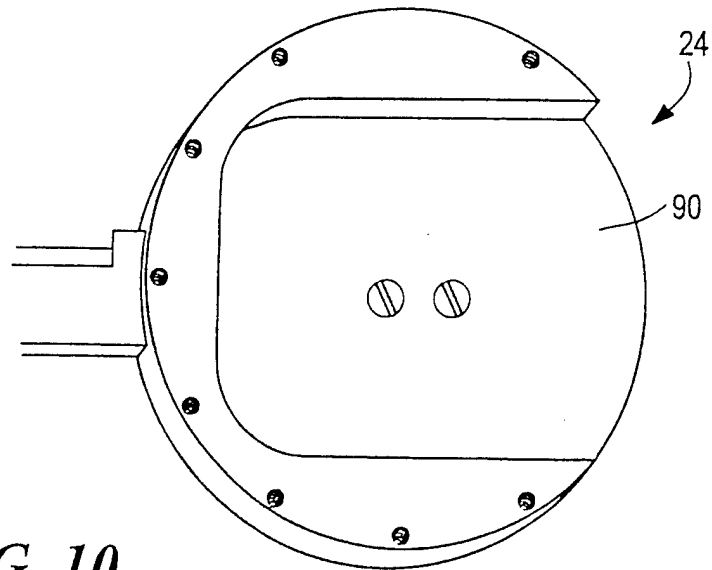
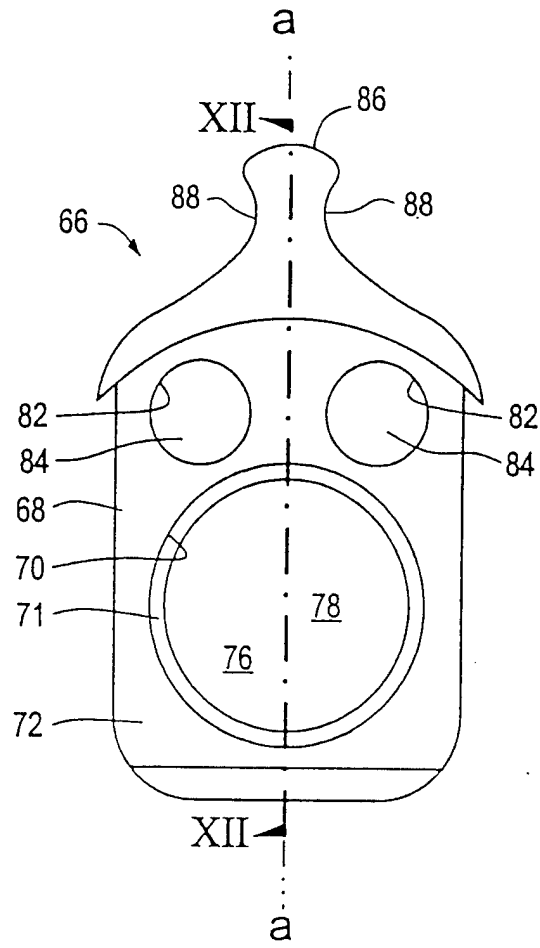


**FIG. 6**



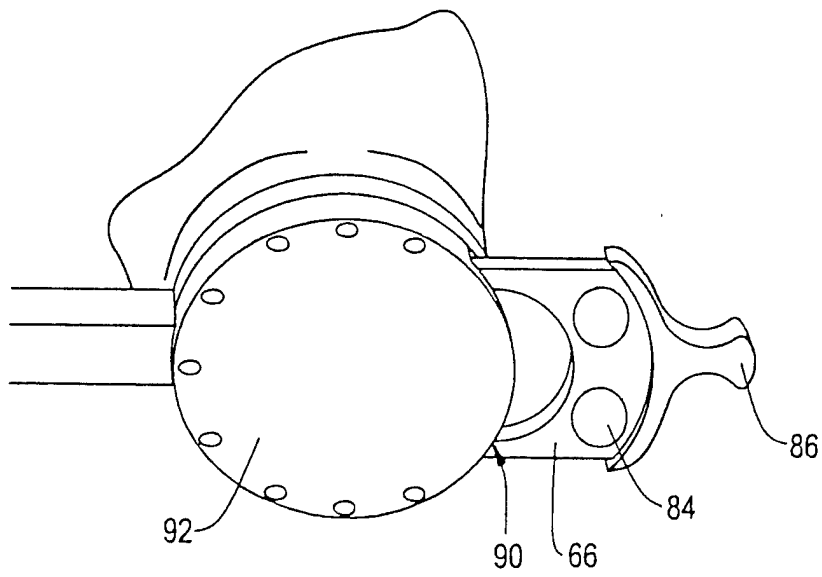
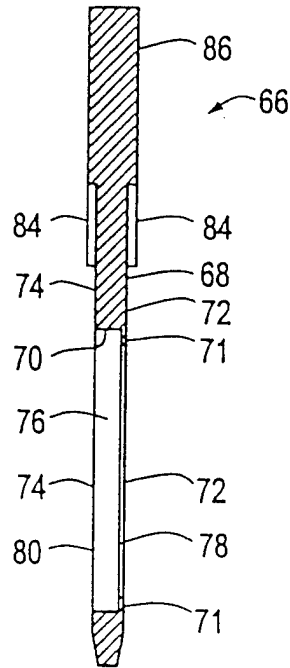
**FIG. 9**

**FIG. 11**



**FIG. 10**

**FIG. 12**



**FIG. 13**