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3 AN EYECUP ASSEMBLY FOR A SUBMARINE PERISCOPE

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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.

10

11 BACKGROUND OF THE INVENTION

12 (1) Field of the Invention

13 The invention relates to eyecups for viewing devices, such
14 as periscopes, telescopes, mounted binoculars, eye examination
15 devices, and the like, and is directed more particularly to an
16 eyecup assembly of special utility in conjunction with blinder
17 assemblies, which are part of submarine periscope systems.

18 (2) Description of the Prior Art

19 Eyecups for use on submarine periscope blinder assemblies
20 traditionally have been provided with a circular rubber flange
21 portion molded onto the rubber eyecup portion thereof. Submarine
22 periscope systems include a "blinder assembly" which serves to
23 prevent the passage of light to one eye of an operator, while

1 permitting light to pass to the other eye through a clear glass
2 or filter, such that the operator views a target with one eye.
3 The blinder assembly has been provided with a groove into which
4 the eyecup flange has been pressed. The groove receives the
5 flange therein and the eyecup is held thereby on the blinder
6 assembly.

7 Eventually, however, the flange tends to stretch out and
8 become larger than the groove, at which point the flange-in-
9 groove interconnection is no longer effective and the eyecup
10 becomes loose and eventually drops from the blinder assembly.

11 To solve the problem, mechanical clamps have been used to
12 hold the rubber flange of the eyecup in the groove on the blinder
13 assembly. Such clamps have been effective to varying degrees,
14 depending in large measure on the ingenuity and handiness of the
15 one devising and installing the clamp.

16 It is also desirable that the eyecup assembly be conformable
17 to the areas of a viewer's face surrounding either one or the
18 other of the viewer's right and left eyes.

19 Accordingly, there is a need for an eyecup assembly which is
20 adapted for secure attachment to a submarine periscope blinder
21 assembly, which does not fall from the periscope or require make-
22 shift measures to be retained on the blinder assembly and which
23 can be interchangeably mounted to selectively be conformable to

1 either one or the other of the area of the viewer's face
2 surrounding the right eye or the area of the face surrounding the
3 left eye.

4

5 SUMMARY OF THE INVENTION

6 An object of the invention is, therefore, to provide an
7 eyecup assembly for a submarine periscope blinder assembly, which
8 eyecup assembly is adapted for consistently secure attachment to
9 the blinder assembly and which can be interchangeably mounted to
10 the blinder assembly in such a way that it is selectively
11 conformable to either of the areas of the viewer's face
12 surrounding the right and left eye.

13 With the above and other objects in view, as will
14 hereinafter appear, a feature of the invention is the provision
15 of an eyecup assembly for a submarine periscope blinder assembly.
16 The eyecup assembly comprises an annularly-shaped ring having a
17 multiplicity of holes, which are unthreaded, extending
18 therethrough and adapted to receive screws for securing the eye
19 cup assembly to a like multiplicity of holes which are threaded
20 and arranged in a ring pattern around an eyepiece opening in the
21 blinder assembly, the annularly-shaped ring defining a central
22 viewing opening. The eyecup assembly further comprises an eyecup
23 lateral shell member circumscribing the eyecup chamber and which

1 is fixed to the ring and configured to conform generally to an
2 eye area of a viewer's head, more particularly, the eyecup
3 lateral shell member is composed of one portion which is
4 generally configured to conform to a portion of the facial area
5 of a viewer's eye including the temple and upper cheek, and
6 another portion generally configured to conform to a portion of
7 the facial area including the central forehead and upper nose,
8 with each of the one and another portions bilaterally symmetrical
9 about a horizontal axis of symmetry through the threaded holes.
10 This arrangement enables the eyecup assembly to be
11 interchangeably mounted in a way accommodating either the
12 viewer's right or left eye. Depending on whether the eyecup
13 assembly's central viewing opening is to be in condition
14 permitting light to pass to the eye, or in a condition preventing
15 passage of light to the eye, a rigid annulus, or a rigid opaque
16 plate, respectively, overlays the annularly-shaped ring and has a
17 like multiplicity and pattern of unthreaded holes, such that
18 heads of the screws for securing the eyecup assembly to the
19 blinder assembly engage the rigid annulus or rigid circular
20 plate. The lateral shell member is provided with vent holes.

21 The above and other features of the invention, including
22 various novel details of construction and combinations of parts,
23 will now be more particularly described with reference to the

1 accompanying drawings and pointed out in the claims. It will be
2 understood that the particular device embodying the invention is
3 shown by way of illustration only and not as a limitation of the
4 invention. The principles and features of this invention may be
5 employed in various and numerous embodiments without departing
6 from the scope of the invention.

7

8 BRIEF DESCRIPTION OF THE DRAWINGS

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

14 FIG. 1 is a front elevational view of one form of an eyecup
15 assembly illustrative of a preferred embodiment of the invention;

16 FIG. 2 is a sectional view taken along line II-II of FIG. 1;
17 and

18 FIG. 3 is similar to FIG. 2, but illustrative of an
19 alternative embodiment.

20

21 DESCRIPTION OF THE PREFERRED EMBODIMENT

22 Referring to FIGS. 1 and 2, it will be seen that an
23 illustrative embodiment of eyecup assembly 10 includes an

1 annularly-shaped ring 12 having a multiplicity of unthreaded
2 holes 14 (twelve shown in FIG. 1) extending therethrough and
3 adapted to receive screws 18 for securing the eyecup assembly to
4 a blinder assembly portion (not shown) of a submarine periscope
5 (not shown). The ring 12 defines a central viewing opening 16.

6 A flexible eyecup lateral shell member 20 is fixed to ring
7 12 and is configured to laterally circumscribe an eyecup chamber
8 and at its outer end to conform generally to an eye area of a
9 viewer's head. Referring to FIG. 1 for a more particular
10 description of how the configuration of shell member 20 conforms
11 to the area of a viewer's face in a way adaptable for either eye,
12 the unthreaded holes 14 in annularly-shaped ring 12 are arranged
13 in a pattern symmetrical relative to horizontal and vertical
14 reference axes H-H and V-V in the plane of ring 12. Lateral
15 shell member is composed of four sectors 20a, 20b, 20c, and 20d,
16 respectively extending from the four quadrants of ring 12 defined
17 by the axes H-H and V-V. The portion of the shell member
18 consisting of sectors 20a and 20b, which as cup assembly 10
19 appears of FIG. 1 is to the left of vertical axis V-V, is
20 configured to generally conform to a portion of the viewer's
21 facial area surrounding an eye including the upper cheek and
22 temple. This portion ((sectors 20a and 20b) is bilaterally
23 symmetrical about axis H-H. That is to say, sectors 20a and 20b

1 are of identical predetermined shapes which generally conform to
2 either the temple or the upper cheek areas of a face, but are in
3 a mirror image relationship to one another about axis H-H. The
4 portion of the shell member on the other side (right side as
5 eyecup assembly 10 appears in FIG. 1) of axis V-V consists of
6 sectors 20C and 20d. This portion is likewise bilaterally
7 symmetrical about horizontal axis H-H, with sectors 20c and 20d
8 of identical predetermined shapes which generally conform to
9 either the central forehead or upper nose areas of a face, but
10 are in a mirror image relationship about axis H-H. In accordance
11 with the present invention, this configuration of shell member 20
12 enables eyecup assembly 10 to be interchangeably attached to a
13 like aligned ring of threaded holes around an eyepiece opening on
14 the blinder to selectively receive either one of the viewer's
15 right and left eyes, by indexing the ring of holes 14 in the
16 annularly shaped ring 12 at positions 180° apart. The shell
17 member 20 is provided with a plurality of vent holes 22. The
18 vent holes 22 prevent a vacuum from developing when the operator
19 presses against flexible cup 20.

20 FIG. 2 depicts an embodiment of eyecup assembly 10 which
21 permits light to pass from the eyepiece opening of the periscope
22 blinder assembly (not shown) to the viewer's eye. As will become

1 apparent as the description progresses, in this preferred
2 embodiment annularly-shaped ring 12 is flexible.

3 A rigid annulus 24 overlies ring 12 and is provided with
4 unthreaded holes 14a aligned with the ring holes 14, such that
5 heads of screws 18 received by holes 14 engage rigid annulus 24
6 and not the flexible ring 12.

7 The ring 12 and lateral shell member 20 are preferably
8 formed as a unitary molded body, as shown in the drawings. In
9 one preferred embodiment, the material out of which a combined
10 ring 12 and lateral shell member 20 is molded is a neoprene
11 formulation which exhibits a hardness in the range of 50 to 80 of
12 the Shore scale of Durometer measurement. The invention may also
13 be practiced by molding shell member 20 using any of other known
14 elastomeric materials exhibiting like durability and hardness
15 characteristics.

16 In fabrication of the periscope blinder assembly, ring 12 is
17 secured to the blinder assembly by twelve screws 18, the screw
18 heads bearing against the rigid annulus 24 which, in turn,
19 presses ring 12 against the surface of the blinder assembly to
20 which the eye cup assembly is attached.

21 In use of eyecup assembly 10 in connection with a periscope
22 blinder assembly, a viewer presses each eye into the outer end
23 shell edge 20e of the lateral shell member 20 of the respective

1 eyecup assembly 10. An eyecup assembly in accordance with the
2 invention is suitable for either a left or right eye and for
3 either a blind or viewing opening 16. Referring to FIG. 3, it
4 will be seen that when used as a blind eyecup assembly 10' to
5 prevent passage of light from the eyepiece opening of the
6 blinders assembly to the viewer's eye, the opening 16 is closed
7 off by a rigid opaque plate, or "blank" 26.

8 There is thus provided an eyecup assembly adapted for secure
9 attachment to a submarine periscope blinder assembly.

10 It will be understood that many additional changes in the
11 details, materials, and arrangement of parts, which have been
12 herein described and illustrated in order to explain the nature
13 of the invention, may be made by those skilled in the art within
14 the principles and scope of the invention,

15 ... For example, while the above description has
16 focused on use of the eyecup assembly in conjunction with a
17 submarine periscope, and while the invention is believed to find
18 substantial utility in such combination, it will be apparent that
19 the invention is readily adaptable to usage in other similar
20 environments, such as in telescopes, mounted binoculars, eye
21 examination machines, and the like.

1 Attorney Docket No. 79452

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3 AN EYECUP ASSEMBLY FOR A SUBMARINE PERISCOPE

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5 ABSTRACT OF THE DISCLOSURE

6 An eyecup assembly for a submarine periscope blinder
7 assembly includes an annularly-shaped ring having a multiplicity
8 of holes, which are unthreaded, extending therethrough and
9 adapted to receive screws for securing the eyecup assembly to a
10 like multiplicity of holes which are threaded and arranged in a
11 circular pattern around an eyepiece opening in the blinder
12 assembly, the ring defining a central viewing opening. An eyecup
13 lateral shell circumscribes the eyecup chamber and is fixed to
14 the ring and configured to conform generally to an eye area of a
15 viewer's head, and to be interchangeably mounted to the threaded
16 holes to receive either the viewer's left or right eyes by
17 selectively indexing the holes in the ring 180° apart relative to
18 the threaded blinder assembly holes.

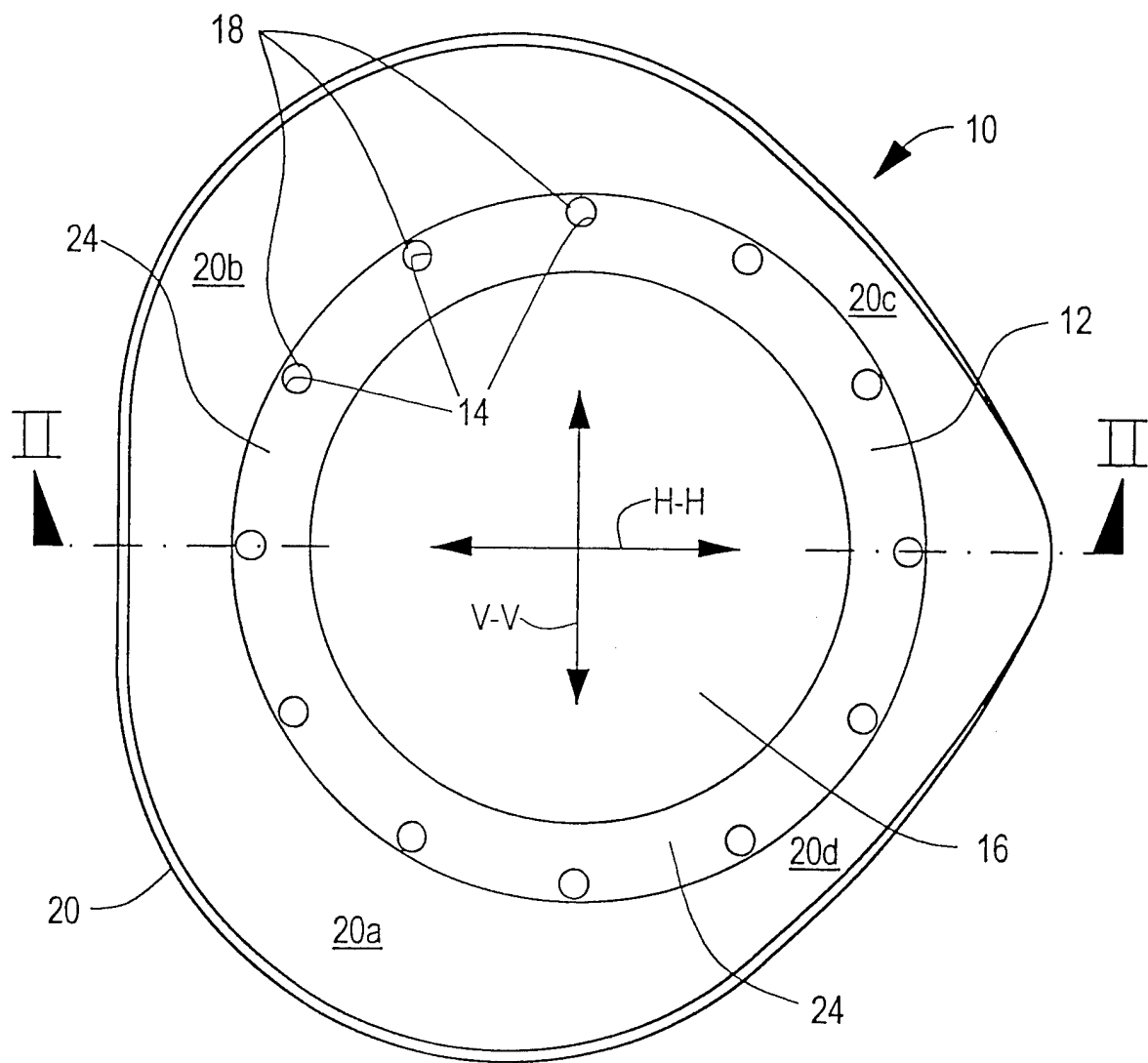
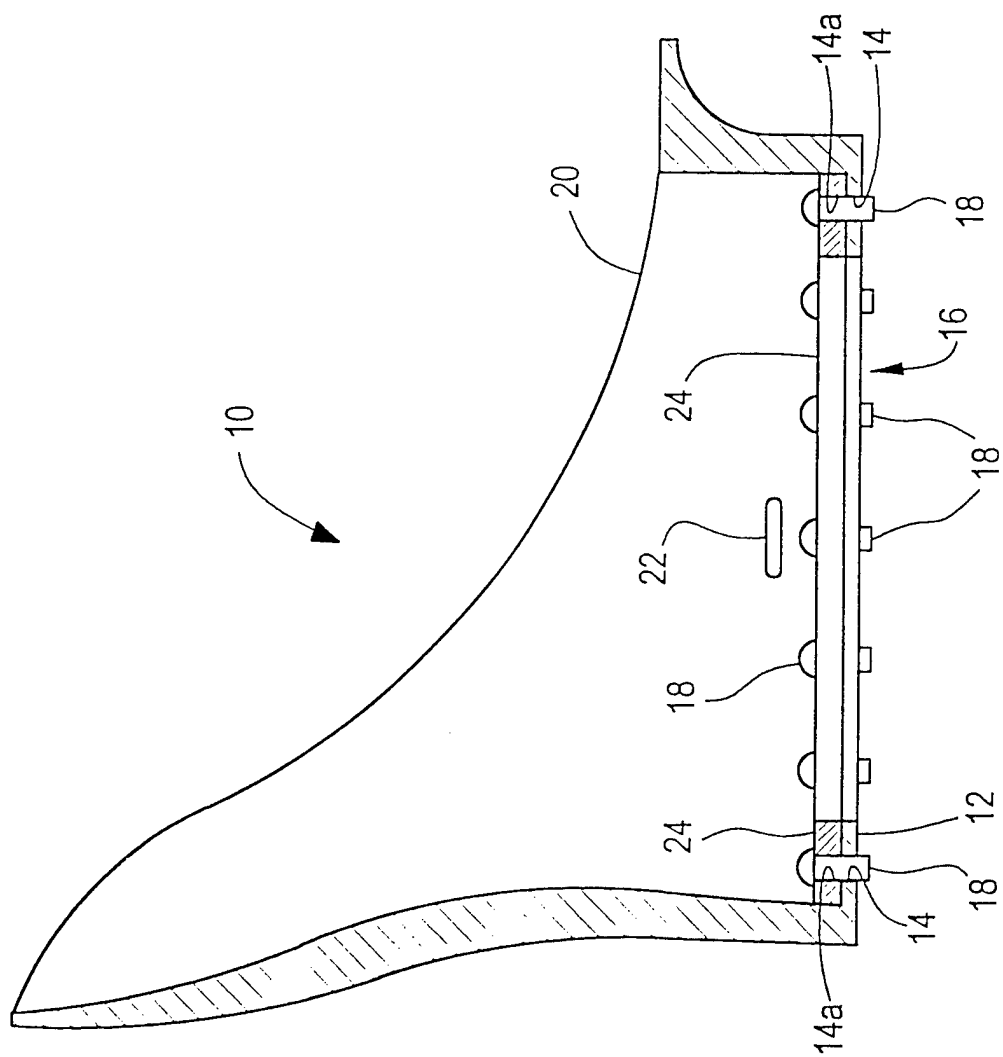


FIG. 1

**FIG. 2**

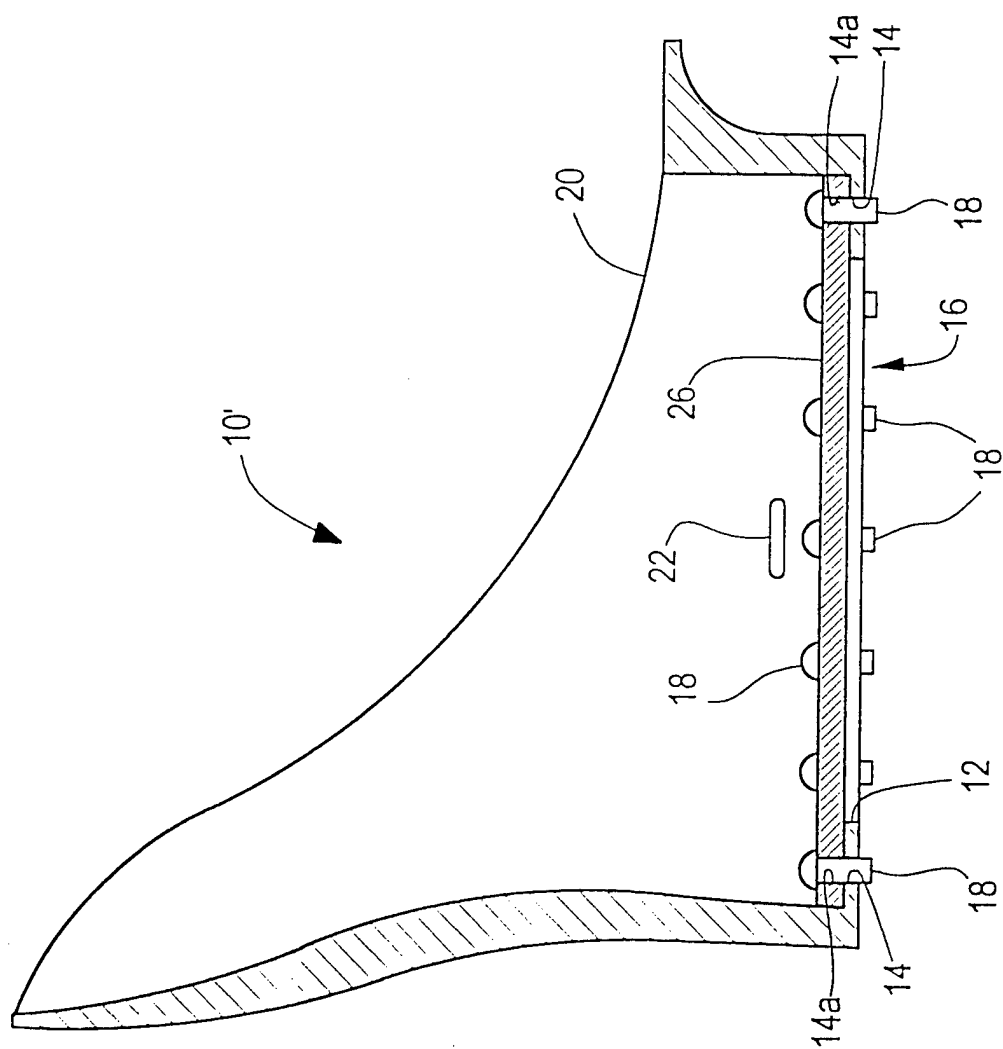


FIG. 3