Dec. 2, 1952 W. R. CHRISTENSEN ET AL 2,619,644

COLD WEATHER GOGGLES

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Fig. 1

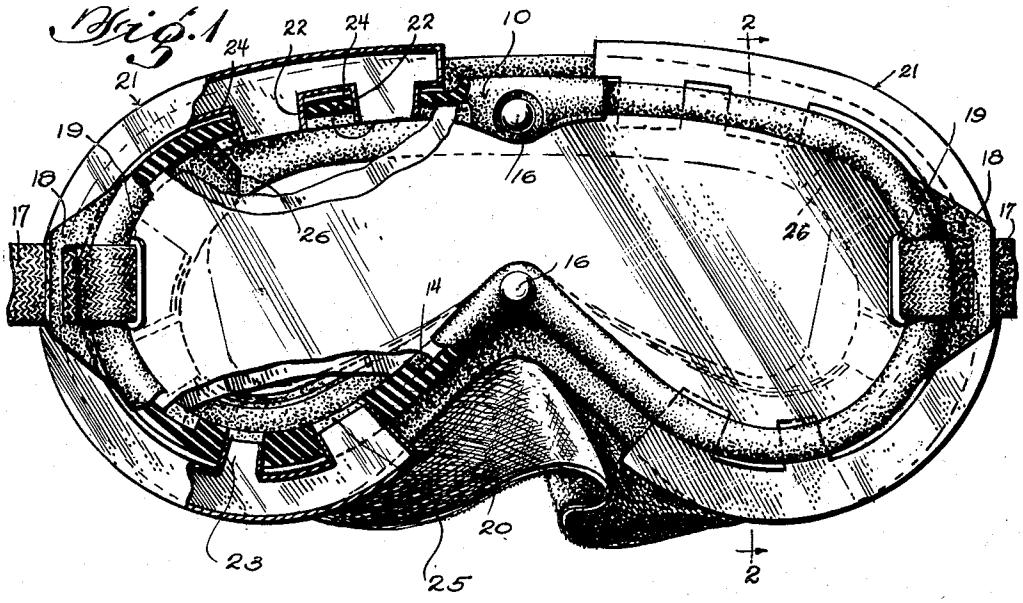


Fig. 3

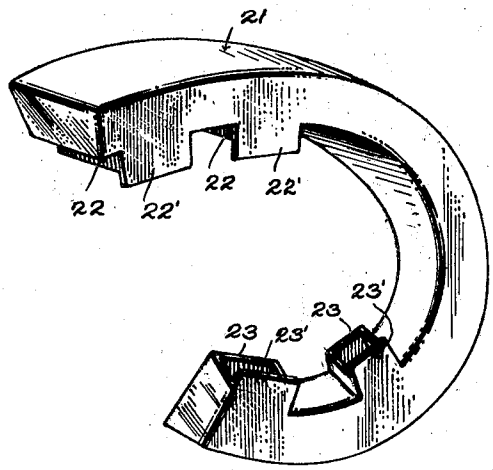
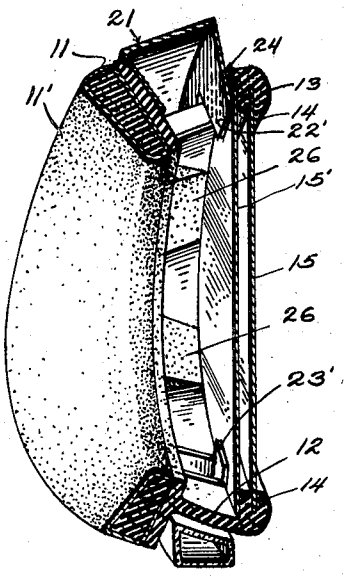


Fig. 2



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COLD WEATHER GOGGLES

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5 Claims. (Cl. 2—14)

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The invention described herein, if patented, may be manufactured and used by or for the Government for governmental purposes without the payment to us of any royalty thereon.

This invention relates to an improvement in goggles and, more particularly, to the provision of anti-fogging and anti-frosting goggles for use under conditions of low ambient temperatures.

Broadly, goggles, to be efficient under low temperatures, must be constructed to prevent the condensation of moisture on the lens and also prevent, so far as possible, undue chilling of the eyes.

Accordingly, it is an object of this invention to provide an improved goggles embodying means for cooling and dehumidifying the air trapped by the goggles frame.

It is another object of this invention to provide an improved goggles structure of the completely enclosed type embodying condensers for cooling and dehumidifying the air trapped by the frame of the goggles to prevent fogging or frosting of the lens in low temperatures.

It is a further object of this invention to provide an improved enclosed goggles embodying air cooling and dehumidifying means on the exterior thereof which affects recirculation of the air confined by the frame of the goggles so that undue chilling of the eyes is prevented.

Further objects, advantages and adaptations of this invention will be apparent from the following description and the accompanying drawings, in which:

Figure 1 is a front elevational view in partial cross-section of the goggles structure embodying this invention;

Figure 2 is a cross-sectional view on line 2—2 of Fig. 1; and

Figure 3 is a perspective view of a goggle condenser, embodying a moisture-removal and air-circulating passageway.

Referring to the drawings, goggles frame 10 comprises a conventional, flexible, rubber-type structure having a resilient, face-contacting part 11 and a web 12 connecting a bead 13, which has a flexible lens-holding groove 14 therein with the face-contacting part 11. The latter is illustrated in Fig. 2 as being provided with a built-up or additional face-padding of cloth or chamois 11', secured by a suitable adhesive as rubber cement or the like. This additional padding 11' was found to aid in the goggles resisting frost at low temperatures and also, with the protective nose-piece hereinafter described, aided in protecting the wearer against cold.

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As above indicated, the goggles frame 10 is of conventional rubber material, and the bead 13 is adapted to be distorted for insertion of goggle lens 15 in groove 14 in the usual and conventional manner. In addition to the groove 14, there is provided a pair of snap fasteners 16, likewise of conventional structure for clamping or securing the lens 15 into groove 14. Goggles frame 10 is also provided with conventional head straps 17, threaded through lugs or ears 18 of the goggles frame 10 with enlarged ends secured in T-shaped slots 19 in the lens 15 in a conventional manner. Also secured to the face-contacting portion 11, by suitable rubber cement or other adhesive, is a nose-protector body 20 of flexible cloth or chamois material.

As hereinafter described, the goggles structure is provided with air cooling and dehumidifying condensers 21, comprising closed tubular rigid passageway forming means conforming in shape in an end to end direction substantially to the outer side of the frame 10, provided with a pair of air-inlet openings or ducts 22 and outlets or ducts 23. These passageway forming means or condensers 21 are of rectangular shape in cross section and may be formed from a plastic, such as moldable resin, cellulosic or the like material. If desired they may be formed of metal, and in any case with or without internal and/or external fins. In the assembled relation of the parts these passageway forming means encompass the outer side of the web of frame 10 spaced outwardly thereof a short distance as illustrated in Fig. 1.

The web 12 is provided with a pair of apertures 24 in the top side of each eye-cup for snugly receiving the inlets 22 which are sealed therein by a suitable rubber or plastic adhesive. Along the lower portion of the frame 10 a second pair of apertures 25 is provided in the web 12, within which apertures the air outlet ducts 23 of condensers 21 are adapted to be snugly received. The outlet ducts 23 may be fixedly sealed in these apertures by means of a suitable adhesive, in the nature of rubber, resin, cellulose or the like, or they may be secured solely by the clamping pressure of the sides of the apertures 25 in the web 12. In any event the connection between the inlet and outlet ducts and the frame 10 is the sole means of mounting the condensers 21 on the frame 10.

As disclosed in Fig. 2, the goggles are provided with an inner lens or partition 15', pressed against the inner side of bead 13 so as to be held in closely spaced relationship to lens 15 by lugs 22'

and 23' on condenser air inlet and outlet ducts 22 and 23, respectively. The inner lens is additionally held in position by one or more supporting or retaining blocks 26 of rubber or cork, or the like, cemented to the interior of web 12 so as to abut against the body portion 11 and inner lens 15' and hold the latter in place to provide a substantially sealed dead air thermal insulating space between the lenses 15 and 15'. It will be observed that inlet and outlet ducts 22 and 23 communicate respectively with the upper and lower sides of the space in the frame to the rear of the inner lens 15'.

By the arrangements thus provided, air is entrapped in the goggles frame 10 behind partition 15' and this air is heated by contact with the wearer's face. This heated air passes into the passageways or condensers 21 through inlet duct 22. The condensers 21, being exposed to the outside atmosphere and spaced from frame 10, are subject to low external temperature conditions which when this temperature is low will cause moisture to condense from the air as it flows through the condensers 21. After dehumidification of the air it flows back into the eye-cup cavities of the goggle frame 10 through outlet ducts 23, spreads laterally within the eye-cup cavities, again becomes warm and absorbs moisture tending to collect or condense on the inner lens 15'. The air space provided between the outer and inner goggle lenses 15 and 15' is of sufficient insulating value to prevent condensation of moisture on the confronting sides of the inner and outer lenses 15' and 15 respectively.

In the structure thus described the goggles lenses remains free of fogging and frost, or retains visibility, for periods of one hour and longer at temperatures up to minus 20° F. By spacing condensers 21 from rib 12 one half inch, for example, the condensing capacity of condensers 21 may be increased so that the range of temperatures in which the condensers are effective to prevent fogging or frosting of the lens of the goggles is increased. As heretofore mentioned, fins may be formed on the condensers 21 externally and/or internally of the units. Further, while the condenser shape is disclosed as rectangular in cross section, it may be formed in any other shape desired. For example, the shape may be molded or formed to utilize the greatest surface area contact possible without substantially increasing or enlarging its bulk size.

In accordance with the patent statutes, the foregoing is a description in detail of what is now considered to be the preferred form of the invention, but it will be obvious that various minor changes may be made in the structural details without departing from the spirit of the invention, and it is intended that all such changes be included within the scope of the appended claims.

We claim:

1. An anti-fogging and anti-frosting goggles comprising a frame including a flexible part to contact the face of a wearer in substantially sealed relation thereto, transparent lens forming means sealed in said frame forward of the face contacting part including means defining a dead air thermal insulating space at the forward side of said frame and cooperating with the frame to define a space to the rear of the dead air space containing air warmed by contact with the wearer's face when the goggles are worn, and an air dehumidifying and cooling condenser comprising a continuous imperforate passageway on the exterior of the frame extending between and having an inlet communicating with the top side of the space in said frame to the rear of the lens forming means and an outlet communicating with the bottom side of the said space to induce a convectional flow of air between the top and bottom of the said rear space.

2. An anti-fogging and anti-frosting goggles comprising a frame including a flexible part to contact the face of a wearer in substantially sealed relation thereto, transparent lens forming means in said frame forward of the face contacting part thereof including means defining a dead air thermal insulating space at the forward side of said frame and cooperating with the frame to define a space to the rear of the dead air space containing air warmed by contact with the face of a wearer of the goggles, and means forming a passageway communicating with the space in said frame to the rear of said lens forming means along the top and bottom sides of the frame, at least a portion of the walls of said passageway forming means being exposed to the exterior so as to be cooled by the atmosphere and thus effect a cooling of the air in the same so as to produce a convectional flow of air through the passageway forming means from the top to the bottom side of the said rear space in the goggles.

3. A goggles as defined in claim 2 wherein the passageway forming means substantially conforms in shape to at least a portion of the outer periphery of the frame and is disposed in encompassing spaced relation thereto.

4. An anti-fogging and anti-frosting goggles comprising a frame including a flexible part to contact the face of a wearer in substantially sealed relation thereto, transparent lens forming means in said frame forward of the face contacting part thereof including means defining a dead air thermal insulating space at the forward side of said frame and cooperating with the frame to define a space to the rear of the dead air space containing air warmed by contact with the face of a wearer of the goggles, means forming a passageway substantially conforming to the contour of at least a portion of the periphery of said frame, and cooperating means on the frame and adjacent opposite ends of said passageway forming means to mount the latter on the exterior of the frame, said passageway forming means communicating with the space isolated by the goggles to the rear of said lens forming means along the top and bottom sides of the frame so as to produce a flow of warm air convectionally in said passageway forming means from the top to the bottom side of the said rear space.

5. An anti-fogging and anti-frosting goggles comprising a frame including a flexible part to contact the face of a wearer in substantially sealed relation thereto, transparent lens forming means in said frame forward of the face contacting part thereof including means defining a dead air thermal insulating space at the forward side of said frame and cooperating with the frame to define a space to the rear of the dead air space containing air warmed by contact with the wearer's face when the goggles are worn, rigid passageway forming means extending from the top to the bottom side of said frame around the outer edges thereof and substantially conforming to the contour of the said outer edges, and inlet and outlet ducts on said passageway forming means snugly received in apertures respectively on the top and bottom sides of said frame in sealed relation thereto to form the sole

means for mounting said passageway forming means on said frame, said inlet and outlet ducts establishing communication with the top and bottom sides of the space to the rear of said lens forming means so as to induce a convectional flow of air between the said sides.

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