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R. L. MILLER
AVIATOR'S HELMET
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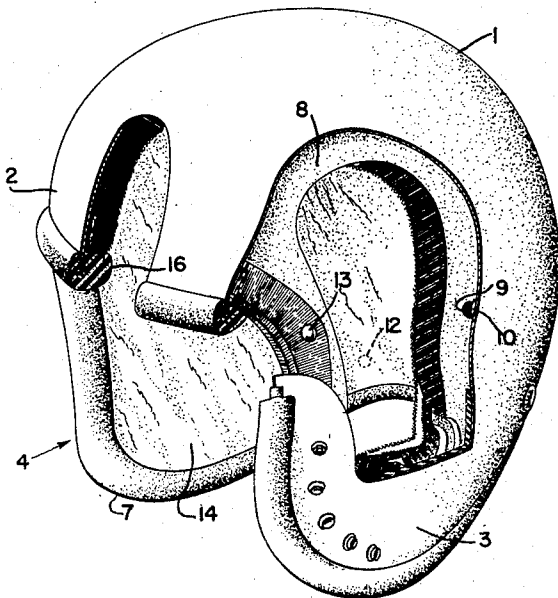
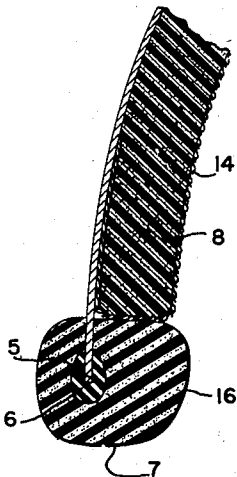
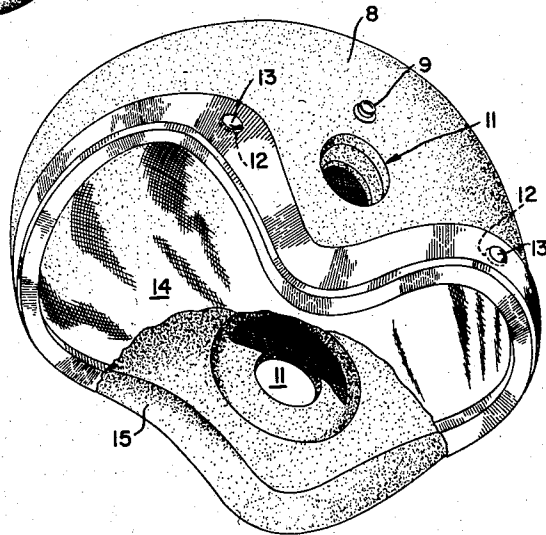


Fig. 2.



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AVIATOR'S HELMET

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2 Claims. (Cl. 2—6)

This invention relates to helmets for aircraft pilots and specifically to improvements in such helmets involving means to attenuate noise from the aircraft to assist in avoiding pilot fatigue and to assist in the avoidance of interference with his communication system.

The primary object of this invention is to provide an aviator's helmet having an improved sound attenuating liner.

Another object of this invention is to provide an aviator's helmet in which a seal is provided along the opening edge of the helmet to contact the head of the pilot to cooperate with a sound attenuating liner within the helmet to substantially eliminate aircraft noise from reaching the pilot's ears.

A still further object of this invention is to provide an aviator's helmet having an outer shell composed of a fiber glass reinforced plastic resin to protect the head of the wearer in combination with a resilient sound attenuating liner within the shell to substantially eliminate noise from reaching the ears of the pilot and to act as an aid toward rendering the helmet adaptable to heads of different shapes and sizes.

Another specific object of this invention is to provide an aviator's helmet including an outer shell for encompassing the head of the pilot including the area below and behind the ear section of the pilot with the shell including a seal around the open portion thereof to contact the pilot's head at all points and to cooperate thereby with a resilient sound absorbing liner in preventing aircraft noise from affecting the ears of the pilot.

With the foregoing and other objects in view, the invention resides in the following specification and appended claims, certain embodiments and details of construction of which are illustrated in the accompanying drawings, in which:

Figure 1 is a partially sectional view in substantially side elevation of the helmet comprising the invention;

Figure 2 is a partially sectional view in perspective of the liner removed from the helmet, as shown in Figure 1, and

Figure 3 is a detailed view illustrating the construction of the seal bordering the open portion of the helmet.

Now, referring more particularly to Figure 1, the helmet is illustrated as having an outer shell 1 including a forward portion 2 for encompassing the forehead of the pilot. The shell 1 is further provided with depending ear encompassing portions 3 and 4. As distinguished from the normal football-type of helmet, wherein only an ear flap is provided, the shell is continued from ear portion 3 to portion 5 along a base line at the rear to such an extent that the lower base section of the head of the pilot is substantially encompassed.

The shell 1 is preferably constructed by means of a molding operation in which a suitable resin is combined with a plurality of layers of fiber glass to provide a relatively tough protecting coverage for the pilot's head.

The edge 5 of the shell 1, which defines the opening

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for the head cavity is covered by a channel rubber strip 6 which is attached thereto by a suitable adhesive. In order to effectively seal the interior portion of the cavity within the shell 1 from exterior noise, a resilient channel member 7 is slipped over the rubber strip 6 and is secured by an adhesive to the exterior and interior wall of shell 1. The purpose of the rubber strip 6 is to guard against possible damage to the channel member 7 by the relatively sharp edge 5 of the shell. The channel member 7 is preferably formed of neoprene although other suitable resilient materials could be used.

A resilient sound attenuating liner 8 is illustrated in Figure 1 as covering substantially the entire interior surface of shell 1, the edge thereof contacting the upper portion of the member 7. The liner is provided with an integrally molded stud 9 to cooperate with a female socket 10 on the interior surface of the shell 1 to secure the liner within the shell cavity. Although only one such fastening means is illustrated, two are used, one on each side, and others may be utilized. The liner is formed by mixing polyurethane material and a catalyst and placing the same in a mold with subsequent cure treatments. It was found that the most desirable class of polyurethane for sound attenuating purposes was F29R resin. The catalyst utilized to activate and foam the resin was F29C catalyst. Both of these are available from the Nopco Chemical, Harrison, N. J. The liner produced by the process with this specific polyurethane material was found to have the highest sound absorbing characteristics consistent with the desired resiliency necessary to assist in fitting a helmet to various head sizes and shapes.

As shown in Figure 2, the liner 8 is provided with openings 11 for the accommodation of the head phones (not shown) utilized by the pilot for radio reception. At various points on the outer surface of the liner 8 female sockets 12 are provided to receive cooperating studs 13 which are secured to a cloth liner 14 which extends over the interior surface of the sound absorbing liner 8. As illustrated in Figures 2 and 3 the cloth liner 14 is wrapped about the edge 15 defining the opening for the liner and is folded back upon the exterior surface of the liner so that the studs 13 may engage sockets 12 to thereby secure the cloth liner to the sound absorbing liner.

The lower portion of the shell 1, including the ear portions 3 and 4, is inherently flexible to press inwardly against the lower portion of the pilot's head. In placing the resilient member 7 along the shell edge 5 around the entire cavity, it then becomes obvious that the inner portion 16 of the member 7 will be pressed into contact with the head of the wearer at all points including the forehead and the area at the base of the rear of the pilot's head. Thus, effectively, the interior area of the shell cavity is effectively blocked to a considerable extent from aircraft noise by the utilization of this seal member 7. Utilizing in combination with this seal the polyurethane liner 8 with its inherent high sound absorbing qualities an optimum amount of blocking of external aircraft noise is afforded the pilot. Thus, a lessening of pilot fatigue results as well as a minimum amount of interference with radio reception. It is fully realized that helmets of various types, such as those worn by athletes and aviators in the past have been provided with a hard outer shell and a resilient, generally sponge rubber, liner. However, this prior art was not concerned with sound attenuation and furthermore the materials utilized would not be effective or practical in dealing with the problem of aircraft noise which is fully met by the present invention.

Furthermore, the invention by its use of the resilient form of polyurethane for the liner 8 with a relatively

thick wall section on the order of one inch, adapts itself readily with only a few exterior shell sizes to heads of various sizes and dimensions. In other words, for a small, medium, and large head size, an appropriate matching liner and shell will be utilized. Then various head shapes in these general head sizes may be accommodated by the inherent resiliency of the polyurethane material. In other words the liner substantially contacts all portions of the pilot's head with the exception of the chin and face in close fitting relationship regardless of the head shape and thus serves the double function recited above.

It is obvious that this invention might be varied as to use of materials such as the material of the channel member 7 might be something other than neoprene. However, from a practical standpoint, and after considerable experimentation, it was found that neoprene served the purpose admirably. Likewise, it is foreseeable that some other material than polyurethane might be utilized for the formation of the sound absorbing liner 8, but as heretofore recited in the specification, the optimum sound absorbing characteristics are achieved by the use of this material and preferably in the proportion given in connection with the catalyst.

I claim:

1. An aviator's helmet comprising an outer shell with an edge portion thereof defining an interior cavity, said shell including a forehead portion, two ear encompassing portions, and a base of the head portion at the rear of the shell joining said ear portions, the ear portions and head base portion of said shell being inherently resilient, a resilient seal secured along the entire length of said cavity defining edge portion of the shell and extending

inwardly thereof for contact at all points with the head of the wearer to block the open reception of noise from the exterior of the helmet to the cavity thereof, and a resilient liner of high sound attenuating characteristics secured within said shell and substantially encompassing the entire interior surface thereof, said seal extending inwardly of the shell cavity a greater distance than the liner, and said liner being in contact with the seal within the shell along the upper surface of the seal.

2. An aviator's helmet comprising an outer shell formed of a molded resin impregnated fiberglass lamination with an edge portion thereof defining an interior cavity, said shell including a forehead portion, two ear encompassing portions, and a base of the head portion at the rear of the shell joining said ear portions, the ear portions and the base of the head portion of said shell being inherently resilient, a resilient neoprene seal secured along the entire length of said cavity defining edge portion of the shell and extending inwardly thereof for contact at all points with the head of the wearer under the effect of the inherently resilient portions of the shell to block the open reception of noise from the exterior of the helmet to the cavity thereof, and a resilient liner of polyurethane material secured within said shell and substantially encompassing the entire inner surface thereof, said seal extending inwardly of the shell cavity a greater distance than the liner, and said liner being in contact with the seal within the shell along the upper surface of the seal.

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