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Elifritz

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[54] **DIVING HELMET ASSEMBLY**

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[52] **U.S. Cl.** ..... **128/142.7**; 2/2.1 R

[51] **Int. Cl.** **A62b 18/04**

[58] **Field of Search** ..... 128/141 R, 142–142.7, 128/145 R, 145.5–145.8, 146, 146.3–146.7; 2/2.1 R, 2.1 A, 5 R, 6 R, 3 R

[56] **References Cited**

UNITED STATES PATENTS

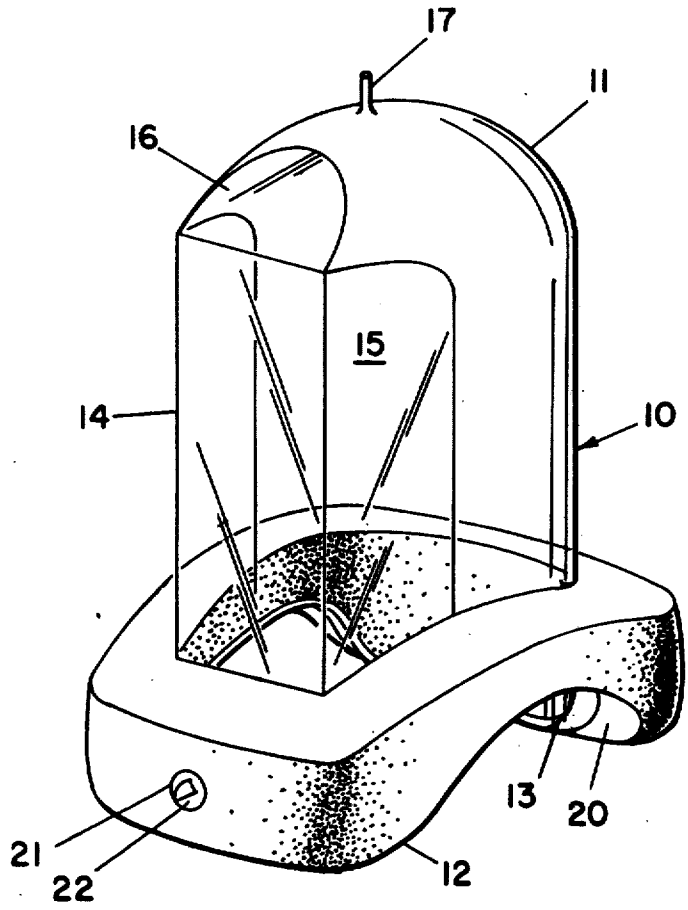
652,080	6/1900	Chappell	2/5 R
1,264,706	4/1918	Stallworth	128/142
3,675,650	7/1972	Domyan	128/142.7
3,707,004	12/1972	Kapitan	128/142.7

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[57] **ABSTRACT**

A diving helmet assembly consisting of a transparent plastic helmet having an outwardly extending flange, and a hollow plastic collar which fits around the helmet and engages the flange. The helmet is substantially dome shaped preferably with flat polished portions for clear viewing, and has a hose connection to permit air to be supplied to the helmet when it is immersed in water. The hollow interior of the collar is filled by the user with heavy ballast material such as sand or concrete to counteract the buoyancy of the air filled helmet in water.

7 Claims, 4 Drawing Figures



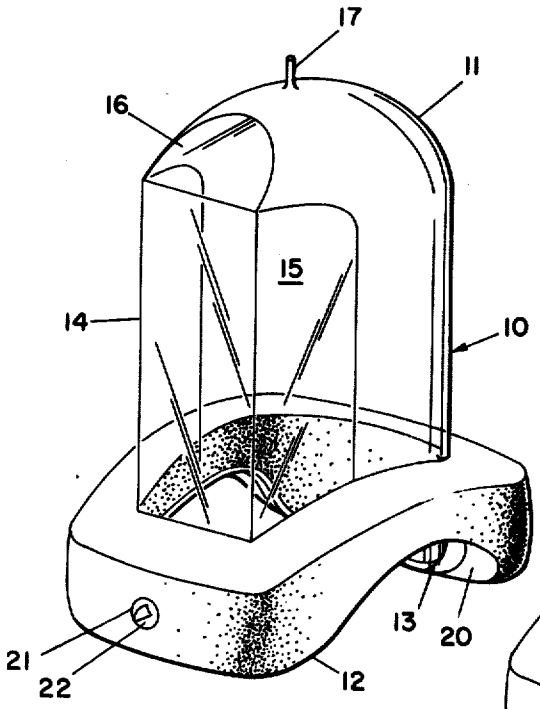


Fig. 1

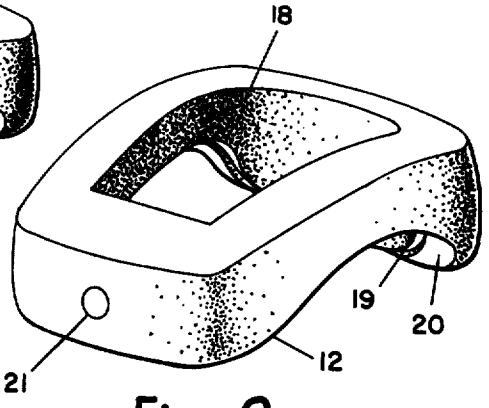


Fig. 2

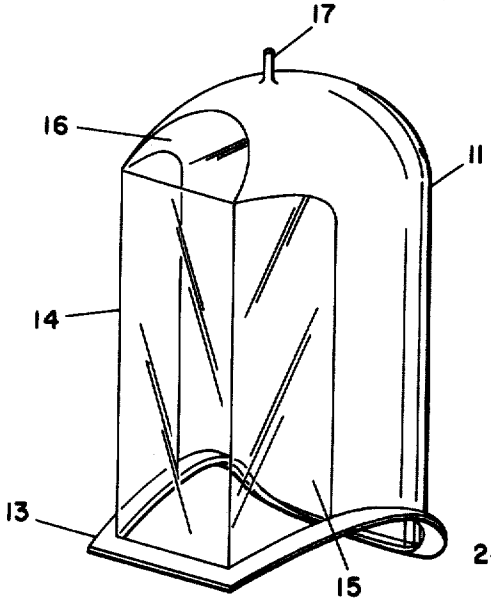


Fig. 3

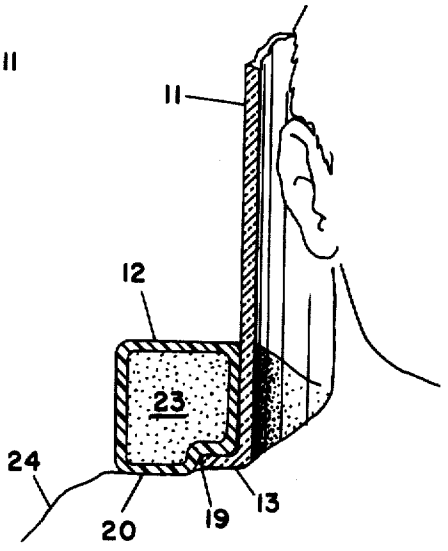


Fig. 4

DIVING HELMET ASSEMBLY

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention pertains to the field of underwater diving helmets, and more particularly to helmets which do not require sealing to a diver's body.

2. Description of the Prior Art

Known prior art diving helmets have typically consisted of a heavy metal or fiberglass helmet structure having small transparent windows placed therein. These windows allow only a very restricted field of view, as well as presenting a sealing problem at the joints between the helmet structure and the windows. Moreover, these known helmets have typically been prohibitively expensive for the majority of non-professional divers, due largely to the cost of the materials from which the helmets have been made, and the machining and assembly steps required. Such helmets have also generally been adapted only to the use of lead as ballast, which has contributed to the expense of construction, and has made transport, and handling difficult and expensive.

SUMMARY OF THE INVENTION

I have invented a safe and inexpensive diving helmet assembly which consists of a helmet and a detachable collar. The helmet is formed in one piece of a transparent plastic material, and is substantially dome shaped with flat portions at the front, top and sides which are preferably polished to provide substantially distortion-free viewing areas. The hollow plastic collar fits snugly around the helmet and engages a flange at the bottom of the helmet to prevent the collar from slipping off the helmet. The bottom of the helmet and collar are contoured to rest comfortably on a diver's shoulders.

My diving helmet assembly functions generally in the same manner as an open diving "bell", with air or other breathable gas being pumped under pressure from a compressor at the surface through a hose to the helmet. The pressure of the air in the helmet is maintained at the pressure of the water surrounding the helmet to thereby keep the helmet interior free of water and to properly pressurize the diver's lungs. Because the pressures inside and outside the helmet are approximately equal, very little pressure stress is applied to the helmet. Thus my diving helmet assembly is structurally suitable for safe use at substantial depths, although it is contemplated that the depth of use will be restricted to minimize other hazards to divers.

The hollow collar has an opening therein to allow concrete, sand, scrap metal, or other commonly available ballast material to be introduced into the interior of the collar. When the heavy ballast-filled collar in engaged on the helmet it counteracts the buoyancy of the air filled helmet, and maintains the helmet on the diver's shoulders in a proper upright position in the water.

Because of the simple construction of the helmet and collar, these articles can be manufactured inexpensively and at high speed using plastic molding machines, and with a minimum of human labor. The helmet is tapered to allow compact stacking of the helmets and collars during transport and storage. The collar can be transported empty, to be filled later by the user with ballast material. Most of the commonly available denser than water ballast materials can be used, and expensive lead is not required for a ballast as with known prior art diving helmets.

Further objects, features and advantages of my invention will be apparent from the following detailed description taken in conjunction with the accompanying drawings showing a preferred embodiment of a diving helmet assembly exemplifying the principles of my invention.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings:

FIG. **1** is a perspective view of my diving helmet assembly with the helmet and collar portions of the assembly in assembled relation.

FIG. **2** is a perspective view of the collar portion of the assembly of FIG. **1**.

FIG. **3** is a perspective view of the helmet portion of the assembly of FIG. **1**.

FIG. **4** is a cross-sectional view of a portion of the diving helmet assembly of FIG. **1** shown in place on the shoulder of a user.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now more particularly to the drawings, wherein like numerals refer to like parts throughout the several views, my diving helmet assembly is shown generally at **10** in FIG. **1**. The diving helmet assembly **10** has two detachable parts, a helmet **11** and a collar **12** which fits around the helmet.

As best shown in FIG. **3**, the helmet **11** is substantially dome shaped and is preferably composed of a high strength transparent plastic material such as cellulose acetate propionate. Use of this material also permits production of the helmet by high speed injection molding, which allows the helmets to be produced rapidly and inexpensively. A flange **13**, formed integrally with the helmet **11**, extends outwardly around the open bottom end of the helmet to provide a means for engaging the collar **12** on the helmet. The bottom end of the helmet and the flange **13** are contoured to generally fit a diver's shoulders and rest comfortably thereon.

Although the helmet **11** is substantially dome shaped, the front portion **14** of the helmet is preferably formed as a flat surface to provide a primary clear viewing area without significant distortion. Two flat surfaced side portions **15** and a flat surfaced top portion **16** preferably converge from the curved portions of the helmet to the front portion **14**. To provide best viewing clarity, it is preferable that the flat portions **14**, **15**, and **16** also be polished. Although the remaining curved portion of the helmet is not polished, it is preferably transparent to provide some additional visibility.

A hollow protrusion **17** is formed integrally with the rest of the helmet **11** at the upper end thereof to provide means for connecting an air hose to supply air from the exterior to the interior of the helmet **11** when the helmet is submerged in water. The hose connection protrusion **17** protrudes above the upper portion of the helmet **11** a distance sufficient to allow an air hose (not shown) to be fitted on to the protrusion. The air hose is then clamped or glued to the connection protrusion **17** to provide a secure fluid-tight fitting between the hose and the protrusion.

The collar **12** is preferably blow molded from a sturdy plastic such as linear polyethylene, and has a hollow interior. As shown in FIG. **1**, the collar **12** sur-

rounds the helmet **11** when the assembly **10** has been assembled for use. The inward facing surface **18** of the collar substantially conforms to the exterior shape of the helmet to allow the collar to fit snugly when properly positioned. The helmet flange **13** is engaged by the collar in an indentation **19** which extends around the inner edge of the bottom surface **20** of the collar. As best shown in FIG. **4**, the indentation **19** allows the flange **13** to rest comfortably on a diver's shoulder **24**, with the bottom surface of the flange approximately even with the bottom surface **20** of the collar which is also contoured to substantially fit the shoulders of a diver.

As previously indicated, the collar **12** is hollow, and has an opening **21** through which heavy, dense ballast material **23** can be inserted to fill the interior of the collar. A plug **22** fits into and closes the opening **21** to retain the ballast material. It is anticipated that the collar will be transported and stored empty to minimize the cost of transport and handling, with the user providing the ballast as needed. The ballast **23** must necessarily be denser than water and have sufficient weight so that engagement of the ballast-filled collar on the helmet **11** will counteract the buoyancy of the air filled helmet in water and retain the helmet in place on the diver's shoulders during underwater movement. It has been found that several commonly available materials are satisfactory for this purpose, as for example, concrete, heavy scrap metal, or sand. The relatively large volume of the interior of the form-fitting collar allows these inexpensive materials to be used rather than the usual lead ballast. For example, when the collar is filled with concrete ballast it will weigh approximately 40 pounds. The cost of concrete is currently approximately one-twentieth that of lead, and is normally much more readily available to the user.

The helmet **11** is formed with an upward taper from the bottom end to the top end of the helmet. This design facilitates removal of the helmet from an injection molding machine, and also allows several helmets to be stacked one over another in telescoping relation to minimize the space occupied by the helmets during transport or storage.

It is understood that my invention is not confined to the particular construction and arrangement of parts herein illustrated and described, but embraces all such modified forms thereof as come within the scope of the following claims.

I claim:

1. A diving helmet assembly which comprises:

a. A substantially dome shaped one piece helmet having an open bottom end, said helmet being of fluid-impervious transparent plastic material;

b. a collar adapted to fit around said helmet, said collar having a hollow interior and an opening to receive ballast material therein;

c. means for removably engaging said collar on said helmet to counteract the buoyancy of the air-filled helmet in water, and

d. means on said helmet for connecting a hose to supply air from the exterior to the interior of said helmet when said helmet is submerged in water.

2. The diving helmet assembly specified in claim **1** wherein the helmet is cellulose acetate propionate plastic.

3. The diving helmet assembly specified in claim **2** wherein the helmet has at least one substantially flat transparent portion with polished surfaces.

4. The diving helmet assembly specified in claim **1** wherein the hollow collar is linear polyethylene plastic.

5. The diving helmet assembly specified in claim **1** wherein the means for engaging the collar with the helmet comprises a flange formed integrally with the bottom end of said helmet and extending outwardly therefrom, and wherein the collar has a bottom surface with an indentation around the inner edge thereof to engage said helmet flange.

6. The diving helmet assembly specified in claim **1** wherein the collar has a bottom surface, and wherein the bottom end of said helmet and the bottom surface of said collar are contoured to substantially fit a diver's shoulders and rest comfortably thereon.

7. The diving helmet assembly specified in claim **1** wherein said helmet tapers inwardly from the bottom end thereof to the top end thereof.

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