

April 12, 1938.

J. E. WILLIAMSON

2,113,779

DIVING HOOD OR DEVICE

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2 Sheets-Sheet 1

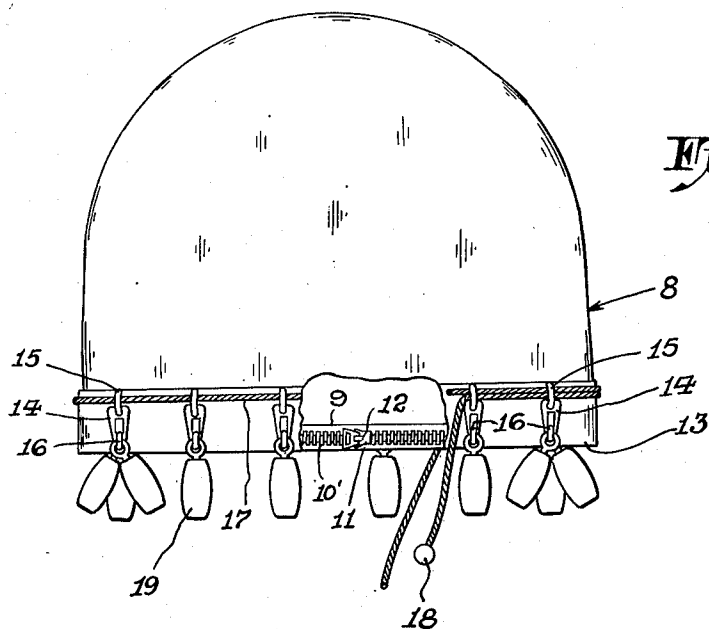


Fig. 2.

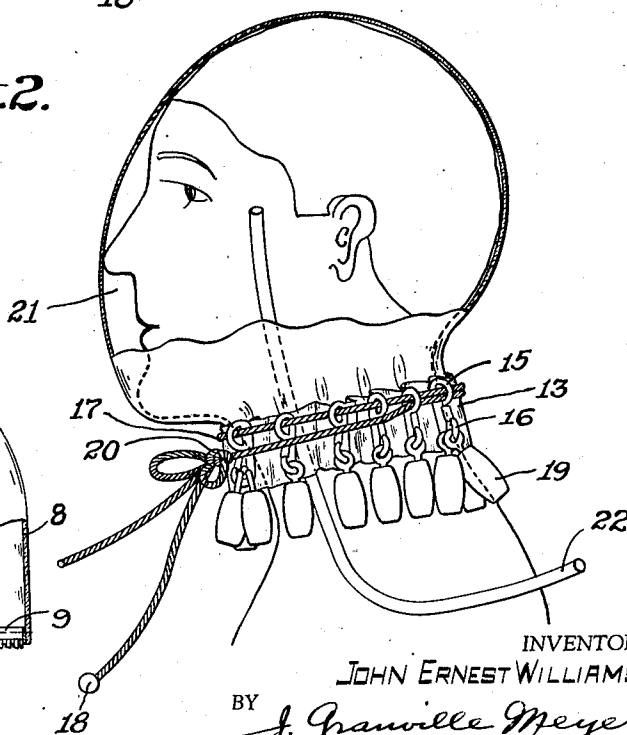
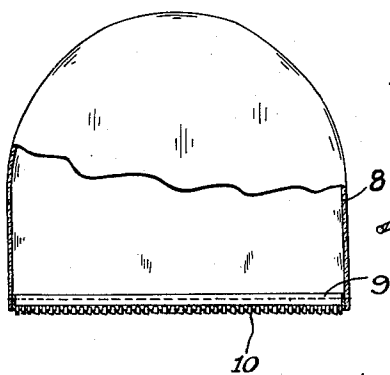


Fig. 3.



INVENTOR.
JOHN ERNEST WILLIAMSON
BY *J. Granville Meyers.*
ATTORNEY.

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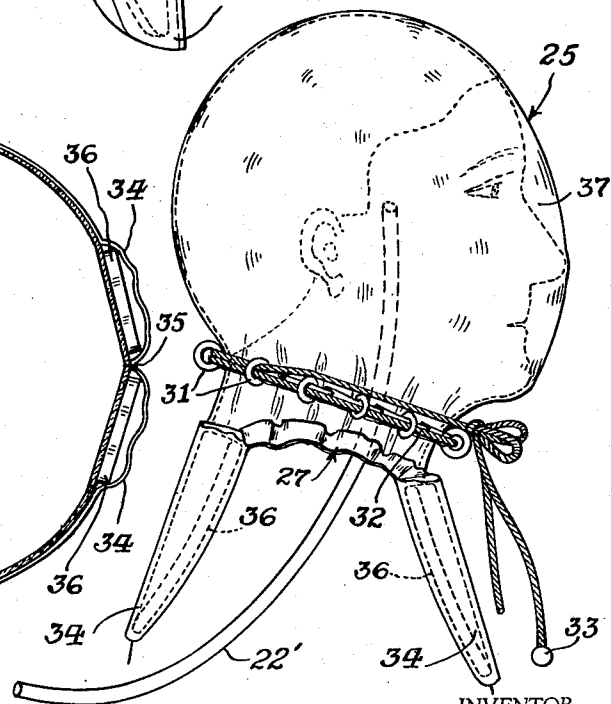
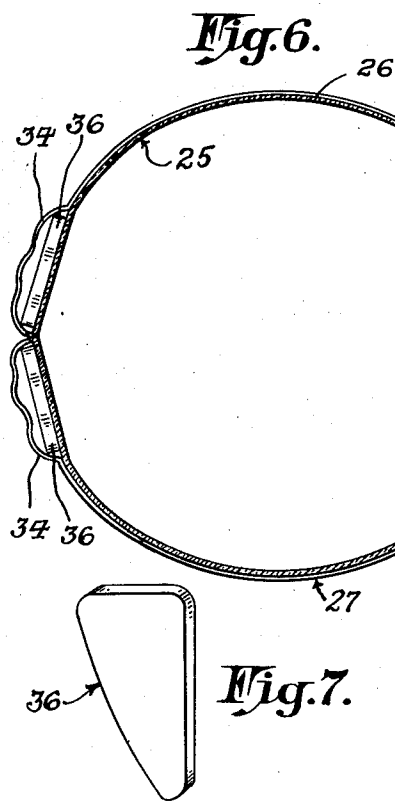
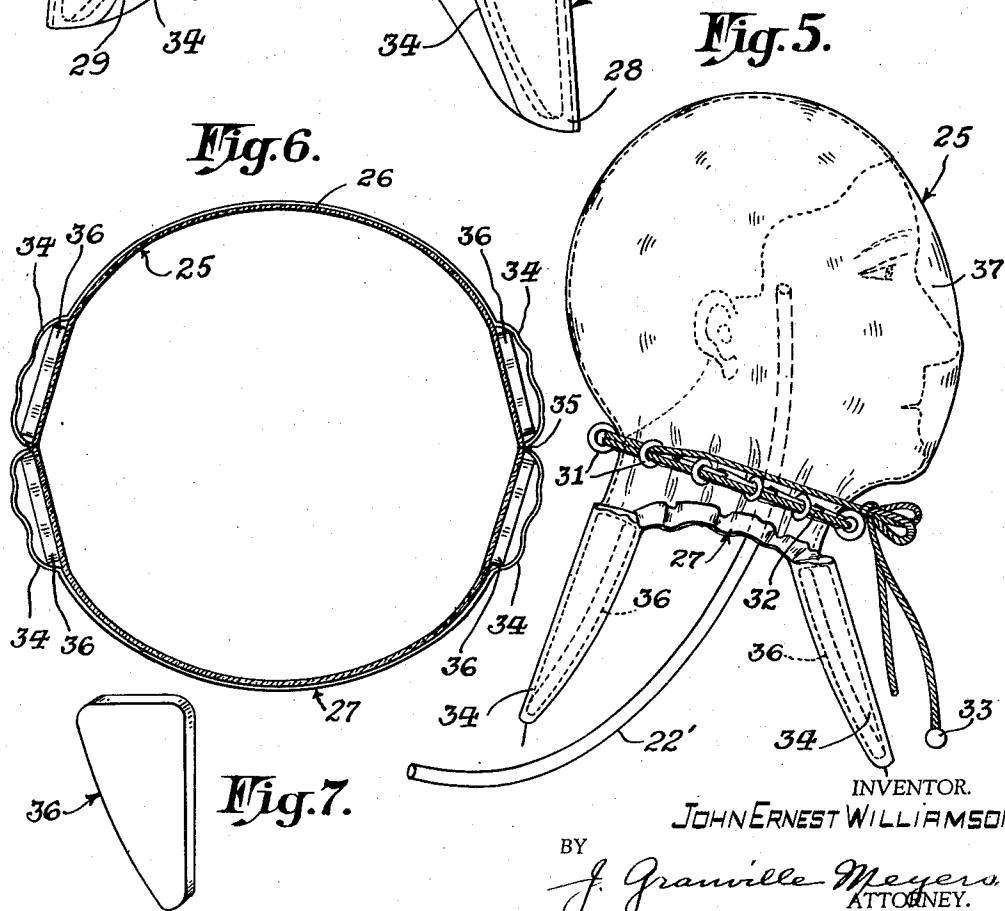
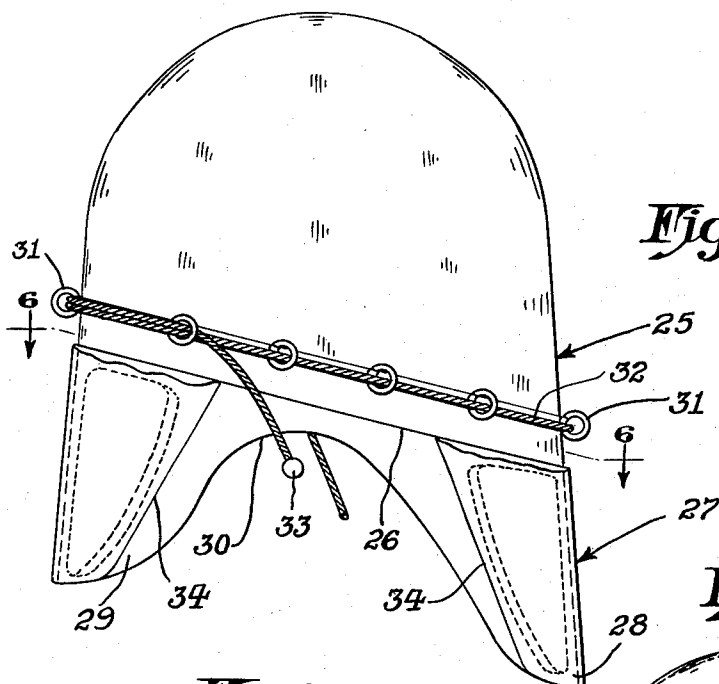
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2 Sheets-Sheet 2



INVENTOR.

JOHN ERNEST WILLIAMSON

BY

J. Granville Meyers
ATTORNEY.

UNITED STATES PATENT OFFICE

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DIVING HOOD OR DEVICE

John Ernest Williamson, Lake Worth, Fla.

Application September 13, 1935, Serial No. 40,503

2 Claims. (Cl. 61—70)

My present invention relates to improvements in diving hoods or devices especially adapted for use in making under-water or submarine observations or explorations.

Prior to my invention, helmets used in under-water work have been constructed of rigid metal of considerable weight, and have in many instances been adapted for connection with special divers' suits. It has been generally believed necessary in making under-water observations or explorations to provide a rigid helmet of great strength and weight. Such structures are not only cumbersome, but are relatively expensive and hence the use thereof has been confined almost exclusively to professional divers engaged in commercial enterprises.

By virtue of my experience in submarine or under-water work, I have discovered that it is not essential in all cases to provide a heavy rigid metal helmet for association with a special diving suit to provide an armor in order to enable persons to enjoy spending considerable time beneath the surface of bodies of water, and my present invention resides principally in the provision of flexible, light, relatively cheap, and foldable hoods or head encasing members which may be worn by anyone desiring to descend beneath the surface of water and remain submerged for considerable periods of time with the utmost of comfort and safety.

The principal general object of my present invention is to provide flexible or foldable relatively light and cheap devices for the above purpose, especially constructed and arranged for easy application over the head to exclude any appreciable amount of air from between the devices and the sides, top, and back of the head, while providing ample space between the fronts of the devices and the faces of the wearers especially adjacent the nose and mouth through which breathing is effected, thus eliminating, to a considerable extent, the natural buoyancy of air filled helmets.

The hoods or head encasing devices of the above type are especially designed to receive a supply of air thereinto either from portable tanks carried by the users, or from a source of supply above the water, and which in either case is supplied through a preferably flexible tube terminating within the devices to supply the air to the wearers for proper breathing, and creating within the flexible devices pressures substantially balancing the pressures existing at the depths beneath the surface of the water and at which the helmets are used.

Another and more specific object of the invention is to provide flexible head encasing devices of the above type preferably formed of transparent material such as moisture-proof Cellophane or other regenerated cellulose products. If desired, rubber or other flexible water-impervious materials having a window provided therein to afford clear visibility beneath the surface of the water may be used. The advantage or desirable feature of the transparent hoods or helmets is that they permit instant identification and observation of the wearers beneath the water, as well as on the surface while also affording clear visibility in all directions.

Another object of the invention is to provide a diving hood or device for use in making submarine or under-water observations or explorations, composed of a collar-like member which may be of standard size, and dome-shaped flexible foldable head enclosing members of the character mentioned adapted to be detachably connected to the collar, so that dome-shaped head enclosing members of different sizes may be interchangeably used with the collar-like or neck-encircling member to effect accomplishment of the minimizing of buoyancy, and to permit proper fitting of the device to heads of different sizes.

A further object of the invention is to provide in connection with a device of the above type, a neck-encircling collar-like member provided with means to readily contract the same about the neck of the wearer to draw the dome-shaped head encasing portion against and into substantial conformity to the top, back, and sides of the head to eliminate appreciable air spaces at such areas while still affording the air spaces at the front adjacent the nose and mouth of the wearer to eliminate buoyancy and to afford the necessary breathing spaces to which air is supplied.

A further specific object of the invention is to provide means attachable to the neck-encircling member to hold the same down to overcome what little buoyancy remains after the dome-shaped portion has been drawn into substantial conformity with the head of the wearer, whereby the air which enters the hood or helmet will prevent the rise of water therein above the mouth of the wearer without lifting or raising the helmet to an extent which would permit the rise of water above the mouth and nose of the wearer, thus assuring free respiration, safety and comfort.

Still a further specific object of the invention is to provide the contracting means for the neck portion of the hood or helmet of such character

as to permit quick opening of the same so that the helmet may be instantly removed if necessary at any time while the wearer is submerged in the water or upon rising to the surface.

The foregoing and other objects and advantages of the invention and the details of the construction and operation of preferred forms of hoods or helmets embodying the invention will become more apparent and will be pointed out in detail during the following description of the accompanying drawings, in which—

Fig. 1 is a side elevation of a hood or helmet embodying the invention in extended position and with parts broken away to show the detachable connecting means between the dome-shaped head encasing member and the neck-encircling member;

Fig. 2 is a view similar to Fig. 1 and partly in section showing the hood or helmet applied and illustrating the means of introducing air thereinto;

Fig. 3 is a side elevation of the dome-shaped or head-encasing member of the device of Fig. 1 shown partly in section and detached from the neck-encircling member;

Fig. 4 is a view similar to Fig. 1 showing a modification of the invention;

Fig. 5 is a view similar to Fig. 2, but wholly in elevation and showing the head or helmet of Fig. 4 applied to the wearer;

Fig. 6 is a view taken on the line 6—6 of Fig. 4 looking in the direction of the arrows; and

Fig. 7 is a perspective view of one of the weights which may be used in connection with the device of Figs. 4-6 to assist in holding the hood or helmet down.

Referring to Figs. 1-3 of the drawings, the numeral 8 designates generally the dome-shaped head-encasing member, illustrated as being of transparent material, and which may be formed by molding any suitable cellulosic, pyroxylin, or other suitable compound, or by cutting sheets of regenerated cellulose or the like into such segments as to enable them to be assembled by joining together with suitable adhesive to form the dome-shaped member 8. The lower end of the member 8 is open and is shown as having a tape 9 secured around the open mouth of the member either by stitching or adhesive. The tape 9 carries fastening elements 10 which interlock with similar elements 10' carried by a tape 11 attached to the collar portion 13 of the device. This separable fastening means is well known as a "zipper" and is commercially available. A key 12 engages and disengages the elements 10 and 10' by movement therealong, and I prefer to use the type of key and elements 10—10' which permits entire separation of the members 8 from the collars or neck encircling members 13 to which the tape 11 is attached. It will be noted that the collar 13, which may be made of any flexible material of appreciable strength, preferably fabric, is arranged around the member 8 extending below the lower open end of the member 8.

The dimensions of the member 8 are such as to permit them being placed over the heads of normal persons with the collar portion 13 and the lower ends of members 8 below the chin. Since it is an important feature of the invention to eliminate as much as possible the buoyancy of the head encasing members, the diameters of the members 8 are substantially the same as the distance between the nose and back of the head of the average person with some slight clearance

to facilitate placing the devices over the head and removing them therefrom. Of course the members 8 can be made in different sizes, as for children, women and men, to effect this fit.

The collar member 13 is shown provided at predetermined intervals thereon with plates 14 having on their upper ends eyes or loops 15 and on their lower ends snap hooks 16. The loops 15 have threaded therethrough a cord 17 which runs at certain points, as between the sides of the neck and across the back of the neck, doubly through some of the loops and singly through the other loops. The cord 17 is also provided preferably at least on one of its ends with a weight 18 to hold said end of the cord down when the device is being worn in the water so that if it is necessary to untie the cord for quick removal of the helmet, the said end on which a pull is exerted will be located on the chest of the wearer and not floating around.

I have illustrated weights 18 suspended from the hooks 16, some of the weights arranged individually and others in groups on certain of the hooks. This illustrated arrangement is only to show that the weights may be varied, because if desired there may be one on each of the hooks or there may be two on certain of the hooks and none on others, etc. The purpose of the weights is to further overcome the buoyancy and tendency of the hood or head encasing member to ascend above the desired point at which the water level within the hood or head encasing member will be below the mouth of the wearer and preferably adjacent or just below the chin.

In Fig. 1 the device is shown extended ready to be placed on the head, which is accomplished by simply pulling the collar down over the top of the head until the top of the head meets the top of the member 8 as shown in Fig. 2. Then the cord 17 is tightened to contract the collar 13 simply by pulling on opposite ends of the cord. When the collar has been sufficiently contracted to approach the neck and brought under the chin, yet leaving a space for escapement of air, a slip knot is tied as indicated at 20 beneath the chin. The weight 18 on the cord 17 holds that end of the cord down adjacent the chest of the wearer for ready grasping without searching around for it when it is desired to remove the device.

It will be noted in Fig. 2 that when the collar has been contracted the member 8 fits fairly snugly against the top of the head as well as along the back thereof, and also against the sides of the head and face leaving only an appreciable space 21 at the front of the device adjacent the nose and mouth of the wearer.

As previously mentioned, the device is especially adapted for use in making under-water observations or explorations, and is adapted to receive free air either supplied from a portable tank carried by the wearer or from a separate source of supply above the surface of the water. In either case this air is supplied into the device through flexible tube 22 which leads up between the collar and neck of the wearer across the jaw and preferably to a point between the eye and ear along the side of the face as shown in Fig. 2. However, the user may adjust the tube within the device to terminate therein at any point he desires which will permit the flow of air supplied through the tube to enter the space 21 from which it is inhaled. When the wearer exhales the used air admixed partly with the fresh air which has been supplied through the tube is discharged through the water around the neck of the device

and out beneath the collar. The pressure of the air supplied may be or is so regulated as to balance the pressure of the water according to the depth to which the user descends.

With a flexible device of the character above mentioned any person may descend and observe the effects existing beneath the surface of the water, as well as submarine life or scenes, and remain as long as desired, or as long as the air for breathing is properly supplied. If the air supply should become exhausted, or if the device should develop a leak from accidental causes which would permit the water to rise therein above the nose and mouth of the wearer, he simply pulls the string 18 permitting the collar to be instantly expanded and the device easily removed from the head whereupon he may quickly ascend and resume normal breathing at the surface of the water.

Another point I would point out is that the pressure of the air which is fed to the interior of the hood or head-encasing member through the tube 22 keeps the level of the water below the nose and mouth of the wearer.

Obviously the member 8 may be replaced if it develops a defect or leak simply by disconnecting it from the collar and connecting a new one by the slide fastener. Also both members 8 and 19 being flexible may be rolled or folded into compact form to be easily carried around or packed when not in use.

In Figs. 4-6 I have shown a modification of the invention wherein the numeral 25 designates generally a dome-shaped head encasing member corresponding to the member 8 of Figs. 1-3, and made according to the specification above given in connection with the member 8 as to dimensions for securing the substantially snug fit around the head with a space at the front. One difference between the member 8 and the member 25 is that the latter has a longer front and shorter back, whereas the former is of substantially the same length both at the front and back. The member 25, therefore, has an inclined lower edge 26. Another and essential difference between the structures of Figs. 1-3 and 4-6 respectively is the provision in the latter of a yoke-like member engageable at opposite sides of the head over the shoulders of the wearer, the said yoke-like member being designated generally by the numeral 27 and having an elongated front 28 and elongated back 29 separated by the notches 30 which fit across the tops of the shoulders of the wearer. The top of the yoke-like member 27 is overlapped by, or may overlap alternatively, the lower end of the member 25 and be secured thereto by any suitable means, such as the detachable fastening means of Figs. 1-3, or by stitching, or suitable water resisting adhesive. Around the junction between the parts 25 and 27 are arranged a plurality of loops or rings 31 receiving the cord 32 similar to the cord 17 and provided on one end with the weight 33 similar to the weight 18 and for the same purpose.

The member 27 may be constructed of any flexible strong material permitting the provision therein of pockets 34 on the front and back extensions 28 and 29. Each pair of pockets is shown separated by a crease 35 defined by stitching or other securing means for joining the material of the pockets to the material of the yoke-like member 27. Each pocket is adapted to receive one or more weights 36, shown in perspective in Fig. 7, which co-operate with the other features of the construction of the device to over-

come buoyancy. The pockets are shown as being of tapered formation from top to bottom and the weights 36 are of substantially the same shape, though less dimension, than the pockets to facilitate insertion of the weights in the pockets and removal therefrom. Preferably the pockets are open at the bottom to permit water to flow freely therefrom when the wearer emerges from the water in which he has been submerged.

The device of Fig. 4 is shown applied in Fig. 5 wherein the cord 32 has been drawn around the neck and tied at the front in the same manner as the cord 17 to contract the device around the neck, thus conforming the member 25 substantially to the shape of the head while affording the air space 37 at the front of the face of the wearer in the same manner as the space 21 of Fig. 2 is provided, and for the same purpose. It will be noted that in Fig. 5, where the device is shown applied and contracted, that the portions 28 and 29 of the yoke-like member 27 are disposed on the chest and back of the wearer with the weights in the pockets 34 holding the device down in proper position on the head of the wearer. The tube 22' of Fig. 5 corresponds to the tube 22 of Fig. 2 and supplies air into the device from any suitable source of supply as previously mentioned. If desired the tubes may simply be inserted under the device along the neck and cheek to be held in place by the contracting means or cords 17 and 32 when the same are tightened and tied, or if desired separate fastening elements or clips, not shown, may be applied to the neck portions of the devices to engage the tubes and assure holding them in place. The latter arrangement might be preferred by amateurs who would fear the displacement of the tubes and the failure of the air supply into the devices.

The manner of applying the device of Figs. 4-6 is the same as described in connection with that of Figs. 1-3, that is, the hood or head encasing member is brought down over the head until the top of the head is engaged by the top of the member 25. At that time the portions 28, 29 of the yoke-like member 27 are at the front and back of the body of the wearer immediately below the neck. The cord 32 is then drawn to contract the neck encircling portion and bring the device to the position of Fig. 5, whereupon the cord is tied in a slip knot.

The devices of Figs. 4-6 may also be folded into flat condition or rolled as desired and of course since each of the devices is made of relatively light yet strong water-proof material, they may be easily transported or packed. Furthermore the construction provides for the utmost comfort and safety of the wearer.

What I claim is:

1. A diving hood or device adapted for use in making underwater observations or explorations, comprising a substantially dome shaped, flexible head encasing member, the lower end of which, when the member is placed over the head, extends toward the neck of the wearer, and means to readily contract the same about the neck of the wearer so as to draw the dome shaped head encasing portion against and in substantial conformity to the top, back and sides of the head to eliminate appreciable air spaces at all such areas, while still affording air spaces at the front adjacent the nose and mouth, and to afford the necessary breathing spaces to which air is supplied, said means consisting of means which eliminates buoyancy by squeezing out air space and

which is arranged under the chin and in an inclined location around the neck, so as to lie closely against the parietes and the posterior occiput of the head and to be effective in admitting only the proper water level controllable by the air pressure so as not to interfere with breathing.

2. A diving helmet adapted for deep water use, comprising a dome-shaped, flexible member adapted to fit around the entire head in close proximity to the surface of the cranium, the lower end of which extends towards the neck of the wearer and is contractible about said neck, while the upper portion is conformable to the

shape of the cranium and in contact with the top, back and sides of the head, leaving only a small space adjacent the face to which air may be supplied for breathing, and means comprising a drawstring which loosely contracts the neck portion of the helmet and has the function of eliminating buoyancy by squeezing out air space, said drawstring occupying a substantially inclined location so as to fit under the chin, pass along the parietes and under the posterior occiput of the head in order to effectively contact the helmet with the entire surface of the head, except in front of the face, as specified.

JOHN ERNEST WILLIAMSON.