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FACE PLATE WITH NOSE PINCERS

Filed March 18, 1960

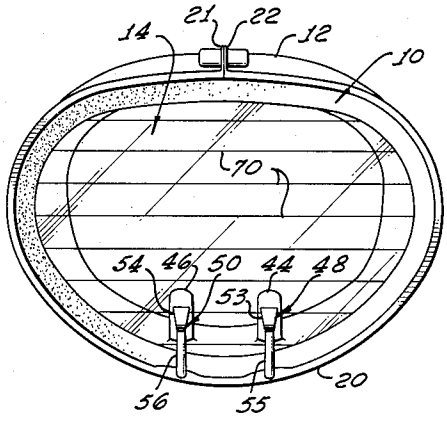


FIG. 1.

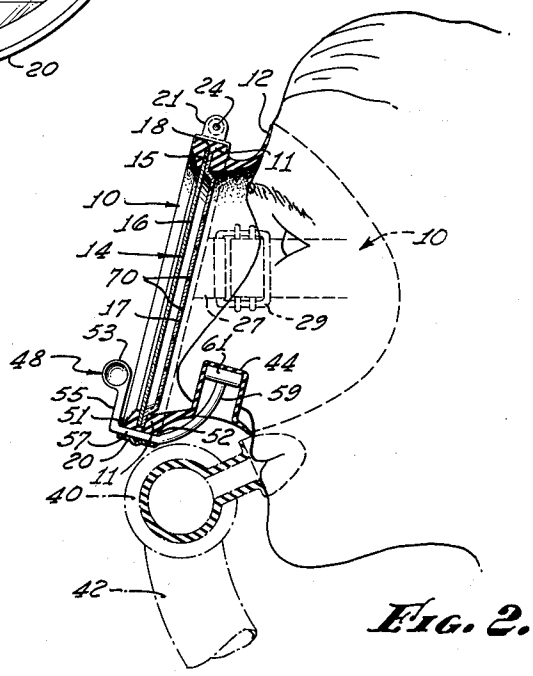


FIG. 2.

FIG. 4.

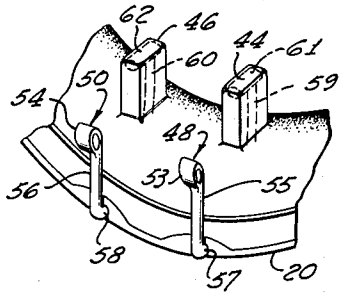
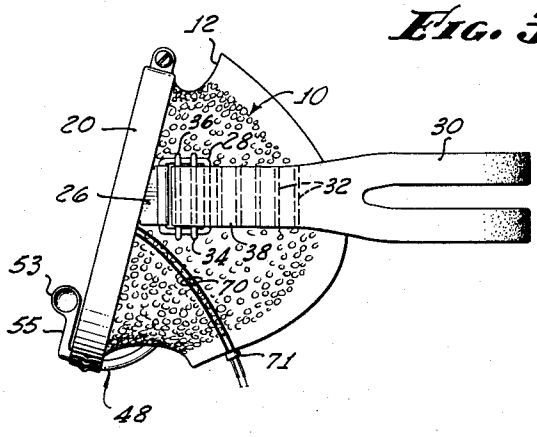


FIG. 3.



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FACE PLATE WITH NOSE PINCERS

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This invention relates to face plates, or masks, for underwater diving, which is also known as "skin diving," and improvements in the construction of such face plates: the improvements relate to nose pincers and viewing lenses used in such plates.

Face plates generally include a rubber frame, a glass, or transparent plastic plate, or lens, and some means for closing the nose of the diver for equalizing the pressure exerted on the ear drums of the diver. By closing the nose and then exhaling, while holding the mouth tightly closed, the diver is capable of raising the inner pressure in his lungs and the bronchial tube and this increased pressure is communicated through the Eustachian tubes to the inner ears and the inner surfaces of the ear drums, thus equalizing the pressure exerted by water on the outer surface of the drum, with the air pressure produced in the inner ear. This pressure equalizing technique is identical to that commonly used by aircraft passengers when the aircraft changes altitude.

In the known face plates, the rubber frame of the face plate is provided with two rubber fingers, or rubber sleeves, which are used for closing the nose by inserting two fingers into the two sleeves, these sleeves being located adjacent to the nostrils of the wearer in the rubber body of the mask. The sleeves of this type are very inconvenient to use, and, moreover, require the use of two hands since it is impossible to conveniently reach these sleeves with the fingers of one hand. This is due to the fact that directly adjacent to, and directly below the sleeves, the diver holds in his mouth a large mouthpiece connected to an intake hose on one side and an exhale hose on the other. The intake hose is connected to compressed air tanks. The mouthpiece leaves hardly any room between it and the sleeves for convenient manipulation of the sleeves, and especially so with one hand. There are many occasions when the use of two hands for such purpose is very undesirable when, for example, the diver must defend himself against some hazard threatening him in the course of his dive, such as sharks, etc.

This invention discloses a face plate construction which provides conveniently mounted nose pinchers provided with properly mounted lever arms, the ends of which are mounted in front of the lens. These lever arms, therefore, can be actuated quite conveniently with one hand, thus facilitating and expediting the entire procedure of equalizing the pressure against the ear drums.

The face plate is also provided with a preferably sealed, double pane window, or lens, with a space between the two panes either filled with air or evacuated for thermally insulating the outer pane from the inner pane. The panes of the window can be made of transparent plastic or glass, or a combination of plastic and glass. When glass is used for the outer pane, then a tempered glass is preferable because of its strength and resistance to impact. The lens of this type make it less likely that the inner pane will have a temperature which will produce condensation of moist air occasionally exhaled by the diver onto the face plate. The inner pane may be equipped with an electric heater to prevent condensation.

It is, therefore, an object of this invention to provide a face plate with conveniently located, and manually actuated nose pincers for closing the nose of the diver.

The novel features which are believed to be characteristic of this invention, both as to its organization and method of operation, together with further objects and advantages thereof, will be better understood from the accompanying drawings in which several embodiments of the invention are illustrated by way of several examples. It is to be understood, however, that the drawings are for the purpose of illustration only and are not intended as a definition of the limits of this invention.

Referring to the drawings:

FIG. 1 is a front view of the face plate.

FIG. 2 is a side sectional view of the face plate.

FIG. 3 is a side view of the face plate including a strap.

FIG. 4 is a perspective view of that portion of the face plate which includes the nose pincers.

Referring to the drawings the face plate includes a soft, pliable face member **10** having a lens flange **11** and a face flange **12**. Flange **12** tightly engages the face of the diver in the manner illustrated in FIG. 2. The lens flange **11** surrounds lens **14** and the edge of the lens fits into a recess **15** provided in the lens flange **11**. The lens includes an outer pane **16**, preferably made of tempered glass, and an inner pane **17**, made of transparent plastic, such as cellulose acetate butyrate. The two panes are joined together at **18** along the edges of the two panes. The inner lens **17** may be provided with heating wires **70** imbedded in the pane for heating it so as to eliminate any possibility of condensation. The wires are connected to a water-tight socket **71** which is connected to a flashlight battery. A metallic lens clamp **20**, having a U-shaped across section, visible more clearly in FIG. 2, is used for clamping tightly the lens flange **11** against the edge portion **18** of the lens so that the lens forms an air-tight and water-tight joint with frame **11**. The ends of this band are provided with two lugs **21** and **22** which are clamped and tightened together by means of a bolt **24**. In this manner, flange **11** is held quite securely and tightly against the lens so that flange **11** forms an air-tight and water-tight joint with the lens. The lens clamp **20** also stiffens flange **11** by clamping it very tightly against a rigid structure of the lens. Therefore, the flange **11** becomes a stiff, tightly compressed flange even though, by itself, it is quite pliable because it is made of soft rubber. Soft rubber must be used for making member **10** in order to make an air-tight joint with the face of the diver. As will be pointed out later more in detail, soft rubber may be replaced with polyvinyl chloride plastisol or other synthetic resins.

It is, therefore, the combination of the U-shaped metallic lens clamp **20**, flange **11** and lens **14** that make the front portion of the face plate rigid, the soft rubber flange **11** acting as a rubber gasket between member **10** and the lens. The U-shaped clamp **20** is also provided with two metallic buckle clamps **26** and **27** which are used for fastening two buckles **28** and **29** to flange **20**. The buckles are then connected to two rubber straps, such as strap **30**, shown in FIG. 3. The strap is provided with a ribbing **32** for obtaining a positive engagement between the strap and the one, or two, sliding cross-bars **34** and **36** used for holding the portion **38** of the strap in the buckle. The length of strap **30** is adjusted so as to provide an air-tight and water-tight joint between the face plate, and especially its flange **12**, and the skin of the user.

FIG. 2 also illustrates a typical mouthpiece **40** and a flexible hose **42** connected to the mouthpiece. The mouthpiece blocks any convenient access of the diver to the tip of his nose. The invention overcomes this difficulty by providing pincer members **48** and **50**. The inner portions **59** and **60** fit into two soft rubber fingers, or closed-off members, **44** and **46**, which are molded into the member **10** at the same time as the entire rubber member **10**

is molded. The two pincer members **48** and **50** comprise two U-shaped metallic pincers rotatively mounted in the U-shaped metallic lens clamp **20** with the aid of clamp recesses, such as recess **51** and **52**, FIG. 2. Each pincer is provided with a finger tip **53**, **54**, a lever arm **55**, **56**, a rotatable shaft-like portion **57**, **58**, lever arms **59** and **60**, and pincer members, or cross-bars, **61** and **62**, which fit into the fingers, or recessed members, **44** and **46**. The recessed members **44** and **46** are spaced from each other so that the nose of the diver loosely fits into the gap formed between them. The diver can close his nose with one hand very readily by pressing the finger tips **53** and **54** toward each other. Since the pincers **48** and **50** are rotatively mounted in a positive manner in the metallic clamp **20**, the clamp as well as the entire face plate, which supports the clamp, acts as a stable bearing frame for the pincers. Therefore, closing of the nose of the diver is also positive and accurate. Stated differently, there is no wobble in the pincers or fingers **44** and **46** and they remain properly positioned with respect to the tip of the nose of the diver so as to close it properly upon the actuation of the pincers. Recessed members **44** and **46** also provide soft cushions which are interposed between the pincer members **61** and **62** and the nose of the diver. The pincer members are made sufficiently long so as to produce positive closing of the entire width of the air passages of the two nostrils.

What I claim as new is:

1. A face plate for underwater diving including a pliable face-engaging member having a face flange for engaging the face of the wearer of said plate, said member having a lens flange, first and second inwardly projecting pliable fingers provided in the lower central portion of said face-engaging member, a lens mounted in said lens flange, a lens clamp surrounding said lens flange for making a water-tight joint between said lens flange and said lens, and first and second pincer members rotatively mounted in the lower portion of said lens clamp and said lens flange, said pincer members each having first and second lever arms, said first arm being located in front of said lens and said second arm fitting into its respective pliable finger, said first finger and said first pincer member being positioned in spaced relationship to one side of a vertical line of symmetry of said face plate, and said second finger and pincer member being positioned in spaced relationship to the other side of said line, the movement of said first arms toward each other producing a pincer action by said second arms and said fingers on the nose of the wearer of said face plate.

2. The face plate as defined in claim 1 in which said pincer members each includes said first and second lever arms interconnected through a rotatable shaft, said first lever arm terminating in a finger tip positioned in front of, and adjacent to, said lens, and said second lever arm terminating at the closed, inner end of said finger.

3. A face plate including a face member having two spaced, inwardly projecting fingers with sealed ends, said fingers being positioned in the lower part of the face member and being spaced from each other so as to be located one on one side and the other on the other side of the nose of the wearer of such mask, and first and second U-shaped pincer means for actuating said fingers into the nose-closing position upon the manual actuation of said pincer means, each of said pincer means including a first lever arm fitting into its finger and corresponding to one leg of said U, a second lever arm positioned adjacent to the outer surface of said plate and corresponding to the other leg of said U, and a rotatable shaft interconnecting said first and second lever arms and corresponding to the bottom portion of said U, said nose-closing position being obtained by moving said first and second lever arms toward each other.

4. A face plate including a pliable face-engaging body having first and second spaced, inwardly projecting pliable portions located in the lower part of said face-engaging body, the first portion being to the left and the second portion being to the right of the nose of the wearer of said plate when said plate is properly mounted on the face of said wearer, and first and second nose pincers rotatively mounted in and supported by said face-engaging body, said first pincer having first and second lever arms, said first arm projecting into said first pliable portion and said second arm being in front of said face plate, and said second pincer having third and fourth lever arms, said third arm projecting into said second pliable portion, and said fourth arm being in front of said face plate, said first and second nose pincers actuating said pliable portions into the nose-closing position upon the actuation of said pincers by said wearer with the aid of said second and fourth lever arms.

5. The face plate as defined in claim 4, in which said first pincer includes a first shaft portion interconnecting said first and second lever arms, and said second pincer includes a second shaft portion interconnecting said third and fourth lever arms, and a lens clamp surrounding said face-engaging body, said first and second shafts being rotatively mounted in said lens clamp.

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