

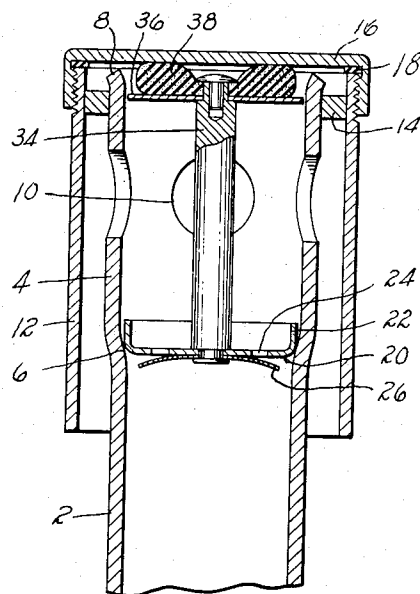
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SNORKEL

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SNORKEL

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This invention relates to improvements in underwater breathing devices for swimmers, commonly referred to as "snorkels."

One object of the invention is to provide a snorkel in which mixing of exhaled air with air about to be inhaled is prevented, and dilution of air to be inhaled by carbon dioxide in the exhaled air is thereby eliminated.

Another object is to provide a snorkel which may be worn for long periods of immersion with increased comfort and safety, and reduced fatigue, in comparison with prior art devices.

Another object is to provide a snorkel of simplified construction which is particularly suitable for manufacture at low cost, which has an improved arrangement for preventing entrance of water during immersion, and which may be readily and conveniently disassembled for cleaning or other purposes.

Other objects will be in part obvious, and in part pointed out more in detail hereinafter.

The invention accordingly consists in the features of construction, combination of elements and arrangement of parts which will be exemplified in the construction hereafter set forth and the scope of the application of which will be indicated in the appended claims.

In the drawings:

The single figure is a partial vertical sectional view of a snorkel constructed in accordance with the present invention.

Referring to the drawing, a snorkel constructed in accordance with the invention includes a breathing pipe or tube 2 through which air may be drawn by a submerged swimmer, only the upper or air-intake end of the tube being shown. As will be readily understood, the tube 2 is provided at its lower end with a suitable mouthpiece having a combination exhaust and drain valve, not shown, and is disposed when in use with the portion shown above the surface of the water. The upper end of the tube is straight and terminates in a portion 4 of slightly enlarged diameter forming a circumferential shoulder 6 at its inner end and having a slightly flaring lip 8 at its outer end. The enlarged portion 4 is provided with a number of circumferentially spaced openings 10 of generous size through which air may be drawn into the tube when the swimmer inhales.

Surrounding the enlarged portion 4 is a concentric spaced cylindrical sleeve 12 open at its lower end and sealed to the tube at its upper end by a spacing ring 14. The upper end of the sleeve is externally threaded and closed by a cover 16 which also serves to close the end of the tube 2. A gasket 18 seals the cover to the sleeve. With this arrangement, the sleeve and cover 16 together form a hood preventing entrance of water into the end of the tube 2 should the snorkel become completely immersed, the sleeve 12 forming with the tube itself an air-lock which surrounds the openings 10 and automatically prevents the entrance of water through the openings 10.

For the purpose of preventing dilution of air inhaled

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through the tube by exhaled air, the snorkel is provided with an inwardly opening check valve 20 in the tube. The check valve includes a cup-shaped valve seat 22, transversely supported within the tube on the shoulder 6.

The seat has a plurality of holes 24 through which air may flow from the enlarged portion 4 down into the remainder of the tube. Attached to the underside of the valve seat is a disc-shaped valve flapper 26 of sufficient diameter to cover the holes 24 in the seat. The valve flapper 26 is flexible or resilient, so that upon inhalation the flapper is drawn away from the holes 24 in the seat, as shown in the drawing, and permits fresh air to flow down through the tube to the swimmer, while upon exhalation, the flapper is forced up against the seat and covers the holes 24 to prevent reverse air flow in the tube. With this arrangement, air cannot be exhaled through the tube 2 but will be discharged directly into the water through the mouthpiece exhaust valve. Hence dilution or contamination of air within the tube by exhaled air is prevented, so that upon each inhalation the swimmer draws into his lungs only fresh air, and rebreathing of exhaled air is wholly avoided. Thus the usual discomfort and fatigue caused by breathing the high concentration of carbon dioxide in the previously exhaled air is eliminated, and the snorkel may be worn for long periods with substantially increased comfort and safety.

To facilitate convenient cleaning or inspection of the snorkel, the check valve 20 is arranged to be completely removable from the tube. To this end there is attached to the valve 20 a pin or stem 34 which extends approximately to the upper end of the tube and carries a pad 38 of resilient compressible material, such as sponge rubber, supported by a transversely disposed backing plate 36. The plate 36 is loosely engageable with the wall of the tube, and thereby keeps the stem axially aligned in the tube and prevents tilting of the valve 20 relative to shoulder 6. The pad 38 is compressed between the cover 16 and backing plate 36 when the cover is tightened down on the sleeve 12, and thus provides an inexpensive means of compensating for dimensional variations in the various parts, while insuring that the check valve will automatically be properly seated against the shoulder 6 when the cover 16 is applied. With this arrangement valve 20 may be readily removed from the tube merely by removing the cover, grasping the pad 38, and lifting the pad, stem 34 and valve out as a unit. The straightness of the tube permits direct visual inspection of the snorkel interior when the cover is removed, as well as enabling the interior to be readily washed out or easily scrubbed if desired. This arrangement also enables quick and easy removal of sand or the like which may inadvertently enter the snorkel.

Thus it may be seen that in a snorkel constructed in accordance with the present invention mixing of exhaled air with air about to be inhaled is prevented, and the discomfort and fatigue of rebreathing carbon dioxide-laden air is eliminated, so that the period a swimmer may remain comfortably and safely submerged is greatly increased. The hood arrangement provided by sleeve 12 and cover 16 is simplified in construction, yet provides a seal which is automatically effective to prevent entrance of water into the tube, while permitting ready disassembly of the device for easy cleaning, inspection, or the like, whenever desired.

As many changes could be made in the above construction and many apparently widely different embodiments of this invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

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We claim:

1. In a snorkel, a tube open at one end, an inverted cup-shaped hood covering said one end of the tube, said hood being sealed to the tube adjacent said one end and concentrically surrounding a portion of the tube adjacent said one end in closely spaced relation thereto to form an air lock, air induction ports in the tube adjacent the inner end of the air lock, and a one-way air induction valve in the tube.

2. In a snorkel, a tube open at one end, an outwardly facing annular shoulder in the tube spaced from said one end, a spaced sleeve surrounding the portion of the tube adjacent said one end and sealed to the tube at said one end to form with the tube an air lock, air induction ports in the portion of the tube surrounded by said sleeve, an inwardly opening check valve in the tube supported on said shoulder, and a cover closing the end of the tube.

3. In a snorkel, a tube having an enlarged portion at one end forming an outwardly facing annular shoulder within the tube, air induction ports in said enlarged portion of the tube, a spaced sleeve surrounding the enlarged portion of the tube and connected to the tube at its outer end to form with the tube an air lock, a removable check valve in the tube including a disc-shaped apertured valve seat supported on said shoulder and an inwardly opening valve flapper connected to the valve seat for closing the apertures therein, and a removable cover on the end of the tube.

4. In a snorkel, a tube having an enlarged portion at one end forming an outwardly facing annular shoulder within the tube, air induction ports in said enlarged portion of the tube, a spaced sleeve surrounding the enlarged portion of the tube and connected to the tube at its outer end to form with the tube an air lock, an inwardly opening check valve in the tube supported on said shoulder, a pin attached to said valve extending axially to the end of the tube, a removable cover closing the end of the tube, and a resilient member compressed between the pin and the cover for holding said valve seated against said shoulder.

5. In a snorkel, a tube having a portion of enlarged diameter at one end forming at its intersection with the remainder of the tube an internal annular shoulder facing the end of the tube, air induction ports in said enlarged

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portion, a concentrically spaced cylindrical sleeve surrounding the enlarged portion, said sleeve being connected to the tube at its outer end to form with the tube an air lock for said ports, a removable inwardly opening check valve in the tube including a valve seat supported on said shoulder and a movable valve flapper attached to the inner side of said valve seat, a stem attached to said valve seat and extending axially to the end of the tube, a transversely disposed support on the outer end of the stem, a removable cover on the end of the tube, and a pad of resilient material carried by the stem compressed between the cover and the support for holding said valve seat against said shoulder.

6. In a snorkel, a tube having an enlarged diameter portion at one end forming at its intersection with the remainder of the tube an internal annular shoulder facing the end of the tube, said enlarged diameter portion having a plurality of circumferentially arranged air induction ports, a concentrically spaced cylindrical sleeve surrounding the enlarged portion, an annular member closing the space between the sleeve and the tube adjacent the outer end of the sleeve to form an air lock for said ports, a check valve in the tube including an apertured disc-shaped valve seat supported on said shoulder and a flexible valve flapper attached to the inner side of said valve seat for closing the apertures therein, a pin attached to said valve seat and extending axially to the end of the tube, a transversely disposed backing plate on the outer end of the pin engageable with the inside wall of the tube, a removable cover for the end of the tube threaded on the outer end of the sleeve, and a pad of resilient material carried by the pin compressed between the backing plate and the cover.

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