

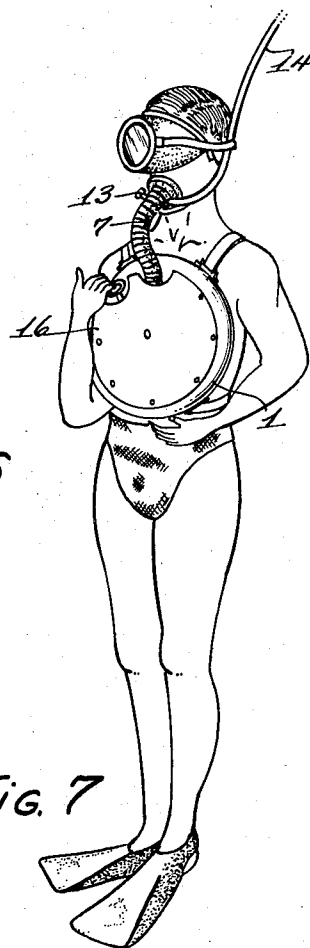
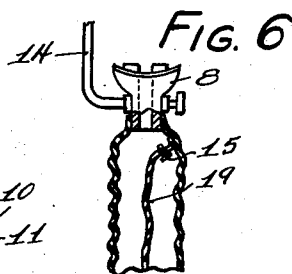
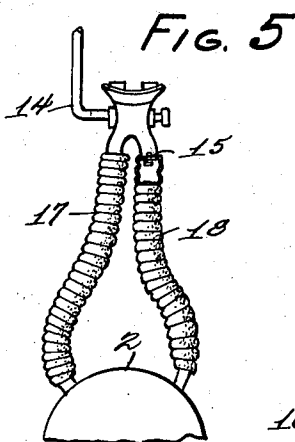
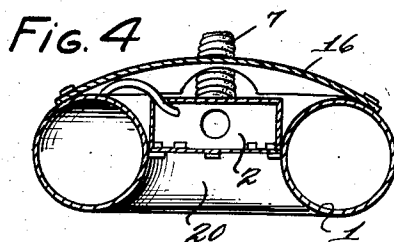
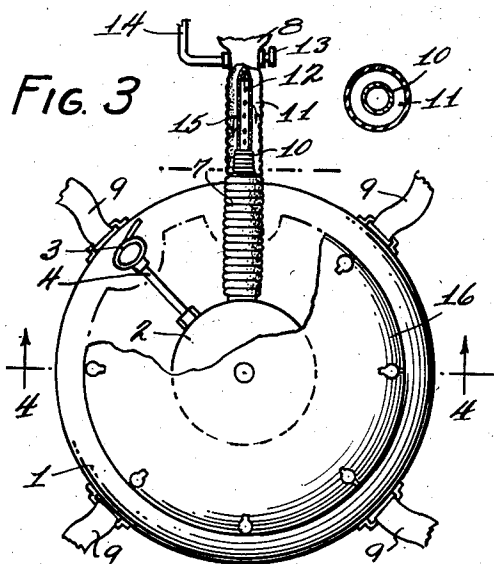
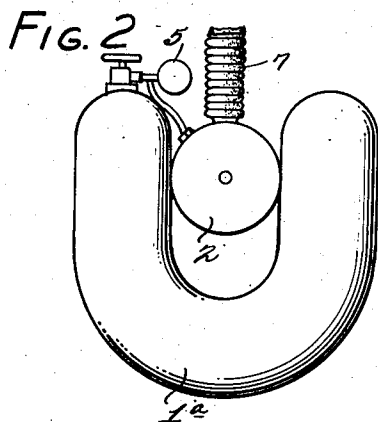
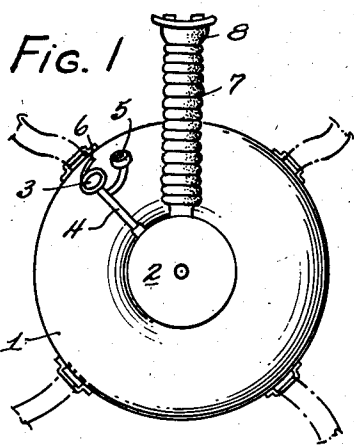
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2,844,145

SELF-CONTAINED BREATHING APPARATUS

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2,844,145

SELF-CONTAINED BREATHING APPARATUS

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3 Claims. (Cl. 128—142)

This invention relates to self-contained breathing apparatus, in particular for divers, of the well known type including at least a metal cylinder containing a compressed breathable gas, such as air, a pressure regulator connected with said cylinder and delivering to the diver air expanded to a pressure substantially equal to the water pressure on the outer face of a flexible diaphragm provided in said regulator, a breathing in pipe for connecting the air outlet of the regulator to a mouthpiece, a breathing out pipe which may be the breathing in pipe, and a breathing out valve.

The main object of the present invention is to provide a breathing apparatus of the above general type which is so arranged that it is a compact unit adapted to be easily carried in front of the upper part of the diver's body without impeding him.

This breathing apparatus is characterized in that it comprises a container for compressed breathable gas, in the form of a volume generated by a closed conical curve moving along a directrix which is itself a conic but is not necessarily closed, the pressure regulator of the apparatus being disposed in the free space surrounded by said volume.

The accompanying drawings show by way of example only some embodiments of the invention.

Figure 1 shows the preferred form of embodiment of a compressed air container.

Figure 2 shows a modified form of a compressed air container.

Figure 3 shows, at a larger scale and with a portion broken away, the container of Figure 1 with its regulator and breathing pipe.

Figure 4 is a top view of the device of Figure 3.

Figure 5 is a modified form of adaptation of the breathing pipe to the air container.

Figure 6 shows another form of embodiment of the breathing hose.

Figure 7 shows a diver equipped with a breathing apparatus according to the invention.

Preferably, the container of the breathing apparatus has the shape of a torus 1 (Fig. 1) in the central free space of which is located a generally cylindrical pressure regulator 2. Said regulator is of the known type including a flexible diaphragm on the outer face of which is applied the pressure of the surrounding water. The regulator is connected with the container through a high pressure tube provided with a valve 3 adapted to allow said container to be filled with air, and with a pressure-gauge 5. It is to be noted that, due to the ventral position of the apparatus, said pressure-gauge is placed under the direct observation of the diver. The expanded air delivered by the regulator 2 at a pressure substantially equal to that of the water on the outer face of the diaphragm is breathed in by the diver through a pipe 7 which connects the regulator with a mouthpiece 8.

Figure 2 shows an apparatus in which the air container

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1a has a U shape, the pressure regulator being inserted between the legs of said U.

In Figure 3, 9 indicates the fastening elements of the container 1. It is obvious that said container lends itself to a convenient type of attachment to the body by means of suspenders or a belt.

In the embodiment shown in Figure 3, use is made of a single breathing hose 7 provided with an inner breathing out pipe 10. An indicated by the arrows, the air breathed in first passes through the annular space 11, then it flows through openings 12 to the inner pipe 10 and thence to the mouthpiece 8. At 15 is provided a breathing out valve the function of which is to prevent carbon dioxide from being sucked back during the breathing in of the diver.

A three ways cock 13 allows to put in communication the mouth-piece 8 either with the breathing circuit or with a snorkel 14 for breathing in atmospheric air.

In the example shown in Figure 3, a casing 16 is provided for protecting the regulator 2 and the high pressure pipe 4. Said casing gives to the whole of the breathing apparatus a hydrodynamic profile and prevents the risks of entanglement or hooking. The portion 20 (Figure 4) of the central recess of the toric container which is not filled with the regulator may be used for lodging ballasting weights so avoiding the inconveniences of the ballasting with a lead belt.

Figure 5 shows a modified form of the breathing circuit in which are provided two separate hoses 17 and 18 one for the breathing in and the other for the breathing out. In the modified form of Figure 6, the breathing circuit consists of a single hose divided into two passages by a flexible wall 19.

The apparatus described is used at the best in a ventral position but it may obviously be borne in a dorsal position by keeping the most of its advantages. It may be also used in environments other than underwater such deleterious atmospheres.

What I claim is:

1. A breathing apparatus for divers of the general kind set forth, wherein the apparatus comprises a pressure regulator, and a container for compressed breathable gas, in the form of a volume generated by a closed conical curve moving along a directrix, which is itself a conic but is not necessarily closed, the pressure regulator of the apparatus being placed in the free space by the said volume.

2. In a self-contained breathing apparatus of the general kind set forth, in combination, a breathable gas container of toric shape adapted to be borne by the user in a ventral position, a cylindrical gas pressure regulator fitted in the central recess of said container and having an air inlet connected with the container and an expanded air outlet connected with the entrance of the respiratory tracts of the user, and an exhaust valve allowing the user to breathe out into the water.

3. In a self-contained breathing apparatus of the general kind set forth, in combination, a breathable gas container having a U shape, a gas pressure regulator fitted between the legs of said U and having an air inlet connected with the container and an expanded air outlet connected with the entrance of the respiratory tracts of the diver, and an exhaust valve allowing the user to breathe out into the water.

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