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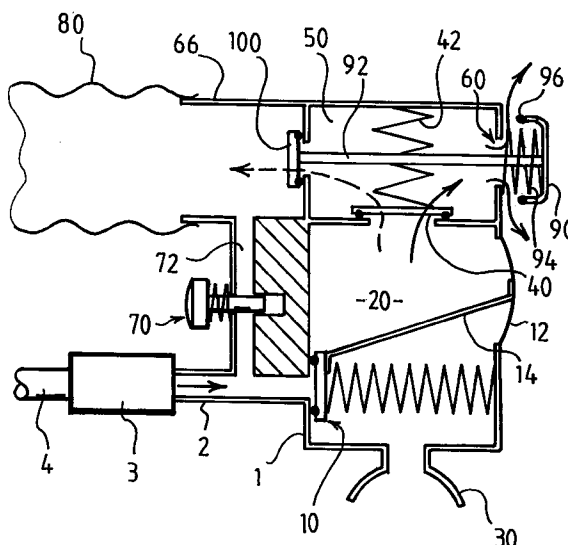
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(71) Applicant : **Craske, Stephen Allan**
15 Queens Terrace
Exeter, Devon EX4 4HJ (GB)

(72) Inventor : **Craske, Stephen Allan**
15 Queens Terrace
Exeter, Devon EX4 4HJ (GB)

(54) **Scuba breathing apparatus.**

(57) Air is inhaled from a high pressure supply via a demand valve 10, a main breathing chamber 20, and a mouthpiece 30. Exhaled air passes through chamber 20, exhaust valve 40, and a secondary chamber 50, to exit via an exhaust port 60. A buoyancy jacket can be inflated from the high pressure supply via a first button-operated valve 70 and a flexible conduit 80. The jacket can also be inflated from mouthpiece 30 by depressing a second button 90 to sealably close port 60 and open a buoyancy valve 100 between chamber 50 and conduit 80. The non-return exhaust valve 40 allows air to flow in one direction from mouthpiece to jacket but prevents reverse flow.



TECHNICAL FIELD OF THE INVENTION

This invention relates to breathing apparatus for use by a scuba diver.

BACKGROUND

GB 2 037 587-A and EP 0 278 598-A both disclose breathing apparatus which comprises:

- an inlet coupling for connection to a reservoir of compressed air;
- a buoyancy conduit for connection to a buoyancy device;
- a mouthpiece connected to a breathing chamber; and
- a demand valve for controlling the supply of air from the inlet coupling to the breathing chamber.

In both cases the diver can inhale air from the jacket, which is considered to be a dangerous procedure.

SUMMARY OF THE INVENTION

The present invention proposes that the apparatus has the features stated in the characterising part of Claim 1.

BRIEF DESCRIPTION OF THE DRAWINGS

The following description and the accompanying drawing referred to therein are included by way of non-limiting example in order to illustrate how the invention may be put into practice. The drawing is a diagrammatic sectional view of scuba diving apparatus of the invention.

DETAILED DESCRIPTION OF THE DRAWINGS

The apparatus includes a valve body 1 provided with an inlet coupling 2 for connection via a quick-release device 3 and a high pressure hose 4 to a reservoir of compressed air (not shown). The coupling 2 communicates with a breathing chamber 20 via a spring-loaded demand valve 10. A mouthpiece 30 opens into the chamber 20, and a diaphragm 12 is sealably mounted in the wall of the chamber 20, exposed to external water pressure. The diaphragm is coupled to the demand valve 10 via a lever 14 such that when the diver breathes in through the mouthpiece 30, the diaphragm moves inwards and opens the valve 10 via the lever 14 to admit air to the diver.

When the diver exhales into the chamber 20 a one-way exhaust valve 40, which is biased closed by a spring 42, allows air to pass into a secondary chamber 50, from which it escapes via an exhaust port 60. The valve body 1 is provided with a large-bore buoyancy conduit 66 for connection to a jacket or similar

inflatable buoyancy device (not shown) via flexible hose 80. The conduit 66 communicates with the secondary chamber 50 via a buoyancy valve 100 which is connected to a push rod 92. The rod 92 extends through the port 60 to carry a manual actuator button 90, which in turn contains a bias spring 94 acting between the button and the valve body 1 to bias the buoyancy valve closed.

The valve 100 thus prevents air from passing to or from the buoyancy conduit 66, but the jacket can be inflated for increased buoyancy by operating an inflate button 70 to admit air from the inlet coupling 2 along a passage 72 to the buoyancy conduit 66. Deflation of the jacket is achieved by partial depression of the actuator button 90, sufficient to open the valve 100 and allow air out through the chamber 50 and exhaust port 60.

The diver can also exhale into the jacket to inflate it manually, which is normally carried out at or above sea level when there is little or no water pressure on the jacket. This is achieved by fully depressing the actuator button 90 until the exhaust port 60 is closed by a seal 96 on the button, and the valve 100 is opened to connect the secondary chamber to the buoyancy conduit. The buoyancy device can now be inflated by air exhaled through the exhaust valve 40.

All the described functions are thus achieved without changing mouthpieces and with only two buttons.

Possible modifications include the following:

1. The inflation button 70 could be arranged to inflate the buoyancy jacket from an auxiliary tank.
2. The buoyancy conduit could have a further valve, biased shut, and openable by a third button to deflate the jacket direct to the outside.
3. A purge button could be provided, e.g. mounted in the diaphragm, to open the demand valve 10.

Claims

1. Breathing apparatus for scuba diving, comprising:

- an inlet coupling (2) for connection to a reservoir of compressed air;
- a buoyancy conduit (66) for connection to a buoyancy device;
- a mouthpiece (30) connected to a breathing chamber (20); and
- a demand valve (10) for controlling the supply of air from the inlet coupling to the breathing chamber,

and characterised by:

- a secondary chamber (50) provided with an exhaust port (60) ;
- a buoyancy valve (100) arranged to control communication between the buoyancy conduit and the secondary chamber, said valve

being biased to a closed position;

- a one-way valve (40) arranged between the breathing chamber and the secondary chamber to allow exhaled air to pass from the mouthpiece into the secondary chamber but preventing air from passing in the opposite direction from the secondary chamber to the mouthpiece; and 5
- a manual actuator (90, 92) operable to close the exhaust port and open the buoyancy valve to connect the secondary chamber to the buoyancy conduit whereby the buoyancy device can be inflated by exhaled air. 10

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2. Breathing apparatus according to Claim 1, in which the manual actuator (90, 92) is further operable to connect the buoyancy conduit (66) with the exhaust port (60) to deflate the buoyancy device. 20

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