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DEMAND REGULATOR FOR BREATHING APPARATUS

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Fig. 1

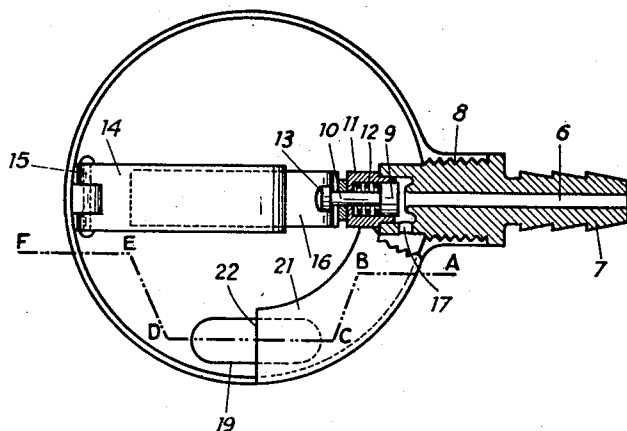
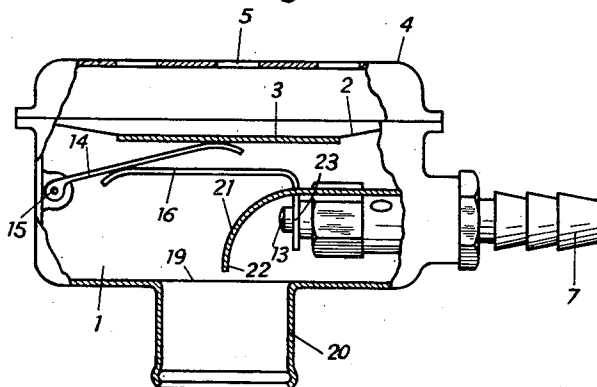


Fig. 2



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**DEMAND REGULATOR FOR BREATHING APPARATUS**

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 4 Claims. (Cl. 137—63)

The present invention relates to demand regulators for breathing apparatus of the kind comprising a chamber closed by a flexible diaphragm exposed on its outer face to the pressure of the ambient environment and connected on the one hand to a pressurized air source, delivering air to the chamber through a valve actuated by the movements of the flexible diaphragm caused by the breathing movement of the apparatus user and on the other hand to an inhalation hose leading air to the respiratory tracts of this user. Breathing apparatuses provided with such regulators are used for underwater breathing, also in poisonous or rarified atmosphere.

Regulators in which the pressurized air flow enters the regulator chamber close to the inhalation hose inlet and directed towards this inlet, particularly those manufactured by the applicants under the trade-name "Mistral," are already known. Such regulators, often called "injection" regulators, provide a very good respiratory ease, since the fresh air stream entering at high speed the inhalation hose, produces in said hose an excess of pressure and makes easier for the user to inhale.

Regulators of such kind at present known are for this purpose provided with, either an injection orifice, either a special conduit connected to the pressurized air inlet valve and extending into the regulator chamber, close to the inhalation hose inlet, so that the air coming from said inlet valve is ejected direct into the inhalation hose.

In view of getting a smaller and simpler apparatus, the valve may be of such type that it is necessary to utilize at the valve outlet a special conduit of bent or elbowed shape to get the desired injection result.

The regulator according to the invention allows to get in a most simple and efficient way the same "injection" effect and therefore the same breathing ease, without utilizing any special conduit. It is characterized in that a deflector deviates the pressurized air stream entering the chamber, towards the breathing hose inlet.

This deflector may have varied shapes without departing from the principle of the invention. However it is preferably a thin, bent deflector fitted to the chamber wall close to the pressurized air supply valve and whose far end close to the inhalation hose inlet has such a direction as to deliver air direct into the inhalation hose.

An example of demand regulator for underwater breathing apparatus according to the invention and illustrated in the accompanying drawings is given herebelow, being understood that the invention may be embodied otherwise than as specifically described.

FIG. 1 is a plan view of the regulator, the casing cover and the actuating diaphragm being removed and part of the deflector being cutaway, the reducing valve seat being shown as a section to indicate the circuit followed by the breathable air.

FIG. 2 is a sectional view according to A, B, C, D, E, F, of FIG. 1.

This regulator comprises as usual a cylindrical chamber casing 1, one wall of which is a flexible diaphragm 2, provided with a rigid central disk 3 intended to remain in contact with the end of a lever of the air inlet valve actuating device, hereafter described.

The diaphragm is protected by a cover 4, attached on its periphery to casing 1 so as to hold in a fixed position the rim of diaphragm 2 by any appropriate means (screws,

fasteners, etc.) which is not illustrated. This cover is drilled with holes 5 allowing surrounding water to come into contact with the diaphragm.

High pressure air is supplied to the chamber through a conduit 6 whose wall 7 is attached to the regulator chamber wall by means of thread 8.

A valve 9 with guide-stem 10 can slide in a member 11 and is seated against valve seat in the rest position by the thrust of helical spring 12. The valve 9 is actuated by diaphragm 2 during inhalation through two co-operating levers 14 and 16. The diaphragm 2 pushes downwards lever 14 end, said lever rotating around axis 15.

Lever 16 in turn is rotated by lever 14 and its arm 23 moves the head 13 of stem 10 so that the valve 9 moves away from its seat. Pressurized air escapes then through the valve seat and enters the regulator chamber through one or more lateral orifices 17. The air stream is then deviated towards orifice 19 of nozzle 20 connected to inhalation hose, by means of deflector 21 whose end 22 is close to the plane containing said orifice. The fresh air stream thus enters at high speed the nozzle 20 connected to the inhalation hose.

As inhalation comes to an end, the under-pressure in chamber 1 ceases, diaphragm 2 and levers 14 and 16 come back to their initial position, and valve 9 pushed backwards by spring 12, seats back against valve seat, thus stopping the air delivery.

What we claim is:

1. A demand regulator for a breathing apparatus, comprising a regulator chamber closed by a flexible diaphragm, a pressurized air inlet connected to a pressurized air source and adapted to discharge into said regulator chamber, an inhalation air nozzle mounted on said regulator chamber out of alignment with said pressurized air inlet and connected to an inhalation hose, valve means controlling the pressurized air stream and actuated by the movements of said flexible diaphragm, and a deflector strip mounted in said regulator chamber positioned between said pressurized air inlet and terminating close to said inhalation air nozzle, said deflector strip being formed to direct air from said inlet through said chamber, the terminal portion of said deflector strip being so formed as to direct air in a path into said inhalation air nozzle generally parallel with the central portion of said nozzle.

2. A demand regulator for a breathing apparatus, comprising a regulator chamber closed by a flexible diaphragm, a pressurized air inlet connected to a pressurized air source and adapted to discharge into said regulator chamber, an inhalation air nozzle mounted on said chamber out of alignment with said pressurized air inlet and connected to an inhalation hose, valve means controlling the pressurized air stream and actuated by the movements of said flexible diaphragm, and a deflector strip extending into said regulator chamber between said pressurized air inlet and said inhalation air nozzle, terminating at the proximity of said inhalation air nozzle, close to and parallel with the center line thereof, whereby, the air stream entering said regulator chamber is deviated towards and delivered directly into said inhalation air nozzle.

3. A demand regulator for a breathing apparatus, comprising a regulator chamber closed by a flexible diaphragm, a pressurized air inlet connected to a pressurized air source and adapted to discharge into said regulator chamber, an inhalation air nozzle mounted on said regulator chamber out of alignment with said pressurized air inlet and connected to an inhalation hose, valve means controlling the pressurized air stream and actuated by the movements of said flexible diaphragm, and a deflector strip, fitted to said regulator chamber wall close to said pressurized air inlet, extending along said regulator chamber wall, terminating in the proximity of said inhalation

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air nozzle close to and parallel with the center line thereof and cooperating with said regulator chamber wall to form an open channel, whereby the air stream entering said regulator chamber is deviated towards and delivered directly into said inhalation air nozzle.

4. A demand regulator for a breathing apparatus, comprising a cylindrical chamber, a flexible diaphragm which forms the cover of said cylindrical chamber, a pressurized air inlet connected to a pressurized air source and adapted to discharge into said cylindrical chamber tangentially with the cylindrical wall thereof, an inhalation air nozzle located in the bottom wall of said cylindrical chamber and connected to an inhalation hose, valve means controlling the pressurized air stream and actuated by the movements of said flexible diaphragm, and a deflector strip, fitted perpendicularly to said cylindrical wall, extending along said cylindrical wall on a sector comprised between said pressurized air inlet and said inhalation air

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nozzle, said deflector strip terminating at one end close to and generally parallel with the central portion of said inhalation air nozzle, and cooperating with said cylindrical wall and the bottom wall of the chamber to form an open channel, whereby the air stream entering said cylindrical chamber is deviated towards and delivered directly into said inhalation air nozzle.

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