B. Rouquayrol.

Diving Armor.

No. 59,629. Patented Nov. 6, 1866.

Fig. 6.

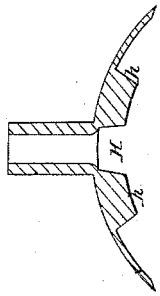


Fig. 7.

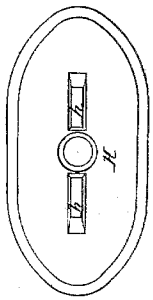


Fig 8

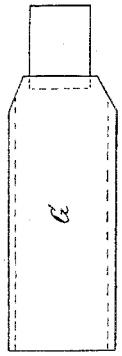


Fig. 4.

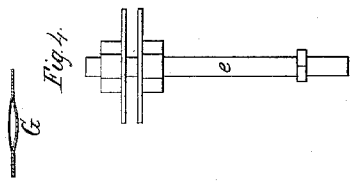


Fig. 2.

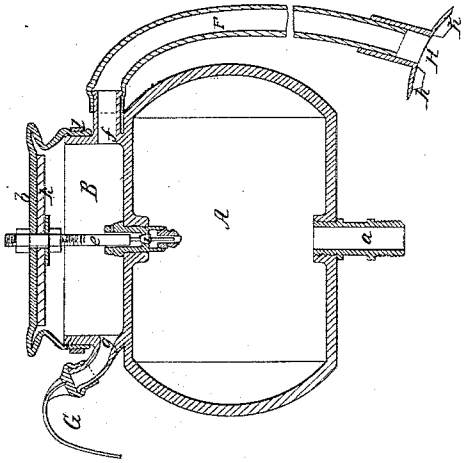


Fig. 3.

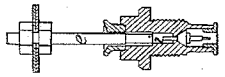


Fig. 1.

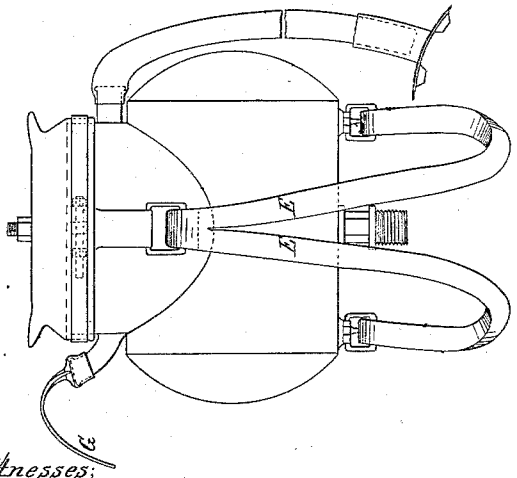
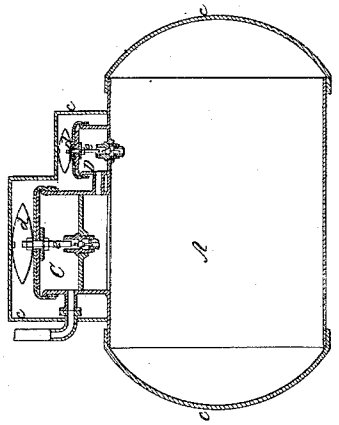


Fig. 5.



Witnesses;
J. A. Duncan
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his attys

UNITED STATES PATENT OFFICE.

BENOIST ROUQUAYROL, OF PARIS, FRANCE.

IMPROVEMENT IN REGULATING THE FLOW OF GASES IN APPARATUS FOR DIVING.

Specification forming part of Letters Patent No. **59,529**, dated November 6, 1866.

To all whom it may concern:

Be it known that I, BENOIST ROUQUAYROL, of Paris, in the Empire of France, have invented certain new and Improved Apparatus for Regulating the Flow of Gases; and I hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, in which—

Figure 1 is a side elevation of an apparatus constructed in accordance with my invention. Fig. 2 is a longitudinal vertical section of the same, and Fig. 5 a similar section of a modified form of the apparatus. Figs. 3, 4, 6, 7, and 8 represent detached parts of the apparatus.

The apparatus I have invented is intended to regulate the flow of compressed gases, and to furnish to the diver or workman who employs it respirable air under a pressure equal to that of the medium in which he is.

The construction and arrangement of this apparatus are very simple, as will be seen by reference to the drawings.

A, Fig. 2, is a reservoir of any suitable form—as, for instance, cylindrical—containing air compressed to a degree which may be the equivalent of forty atmospheres. This air, supplied by the compensating-compressors described in a previous patent granted to me, is introduced through one of the orifices *a*, hermetically closed by screw-stoppers.

Above the reservoir A is formed the air-chamber B, which communicates with the said reservoir through an orifice provided with a valve, *i*, which is operated by a stem or rod, *e*, secured by nuts to the cover *b* of the chamber B. This cover, made of gutta-percha or other suitable flexible and elastic material, strengthened or braced at its center by a wooden or metal disk, *k*, is secured around the upper part of the chamber B by a metal belt or band, *l*. A gutta-percha tube, F, extends from this chamber to the mouth of the diver, who carries on his back the apparatus just described.

From this arrangement of parts it results that if the exterior pressure exceeds that of the air inclosed in the chamber B the elastic cover *b* will be depressed, carrying with it in its movement the rod *e*, which, by opening the check-valve *i*, will allow a certain quantity of air from the reservoir A to pass into the chamber B. The workman will thus be constantly supplied with air, which comes to him under a pressure equivalent to that of the medium in which he is.

The construction of the regulating-rod *b* and distributing-valve *i* is shown in detail in Figs. 3 and 4. This arrangement of the apparatus produces a constant flow of gases, sufficiently regular to enable the workman to respire freely when working under water or in a mephitic atmosphere; but the apparatus may be so constructed as to meet all desirable conditions as regards regularity.

For this purpose two regulating-chambers, C and D, Fig. 5, are placed on top of the air-reservoir A, communicating with each other by means of a tube, *x*, or in any other suitable manner. These regulating-chambers are surrounded by a metal casing, *c*, and their elastic covers are submitted to the constant pressure of two springs, *d*, placed over the tops of the chambers and within the casing *c*. The distributing-valves, regulating-rods, &c., of these chambers are similar to those above described.

The ordinary apparatus is held on the back of the workman by means of strap E, Fig. 1, suitably arranged. Its weight is very slight, and causes no fatigue to the one who carries it.

In the lower part of the air-chamber B are inserted two tubular pieces of tinned iron, *f* and *g*. The former receives the respiring-tube F, and the latter the valve of expiration G. The respiring-tube F is about one centimeter in diameter, and is made of gutta-percha or other very flexible material. It is secured at one end on the piece *f*, soldered to the air-chamber B, and the other end is inserted in the socket of the mouth-closer H. This last is a simple plate of vulcanized rubber, molded and shaped as shown in Figs. 6 and 7, on which plate are formed two projections, *h h*, by means of which the workman is enabled to hold the mouth-closer in his teeth.

The valve of expiration G, Fig. 8, is composed of two very thin pieces of vulcanized rubber, whose sides (longitudinally) are cemented together. In one end of the tube thus formed a stouter cylindrical piece is inserted and cemented, and then this cylindrical part is placed on the tubular piece *g* of the air-chamber B.

This valve—than which nothing could be more simple—opens to give passage to the air breathed out by the workman, but is effectually closed to the outside liquid or fluid by which it is surrounded.

It is evident that my invention can also be applied to ordinary cork jackets used for diving purposes.

Having thus described my invention and the manner in which the same is or may be carried into effect, what I claim, and desire to secure by Letters Patent, is—

1. The apparatus or regulator substantially as herein described, the same being composed of a compressed-air reservoir surmounted by an air-chamber, the latter being provided with an elastic cover, in the center of which is placed a regulating-rod, which acts on the valve, separating the two chambers in such manner as to permit the air from the reservoir to pass in greater or less quantity into the air-chamber, according as the elastic cover of such chamber is subjected to more or less pressure.

2. In the apparatus herein described, the combination, with the air-reservoir, of two regulating-chambers for producing a constant and regular flow or circulation, substantially as set forth.

3. The construction of the mouth-closer and valve of expiration, substantially as and for the purposes herein shown and set forth.

In testimony whereof I have signed my name to this specification before two subscribing witnesses.

B. ROUQUAYROL.

Witnesses:

E. SHERMAN GOULD,

MORARE.