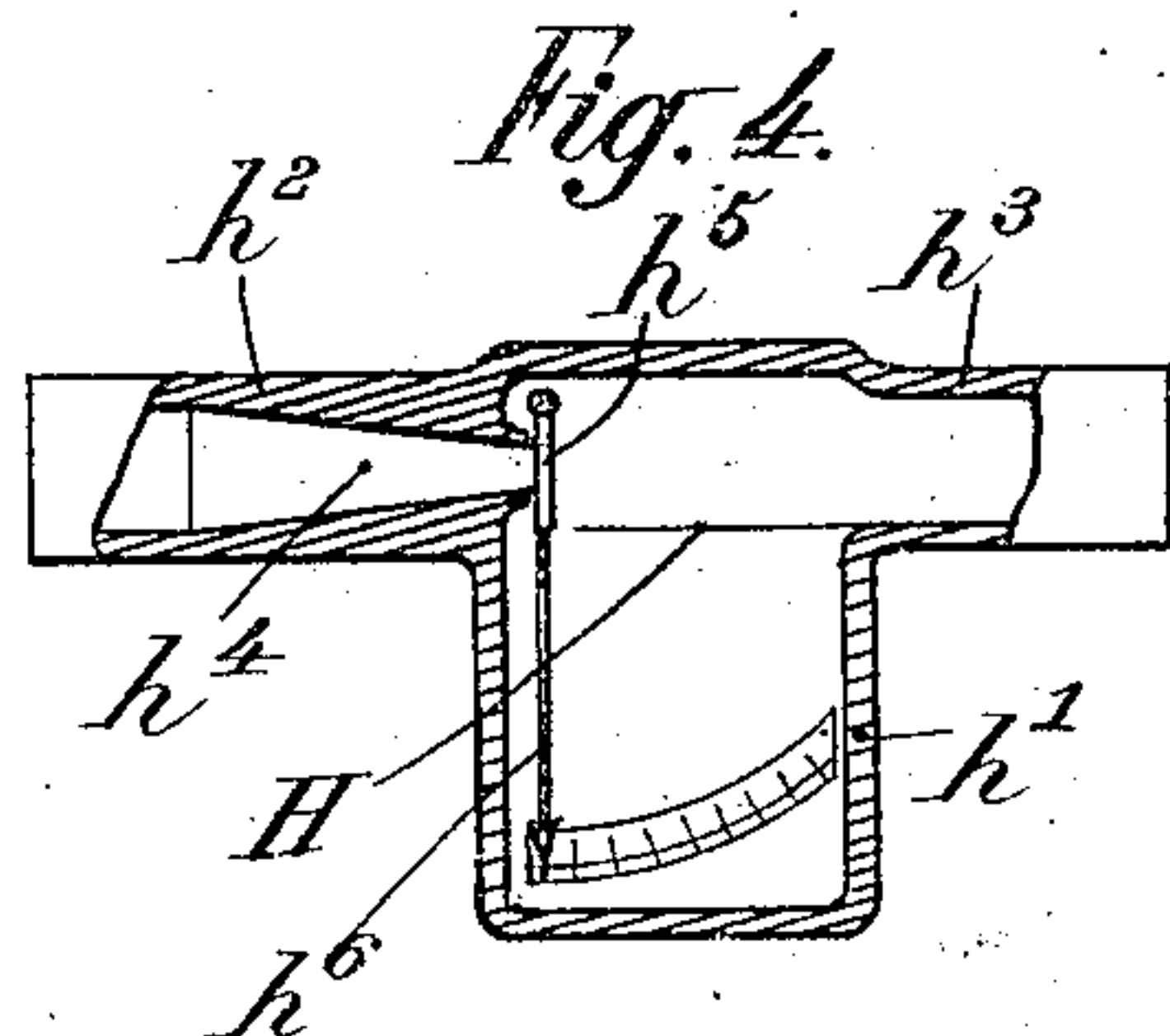
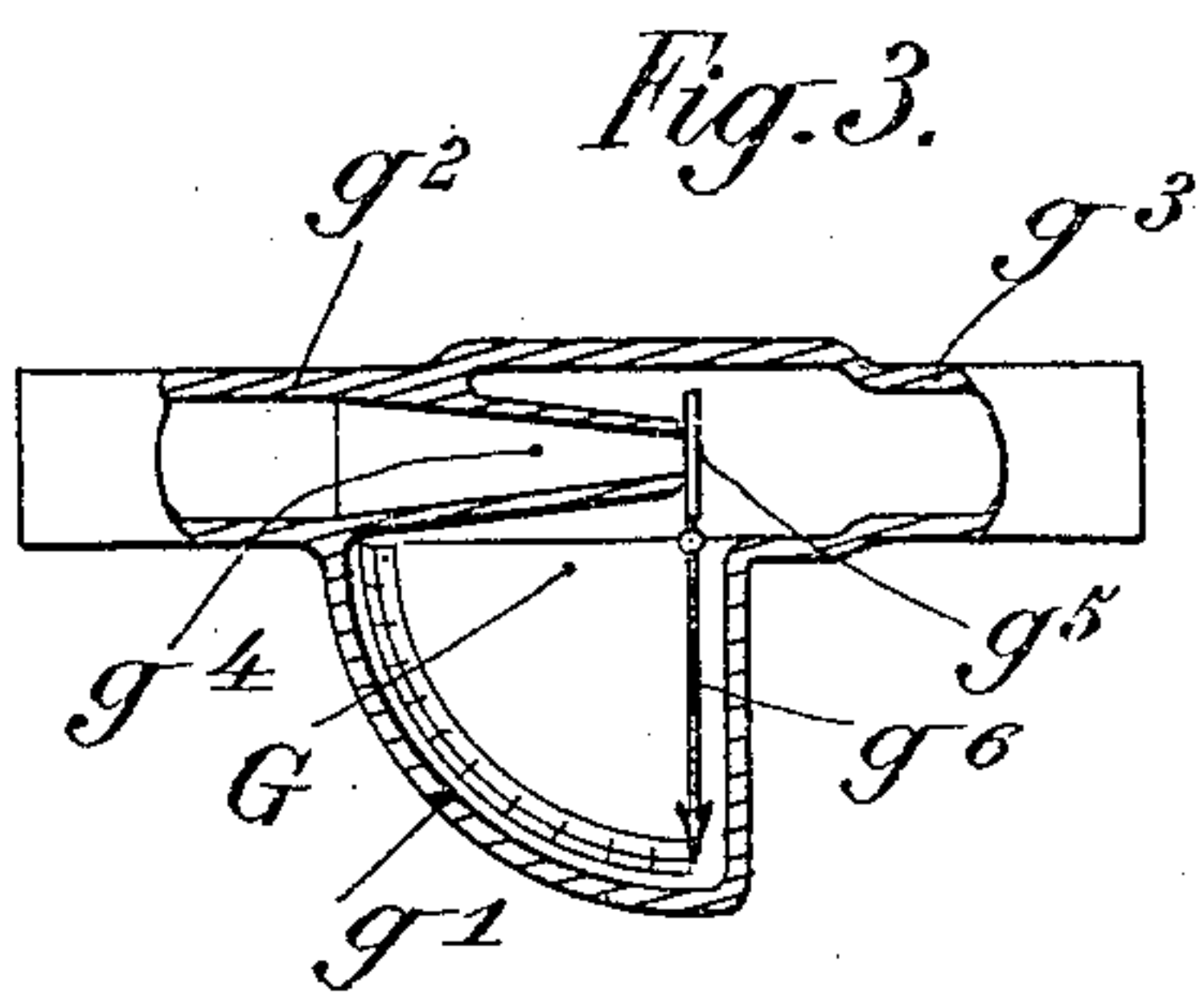
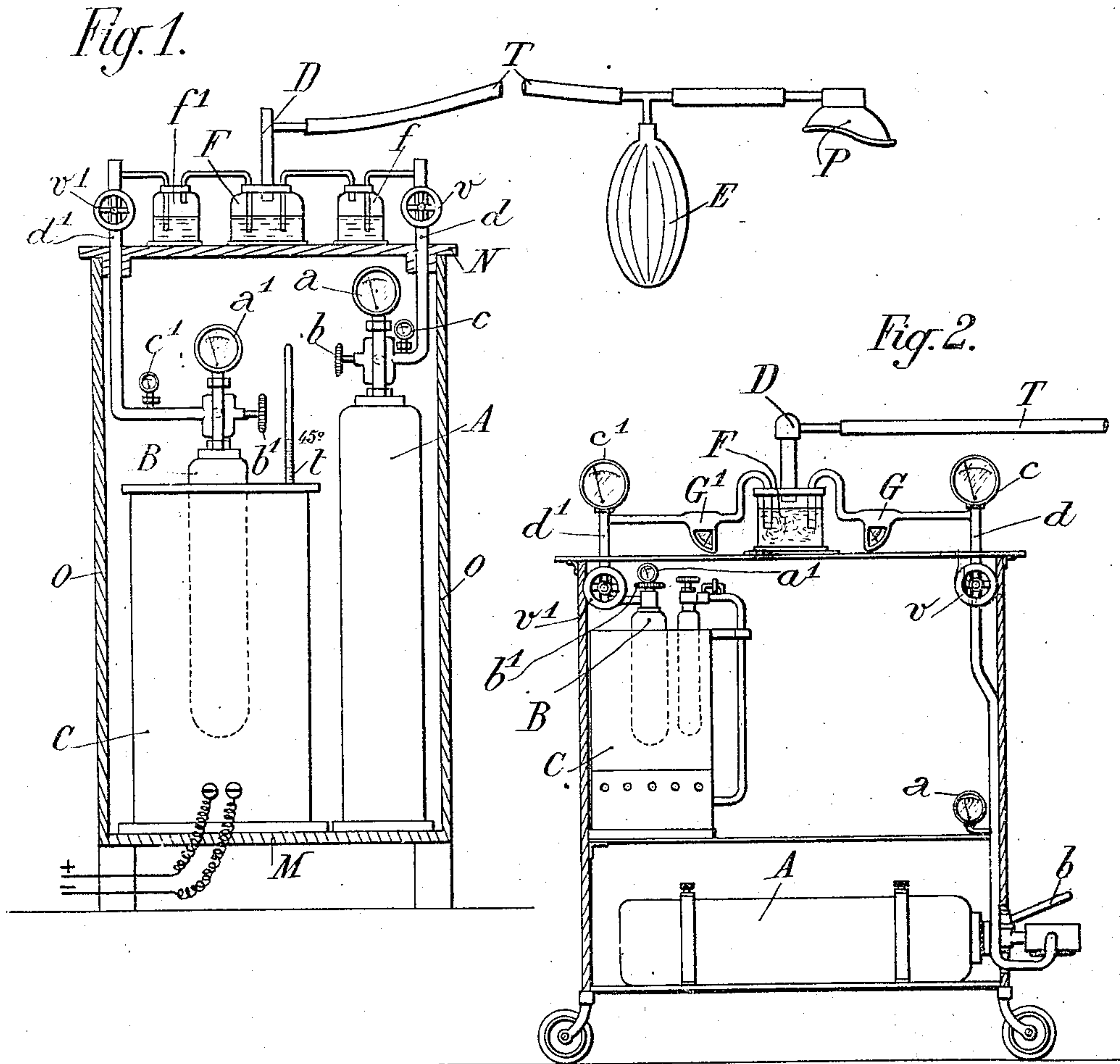


A. BERTHELOT & P. ROSENTHAL.  
 APPARATUS FOR USE IN ADMINISTERING ANESTHETICS.  
 APPLICATION FILED DEC. 3, 1908.

999,950.

Patented Aug. 8, 1911.



Witnesses:

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# UNITED STATES PATENT OFFICE.

ALBERT BERTHELOT AND PIERRE ROSENTHAL, OF PARIS, FRANCE.

APPARATUS FOR USE IN ADMINISTERING ANESTHETICS.

999,950.

Specification of Letters Patent.

Patented Aug. 8, 1911.

Application filed December 3, 1908. Serial No. 465,841.

*To all whom it may concern:*

Be it known that we, ALBERT BERTHELOT and PIERRE ROSENTHAL, citizens of the French Republic, residing at Paris, France, have invented certain new and useful Improvements in Apparatus for Use in Administering Anesthetics, of which the following is a specification.

The apparatus forming the subject of this invention is intended to bring about general anesthesia of a patient by means of chlorid of ethyl, by using a mixture of chlorid of ethyl in gaseous state and of oxygen, the relative proportions of the two gases used, being capable of being varied at will in accordance with requirements. The chlorid of ethyl is normally in a liquid state, but is capable of being converted into gas at a not very high temperature, about 12°. The receptacle containing liquid chlorid of ethyl is heated in order to convert it into gas in such conditions that the gaseous chlorid of ethyl is supplied with a sufficient pressure and in a sufficient quantity to enable the pressure of the said gas to be regulated or adjusted at will to suit requirements. The apparatus being provided with a cylinder of compressed oxygen the operator can advantageously utilize the said source of oxygen for supplying this pure gas to the patient in case of danger as it is sufficient then to close the valve through which the gaseous chlorid of ethyl is supplied.

The construction of the apparatus in question, will be clearly understood from the following description with reference to the accompanying drawings.

Figure 1 shows one form of apparatus according to this invention, Fig. 2 shows another form of apparatus, and Figs. 3 and 4 are detail views of an output indicator.

In the construction shown in Fig. 1, in a frame comprising a base M and an upper plate N supported by uprights O, are arranged a compressed oxygen cylinder A and a cylinder B containing ethyl chlorid in a liquid state. The compressed oxygen cylinder A is provided with a pressure gage *a* which indicates the pressure in the interior of the cylinder, and also with a regulator *b* and its pressure gage *c* for indicating the reduced pressure. The escape of the oxygen gas takes place through the conduit *d* on which is arranged a micrometric adjustment

screw valve *v* beyond which the oxygen passes into a wash bottle *f*.

The cylinder B which contains liquid ethyl chlorid is provided with the same accessories, namely a pressure gage *a'*, regulator *b'* with pressure gage *c'*, conduit *d'* for the escape of the gaseous chlorid of ethyl and micrometric screw valve *v'* for regulating the amount of gas passing into the wash bottle *f'*.

The ethyl chlorid cylinder B is placed in a heating device C the object of which is to keep up a constant temperature of about 45° C. indicated on a thermometer *t*. It is sufficient not to exceed the said temperature, but the source of heat supplied by electricity, gas burner or in any other manner, must be sufficiently powerful to enable the issuing pressure of the ethyl chlorid gas to be maintained constant by quickly making up for the loss of heat due to the passage from liquid to the gaseous state. In that way a sufficiently high pressure of the gas is insured for supplying sufficient quantities to the apparatus.

The two gases, oxygen and ethyl chlorid, escaping from the bottles *f* and *f'* pass into a joint wash bottle F, where they become mixed and thence escape through a branch D and pass to the mask P through a very flexible rubber tube T. The said rubber tube, although very flexible, must be sufficiently thick not to become flattened by bending. Branched on the said tube T is a bladder E of a very thin rubber, which permits easy breathing of the patient on whose face the mask is placed.

The diameter of the tubes of the wash bottles must be sufficiently large to enable the number of bubbles to be counted, even with a strong supply of gas, and consequently the proportion of the two gases to be seen at any moment. They form therefore output indicators.

The wash bottles *f* *f'* F preferably contain water with a suitable proportion of glycerin, which solution moistens the gases when they splutter in the said liquid, while preventing them from carrying away an excessive quantity of water.

The apparatus shown in Fig. 2, is practically the same as just described, and the corresponding parts are marked in the same manner. The only difference is that the



wash bottles  $f f'$  are replaced by one or the other of the output indicators G (Fig. 3) and H (Fig. 4). These output indicators G and H consist of an air tight casing  $g'$  or  $h'$  provided with an inlet  $g^2$  or  $h^2$  and an outlet  $g^3$  or  $h^3$ . The inlet terminates in a nozzle  $g^4$  or  $h^4$  in the interior of the casing G or H. The nozzle  $g^4$  or  $h^4$  is normally closed by a plate  $g^5$  or  $h^5$  mounted on the end of a pivoted hand  $g^6$  or  $h^6$  which moves over a dial so that the pressure of the issuing gas on the plate  $g^5$  or  $h^5$  will indicate the output of the gas at each moment. The constructions of the output indicators H and G shown in Figs. 3 and 4 have the advantage over the wash bottle  $f f'$  of Fig. 1, that they relieve the operator, regulating the supply of gas of the necessity of counting the number of bubbles, the output of gas at both sides being indicated by the needle of the indicator G or H.

It is preferable to start the heater C a little before an operation, so that it should have reached a suitable temperature by the time the operation begins. The oxygen heater and the ethyl chlorid cylinder being each provided with an expansion apparatus having a micrometric indicator, the pressure of the chlorid of ethyl can be regulated at will; for instance the pressure of the said gas may be equal to one-quarter of an atmosphere, so that the oxygen and the ethyl chlorid should have the same pressure when they arrive together at the mixing device F. The apparatus according to this invention, owing to the arrangement of cocks with micrometric screws  $v$  and  $v'$  make it possible to obtain the mixture of the two gases in any desired adjusted proportion shown on the output indicators  $f$  and  $f'$  or G H, as well as to obtain one or the other of the two gases in a desired adjusted quantity, according to requirements.

It will be understood that, if for any reason the operator wants to supply oxygen quickly, he has merely to close the micrometric screw  $v'$  and to open the screw  $v$  corresponding to the oxygen valve so that the said gas passes alone under a suitable pressure, to the mask P.

What we claim as our invention and desire to secure by Letters Patent is:—

1. An apparatus for supplying at will either a mixture of several gases or either of the said gases alone, comprising for each of the said gases, a compressed gas receptacle, its gas regulator, a branch pipe provided with a nozzle, a micrometer screw valve arranged in each branch, an air tight casing wherein said nozzle is inclosed, a plate in front of the orifice of the nozzle, a dial, and an indicator associated therewith and carrying said plate; and a common wash bottle at the end of the said branch pipes, and provided with an outlet branch.

2. An apparatus for producing general anesthesia comprising an ethyl chlorid receptacle; means for heating the same; an oxygen receptacle; and for each of the said gases, a gas regulator, a branch having a nozzle, an airtight casing wherein said nozzle is inclosed, a micrometer screw valve arranged in the branch, a plate located in front of the orifice of the nozzle, a dial, and an indicator associated with the dial and carrying said plate; and a common wash bottle at the end of said two branches and having a single outlet branch provided with a bladder and a mask, said mask being located at the end of the said outlet branch.

3. In an apparatus for administering anesthetics, the combination, with a gas receptacle having a valved branch provided with a nozzle; of an output indicator arranged in said branch and comprising an airtight casing wherein said nozzle is inclosed, a plate arranged at the orifice of the nozzle, a dial, and an indicator associated with said dial and carrying said plate; a receptacle into which the gas is discharged from said branch; and an outlet pipe leading from said receptacle.

In testimony whereof we have hereunto set our hands in presence of two subscribing witnesses.

ALBERT BERTHELOT.  
PIERRE ROSENTHAL.

Witnesses:

H. C. COXE,  
ARMAND WARD.