J. S. PYLE.

ANESTHETIC ADMINISTERING APPARATUS.

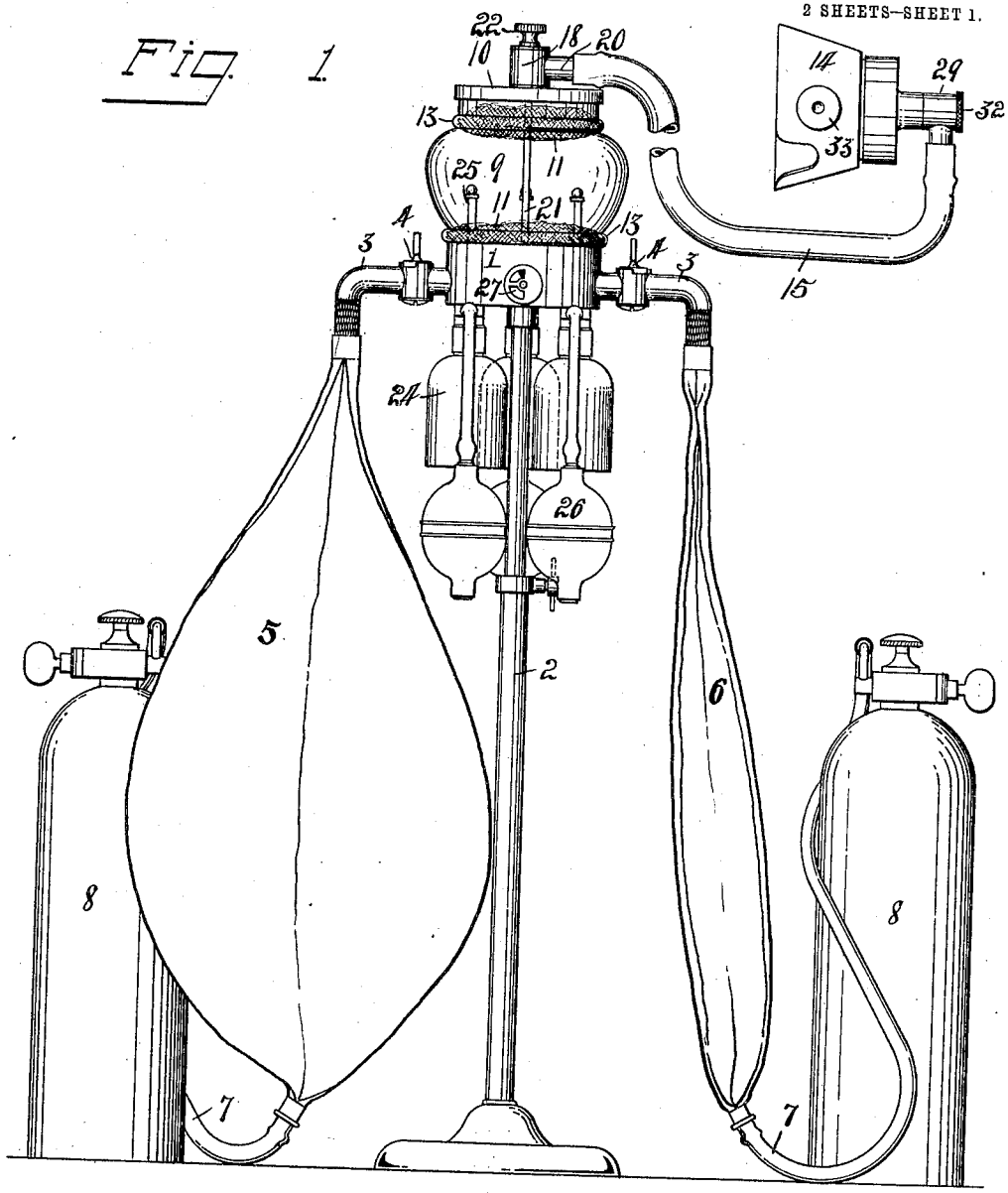
APPLICATION FILED MAY 6, 1911.

1,084,029.

Patented Jan. 13, 1914.

2 SHEETS—SHEET 1.

Fig. 1.



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2 SHEETS—SHEET 2.

Fig. 2.

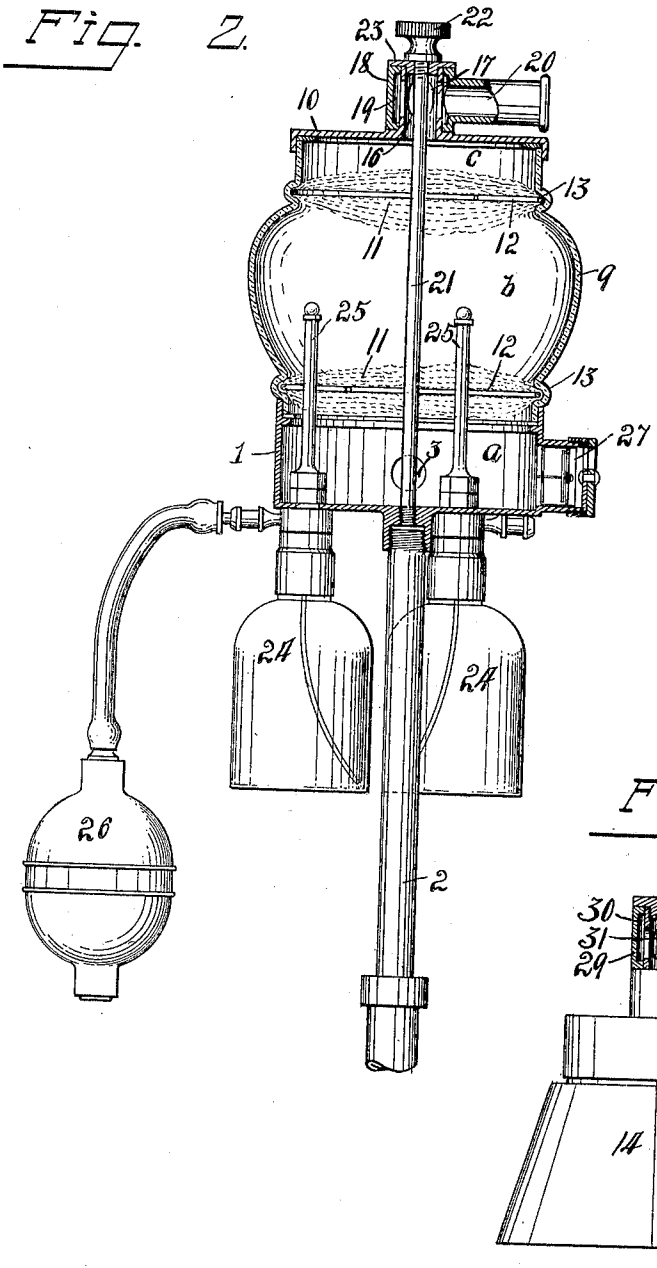
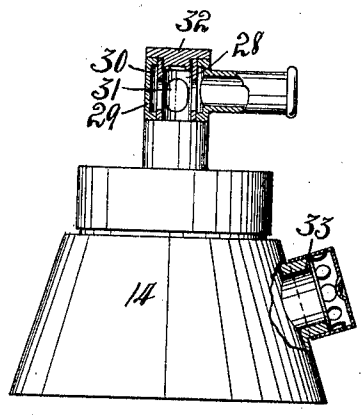


Fig. 3.



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UNITED STATES PATENT OFFICE.

JOHN S. PYLE, OF TOLEDO, OHIO.

ANESTHETIC-ADMINISTERING APPARATUS.

1,084,029. Specification of Letters Patent. Patented Jan. 13, 1914.

Application filed May 6, 1911. Serial No. 625,431.

To all whom it may concern:

Be it known that I, JOHN S. PYLE, a citizen of the United States, and a resident of Toledo, in the county of Lucas and State of Ohio, have invented a certain new and useful Anesthetic-Administering Apparatus; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

My invention relates to apparatus for the administering of anesthetics, and has for its object to improve upon apparatus of this class by the provision of simple and efficient means for effecting a more thorough mixing of the anesthetizing gases employed, and also the provision of efficient means for introducing a liquid anesthetic in spray or vapor form within the mixing chamber of the apparatus, whereby to facilitate and render more practical the use of either a gas or liquid as the anesthetizing agent, or to enable several different kinds of anesthetizing liquids to be employed.

Further objects and advantages of my improved apparatus will be apparent from the following description.

The invention is fully described in the following specification, and while, in its broader aspect it is capable of embodiment in numerous forms, a preferred embodiment thereof is illustrated in the accompanying drawings, in which,—

Figure 1 is a side elevation of the apparatus with one bag shown inflated. Fig. 2 is an enlarged central vertical section of the mixing chamber thereof, and Fig. 3 is an enlarged detail of the face piece with parts in section.

Referring to the drawings, 1 designates a cup-like member, which is shown as being carried at the upper end of a telescopic standard 2, and as having nipples or tubular extensions 3, 3 projecting from opposite sides thereof. These nipples are each provided with a valve 4 of any suitable form and one is intended to have connection at its outer end with a bag 5 for containing oxygen and the other with a bag 6 for containing nitrous oxid, as is common in apparatus of this character. The bags 5 and 6 are shown in the present instance as having connection through tubes 7 with tanks 8 for containing the respective gases.

Mounted upon the member 1 and forming a close seat therewith is a jar-like part 9, preferably of glass, the top of which is closed by a cap 10. The chamber formed by the member 1, jar 9 and cap 10 is preferably divided into the communicating compartments *a*, *b* and *c* (Fig. 2), the partitions 11 therebetween being preferably formed of a coarse gauze or other suitable material for the purpose hereinafter described. If gauze is used in the formation of the partitions 11 several layers of the same are preferably used for each partition, and such layers are held at their edges to the side walls of the associated parts by spring wire rings 12, which seat in the present instance in internal annular grooves 13 provided in the wall of the jar 9.

The gases or vapors which are mixed within the mixing chamber of the instrument pass therefrom to a suitable face piece 14 through a tube 15, which communicates with the upper portion of the mixing chamber through the cap 10. For the purpose of providing a swivel joint between the tube 15 and cap, the latter is shown as having a tubular part 16 projecting upward therefrom and having a series of annularly arranged exit openings 17 therein. A part 18 is swiveled on the tubular part 16 to revolve freely thereon and has an internal annular recess 19 in constant register with the openings 17 and a tubular part 20 projecting from said recessed portion in communication therewith and adapted for the attaching of the face piece-hose 15 thereto. A rod 21 projects upward from the bottom member 1 of the mixing chamber through the tubular part 16 and coöperates with a thumbnut 22 and disk 23 to hold the parts 16 and 18 in assembled relation.

Associated with the mixing chamber of the apparatus are one or more atomizing instruments 24 which are shown in the present instance as having their discharge tubes 25 projecting upward through the bottom of the base member 1 of the mixing chamber with their nozzle ends projected through the lower gauze partition 11 and terminating within the mixing chamber compartment *b*. Air may be supplied to the atomizers for operating the same by a compression of the customary air bulbs 26, or from any other suitable source of air pressure supply. A

plurality of atomizers 24 are preferably used so that the apparatus may be equipped for the spraying of ether, chloroform or other anesthetizing liquids as the condition of the patient or the nature of use may require. In practice it is preferable to use three atomizing instruments, two being for ether and one for chloroform. The vaporized liquid which is discharged from one or more of the atomizers 24 is preferably mixed within the compartment *b* and in its passage through the upper gauze partition 11 is more thoroughly broken up and mixed preparatory to its passage to the face-piece.

The tubes 3 from the bags 5 and 6 open into the compartment *a* of the mixing chamber where the gases from such bags are mixed and may be commingled with air in proper proportion, the air entering said compartment through a valve controlled passage 27. The anesthetizing gases are more thoroughly mixed in their passage through the successive gauze partitions 11, thus enhancing the efficiency of the apparatus.

To facilitate a placing of the face-piece 14 at any desired position relative to the apparatus and to coöperate with the swivel joint between the tube 15 and mixing chamber cap 10 for such purpose, I provide the receiving end of the face-piece 14 with a tubular extension 28 upon which a swivel part 29 is journaled for free revoluble movements about the part 28 as its axis. The part 29 has an internal recess 30 in register with one or more lateral openings 31 in the tubular part 28 and the stem of the part 29 to which the face piece tube 15 attaches projects laterally from the portion of the part 29 which is mounted upon the part 28. A cap 32 threads into the outer end of the part 28 and coacts with the part 29 to hold it to its seat on the former. The gases of exhalation pass from the face-piece 14 through a valve passage 33, the valve of which opens under internal pressure.

I have found from experiments that in the administration of ether or chloroform anesthetics in the usual way the moisture contained in the air which is breathed in with the anesthetic produces local irritation of the mucous membrane and reflex disturbances which render such anesthetic more annoying and dangerous to administer. It is found, however, that by discharging the liquid anesthetic into a chamber in spray or vapor form and diluting or mixing the same with air in sufficient quantity as the administering of the anesthetic or the nature of the patient may require, the cooling or reducing of the temperature within the chamber by reason of the forced evaporation therein causes the water or moisture in the inspired air to be precipitated, thereby producing an anesthetic mixture that is dry, less irritating, less harmful, of higher concentrating quality and having much greater physiological activity than would the same anesthetic when administered in the ordinary way.

In the use of my improved apparatus the valves 4 are first preferably opened to a desired extent to admit oxygen and nitrous oxid to the mixing compartment *a* from the respective bags 5 and 6, and such valves may be regulated during the administering of the anesthetic as the condition of the patient may require. The air valve 27 may also be opened to permit an admission of air to said compartment to weaken the anesthetic as may be desired. The gas which is admitted to the mixing compartment *a* from the bags 5 and 6, or either of them, passes through and is thoroughly broken up and mixed by the gauze partitions 11 before passing to the face-piece where it is inhaled by the patient. When the patient has been placed under the influence of the anesthetic it is preferable to then administer chloroform or ether, preferably the latter, to continue the patient in such state. To accomplish this it is only necessary for the operator to press the bulb of the proper atomizer 24 to effect a discharge of the liquid anesthetic in vapor form into the compartment *b* of the mixing chamber from whence it passes through the upper gauze partition 11 and tube 15 to the face piece. During this operation air is admitted to the lower portion of the mixing chamber through the valve 27 and is thoroughly commingled with the vapor in its passage to the upper gauze partition 11. The swiveling of the tube 15 to the mixing chamber and face piece 14 facilitates a swinging of the face-piece to any desired position to suit the relative positions of the patient and apparatus and to enable the patient to freely turn his head when the face-piece is clamped thereto.

In the administering of anesthetics it is found that under certain conditions it is preferable to combine liquid and gaseous anesthetics, and this is made possible with my apparatus by operating the atomizing instruments or one of them when the valves controlling the admission of gas to the compartment *a* from the bags 5 and 6 are open, as the gases which are mixed in the compartment *a* pass through the lower gauze partition 11 into the compartment *b* where they are mixed with the vapors of the liquid anesthetic employed thus giving a combined gas and liquid anesthetic.

I wish it understood that my invention is not limited to any specific construction or arrangement of the parts except in so far as such limitations are specified in the claims.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is—

1. In an anesthetic administering appara-

tus, a mixing chamber having inlet and outlet passages, an instrument associated therewith for discharging an anesthetizing liquid in vapor form therein, and a gauze-like substance interposed between the portion of said chamber into which the vapors are discharged and said outlet passage.

2. In an anesthetic administering apparatus, a mixing chamber, gauze-like partitions dividing said chamber into a plurality of compartments, gas bags in communication with one of said compartments, liquid atomizing instruments having their discharge nozzles located within another of said compartments, and means for delivering vapors and gases from said chamber.

3. In an anesthetic administering apparatus, a mixing chamber, gauze-like partitions arranged in said chamber to form communicating compartments above and below said chamber, an air inlet to said lower compartment, at least one liquid anesthetic atomizing instrument having its discharge nozzle within said mixing chamber, and means leading from the upper of said compartments for conducting vapors and gases therefrom.

4. In an anesthetic administering apparatus, a chamber having a plurality of communicating mixing compartments, gas supply means in communication with the lower of said compartments, liquid anesthetic atomizing means in communication with another of said compartments, and means leading from the upper compartment for conducting vapors and gases therefrom.

5. In an anesthetic administering apparatus, a cup-like member having valve controlled communication with sources of gas supply, a jar-like part seating on said member and having an outlet passage at its upper end portion, a gauze-like partition disposed at the lower end portion of said part to divide the interiors of said member and part, and means for discharging a liquid in vapor form into said part.

6. In an anesthetic administering apparatus, a cup-like member, a part carried by said member and forming a mixing chamber thereabove, said part having a passage leading from its upper portion and at least one liquid atomizing instrument carried by said member and having its discharge nozzle projected therethrough and into said part.

7. In an anesthetic administering apparatus, a plurality of communicating mixing chambers, one of said chambers having communication with sources of gas supply and having a valve-controlled air inlet opening thereto, means for discharging a liquid anesthetic in vapor form within another of said chambers, and an outlet passage located at the opposite side of the chamber into which the liquid anesthetic is injected to the chamber having said air inlet to permit the inspired air to pass through said chambers to the outlet passage.

In testimony whereof, I have hereunto signed my name to this specification in the presence of two subscribing witnesses.

JOHN S. PYLE.

Witnesses:
C. W. OWEN,
E. E. THOMAS.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."