W. V. GOODFELLOW.

METHOD OF AND APPARATUS FOR GENERAL ANESTHESIA.

APPLICATION FILED NOV. 4, 1916.

1,267,761. Patented May 28, 1918.

Fig. 1.

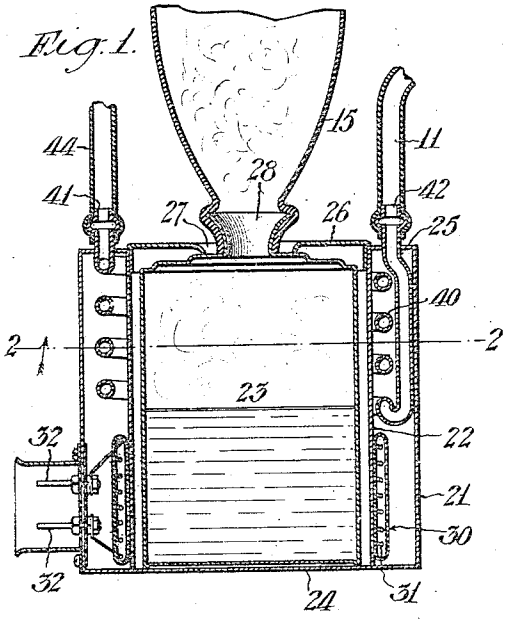


Fig. 2.

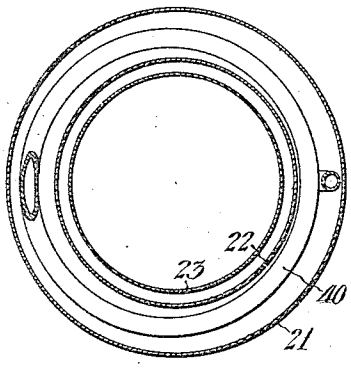


Fig. 5.

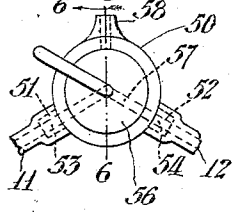


Fig. 6

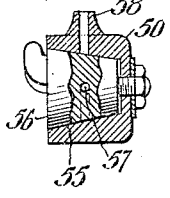
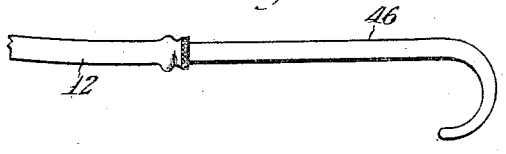


Fig. 3.

Fig. 4.



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METHOD OF AND APPARATUS FOR GENERAL ANESTHESIA.

1,267,761. Specification of Letters Patent. Patented May 28, 1918.

Application filed November 4, 1916. Serial No. 129,623.

To all whom it may concern:

Be it known that I, WALTER V. GOODFELLOW, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented a new and useful Method of and Apparatus for General Anesthesia, of which the following is a specification.

My invention relates to the science of surgery and obstetrics, and particularly to the science of producing in a patient that loss of sensation or feeling partial or complete commonly known as anesthesia.

In surgical science it is common practice to induce a partial or complete loss of sensation before attempting to operate on a patient, this generally being accomplished by administering to the patient an anesthetic, generally in the form of vapor or gas, which is taken into the respiratory system and absorbed into the blood through the mucous membrane of the lungs. Sulfuric ether or chloroform are in common use and may be included with other substances having the same general properties and characteristics under the general term of "anesthetic liquids".

The principal object of my invention is to develop a new technic in the administration of anesthetic liquids. This technic is to provide means for vaporizing the anesthetic by the use of heat and for administering definite quantities of the vapor produced under definitely regulated pressure and absolute control directly to the mucous membranes of the patient without the necessity for mixture with air. Under the present practice, volatile anesthetic liquids are allowed to evaporate and their vapors mixed with air are inhaled into the respiratory system. By vaporizing the liquid within a container by accurately regulated heat, and by providing efficient means for controlling the flow of the vapor, I am able to regulate to a very fine degree the anesthesia produced. I am also able to feed the vapor directly into any suitable body cavity of the patient, so that it is applied directly to the membranes without material loss of vapor. In operations, especially upon the nose or throat, in which the old methods of anesthesia are used, the surgeons and their assistants work in an atmosphere laden with anesthetic fumes, with a corresponding loss of efficiency and even positive illness due to breathing these fumes.

A further object of my invention is to provide means by which the anesthetic may be fed into the rectum and colon. Such a method of administration is much to be preferred to the administration to the respiratory system, as it does not interfere with the patient's breathing and therefore does not interfere with the oxygenation processes within the lungs. It removes the field of anesthesia from the nose, mouth, and throat in cases where operations are to be performed therein.

Further objects and advantages will be made evident hereinafter.

Referring to the drawings, which are for illustrative purposes only:

Figure 1 is a vertical cross section through a generator embodying my invention.

Fig. 2 is a section on the plane 2—2 of Fig. 1, this plane being viewed in the direction of the arrows 3.

Fig. 3 is an elevation of a complete apparatus embodying my invention.

Fig. 4 is a view of an instrument used in oral anesthesia.

Fig. 5 is an end view of the control valve, and

Fig. 6 is a section on the line 6—6 of Fig. 5.

The apparatus used consists of a point 10, flexible tubes 11 and 12, a control valve 13, a generator 14, and a gasometer 15. The generator 14 consists of a vessel formed of two concentric cylinders 21 and 22, the inner cylinder 22 being of sufficient size to take a standard ether can 23. A tight bottom 24 is provided covering the whole bottom of the generator, and an annular top 25 closes in the top of the space between the cylinders 21 and 22. A loose cover 26 closes the interior of the inner cylinder 22, this cover 26 having an opening 27 therein through which the neck 28 of the ether can 23 may project.

Located in the bottom of the space between the cylinders 21 and 22 is a heating element 30 which consists of an electric wire 31 suitably insulated and connected to insulating terminals 32 to which a standard attachment plug 33 may be attached, this attachment plug being so arranged as to connect flexible wires 34 with the terminals

32, the wires 34 being connected to some source of electric power so that a current flows through the electric wire 31 and heats the space between the cylinders 21 and 22 and the ether in the ether can 23.

Situated between the cylinders 21 and 22 above the heating element 30 is a superheating coil 40, this coil having ends 41 and 42 which project through the top 25.

The gasometer 15 is preferably formed of thin and highly elastic rubber, this gasometer being in reality a variable volume container. The upper end 43 of the gasometer 15 is connected through a tube 44 with one end 41 of the coil 40, the other end 42 of the coil 40 being connected to the flexible tube 11. The point 46 shown in Fig. 4 is used for oral anesthesia, and the point shown at 10 is used for rectal anesthesia. The wires 34 may be run directly to a lighting circuit, or preferably a rheostat 47 may be inserted in the circuit 30 that the degree of heat applied may be varied at will.

The valve 13 consists of a casing 50 having projections 51 and 52 to which the tubes 11 and 12 are attached, these projections having an inlet port 53 and an outlet 54 connecting with a central tapered opening 55 in the casing 50. A tapered plug 56 fits tightly in the opening 55 and has a connecting port 57 which is so placed as to connect the ports 53 and 54 which are 120 degrees apart. A blowoff port 58 is formed in the casing 50 between the ports 53 and 54 and 120 degrees from each so that the connecting port 57 may also be set to connect the blowoff port 58 with either the port 53 or the port 54.

The method of operation of my invention is as follows:

The ether can 23, which is partially filled with sulfuric ether, or a similar anesthetic liquid, is placed inside the cylinder 22 and the cover 26 is dropped in place. The lower end of the gasometer 15 is slipped over the neck 28 of the ether can 23 and the plug 33 is put in place.

The degree of heat applied to the heating element 30 may be regulated by the rheostat 47. This heat acting on the ether in the ether can 23 converts a portion of the ether into ether vapor, and this vapor rises through the neck of the ether can 23 into the interior of the gasometer 15, any of the ether which is not thoroughly vaporized collecting on the inner walls of the gasometer and running back into the ether can. The gasometer 15 being elastic is distended by a slight pressure. The vapor therein passes through the tube 44 to the superheating coil 40 where it is further heated to prevent premature condensation, also to prevent cooling of tissue and shock to patient, this heating, however, being moderate in amount so that there is no danger of burning the patient. The ether vapor is practically unmixed with air, the small amount of air which was initially in the can being allowed to escape with the first of the ether vapor which is taken off. Vapor from the coil 40 is carried by the tube 11 to the valve 13. When it is desired to pass the vapor to the patient, the plug 56 is turned so that the ports 53 and 54 are in open communication with each other and vapor flows through the tubes 11 and 12 to the patient. If it is desired to reduce the pressure in the gasometer 15 the plug 56 is turned to connect the port 53 with the port 58, and ether vapor is discharged from the gasometer 15 to the outer air. If it is desired to withdraw vapor from the rectum of the patient, the plug 56 is turned to connect the port 54 with the port 58, and such vapor is discharged from the patient through the tube 12.

I claim as my invention:

1. An apparatus for producing general anesthesia by the use of an anesthetic liquid which comprises a vessel formed of two concentric cylinders, the inner cylinder being of sufficient size to contain a standard sulfuric ether can; a heating element between said cylinders; a superheating coil between said cylinders; a variable volume container; means for connecting a standard sulfuric ether can carried inside said inner cylinder with said variable volume container; means for connecting said variable volume container with said superheating coil; and means for passing vapor from said superheating coil into a body cavity of the patient to be anesthetized.

2. An apparatus for producing general anesthesia by the use of an anesthetic liquid which comprises a vessel formed of two concentric cylinders, the inner cylinder being of sufficient size to contain a standard sulfuric ether can; a heating element between said cylinders; a superheating coil between said cylinders; a variable volume container; means for connecting a standard sulfuric ether can carried inside said inner cylinder with said variable volume container; means for connecting said variable volume container with said superheating coil; and means for passing vapor from said superheating coil into the rectum of the patient to be anesthetized.

In testimony whereof, I have hereunto set my hand at Los Angeles, California, this 28th day of October, 1916.

WALTER V. GOODFELLOW.

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