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T. H. GEBAUER.

INHALING APPARATUS.

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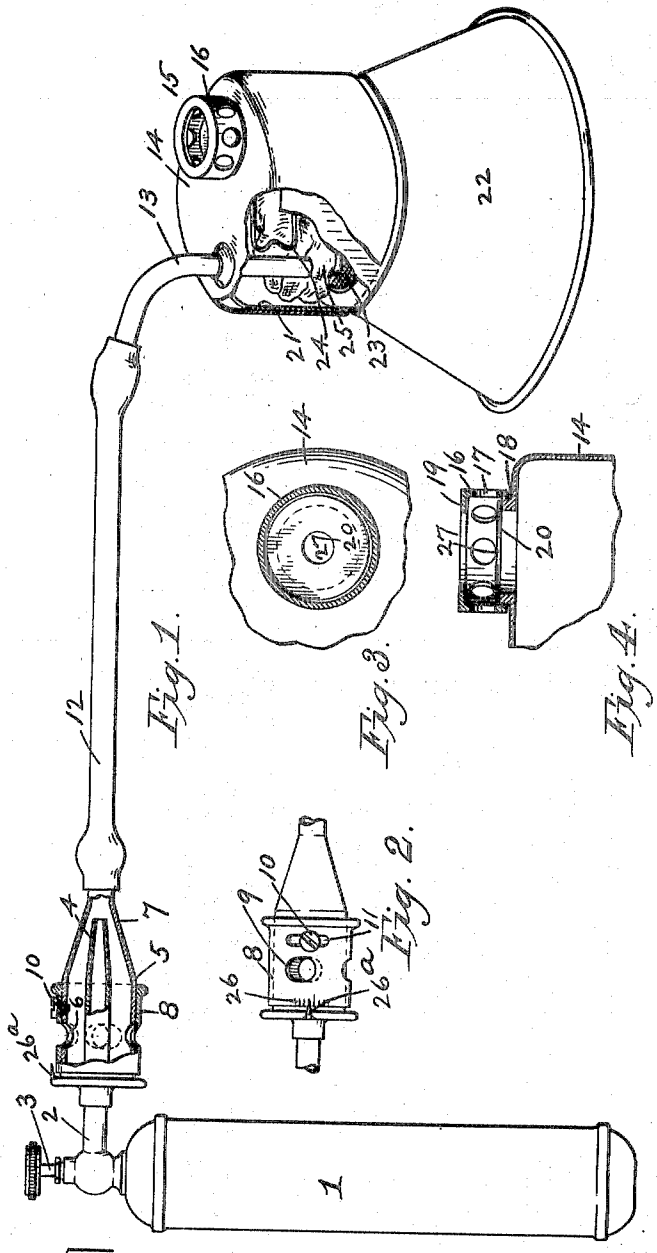


Fig. 1.

Fig. 3.

Fig. 4.

Fig. 2.

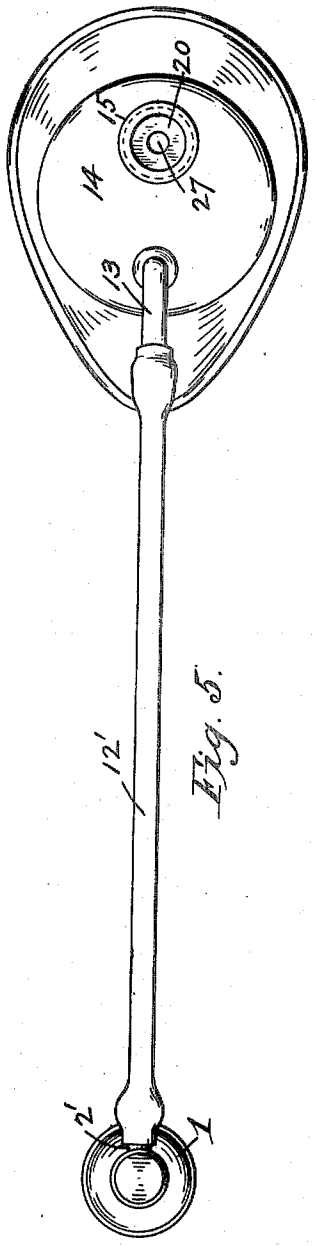


Fig. 5.

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INHALING APPARATUS.

No. 821,354. Specification of Letters Patent. Patented May 22, 1906.

Application filed August 25, 1905. Serial No. 275,749.

To all whom it may concern.

Be it known that I, THEOPHIL H. GEBAUER, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Inhaling Apparatus, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

My invention relates to devices for administering anesthetics, particularly ethyl chlorid, also to devices whereby both chloroform or ether may be administered as a sequence to ethyl chlorid.

One object of the invention is to provide means whereby the ethyl chlorid may be administered without waste of the same.

A further object of the invention is to administer the same without causing the patient to inhale the cold vapor, the inhalation of which frequently results in the patient suffering from an attack of pneumonia after the operation has been performed.

A further object of the invention is to mix the ethyl chlorid with air before the inhalation and to prevent the repeated inhalation of such vapor or of the mixture of such vapor and air.

I have accomplished these results by the apparatus illustrated in the accompanying drawings, wherein—

Figure 1 represents a side elevation, partly in section, of an apparatus embodying my invention. Fig. 2 represents a side elevation of the mixer which I employ with the apparatus shown in Fig. 1. Figs. 3 and 4 represent detail views of the valve which I employ with the apparatus shown in Fig. 1, and Fig. 5 represents a plan view of a modification of the apparatus shown in Fig. 1.

Describing the parts by reference-numerals, 1 represents a metallic receptacle for the ethyl chlorid. Extending from the top of said receptacle is a metalllic tube 2, communication between said receptacle and tube being controlled by means of a needle-valve 3. The tube 2 may be of any desired length, but is preferably a short tube, as shown in the drawings, with the discharge end of the same contracted to form a nozzle 4. This tube carries the surrounding casing 5, mounted thereon in any suitable manner, said casing being provided with a number of openings 6 for the admission of air to the interior of the casing. The forward end of the casing is contracted at 7, approaching, but suitably spaced from, the end of the nozzle 4. A sleeve 8 surrounds the casing 5 and is provided with openings 9, adapted to register with the openings 6 of the casing. A screw 10, carried by the casing, and a slot 11 in the sleeve limit the rotation of the sleeve and sustain the same in operative relation to the casing. The end of this tapering portion 7 is enlarged to receive a tube 12, of rubber or similar flexible material, the other end of said tube 12 being connected to a metallic bent tube 13, which is swiveled in the cap 14 of the inhaler. The cap 14 is removably and telescopically fitted on top of the body of the inhaler and is provided with a valve 15. This valve is shown in detail in Figs. 3 and 4 and consists of a casing or cage 16, having openings 17 in the vertical wall thereof, the casing being preferably threaded on a short nipple 18, projecting from the upper surface of the cap. The upper end of the casing is provided with an inwardly-projecting ledge 19. A perforated disk 20, of mica or other suitable material, rests on the top of the nipple 18.

The inhaler comprises, in addition to the removable cap 14, an upwardly-extending casing 21, on which the cap 14 is adapted to telescope, and a flaring body portion 22, the open lower end of which is shaped to receive and fit closely over the mouth and nose of the patient. The lower edge of the body may be provided with the usual pneumatic cushion. At the junction of the vertical casing 21 and the lower flaring body portion 22 a wire-gauze screen 23 is provided. The casing is also provided with a suitable clamp 24 of ordinary construction, between which and the wire-gauze 23 suitable absorbent gauze or fabric 25 may be inserted.

In the operation of the device as above described the receptacle is held by the operator and the valve 3 is unscrewed. The warmth of the hand is sufficient to vaporize the ethyl chlorid in the receptacle and the vapor passes through valve 3 and tube 2 into the forward end of the contracted portion 7 of the casing. In anesthetizing the patient or first getting him under the influence of the anesthetic the sleeve 8 is set to prevent the flow of air into the casing 5, sufficient air to prevent cyanosis and asphyxiation being admitted at this stage through the perforation 27 in the disk 20. After the patient has been anesthetized a smaller proportion of vapor relatively to the air is required, and the sleeve 8

is then set to admit air to mingle with the vapor. A scale may be provided at 26, cooperating with an index 26ª, to indicate the proportion of air which is admitted to the mixture with the vapor. The mixture of vapor and air flows through tube 12 and connection 13 into the space between the top of the cap 14 and the gauze 25. The patient inhales the mixture of vapor and air, said mixture being further diluted by the air admitted through the perforated disk 20 exhaling through the valve 15, the disk 20 of which vibrates between the nipple 18 and flange 19, permitting the exhalations to pass through the openings 17.

By the construction above described it will be apparent that the vapor is produced at a point remote from the point of inhalation. This is a decided advantage, as when the vapor is produced by spraying the liquid ethyl chlorid against the absorbent gauze or fabric in the inhaler the evaporation takes place on such gauze or fabric. When this has continued for some time, frost is formed on the gauze or fabric, with the result that the patient often contracts a severe cold or even pneumonia by the inhalation of the frosty vapors. Furthermore, under these conditions it is impracticable to perform a major operation with ethyl chlorid alone, as the accumulation of frost on the gauze soon closes the meshes thereof, preventing the vapors from passing therethrough to be inhaled by the patient. A further objection to this method of administering ethyl chlorid is that a large proportion of the vapor in the space between the cap and wire-gauze is carried away by the exhalations of the patient, making the administration thereof in this manner extremely wasteful. After the surface of the gauze once becomes sufficiently cool further vaporization of the liquid is prevented by the coolness of the surface. The liquid then accumulates on the gauze, and the exhalations warming the same evaporate it and drive it into the air. Another manner of administering ethyl chlorid is by spraying the liquid into a rubber bag, but without providing the inhaler with a valve for the escape of exhalations. This results in the reinhalation of vapor and air, causing vitiation of the air, and thereby producing a cyanosis and asphyxiation of the patient. By my apparatus herein described I am able to obviate the objections noted, and as the vaporization occurs at a point remote from the inhaler and is produced by the warmth of the hand I can hold a patient under the influence of the anesthetic for a sufficient length of time to perform a major operation. While it is adapted for a major operation, it is especially useful in conjunction with the administering of ether or chloroform as a sequence to ethyl chlorid. It is a well-known fact that the duration and severity of the illness resulting from the administration of ether or chloroform is proportional to the quantity of such anesthetics administered. In the great majority of operations by far the greater portion of the ether or chloroform is administered in order to anesthetize the patient, after which but a comparatively small quantity of the agent is necessary in order to keep the patient under the influence during the performance of the operation. My apparatus may be employed very successfully for anesthetizing the patient by the use of a small quantity of ethyl chlorid, after which the cap 14 may be removed and the ether or chloroform necessary for maintaining the patient under the influence thereof may be administered by dropping the same on the fabric 25, thereby greatly reducing the quantity over that ordinarily employed.

In Fig. 5 I have shown a modification of the device shown in Fig. 1, wherein a special mixer is dispensed with, and the mixing of the vapor and air takes place entirely within the space between the top of the cap and the fabric 25 and wire-gauze 23. In this figure the short tube 2′ is connected directly with the rubber tubing 12′, said tubing being connected with the tube 13, which, as in the prior modification, is swiveled to the top of the cap 14. The inhaler in Fig. 5 is identical in construction with that shown in Fig. 1. In operation as the patient inhales air is drawn through the perforation 27 to mingle with the vapor below the top of the cap. In exhalation the disk operates in the same manner as in the prior modification, being driven outwardly against the ledge 19 to permit the exhalations to escape through the openings 17. This form of the invention is especially adapted for minor operations, such as those performed by dentists.

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

1. An inhaler for the administration of anesthetics, said inhaler having a connection for supplying an anesthetic thereto and a valve, said valve comprising a casing having openings in the side walls thereof, a vibratory disk within said casing, said disk having a perforation therethrough, and means for supporting said disk on either side of the openings in said casing, substantially as specified.

2. An inhaler for the administration of anesthetics, said inhaler comprising a casing having a removable cap thereon, said cap having a connection for supplying an anesthetic to the interior of the inhaler and a valve, said valve consisting of a casing carried by said cap, said valve-casing having openings in the walls thereof and a retaining-flange at the upper end thereof at a point beyond the openings, and a perforated disk within said casing, substantially as specified.

3. An apparatus for administering anesthetics comprising in combination a vaporizing-receptacle, an inhaler, a duct extending between said receptacle and inhaler, a mixer in said duct having means for admitting air in definite and regulable proportions thereto, and a valve in said inhaler, said valve having means for admitting a limited amount of fluid to the inhaler and means for automatically permitting the escape of a large quantity of fluid therefrom, substantially as specified.

4. An apparatus for administering anesthetics comprising in combination a vaporizing-receptacle, an inhaler, and a duct extending between said receptacle and said inhaler, a mixer in said duct, said mixer having means for admitting a definite and regulable proportion of air thereto and for entirely cutting off the supply of air thereto, and a valve in the inhaler, said valve comprising a casing having discharge-openings in the side thereof and a vibrating disk in said casing, said disk being perforated, substantially as specified.

5. An inhaler for administering anesthetics, comprising a casing having an inlet for the anesthetics and a valve through which exhalations may escape, said valve being provided with means for admitting air to mingle with the anesthetic in the casing, substantially as specified.

6. An inhaler for administering anesthetics, comprising a casing having an inlet for anesthetics and a valve, said valve having a restricted inlet for the admission of air to be inhaled and a free outlet for the exhalations substantially as specified.

In testimony whereof I affix my signature in the presence of two witnesses.

THEOPHIL H. GEBAUER.

Witnesses:
J. B. HULL,
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