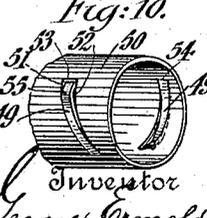
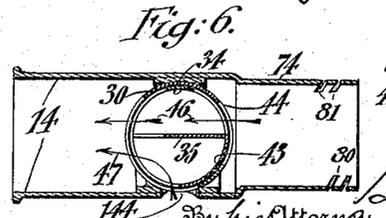
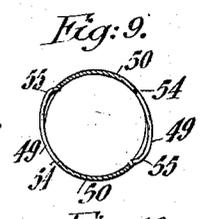
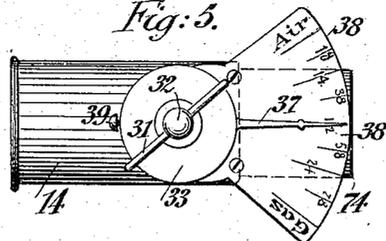
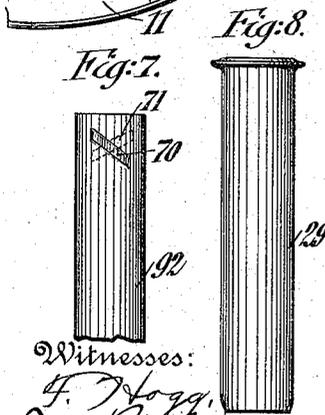
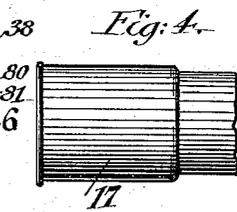
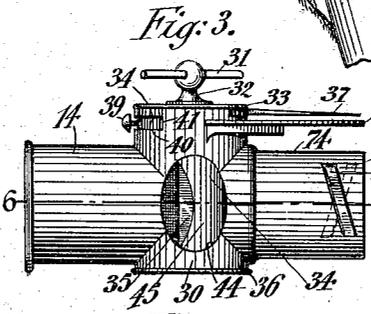
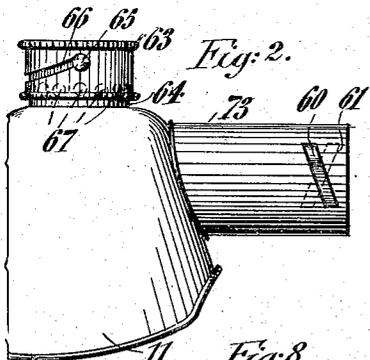
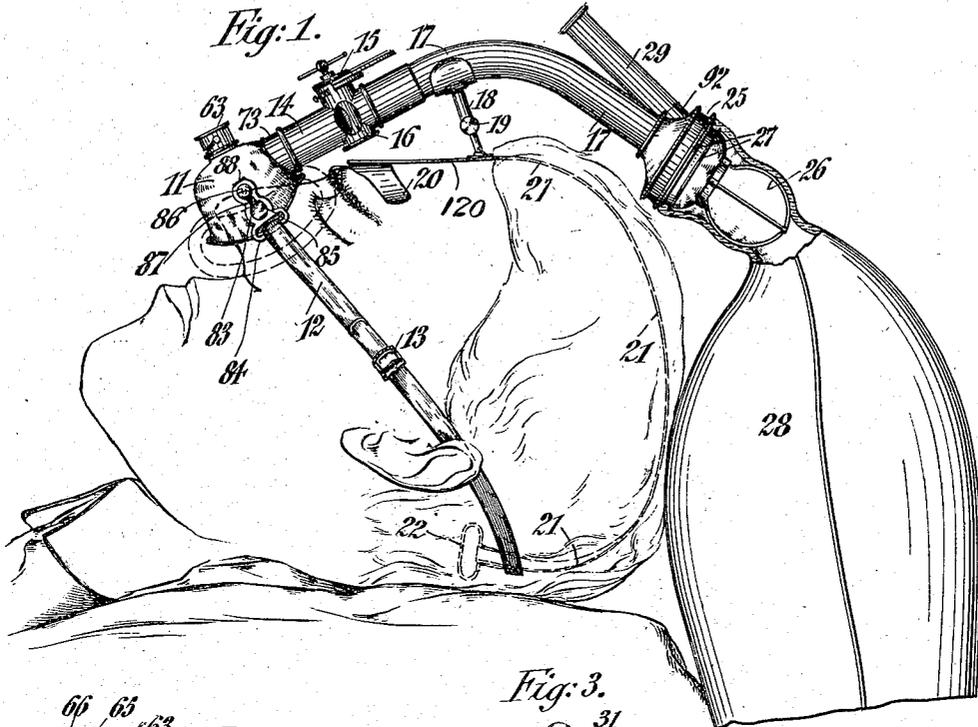


G. ERMOLD.
 INHALER.

APPLICATION FILED APR. 4, 1914.

1,176,886.

Patented Mar. 28, 1916.



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UNITED STATES PATENT OFFICE.

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INHALER.

1,176,886.

Specification of Letters Patent. Patented Mar. 28, 1916.

Application filed April 4, 1914. Serial No. 829,443.

To all whom it may concern:

Be it known that I, GEORGE ERMOLD, a citizen of the United States of America, and resident of New York, in the State of New York, have invented certain new and useful Improvements in Inhalers, of which the following is a specification.

This invention relates to inhalers for administering anesthetics, and the object of the invention is to provide an improvement in inhalers and to make such inhalers more efficient and simple and practical in use. Reference in this connection is made to my United States Letters Patent No. 892,717 of July 7, 1908, in which an improved form of inhaler is shown.

The invention of this application is clearly shown in the accompanying drawing and will be more fully described hereinafter and finally pointed out in the claim.

In the accompanying drawing, Figure 1 shows a side-view of my improved inhaler as applied to a patient, Fig. 2 is a partial side-view of the nose-cover, Fig. 3, a side-view of the regulating mechanism, Fig. 4, a side-view of the end of the tube connecting the regulating mechanism with the gas-bag, Fig. 5 is a top-view of the regulating mechanism shown in Fig. 3, Fig. 6 is a longitudinal section taken on line 6—6 of Fig. 3, Fig. 7 is a side-view of one of the tubes showing the connecting spring used in my improved inhaler, Fig. 8 is a side-view of the anesthetic holder, Fig. 9 is a section of the structure shown in Fig. 7, and Fig. 10 is a detail-view of the spring-clasp of Fig. 9, and which is also shown in Fig. 7.

Similar reference characters indicate corresponding parts throughout the different figures of the drawing.

Referring to the drawing, and more particularly to Fig. 1, the patient has applied a nose-cover 11, which is held in position by means of the band 12 which passes around the back of the head and is adjustable by means of the buckle 13. The nose-cover 11 is provided with an extension 73 to which is connected the regulating device 15. This regulating device 15 governs the flow of air and anesthetic, the latter being supplied through tube 17. The tube 17 is held in position by the support 18, attached to a forehead plate 120. This support is adjusted by the thumb-screw 19 to set the nose cover at different angles to fit different noses. The forehead plate 120 has a spring-clamp 20

which extends to either side of the forehead of the patient, and an extension 21 which extends above and around the head of the patient to the clamping portion 22, which is arranged at the back of the head of the patient and which is engaged by the band 12. The tube 17 communicates with the member 25 to which is secured, by a conical friction joint, an extending member 26 having flanges 27, receiving between them the reinforced mouth of a rubber bag 28. This rubber bag is in communication with a device 29 into which a capsule of the anesthetic is placed, and in which the capsule is pierced and broken. When the capsule is broken, the gas is formed, and in order to take care of the large quantities of the gas so formed, the bag 28 is provided. The gas passes from the bag through the tube 17 through the regulating-device and thereafter into the nose-cover 11. The amount of said gas and the amount of the air necessary to be mixed therewith is regulated by the regulating device 15.

The general operation as just described is well known; but one part of my invention consists in the arrangement of this regulating device, and another part of my invention consists in the arrangement of the connecting spring which binds the various parts together; and a further part of my invention resides in having different nose-covers, which may be readily connected with the tube 14 of the regulating device by means of the spring connection spoken of, and a further part of my invention consists in having the head piece 20, 21 and 22 which has just been referred to, and further parts of my invention will appear in the description now to follow.

In Figs. 3, 5 and 6 is clearly shown the improved mixing-valve, the important feature of which is the septum which operates to permit the gas to be mixed with the air and prevents the gas from passing out of the tube into the air, and at the same time also prevents too much air from entering into the device. The tube 14 has a sleeve 30 arranged at right angles thereto, and at the front of this sleeve a handle 31 is provided, which is secured to a shaft 32, which is secured to a disk 33 to which a sleeve 34 is secured. Sleeve 34 moves within the sleeve 30, and has a septum 35 extending diametrically across the sleeve 34. The inner sleeve 34 is provided with a disk 36, and the disks

33 and 36 serve to hold the inner sleeve 34 in suitable position. Secured to the sleeve 34 is an indicating-finger 37 which operates over a scale 38, which is provided with suitable markings, as "Air", "1/8", "1/4", "1/2", etc., and which markings are arranged to indicate the amount of air and the amount of gas in the proportions in which they are passing to the patient. The indicating scale is of segmental shape, as clearly shown in Fig. 5. To limit the movement of the finger 37, or rather, to limit the movement of the inner sleeve 34, the sleeve 34 is provided with a screw 39 which moves in a slot 40, and is limited in movement by the ends 41 of the slot. Thus it will be clearly seen that when the portion 43 of the inner sleeve 34 completely closes the opening 44 of the outer sleeve 30, which parts are clearly seen in Fig. 6, gas will pass from the tube 17 to the tube 14 and no air can enter, whereas when the portion 43 of the inner sleeve 34 only partially closes said opening 44 air will be permitted to pass into the tube 14 from outside of the tube through the opening 44 and mix with the gas. It will also be seen that when air is permitted to enter, the septum 35 will prevent the air from flowing in a backward direction into the tube 17, and at the same time the septum 35 will prevent the gas from passing outwardly into the atmospheric air. The flow of the gas from the tube 17 to the tube 14 is indicated by the two arrows 46, and the flow of the gas from the exterior of the tube 14 into the tube 14 is indicated by the arrow 47. Hence, by the operation of the inner sleeve 34, with its portion 43 and septum 35, the air and the gas may be properly mixed in the suitable proportions desired and depending upon the time of application of the anesthetic. As is well known, the period of anesthesia is commenced by permitting only air to pass into the tube 14 and into the nose-cover 11, and then very gradually and under complete control, the air is cut off and gas is permitted to take the place of the air, either entirely pure or in proper mixture with the air. This regulation is sufficiently carried out by my improved regulating means, as has been described and shown in Figs. 3, 5 and 6 of the drawing, and the mixture passing at any time is clearly indicated by the scale and the indicating-finger.

In order to assure the efficient interconnection of the various parts, and in order at the same time to permit the ready removal thereof, I have provided improved spring connections, which consist in having the parts provided with a stamped-out portion, which is then bent, as clearly shown, for instance, in Figs. 9 and 10. This stamped-out portion is provided by cutting the sleeve or tube 50, shown in Figs. 9 and 10, at three sides 51, 52 and 53, and then

bending out the so separated metal, which is indicated by 49, away from the portion 54, and then giving this strip 49 of metal a bend, as is indicated by 55. This bend is just sufficient to cause the metal to extend beyond the periphery of the sleeve 50, and serves to provide a suitable friction between the sleeve 50 and the member it engages. The form of this device is clearly shown in Fig. 2, in which the strips 60 and 61 are suitably bent; and a similar one is shown in Fig. 7, which is provided with strips 70 and 71. Such an improved connection is provided between the tube 14 and the extending tube 73 of the nose-cover 11, and a similar connection, indicated by 80 and 81, is provided between the tube 17 and the extension 74 of the regulating mechanism. The nose-cover 11 is provided with an air-valve, the cap 63 of which is connected to the outlet-tube 64 by a screw 65 seated in the tube and projecting through an inclined slot 66 in the cap. When the cap is turned, it is guided by the screw and slot so as to be raised or lowered, according to the direction of turning, and thereby the cap exposes or closes openings 67 in the tube 64, through which air may pass to the interior of the nose-cover. The slot is given considerable pitch, and thereby only a part of a rotation is required, and the air necessary for the patient is instantly supplied. For providing desired friction to hold the cap in position wherever it may be set, a spring similar to the spring 49 may be used.

It will be noted that the tape 12 is provided with a fastening member 83, which consists of a portion 84 engaged by the tape 12, and which is provided with a large opening 85, which readily enables the insertion of the button 86, and which opening 85 is provided with a constricted portion 87 terminating in an opening which is about the size of the stem of the button 86. The member 83 is provided with a laterally-projecting hand-piece 88 which is bent up at right angles to the plane of the member 83, and by the gripping of which this member 83 may be readily slid off from the button 86, so that the stem of the button 86 enters into the opening 85 and may be readily disengaged therefrom.

In Figs. 7 and 8 is shown the capsule-breaking attachment, which consists of the sleeve 29, and which engages the tube 92 by means of the connection 70 and 71. The capsules, containing the anesthetic in liquid form, are placed within the sleeve 29 and thereafter the sleeve 29 is pushed against the tube 92 and the capsule is broken and the liquid is changed into gaseous form, thus filling the bag 28. This capsule-breaking attachment is straight and parallel to the line of the bag and the gas may readily leave the tube 92 and enter the bag 28.

I have shown an embodiment of my invention, but changes may be made therein without departing from the spirit of the same as defined in the appended claim.

5 I claim:

10 An inhaler comprising a nose cover, a supply tube therefor, a head clamp having a plate adapted to rest on the forehead, and an adjustable support mounted on said plate for supporting said tube and permitting a

change of angle of the nose cover to suit different noses.

In testimony, that I claim the foregoing as my invention, I have signed my name in presence of two subscribing witnesses.

GEORGE ERMOLD.

Witnesses:

F. HOGG,

JOS. BISBANO.

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