

## A NEW INHALER FOR NITROUS OXID ANESTHESIA

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This inhaler for nitrous oxid or for nitrous oxid with oxygen or with ether vapor comprises a celluloid face piece with an inflatable rubber rim, an inspiratory valve, an expiratory valve, and a combined supply and rebreathing bag.

In the top of the face piece are two openings, in one of which is mounted the expiratory valve, closed by an outwardly opening disk of aluminum or mica controlled by a delicate and adjustable spring. The second opening com-

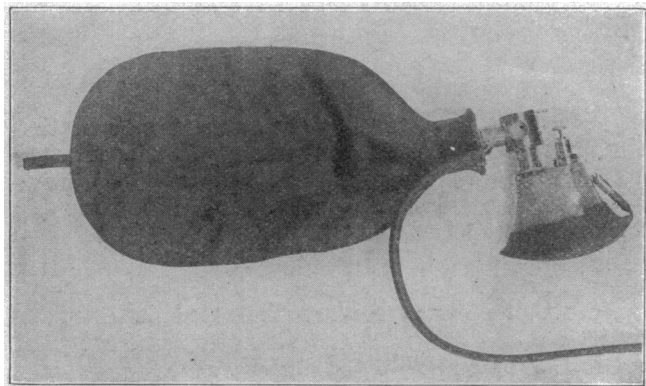


Fig. 1.—Inhaler assembled.

municates by a short tube with the base of a cup, open at the top and having two openings in the side, one for the admission of air and the other communicating by a short tube with the supply and rebreathing bag. A second cup is inverted and ground to fit closely into the outer cup. Diametrically opposite in the sides of the inner cup are two openings, one fitted with the inspiratory valve, closed by an inwardly opening disk of aluminum or mica. The inner cup revolves within the outer and is provided with a stop for three positions, in the first of which the patient breathes air through valves, the opening of the supply bag being closed; in the second, gas through valves, the air opening being closed; in the third position, gas to and fro, the inspiratory valve being idle.

The first position of the inspiratory valve, allowing air to be breathed through the valves, permits the adjustment of the inhaler to the face with the supply bag filled. The patient

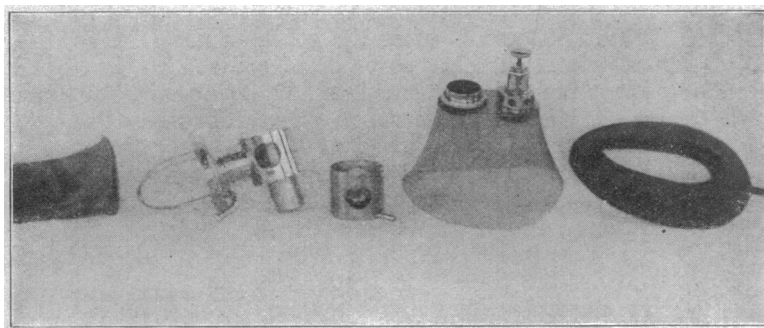


Fig. 2.—Parts of inhaler: From left to right, wide mouthed bag; outer cylinder with bag adjustment, wire mask and supply tube; inner cylinder with inspiratory valve; face piece with expiratory valve; rubber rim.

tests the apparatus by breathing air through valves before gas is turned into the face piece. This important point, brought out by Hewitt many years ago, is frequently overlooked at present.

The second position, allowing inspiration of gas from the supply bag and total expiration through the expiratory valve, results in a more rapid replacement of intrapulmonary air by gas than when rebreathing is indulged in from the first, and a correspondingly rapid induction of anesthesia and absence of excitement.

The third position, with the inspiratory valve idle, converts the supply bag into a rebreathing bag. With a constant flow of gas into the bag, the first part of each expiration, consisting largely of unused gas from the upper respiratory passages, passes into the bag until it is completely filled. The latter part, coming from the lower respiratory channels and pulmonary alveoli, passes out through the expiratory valve. The proportion of the expiration which is retained in the bag and rebreathed depends inversely on the rate of flow of fresh gas into the bag; the more rapid the flow of gas, the less space remains to be filled by the expiration and the greater proportion of the expiration escapes. The proportion of rebreathing may be estimated by noting the point in expiration at which the expiratory valve opens. The tension of the spring controlling this valve is just sufficient to keep the valve closed until the bag is filled.

To sterilize, the expiratory valve is unscrewed and removed. The cups containing the inspiratory valve are separated and detached from the face piece. The inspiratory valve cap is unscrewed and removed. The supply and rebreathing bag, which is wide mouthed and reversible, together with the rubber rim, is sterilized in boiling water. All metal parts are sterilized in boiling water. The celluloid face piece may be placed in boiling water momentarily. It would be destroyed by prolonged boiling.

This inhaler is light, simple, efficient, and readily sterilized.  
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## METHOD FOR STAINING THE DIPHThERIA BACILLUS

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The examination of a large number of smears taken from throat cultures for the diphtheria bacillus, led me to devise a method of staining that has given me excellent results. It is as follows:

## STAIN 1

Gentian violet (saturated alcoholic solution) ..... 10 c.c.  
Acetic acid solution, 4% per cent. (distilled water being used) . 90 c.c.

## STAIN 2

Bismarck brown ..... 0.480 mg.  
Distilled water ..... 125 c.c.

The water should be heated to boiling, then the Bismarck brown should be added, and the mixture boiled for one or two minutes and filtered cool.

The smear should be spread thin and even on the slide, dried in the air and then passed several times through the flame of an alcohol lamp or a Bunsen burner to fix.

The specimen should be stained for thirty seconds with Stain 1, the excess stain washed off with water, and without the specimen's being dried Stain 2 should be added for ten or fifteen seconds, and the specimen washed in running water, dried and examined with oil immersion.

The bacillus, when present, stains as follows: The body of the bacillus becomes a delicate shade of purple or brown, and the clubbed ends and polar bodies, dark purple or black.

Staphylococci, streptococci and pneumococci, when presented, should be stained brown, or brown with a tint of purple.

This method of staining has given me an average of 5 per cent. more positive cultures than any of the other standard methods.

An average of two minutes is the time required to stain the specimen and to examine and make the diagnosis.

**Regimental Officers.**—The regimental medical officer is a person of protean pursuits. His interests reach from the cleanliness of the cook's hands to the care of the wounded under fire.—McCombe and Menzies.