GADGETS

A Modified Nonrebreathing System

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Difficulty is frequently encountered in arranging a satisfactory and safe nonrebreathing anesthesia system in cases where access to the patient's face by the anesthetist is restricted, *e.g.*, in head and neck operations. With very little modification, the conventional circle absorber system can be used to provide a safe nonrebreathing system as well as circle absorption (fig. 1).

The inhalation valve (I) should be placed on the side of the machine nearest the anesthetist so that the corrugated inhalation tube (T) of the absorber can easily be reached and used as an extension of the reservoir bag in the nonrebreathing system. The gas inlet should communicate directly with the bag which is separated from the carbon dioxide absorber by the inhalation valve (I) and is in direct communication with the corrugated inhalation tube (T). When a circle system is required, the free end of the inhalation tube (T) is connected as before with a standard Y-piece (fig. 1). The anesthesia machine functions as efficiently as before and in a similar manner. To set up a nonrebreathing system, a nonrebreathing valve is simply connected to the patient's end of the inhalation tube, which will function as an extension of the reservoir bag. Thus it is not necessary for the anesthetist to be close to the nonrebreathing valve. A removable automatic expiratory valve, such as the valve L-V, can be inserted in the tail of the reservoir bag. There will be intermittent automatic closure of the valve when the bag is compressed and it will prevent excess

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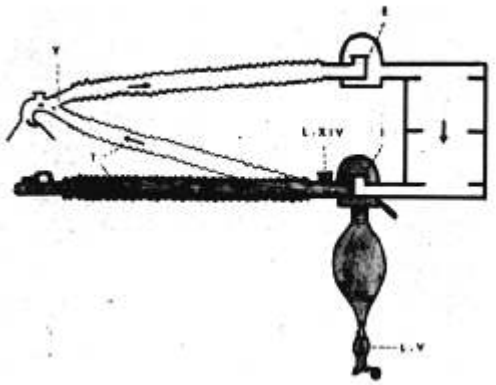

FIG. 1. A circle system with carbon dioxide absorber. It provides the regular circle system with carbon dioxide absorption as well as a far reaching extension of nonrebreathing system. E = Exhalation valve, I = Inhalation valve, T = Corrugated tube, Y = Y-piece, L-V = Valve L-V, L-XIV = Valve L-XIV.

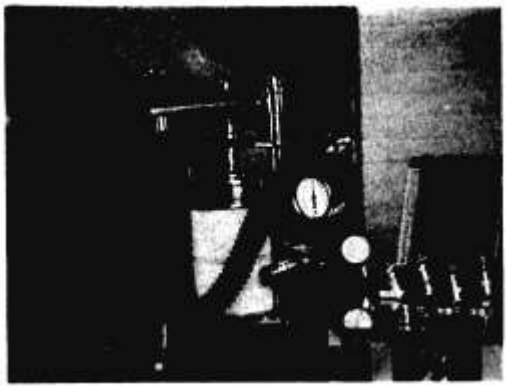

FIG. 2. A simple and convenient nonrebreathing system using Foregger Jumbo Absorber. On the end of the corrugated inhalation tube is a nonrebreathing valve (Frumin valve). The T-piece with the reservoir bag is set between the inhalation tube and the inhalation valve. In the tail of the reservoir bag is placed an automatic expiratory valve (L-V) which provides a pressure safety relief and, during bag compression, automatic closure.

bag pressures at other times. When a nonrebreathing valve with an automatic expiratory valve closure mechanism (such as the Fink, Frumin, Lewis-Leigh, Ruben valves) is used, there is always a danger of undesired expiratory obstruction or possibly of a complete sealing of the system if the pressure in the bag builds up. By using a valve such as valve L-V, the pressure in the bag can be kept low and this danger avoided. A special pop-off valve can also be used for the same purpose. It must be placed between the patient and the inhalation valve (I) as indicated on the diagram (fig. 1) in order to serve the nonrebreathing as well as the circle system. As an extra safety factor, this arrangement provides an inhalation vent in case of increased gas flow or an empty reservoir bag. The patient can inhale air through the open end of the absorber and not inspire against the closed system as would occur with the conventional nonrebreathing system.

On the jumbo absorber of the Foregger machine, the T-piece can be simply removed and placed between the inhalation dome valve and the corrugated inhalation tube, which are on the side of the absorber nearest to the anesthetist (fig. 2). An automatic expiratory valve (L-V) can be inserted into the tail of the reservoir bag to ensure efficient ventilation. As an inspiratory safety vent, air can be sucked in through the open end of the expiratory tube or the expiratory dome valve.

Aerosolization of Drugs During Inhalation Anesthesia

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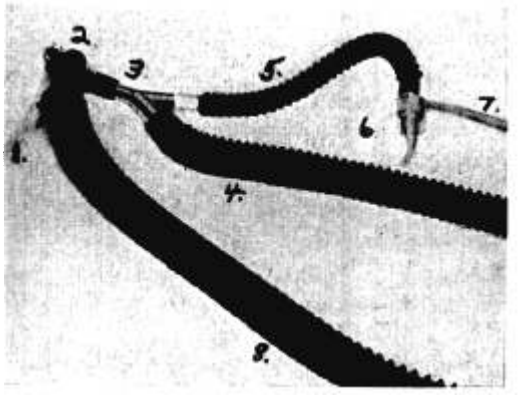
It is frequently advisable to administer an inhalation anesthetic to a patient who has some pulmonary disorder complicating the surgical lesion. At such times I have found this simple adaptation of readily available equipment very effective for the application of inhalation therapy during the course of surgery and anesthesia.

In the accompanying picture: (*1*) is an endotracheal tube in the patient; (*2*) is a swivel Y-inhaler valve or any other chimney Y; (*3*) is a Y-connector; (*4*) is the inspiratory tube from the anesthesia machine connected to one of the Y-connector limbs; (*5*) is a 12 inch length of corrugated conductive tubing; (*6*) is a Bennett twin or a Vaponephrin nebulizer which is taped to the head of the operating table to maintain it in an upright position; (*7*) is the tubing from a "G" size oxygen tank or from a metered source of compressed air; a flow rate of 2 liters of oxygen or air per minute is utilized; (*8*) is the expiratory tube to the anesthesia machine. During the period of nebulization of medications the flow of anesthetic gases to the patient is adjusted to take into account the 2 liters of oxygen or air added to the circuit.

I have aerosolized pancreatic dornase (Dornovac), isoproterenol hydrochloride 1:200 solution (Isuprel), sodium 2-ethylhexylsulfate with potassium iodide (Tergemist), and penicillin singly and in combinations that seemed indicated by the nature of the disorder present.



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