

as measured by microphotography, and found it to be adequate for large adult patients. The pressures developed within a standard "test lung" with a Broyles 7 × 40 bronchoscope fitted with ventilating adapters having jet orifices of 0.035", 0.065", and 0.087" were 9–10, 18–20 and 30–40 cm H₂O, respectively, when oxygen at 50 psi was introduced. The smaller orifices were satisfactory for ventilating the lungs of children and smaller adults.

Instead of building ventilating adapters with orifices of various sizes and a fixed pressure of 50 psi, we elected to standardize on the larger 0.087" orifice and vary the pressure. Due to the almost complete eclipse of rigid-wall bronchoscopy by the fiberoptic procedure, the new adapter has been used in only five adult patients. Ventilation was satisfactory and proceeded without incident. We have not had occasion to use the pediatric bronchoscopy unit since the miniature regulator was introduced into the system. Regulator performance is based entirely on results obtained with the "test lung." Individual pediatric pressure requirements for optimum lung inflation, as determined clinically by the anesthesiologist, can be met simply by regulator adjustment.

Variations in pressure are accomplished by the introduction of a Norgren miniature regulator, especially cleaned internally for use with oxygen, into the system slightly upstream from the toggle valve. The trigger valve is connected to the miniature regulator by chrome-plated hexagonal brass tubing 1.5 cm in diameter and 11 cm long. The connector serves as a nicely balanced handle, permitting satisfactory valve operation with one hand and good visibility of the regulator dial. The regulator can be set and locked in place for any given pressure between 0 and 50 psi. Children, unlike adults, are not suitable subjects for ventilation during fiberoptic

bronchoscopy, due to insufficient space between the bronchoscope and the wall of the endotracheal tube. A rigid-wall bronchoscope fitted with a ventilating injector adapter provides a satisfactory means of performing bronchoscopy in children. When ventilating adapters with a 0.087" jet orifice are fitted to pediatric bronchoscopes the regulator pressure should be set at 15 psi. Due to the smaller bore and shorter length of pediatric bronchoscopes, the decrease in oxygen pressure to 15 psi will entrain ambient air and inflate a "test lung" to a pressure of approximately 20 cm H₂O.

In summary, an improved modification of the Sanders method for the ventilation of anesthetized children and adults during rigid-wall bronchoscopy has been described. The combination of a fixed-orifice ventilating adapter with a miniature pressure regulator introduces complete ventilatory flexibility. All components are presented as parts of a dependable system.*

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Anesthesia Gadgets

To the Editor:—I have devised two gadgets that I have found useful in patient care and would like to call to the attention of other anesthetists. The first is a device to hold the chin up. It is made from a strip of aluminum about an inch wide and 8 to 10 inches long, which is padded on one side with sponge rubber and the ends rounded. These materials are commonly used for splinting fingers or toes and are

available in most emergency room or orthopedic services. The strip is bent to conform to the contour of the patient's chin and is held in place by the head-strap that supports the face mask (fig. 1). This allows for firm support of the patient's chin and a tight fit of the face mask, thereby freeing the hands of the anesthetist for other important tasks.

My second gadget is one to help intubate the trachea



FIG. 1.

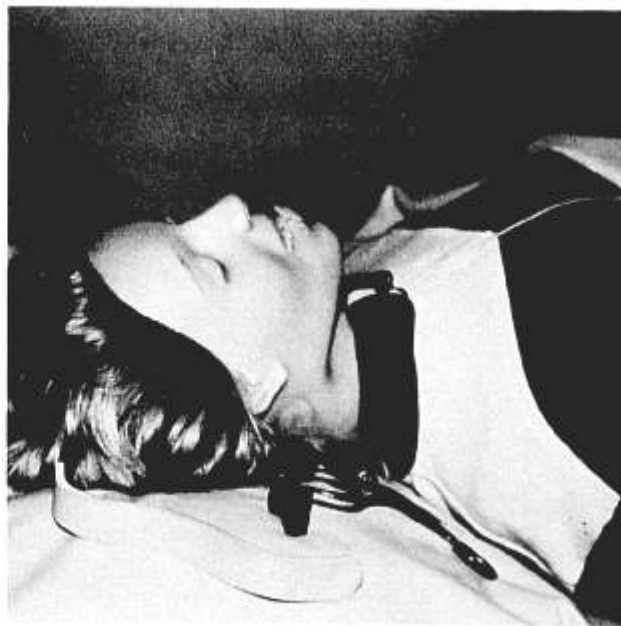


FIG. 2.

of a difficult patient and prevent damage to the upper teeth. This instrument is commonly used by dentists to hold the mouth open; it consists of two prongs, which are rubber-shod and provided with a ratchet that locks it in any position (fig. 2). It can be inserted in the left side of the mouth and locked in the open position. The laryngoscope blade can then be inserted into the right side of the mouth as usual without any force being necessary to pry open the mouth, and without using leverage on the upper teeth (fig. 3). The rest of the intubating techniques follows the usual pattern.

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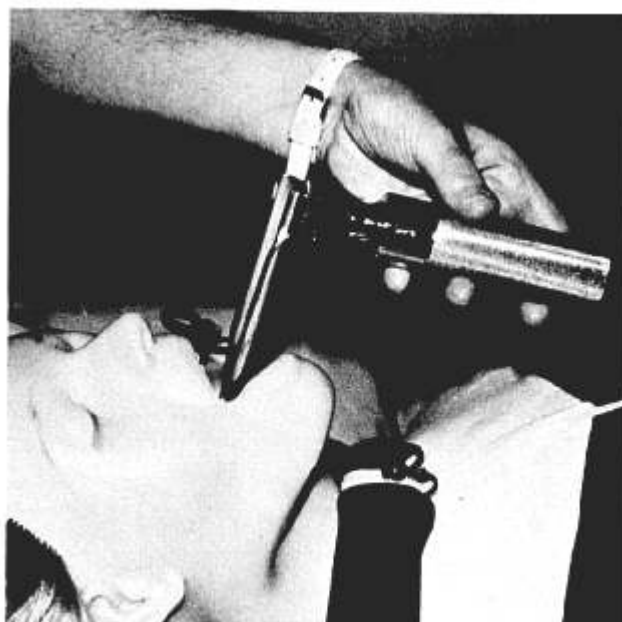


FIG. 3.

Use of a Pop-off Valve during IMV and PEEP

To the Editor:—We read with great interest the report of Perel *et al.*¹ about the hazard of using high flows in a spontaneous breathing circuit during IMV

with PEEP. Besides the variations in tidal volume, use of high fresh-gas flows also causes an inaccuracy in the spirometer readings due to permanent opening