CURRENT COMMENT

STUART C. CULLEN, *Editor*

GADGETS

Valve for Assisted or Controlled Ventilation

Dr. Bernard Horn of Oklahoma City, Oklahoma, designed a valve to facilitate the administration of controlled and assisted ventilation during anesthesia in which the semiclosed circle absorber system is used. Usually there are three ways in which this is accomplished: (1) A pop-off valve is used to keep the rebreathing bag from being overdistended. (2) The tail of the rebreathing bag is partially clamped for the same reason. (3) The tail of the bag is left open, but is occluded with two fingers or the other hand when the bag is squeezed.

In the first two methods, one is never sure how much the patient's lungs are ventilated and how much gas is blown off into the room air. A second disadvantage is that the bag may still be slightly overdistended and continuous positive pressure may be transmitted to the patient's lungs. A third disadvantage is the necessity for frequent readjustments of the clamp on the tail or the pop-off valve. The third method is cumbersome and difficult for most anesthesiologists.

This valve is designed to eliminate the above difficulties. It fits into the tail of the rebreathing bag and functions simply and effectively by closing when the bag is squeezed and opening when the bag is released. The advantages are: (1) The pressure within the rebreathing bag

Valve for assisted or controlled ventilation.

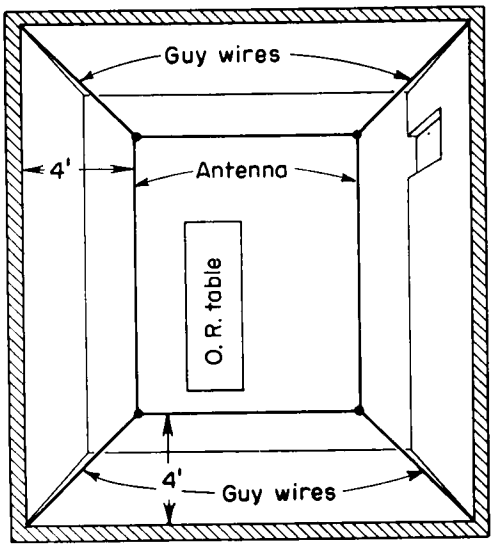
is always that of the ambient atmosphere unless the bag is squeezed by the anesthesiologist. (2) The bag cannot become overdistended under ordinary circumstances, even if the anesthesiologist has to let go of it for a period of time. (If the valve should become closed, *e.g.*, when the patient coughs, the valve may be easily opened by pushing the release rod at the outlet.) (3) All the gases which the anesthesiologist can move with his hand go into the patients' lungs; none into the room air. This is of special value to anesthesiologists with small hands.

The housing is made of plastic and the valve, of silicone. It can be washed easily with a hexachlorophene detergent or soaked in Zephiran. It is easily assembled or disassembled. The original model was made by Mr. Morris Weiss, engineer. Dr. Joseph White and Dr. Lucien Morris also contributed ideas in designing this valve.

Component part of valve.

Electrostatic Indicator

Dr. Wray Enders of Kansas City, Kansas, notes that although methods to prevent the development of electrostatic charges have greatly reduced the chances of an operating room explosion, human error or a coincidence of physical events could cause a static charge

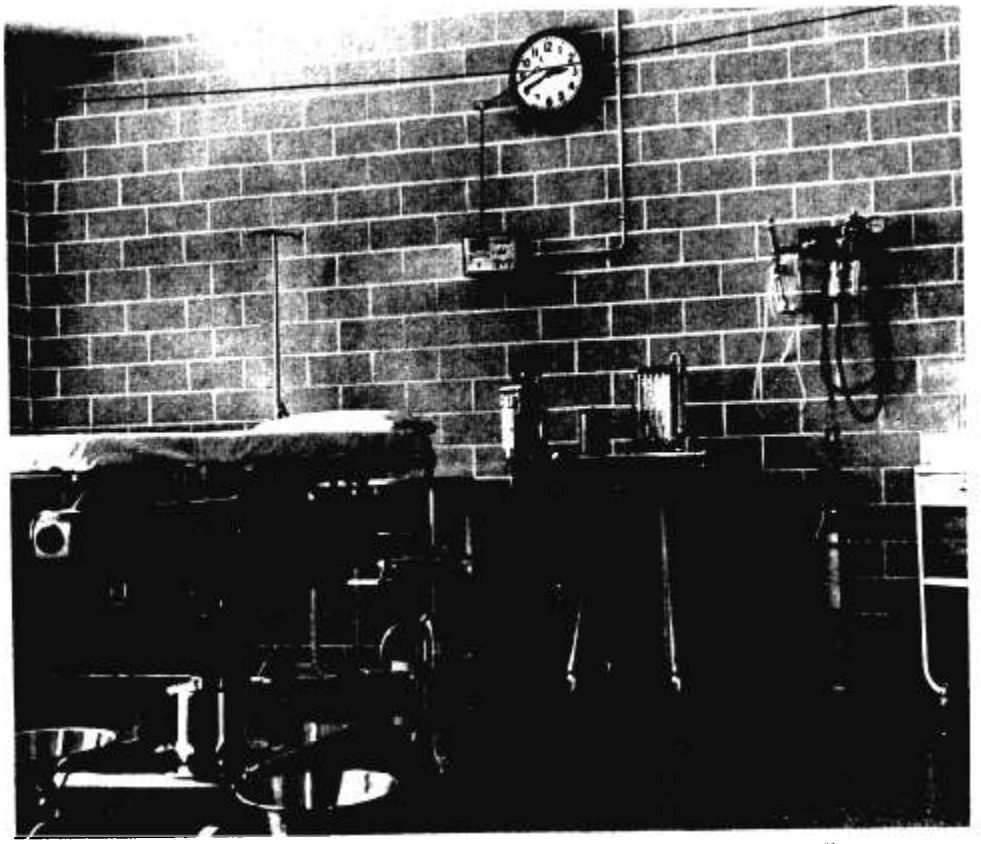


Schematic drawing illustrates suspension of antenna above surgery area in operating room. The antenna is set approximately 4 feet from the operating room walls and held in place by four guy wires from the corners. A wire leads from the antenna to the Staticator on one of the walls.

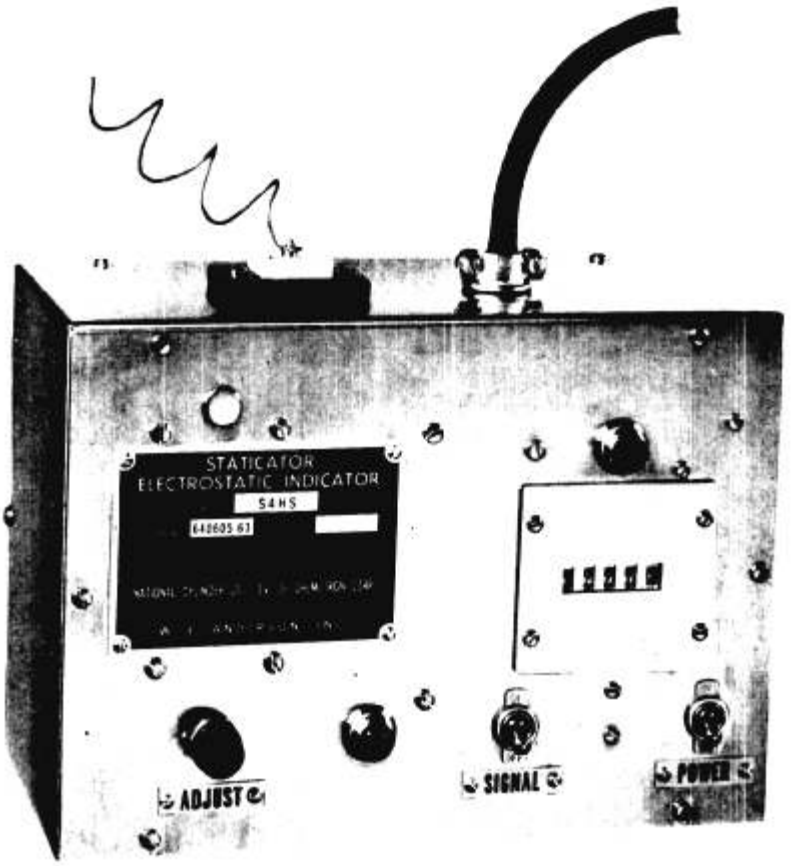
above the safety threshold. Unfortunately, there is no way to prevent the development of static electricity in the operating room because of the constant activity with resultant frictional contact.

The approach used at St. Margaret's Hospital to attain maximum safety recognizes the possibility of unexpected phenomena. In addition to precautions designed to ground existing electrostatic charges, an annunciator is employed to warn the anesthesiologist at the time a charge is created. Through the use of this instrument, an operating room worker responsible for the development of static charges can be kept away from the danger zone close to the patient, or ordered to leave the room.

The function of the annunciator is two-fold: (1) It announces the presence of static electricity, and (2) delineates the cause of the charge, which can subsequently be investigated, isolated, and removed. Subsequent training can be instituted to eliminate this specific cause. It also allows the anesthesiologist to



Staticator is mounted on the center of one of the operating room walls, and the antenna is suspended around surgery area.



Knob at lower left is used to balance the output of the amplifier with the antenna signals. The counter (right) can be used to analyze the number of electrostatic charges under various conditions. Warning light is located above the counter.

dramatically demonstrate safe procedure to operating room personnel.

The annunciator used at St. Margaret's Hospital is called the Staticator. The rooms in which this instrument is being used range from approximately 20 × 20 feet to a size slightly smaller. In each room, the antenna is placed about 4 feet from each wall and is suspended approximately 7 feet from the floor to clear equipment and personnel. The instrument is mounted over 5 feet from the floor on one wall. Staticator and antenna were fastened to the walls with expanding anchors; installation required about two hours. (In new hospitals, the Staticator could be mounted flush with the wall in a space especially designed for it.) A static charge above a predetermined level generated anywhere in the operating room is picked up by the antenna and amplified by the instrument to produce a buzzing sound together with a flashing light. Adjustments of the threshold to responses can be made, if necessary.

The annunciator is the responsibility of the anesthesiologist. Before administration of a flammable anesthetic such as cyclopropane or ether, he switches the unit on. The operating room supervisor keeps a close check on annunciator warnings during surgery. Use of the annunciator has been extremely valuable in implementing the safety training program because the offender is immediately marked. Resulting embarrassment is often enough to convert the worker to the ranks of the safety-conscious.

Arrangement of Accessory Equipment

Dr. E. Trier Mörch of Chicago notes that in recent years more and more mechanical and electronic equipment is being used during anesthesia. This equipment takes up floorspace which is scarce in most operating rooms.

At the University of Chicago, the Cook County Hospital and the Research and Educational Hospital of the University of Illinois, the departments of anesthesia are trying to save space, time and labor by incorporating several different components into one unit, as shown in the illustrations. Figure 1 shows how the respirator can be placed inside the cabinet of the anesthetic machine. Floor space is saved and the respirator is always ready for use. By means of a valve located above the conventional breathing bag, the anesthetist can switch from this bag to the respirator or vice versa in a split second. When the respirator is not needed, the anesthetic machine is used in the conventional way. When the respirator is needed, no time is lost in locating, connecting and checking the respirator. Figure 2 illustrates a practical location of electronic equipment such as the electrocardiograph and electroencephalograph. The equipment is placed permanently on a platform, at least 5 feet above the floor, mounted on the anesthetic machine. All the electric connections between the component parts are left in functional order at all times. When the equipment is needed, the only manipulations necessary are connection of two cables, one to the wall outlet and one to the patient. The cables can be mounted in self-winding reels. The vertical supporting rods can be utilized as stands for bottles for fluid therapy.

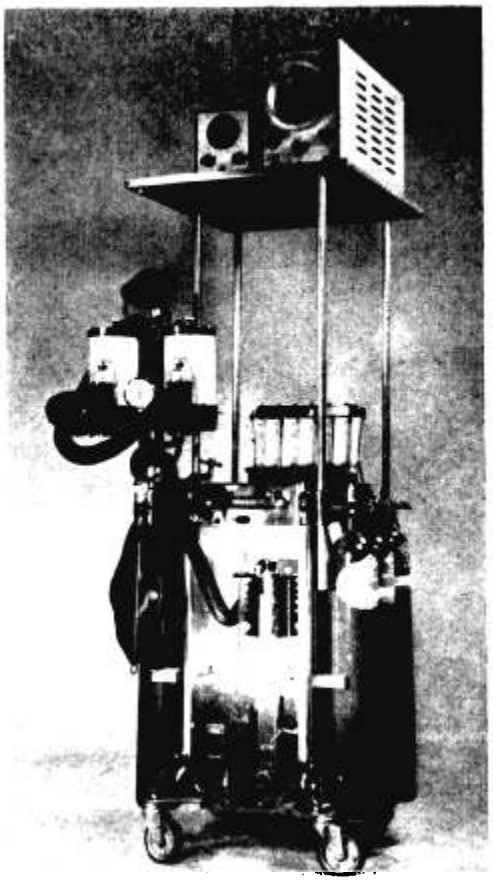


FIG. 2. Electrocardiograph and electroencephalograph mounted on the anesthetic machine.

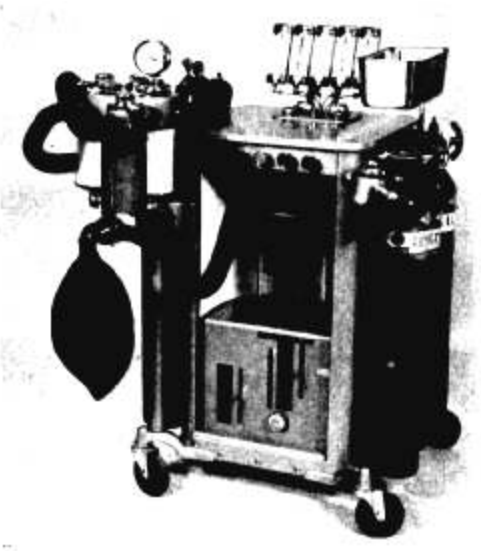
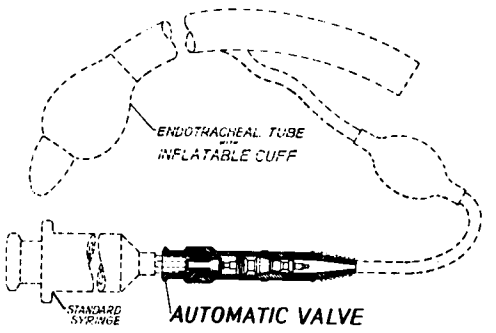


FIG. 1. Respirator placed inside the cabinet of anesthetic machine to save space.

Automatic Valve

Dr. Abe O. Shapiro and the anesthesiology staff of Temple Hospital, Los Angeles, have used an automatic valve advantageously to inflate the cuff on endotracheal tubes. This valve eliminates the use of the "bulldog" clamp, hemostat, strong ties or other similar instruments which tend to crush or damage the soft rubber or plastic tubing.

This valve is light in weight, easily adapted to all caliber tubing, and is simple to use. To inflate the cuff, the plain or Luer-type tip of any standard syringe loaded with air is inserted, and then withdrawn as soon as the cuff is properly inflated. A similar procedure with the tip of an empty syringe will deflate the cuff and even maintain a vacuum.



The names and addresses of manufacturers of the equipment described in this section can be obtained from ANESTHESIOLOGY, 3 Penn Center Plaza, Philadelphia 2, Pennsylvania.

CORRESPONDENCE

Metabolic Acidosis

To the Editor.—I have reread the article of Papadopoulos and Keats [ANESTHESIOLOGY 20: 156, 1959] and checked the plot of the authors' data and find my graph to be correct, unless the tabulated data are in error.

I must apologize to the authors that very few of us in Canada play cricket. Our national sport is hockey—and this game is considerably rougher than cricket. I am sorry also that I didn't realize that they were studying the effect of intravenous glucose on the lactic acid level in the blood. (This effect was reported by Dr. Campbell [Toronto] about 30 years ago.) The title of their study stated explicitly: The Metabolic Acidosis of Hyperventilation Produced by Controlled Respiration. If any mild metabolic acidosis was due to the rise in lactic acid (caused by intravenous glucose) the paper could have been clearer if this fact was mentioned in their discussion and summary.

In framing my remarks I took into account the details of their study, and in answering further to their reply I cannot do better than to quote Doctor Richard Asher [Talking Sense, Lancet 2: 417, 1959] who recently said, "If the technique of reducing ideas to a simple form, and placing them in logical order, were carried out extensively, only a few of our clinical ideas would come through unscathed."

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Tuohy Needle

To the Editor: I wish to refer to the article by Drs. Ralph Fritz and Robert Loehning, "Modified Tuohy Needle," which appeared on p. 712 of the September–October 1959 issue of ANESTHESIOLOGY.

I made the first needle for the late Dr. Tuohy, and I am proud of it. About fifteen years ago I received a complaint from Dr. John Lundy regarding the sharp inside edge of the bevel, and new strict instructions were issued about blunting the sharp edge. Since then I can recall only one more complaint.

At the present time, the entire stock of Tuohy needles, 16 and 17 gauge, has been