nel so that the sensor can be briefly exposed to room air for daily calibration purposes without leaving a hole in the breathing system. The mechanism should be spring loaded in the "sensor in circuit" position, so that the sensor cannot be left out of the system inadvertently. 6) The analyzer should be incorporated into the gas machine but should be readily detachable for servicing or repairs.

It is evident that the production of such an O_2 analyzer will require the cooperation of designers from both the analyzer and the gas machine manufacturers, but it is anticipated that the successful designs will be widely specified by hospital authorities and anesthesiologists anxious to minimize the chance of further hypoxic anesthesia accidents.

Comments and suggestions on this proposal would be welcome.

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The Cluttered Anesthesia Machine—A Cause for Hypoxia

To the Editor:—The accidental intraoperative delivery of hypoxic inspired gas mixtures may occur because of human error or anesthesia machine malfunction.[1] Hypoxic inspired mixtures have resulted from cracked[2] or transposed[3] flowmeter tubes, improperly calibrated flowmeters,[4] and sticky rotameter floats.[5] Fail-safe

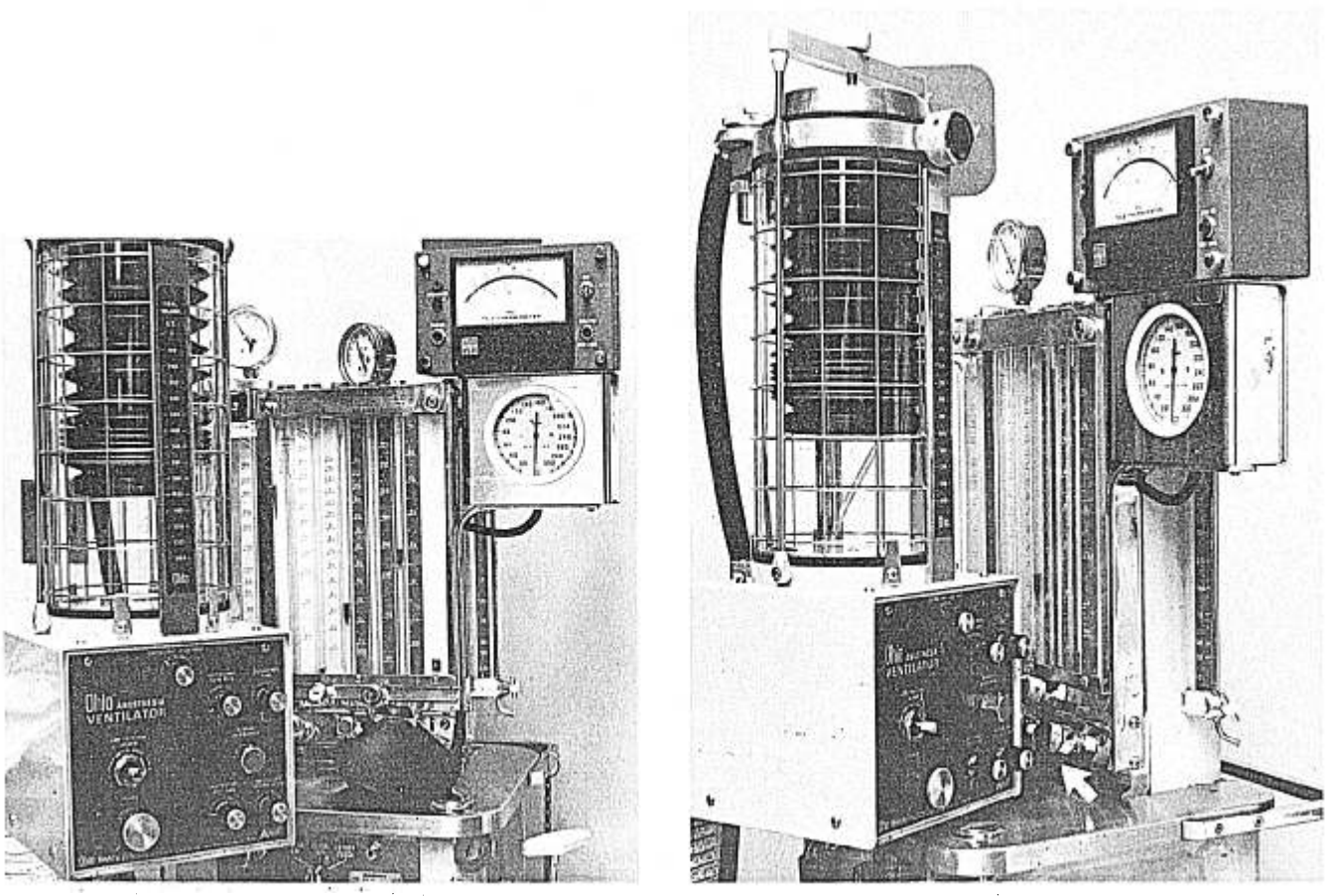

FIG. 1. Moving a side-mounted ventilator toward the anesthesia machine can easily slide a facemask (fig. 1*A*, *left*) along the tabletop toward a concealed wedge position under the oxygen flow control knob (fig. 1*B*, *right*). Contact between the sloping nasal end of the rubber facemask and the corrugated flow knob surface can easily rotate the knob clockwise producing hypoxic mixtures. The oxygen flow control knob has distinctive touch identification projections.[7]

equipment design has now eliminated many of these hazards.[1] Pin-indexed oxygen flowmeters mounted on the right of the gas console nearest the outlet manifold are now standard features on many anesthesia machines.[1,2,6] Some machines even have distinct projections on the oxygen flow-control knob to permit rapid touch identification.[7] Human errors resulting in hypoxic inspired mixtures continue to occur, however, despite recent design and safety improvements.[8]

We report a combination of frequently occurring events that can cause inadvertent and insidious delivery of hypoxic inspired mixtures. The technical setting necessary for this potentially lethal situation includes any movable side-mounted anesthesia ventilator adjacent to an anesthesia machine tabletop and any antistatic rubber facemask (fig. 1*A*). Movement of the ventilator toward the anesthesia machine can easily slide the facemask along the tabletop toward a concealed wedge position under a flow control knob (fig. 1*B*). Contact between the sloping nasal end of the rubber facemask and the corrugated flow-control knob can easily rotate the knob clockwise reducing or terminating gas flow producing hypoxic or anoxic mixtures. Hyperoxic mixtures detrimental to newborns can occur if the nitrous oxide or other diluent (air, helium) flow control knob is rotated clockwise.[9] Unsatisfactory anesthesia may result if a Verni-Trol® or copper kettle flow control knob is rotated clockwise. The strong friction interface produced by opposing a rubber surface on a hard corrugated surface can rotate knobs in either direction with little work expended. By convention, clockwise knob rotation will reduce gas flow and counterclockwise rotation will increase gas flow on American-made anesthesia machines.[1]

Prevention of this often concealed hazard is simple and may include: 1) maintenance of an uncluttered tabletop with facemasks placed in drawers or on separate carts; 2) a ventilator mounting permitting unobscured view of the control panel; and most importantly, 3) continuous, visual surveillance of ventilator settings, flowmeters, gas flows, and inspired oxygen concentration.

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Nothing New Under the Sun—A Japanese Pioneer in the Clinical Use of Intrathecal Morphine

To the Editor:—Since the discovery of opioid receptors in the nervous system by Pert and Synder in 1973,[1] intrathecal or epidural administration of narcotics and their analogs has been widely utilized for the purpose of relieving intractable pain, postoperative pain, and pain during parturition. Morphine appears to be the best drug for this purpose, and Yaksh and Rudy[2] are considered to be the first to report the intrathecal administration of morphine in 1976.

But the true history of intrathecal morphine dates back to 1901, 75 years before Yaksh's report. Dr. Otojiro Kitagawa, a Japanese surgeon, presented a paper on the intrathecal injection of local anesthetics at the third annual meeting of the Japan Society of Surgery, held in Tokyo in April 1901. His report describes four cases of intrathecal administration of the local anesthetic "eucaine" for relieving severe pain due to vertebral inflammation which was not improved by intramuscular morphine. To two of these patients Dr. Kitagawa also gave 10 mg of morphine hydrochloride intrathecally in combination with 20 mg of eucaine. One patient was a 33-year-old man who was relieved of severe pain for