AN IMPROVISED "Q" CIRCUIT FOR THE BIRD VENTILATOR

BY

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The breathing circuit supplied with the Bird ventilator is satisfactory for use by the patient for nebulization therapy. The nebulizer and the expiratory valve, although near the patient, are not much of a problem because the patient can hold this assembly in his hands during use. However, if this ventilator is to be used to assist the patient's ventilation for long periods, this arrangement is cumbersome and inconvenient. Moreover, the position of the nebulizer changes with the movement of the patient, so that nebulization may become inadequate.

In order to overcome these difficulties, the Q circuit has been designed. In this arrangement, the nebulizer and the expiratory valve are situated away from the patient.

When such a circuit is not immediately available an acceptable alternative can be improvised at little expense from commonly available items of equipment.

In the original arrangement, the metal tube B from the ventilator is connected to the expiratory valve through the nebulizer (fig. 1). The patient

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FIG. 1
Diagrammatic representation of original nebulization circuit. A, nebulizer. B, tube from ventilator. +, −, positive and negative pressure lines from ventilator. The patient is connected at the point marked "Patient". The following changes were made in the original nebulization circuit:
(a) The expiratory valve was disconnected at A (fig. 1) so that the nebulizer was left attached at the free end of the metal tube B (fig. 2).
(b) To the open end of the nebulizer at C (fig. 2) a length of polyethylene tubing was attached which ended in a Y connection. This was the inspiratory side of the circuit.

FIG. 2
The improvised Q circuit for the Bird ventilator

(c) One free end of the Y was connected to the patient while the other was connected to the expiratory valve at E by a length of polyethylene tubing. This formed the expiratory side.

(d) A thin-bore polyethylene tubing at F (fig. 2) was cemented to a side hole in the inspiratory as well as the expiratory tube. These tubes were normally kept closed with the regulators from the transfusion set (fig. 3), and can be opened periodically to remove the condensed water in these tubes. This completed the improvised Q circuit.

The circuit is unidirectional. The gases from the ventilator flow along the metal tube B, through the nebulizer to the patient during inspiration. During expiration the gases pass from the patient through the expiratory valve to the atmosphere. There is no back-flow into the inspiratory tube during expiration, as checked by incorporating a Wright respirometer in the inspiratory limb.

In this arrangement, as in the Q circuit, the nebulizer and the expiratory valve are kept away from the patient. In practice this works efficiently as judged by the results of blood-gas examinations.

The expiratory valve and the metal tube B, along with the nebulizer, can be attached to the railing of the bed or the cylinder stand by means of clips such as are used for holding a bicycle pump (fig. 3).

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