

# The Manley Ventilator: Slipped Toggle Switch (Click Mechanism)

by Robert P. C. Liew

M.B., B.S., F.F.A., R.C.S.I., F.F.A., R.C.S. (Eng.)  
Department of Anaesthesiology,  
Faculty of Medicine,  
University of Malaya,  
Kuala Lumpur, Malaysia.

THE AUTOMATIC Manley Ventilator (Manley, 1961) is a constant pressure generator. It is portable and is powered by compressed gas such as from the anaesthetic machine and used mainly for intermittent positive pressure ventilation on a non-rebreathing circuit during anaesthesia.

The ventilator is easy to use with simple controls and visible bellow distension. This bellow carries an arm with a moveable tidal-volume limiting bar. As seen on the outside, the ventilator is cycled on a toggle system or click mechanism.

The expiratory phase is operated by a click mechanism as follows: when the outside concertina bag expands, it lifts the top-plate with its moveable weight and its arm until the adjustable stop (limiting tidal volume) strikes the lever arm of the click. This reverses the click mechanism and the inspiratory stroke follows.

The ventilator fails to cycle when the toggle switch slips from the tidal volume bar-stop of the arm of the bellows. The bellow therefore continues to fill with compressed gases and stops only when fully distended with the top-plate almost at the vertical position (Figure 1) or when the tube connection to the anesthetic volume blows off.

The paralysed patient thus will suffer from the effect of machine failure, especially when the anaesthetist is occupied elsewhere with the patient.

This slip can occur when the right-angled arm is bowed outwards, for example, as a result of repeated knocking when the ventilator is carried



Fig. 1. Manley Ventilator in the failed position, when the arm has slipped from the toggle switch.



Fig. 2. The toggle switch with a tube extension.

from theatre to theatre; or when the rubber on the toggle arm is worn out.

This can be prevented by beinding in the arm of the bellows; or by extension of the rubber tube of toggle arm (Figure 2) or by soldering a vertical bar on to the toggle arm.

In the failed position, the anaesthetist cannot empty the bellow by hand compression in the automatic position. It can be decompressed gradually in the manual position and by lifting the toggle arm.

#### **Acknowledgement**

I am grateful to the Medical Illustration Department, University of Malaya, Kuala Lumpur for the photography.

#### **Reference**

Manley, R. W. (1961). A new Mechanical Ventilator, *Anaesth.* 16, 317.

#### **Summary**

The Manley Ventilator occasionally fails to cycle when the arm of the bellows slips from the toggle switch.