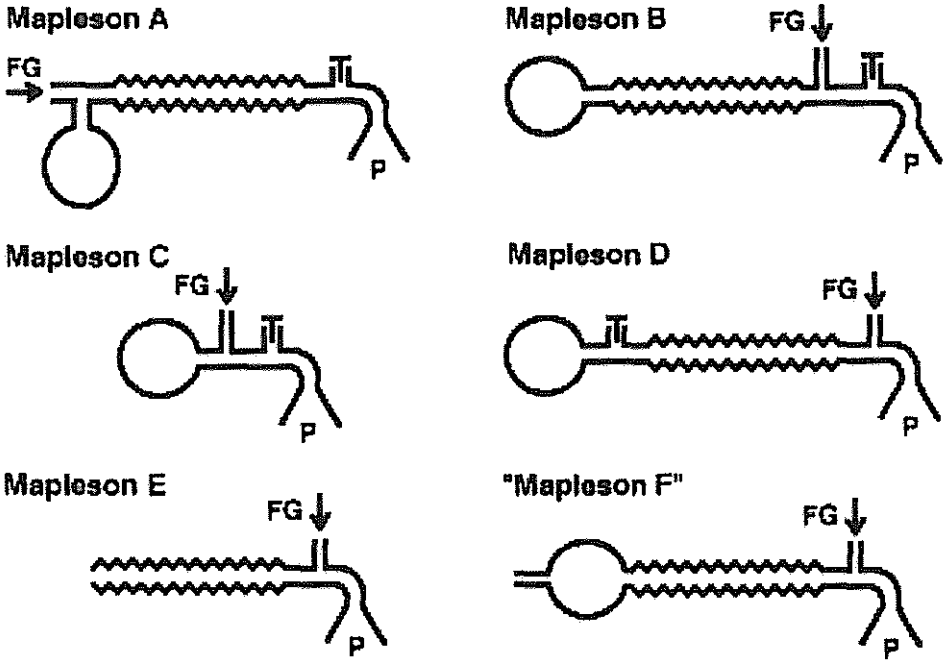
Breathing Circuit

What is the Mapleson system? These describes six semiclosed anaesthetic systems, which include a face mask, a spring-loaded pop-off valve, a reservoir tubing, fresh gas inflow tubing and a reservoir bag.

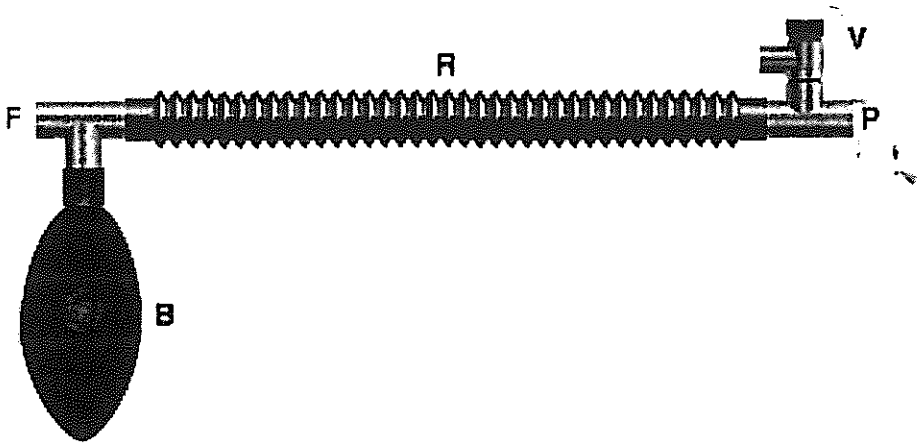


FG = Fresh gas P = Patient

What anaesthetic circuit can we find on the back of our anaesthetic machine?

Mapleson A is the anaesthetic circuit we can find on the back of our anaesthetic machine.

Here's the anaesthetic circuit you can find in our theatre, usually located at the back of the anaesthetic machine.



F = fresh gas flow
B = reservoir bag
R = reservoir tubing
V = spring loaded pop-off valve
P = face mask / patient

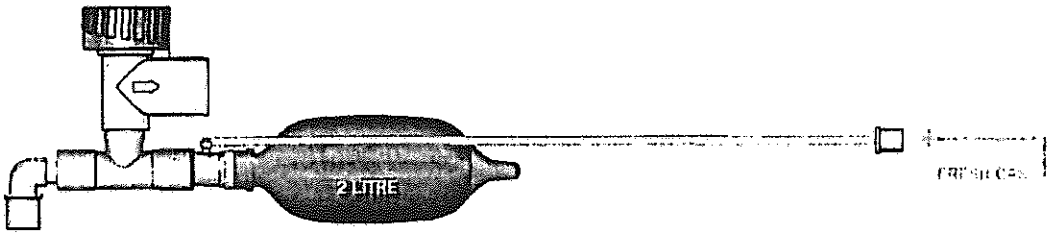
This is a **Mapleson A** system, also known as Magill circuit, in which the spring loaded valve is located near the patient end. The fresh gas flow enters the opposite end of the circuit and it is near the reservoir bag.

It is most **efficient** when used in patient **breathing spontaneously**. Only 1 - 1.5 times the minute ventilation is needed to prevent re-breathing of CO_2.

However, during controlled ventilation, Mapleson A is not as efficient and fresh gas flow as much as 20L/minute to prevent re-breathing of CO_2.

What anaesthetic circuit can we find in our recovery room?

It looks like this:

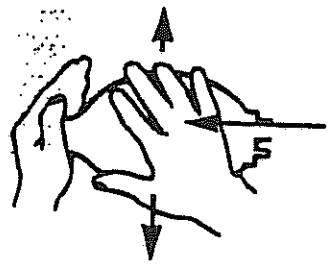


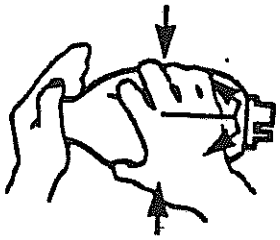
This is a **Mapleson C** circuit.

NOT good in preventing re-breathing, neither during IVVP, nor during spontaneous respiration.

Just that it is small in size, portable and easy to use. That's why it's still there.

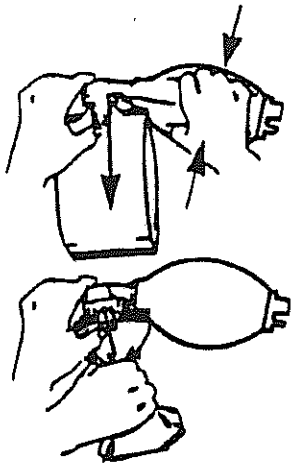
Laerdal Ambu Bag



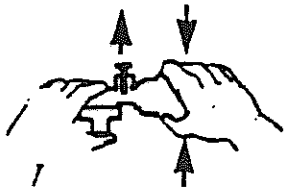


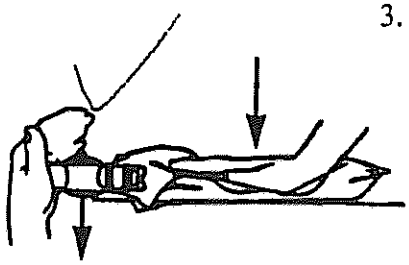
How do we check an ambu bag?

1. Intake valve
    a. compress the ventilation bag with one hand and close its neck opening with the other hand. Release grip on the bag. Look for rapid reexpansion to confirm efficient air intake
    b. close the neck opening and try to compress the bag. If the bag cannot be compressed with reasonable force, or if the bag compression forces the air between your hand and the neck of the bag, the valve efficiently prevents backward leakage of air.



2. patient valve
    a. Assure that the single lip valve has been installed in the patient valve. Attach the patient valve to the bag. Hold the reservoir bag over the patient port connector. Ensure tight seal between the patient port and the reservoir bag. Compress the bag and make sure the lip valve opens during compression. Filling of the reservoir bag confirms that the patient valve directs air to the patient.
    b. With the filled reservoir bag held firmly to the valve connector, compress the reservoir bag while watching the external disk membrane. Lifting of the disk membrane confirms that air is directed to the atmosphere instead of being returned to the ventilation bag.
    c. Patient valve with pressure relief valve:
        1. close patient port connector with your thumb while compressing the bag several times. Visual and audible opening of the relief valve confirms that it's functioning.





3. reservoir flap valve
    a. Do as described in 2a to fill the reservoir bag with ambient air. Then attach the reservoir bag to the intake valve and press on the reservoir bag. Compression of the reservoir bag and visual rise of the outlet flap valve confirms that the reservoir valve efficiently vents excessive gas to atmosphere.
    b. Do as described in 2a to fill the reservoir bag with ambient air. Then attach the reservoir bag to the intake valve. Perform several compression-release cycles on the ventilation bag until the reservoir bag is flat and empty. Rapid re-expansion of the ventilation bag after flattening of the reservoir bag confirms that the reservoir valve efficiently lets in ambient air.