

# Pediatric Valve-Assisted Limited Ventilation (PediVALVe) Device for Controlled Ventilation in Emergency Situations [LAB0109]

## Background

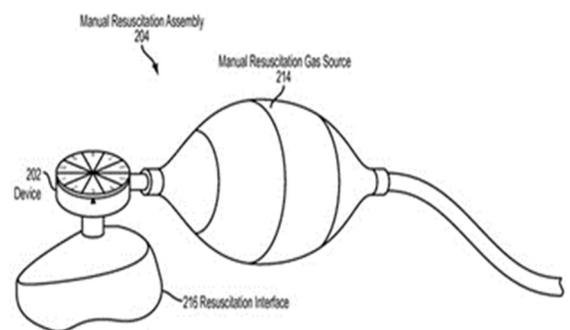
- Children visit emergency rooms ~30 million times each year in the U.S. with up to 5% requiring some airway management or ventilation support. Additionally, hundreds of thousands of children are ventilated during transport.
- A conventional resuscitator is a manual hand-held device used to provide positive pressure ventilation to people who are not breathing, or are unable to breathe adequately.
- Manual resuscitators force-inflate the lungs with pressurized air and/or oxygen, which can lead to complications due to overinflation (over-stretching and/or over-pressurization of the lungs) or overventilation (causes poor circulation in the body).
- Risks of complications from overinflation and overventilation are amplified for children since ventilation requirements vary drastically based on body size and weight.
- Emerging studies show that there is also risk for damage to the lungs of adult patients during ventilation, including the over 350,000 adults suffering cardiac arrest each year who need support of oxygenation and ventilation. New data suggests that lower volumes are needed to prevent overinflation in adults.
- Therefore, a device that prevents overinflation and overventilation in both children and adults is urgently needed.

## Innovation

- This innovation is an improved and non-invasive resuscitator device that prevents overinflation and overventilation across patients of various ages and weights.
- This device uses a gas flow circuit (from a manual resuscitator) to adjustably control assisted breathing during resuscitation.
- The device allows for excessive volumes of air to escape **via a flutter valve**.
- A metric input component is configured and a volume control mechanism modulates the volume of air.
- The device sets an upper limit to the flow of air by age, decreasing the chance of overventilation and excessive thoracic pressures.
- A “metronome” feature allows the healthcare provider to manage pressure, volume and flow for proper ventilation rate.

## Advantage

- Non-invasive resuscitator device that prevents overinflation
- Sets an upper limit to the amount of gas in a resuscitative breath, preventing overventilation and excessive thoracic pressures
- Alleviates healthcare provider anxiety and provides performance improvement



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## Applications

- Monitoring of the volume of oxygen delivered to patients of all ages and weights in emergency rooms and other situations requiring paramedic assistance
- Can be used during manual ventilation and/or intubation both in pre-hospital and hospital settings
- Can serve as a training tool used on manikins to teach healthcare providers the optimal resuscitative breath volume and rate by age range (pediatric to adult)

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## IP Status

- U.S. Patent No. 10,850,055 entitled “Adjustably controlling rescue or assisted breaths” issued December 1, 2020