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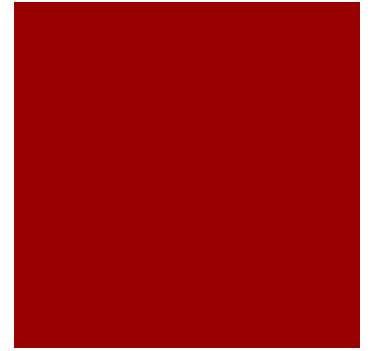
Resuscitation Device

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Client:
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Outline

- Problem Statement
- Background Information
- Design Matrix and Alternatives
- Block Diagram
- SolidWorks Design Video / Fabrication Progress
- PDS
- Testing
- Future Work

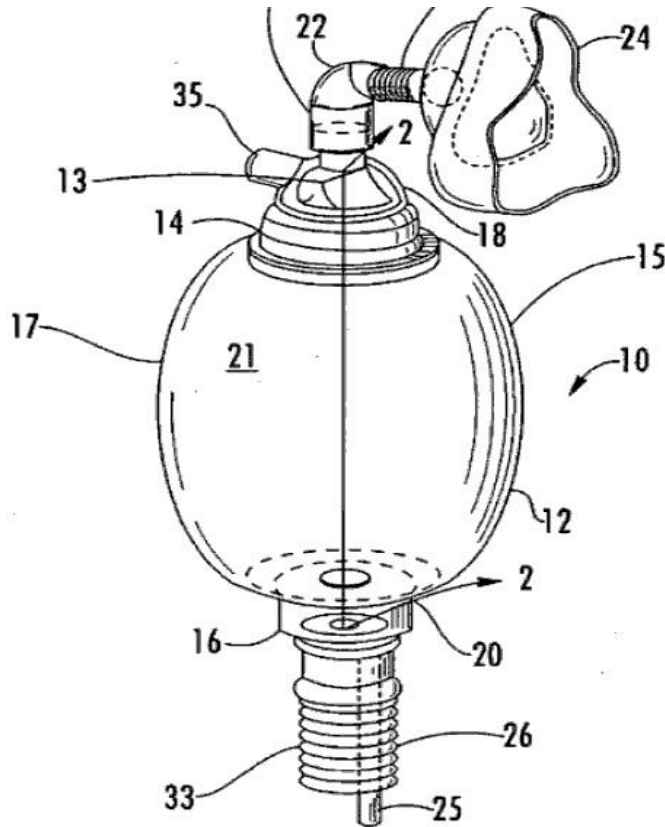


Problem Statement

- Bag Valve Masks are in high demand in developing countries
- Importation is expensive
- Goals
 - Low cost BVM
 - Reusable
 - Necessary components
 - Manufactured locally



Basic Components



- 21: Self-inflating oblong bag
- 20: One-way inlet valve
- 16: Inlet Port
- 35: Exhalation Valve
- 24: Mask
- 18: Outlet Valve Assembly
- 14: Outlet Port
- 33: Optional entrainment reservoir for external source gas

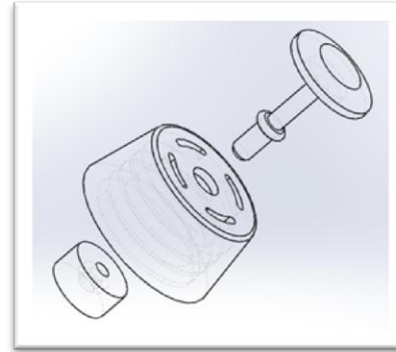
US Patent 20060060199
March 23 2006.

Self Inflating Resuscitation System (basic, standard design)



1. Bag is Squeeze
2. Air pushed past pressure release
3. Air moves through one way valve into mask
4. Upon exhalation air exits through non-rebreathing valve
5. Bag released oxygen enters through O₂ port

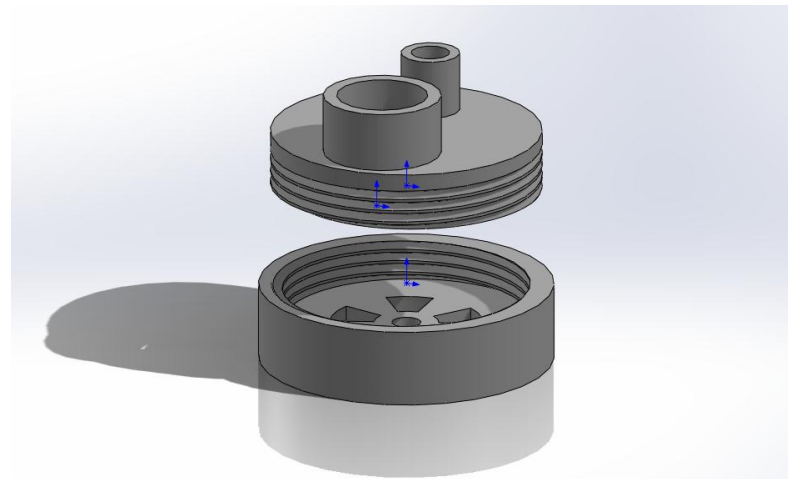
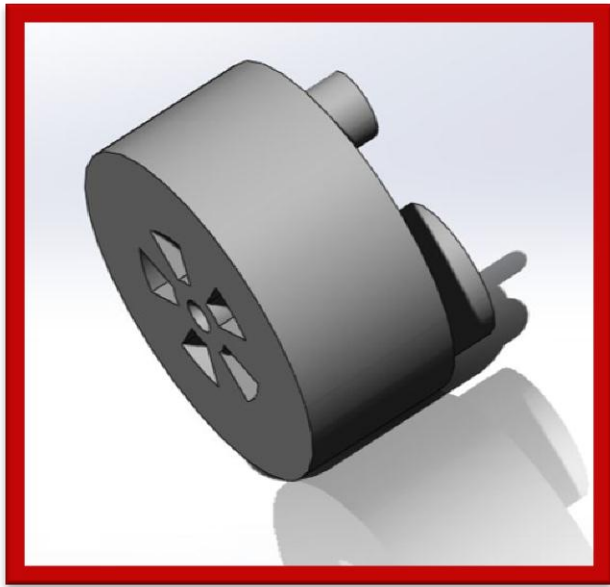
Design Matrix for Pressure Release



Design Trait	Multiplier	Slit in Rubber (one piece)	Spring with rubber stopper (four pieces)	Adjustable spring and rubber stopper (five pieces)
Cost	4	4	3	2
Ease of Assembly	3	5	4	3
Accuracy	5	2	5	4
Manufacturability	2	5	4	2
Totals		51	56	41

Design Considerations

- **Fewer Pieces vs. Functionality**
 - 1 piece inlet valve vs. 2 separate inlet valves



Design Features



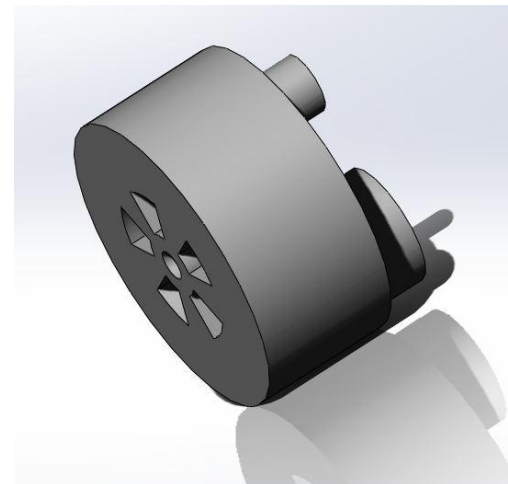
- **Neck**

- Universal bag connection

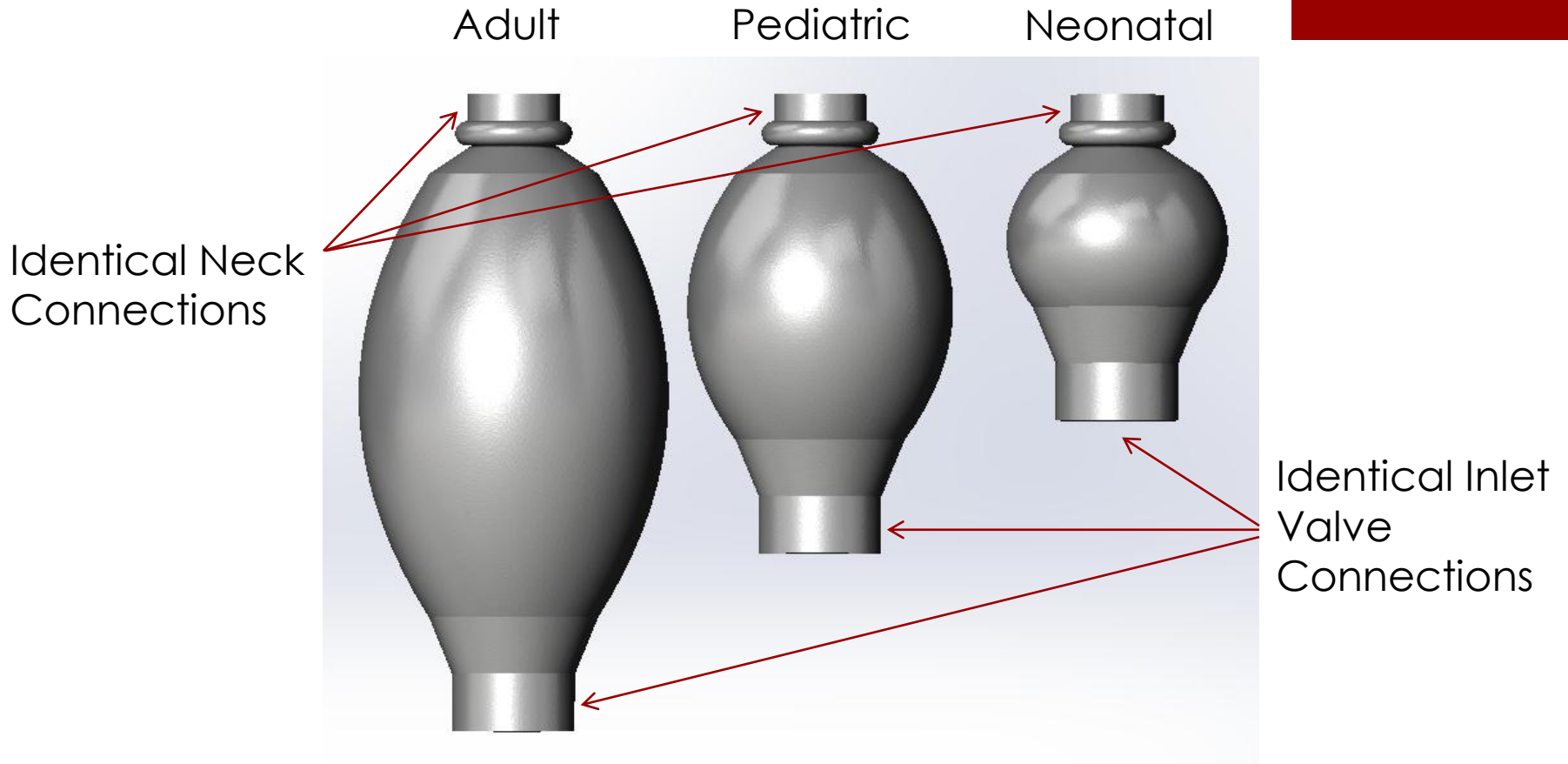


- **Inlet Valve**

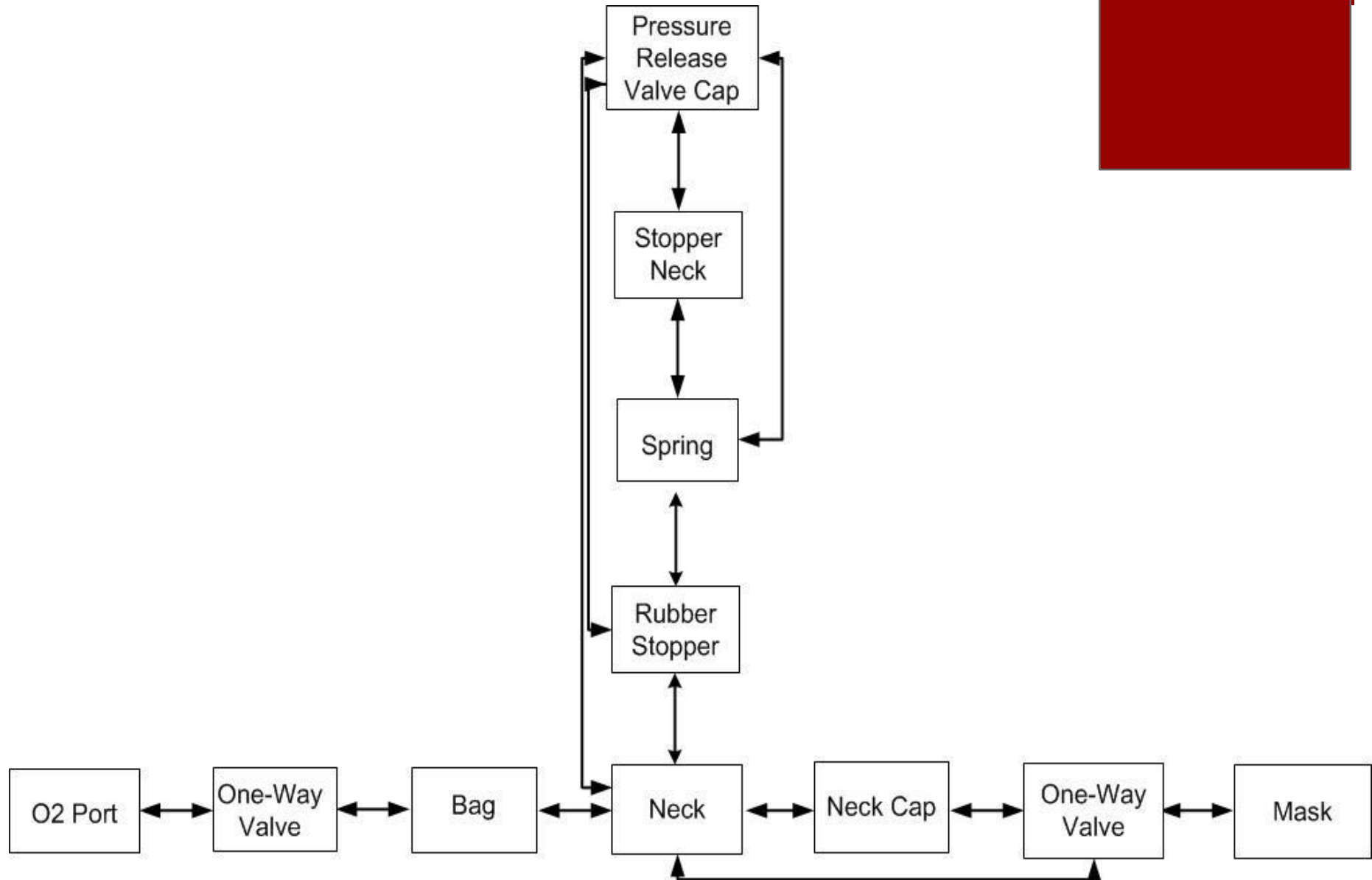
- One piece
- Universal bag connection

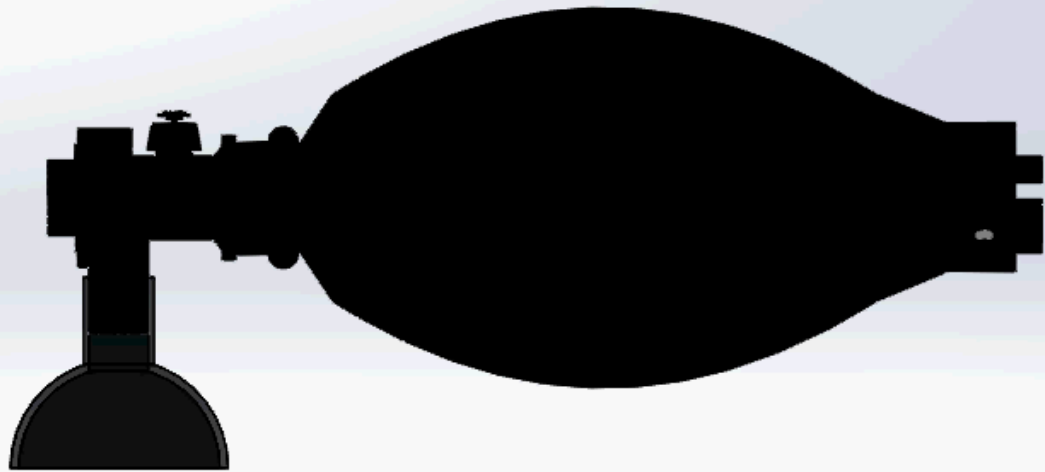


Design Features



Block Diagram





PDS - Physical and Operational Characteristics



- **Weight:** comfortably lifted in one hand.
- **Materials:** Face mask must be biocompatible (latex free rubber) and safe to clean with Cidex
- **Aesthetics:** Clear plastic so it is easy to identify blockage
- **Ergonomics:** Easy to squeeze bag with one hand and maintain mask seal with other. Easy to disassemble
- **Size:** Compliance with ISO regulations of tidal volumes
- **Target Product Cost:** Initially 10 USD. Eventually 5 USD.

Testing

- Test tidal volumes using “Michigan Lung”
- Purchase spring of calculated spring constant
 - $P = F/A$
 - $F = -k*x$
- Verify pressure release valve for 45cm H2O
- Verify seal created by mask using neo-natal model
- Test one way valve threshold limits
- Assembly/disassembly time




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Thank
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