

PROJECTS PORTFOLIO

IQRA DIYAR

MECHANICAL CAD DESIGN ENGINEER

SolidWorks | Product & Medical Device Design | Prototyping

iqradiyar1004@gmail.com

CONTENTS

MEDICAL DEVICES

Medical Device Enclosure for PCB & Electronics	03
BIPIT - Wearable Nausea-Support Mask	04
Nasal Pillow Mask with Noise-Damping Chamber	05
Three-Orifice Spray Bottle	06
Middle Meningeal Artery	07
Silicone Casting Molds	08

MECHANISMS

Scotch Yoke Mechanism	10
Marine Waver	11
Bike Handle Grip Assembly	12

CONSUMER PRODUCTS

Twin Baby Bouncer	13
Over-Door Towel Rack	14

COMPONENTS

Selected Mechanical Parts	15
---------------------------------	----

Medical Device Enclosure for PCB & Electronic Components

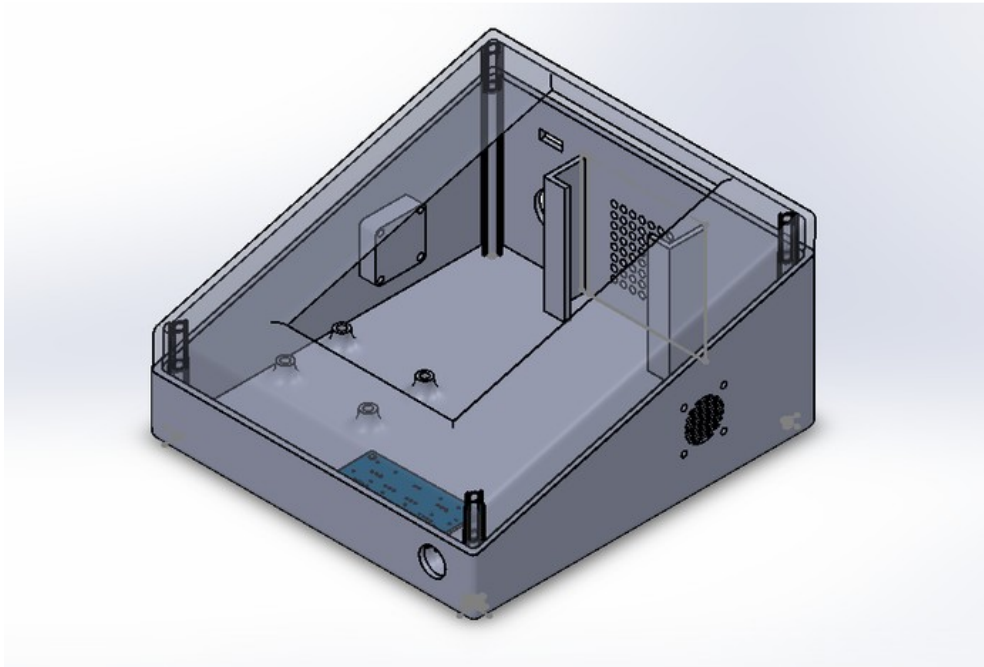
Designed a custom enclosure for a medical device, precisely accommodating PCBs, LCDs, power supply boards, fans, microphones and other electronic components. Ensured accurate component placement, proper clearances, ventilation and ease of assembly. Created detailed 3D CAD models and manufacturing drawings optimized for protection, functionality and reliable performance of all internal electronics.

• Fan

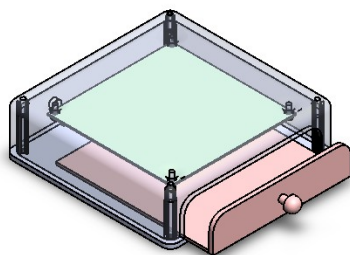
• Microphone

• Power supply placement

• PCB placement



ENCLOSURE WITH INTERNAL COMPONENT LAYOUT



PCB ENCLOSURE WITH DRAWER

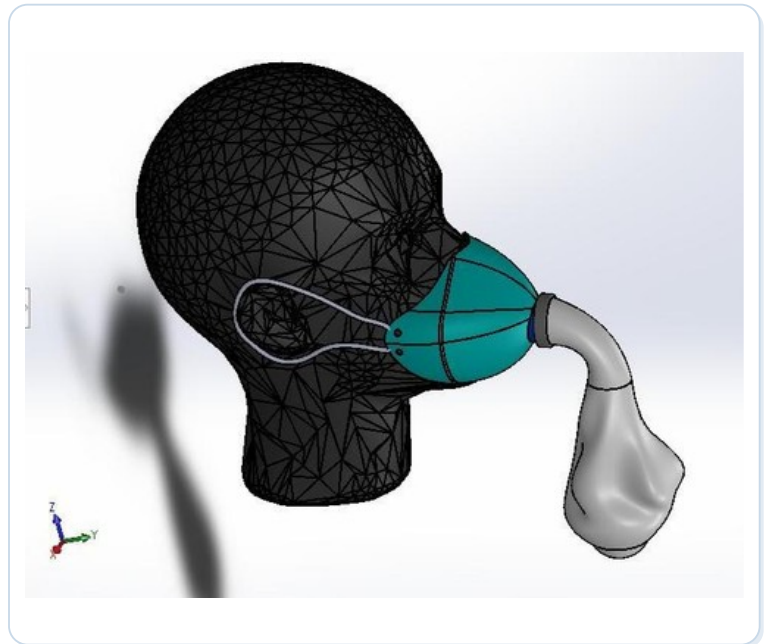
DESIGN FOCUS

- Accurate component placement
- Proper clearances & ventilation
- Ease of assembly
- Detailed 3D models & drawings

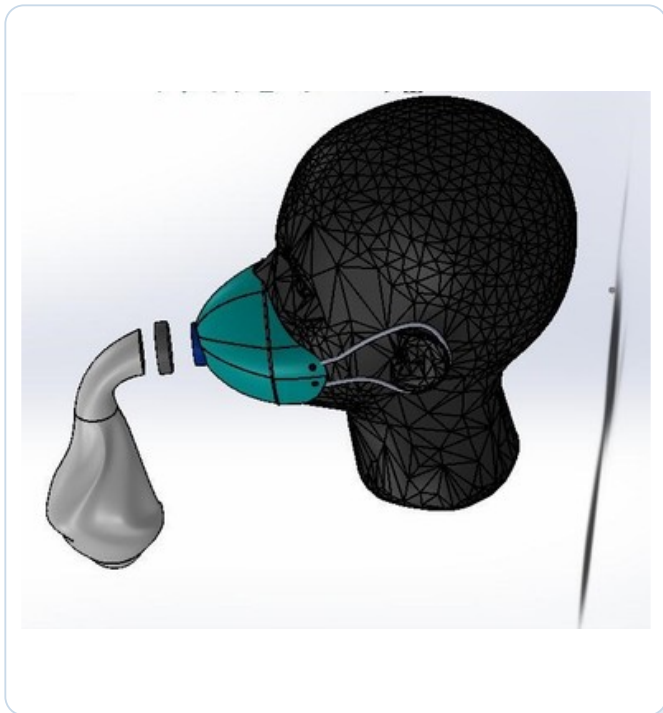
BIPIT - Wearable Nausea-Support Mask

BIPIT is a wearable nausea-support mask that sits comfortably over the mouth and nose, with a directly attached disposable bag for hygienic containment if vomiting occurs.

No tubing. No complex mechanisms. Just a practical, rapid-response solution.



COMFORTABLE MASK



SNAP-FIT MECHANISM WITH VOMITING BAG

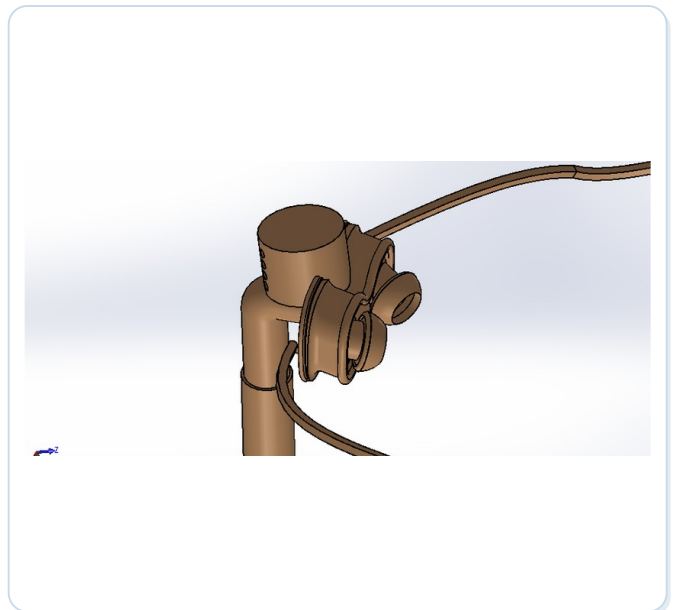


TOP VIEW, BAG ATTACHED

Nasal Pillow Mask with Noise-Damping Chamber

Designed a lightweight nasal pillow CPAP mask concept focused on comfort, stability and noise reduction. The project explored ergonomic headgear geometry, flexible tubing integration and a compact noise-dampening chamber to improve airflow performance and user experience during sleep. CAD development and component detailing were used to refine fit, modularity and manufacturability while maintaining a minimal, low-profile form.

- Ergonomic headgear
- Flexible tubing
- Noise-damping chamber
- Low-profile form

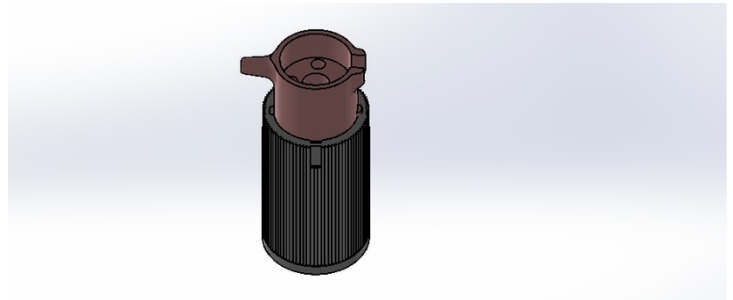


Three-Orifice Spray Bottle

A multiroute delivery spray designed for the nose, mouth and eyes.



FABRICATION



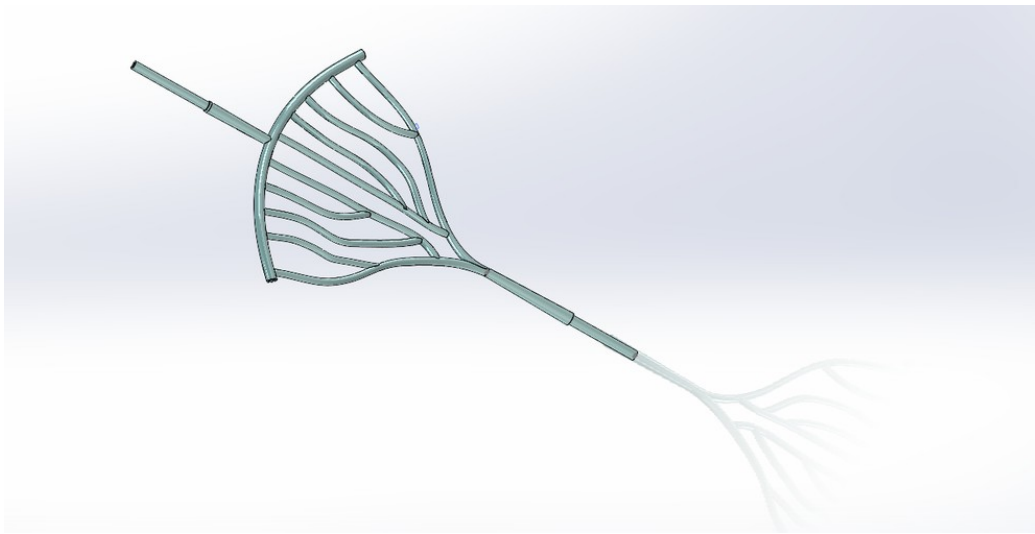
DESIGN



FABRICATED PROTOTYPES

Middle Meningeal Artery

Branching vascular model designed in SolidWorks and fabricated on an SLA printer.



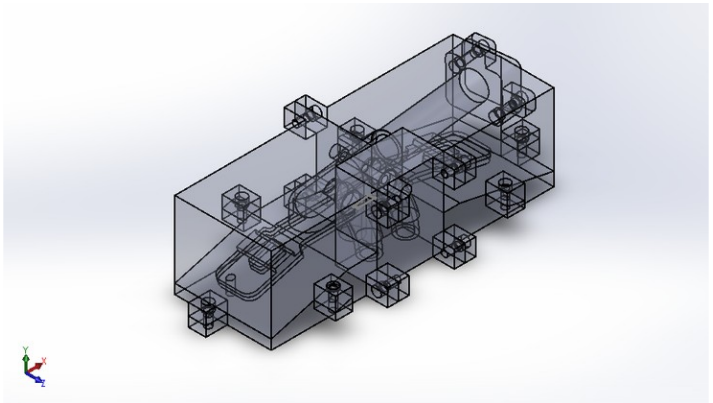
DESIGN



PRINTED BY SLA PRINTER

Mold Design for Silicone Casting

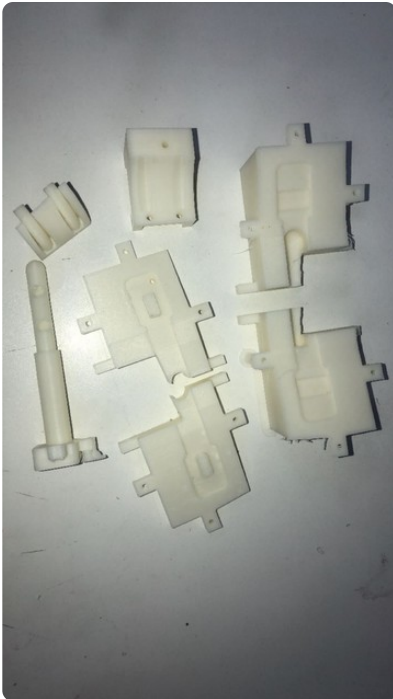
Designed a high-precision silicone casting mold for prototype and low-volume production applications. Created detailed 3D CAD models and manufacturing drawings with a strong focus on accuracy, manufacturability and ease of demolding. Supported prototype trials and refined the design based on casting results and quality feedback.



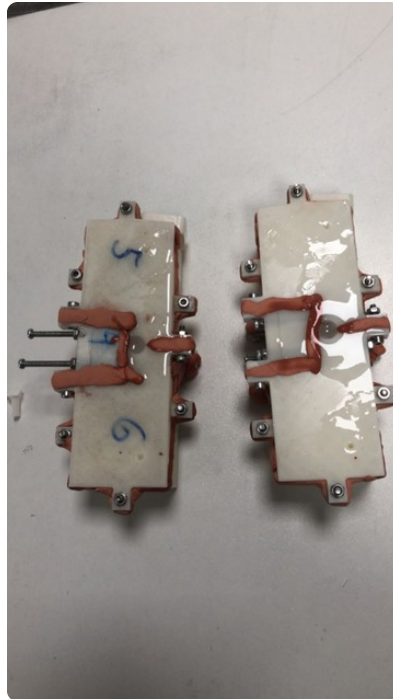
MOLD DESIGN



CAST PART (CAD)



PARTS

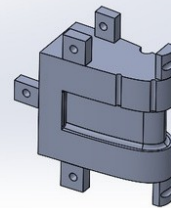
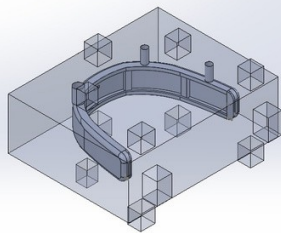
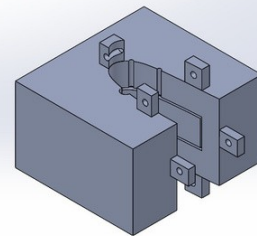
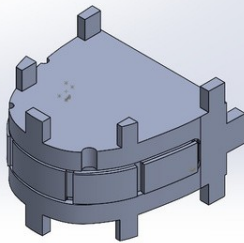
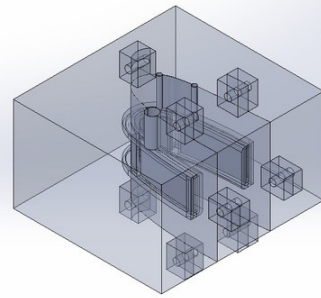
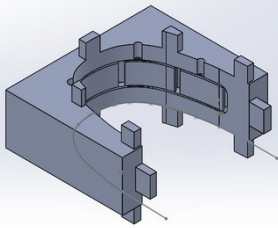


ASSEMBLY



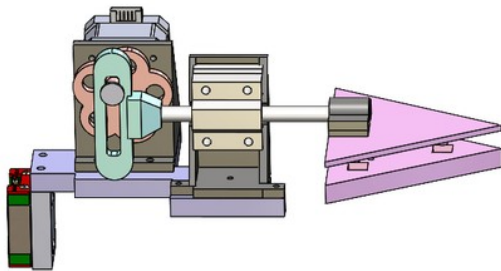
RESULT

Molds for Silicone Casting

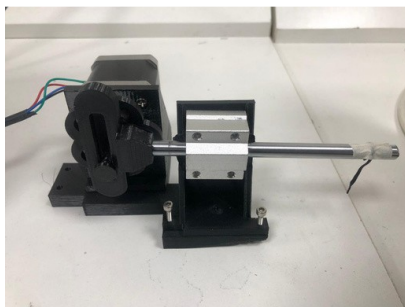


Scotch Yoke Mechanism

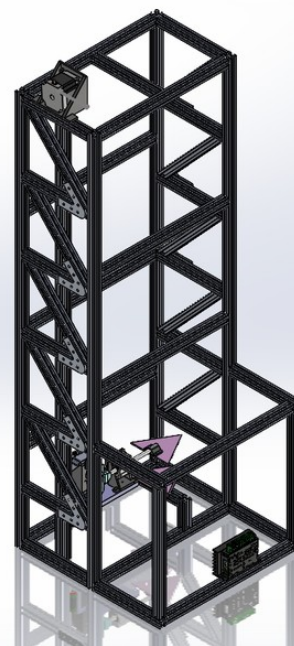
Converts rotational motion into linear reciprocating motion (or vice versa), using a rotating crank, a pin and a sliding yoke with a slot.



YOKE ASSEMBLY (CAD)



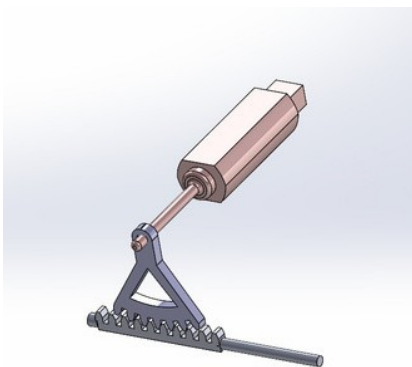
FABRICATED PROTOTYPE



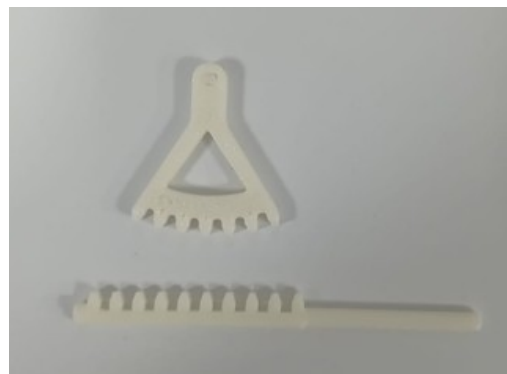
MOUNTED ON ALUMINIUM-PROFILE FRAME

LEFT-RIGHT SWING TO LINEAR MOTION

Translates partial rotation into a linear, reciprocating stroke, ideal for applications requiring back-and-forth movement.



SWING MECHANISM (CAD)



3D-PRINTED PARTS

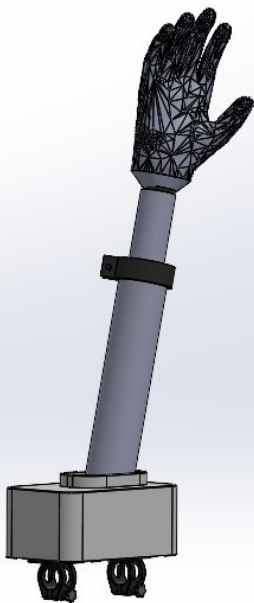
Marine Waver

Concept design of a waving-arm mechanism. The model combines a detailed hand form with a tubular forearm, a clamp band securing the arm, and a compact rectangular base housing with mounting hardware. Modeled in SolidWorks to define overall proportions, housing fit and the mounting arrangement.

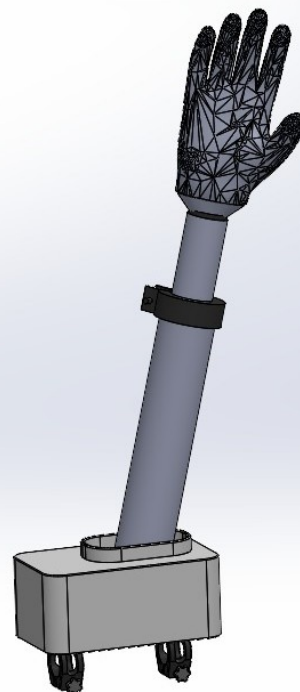
- Detailed hand model

- Tubular forearm with clamp band

- Base housing & mounting



FRONT VIEW

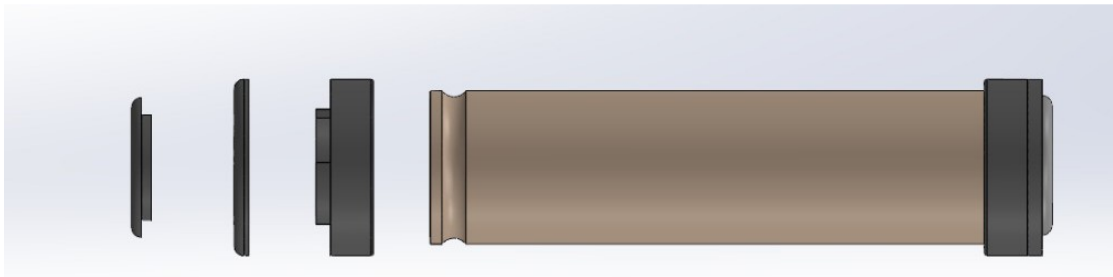


ISOMETRIC VIEW

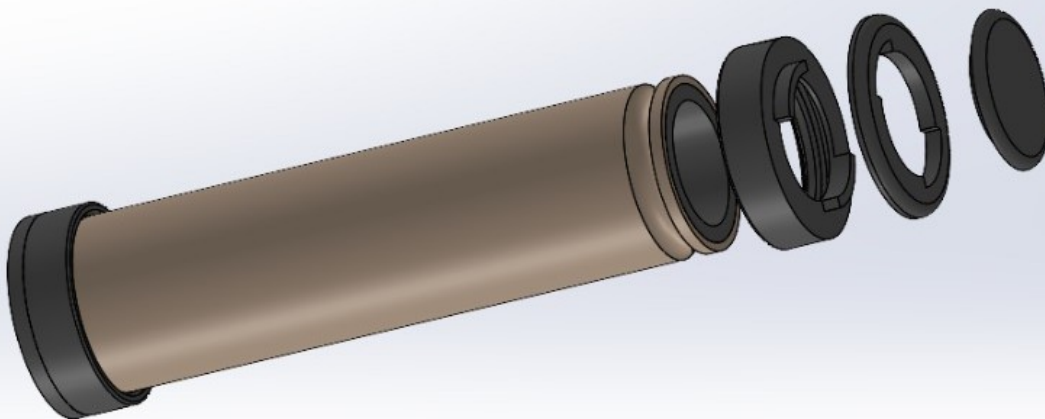
Bike Handle Grip Assembly

Bike handlebar grip assembly modeled in SolidWorks. A soft EPDM grip sleeve (60 durometer) is secured by a locking cap, with additional ring and end components that lock the grip onto the bar. Exploded views show how every component stacks and mates in the assembly.

- EPDM grip sleeve (60 durometer)
- Locking cap
- Locking ring & end cap



EXPLODED VIEW (SIDE)

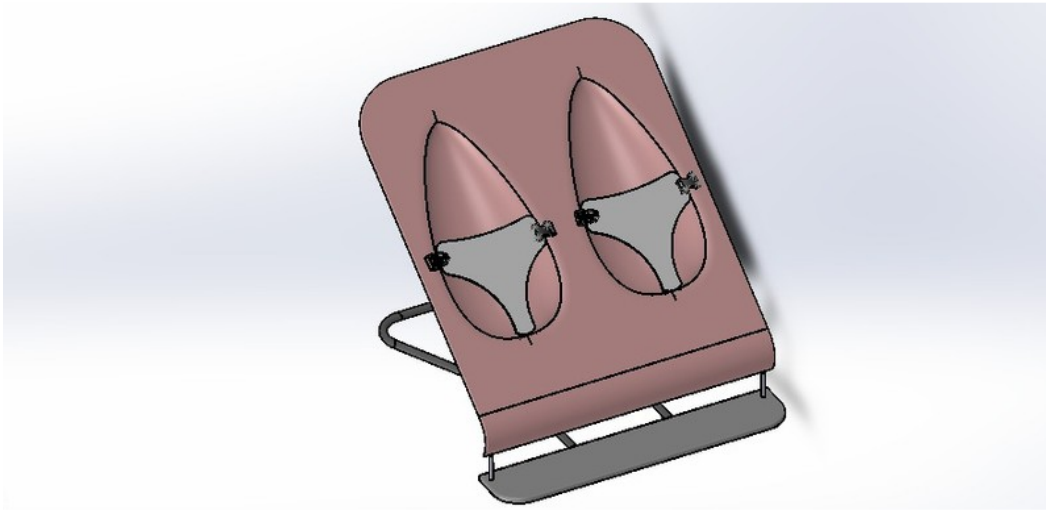


EXPLODED VIEW (ISOMETRIC)

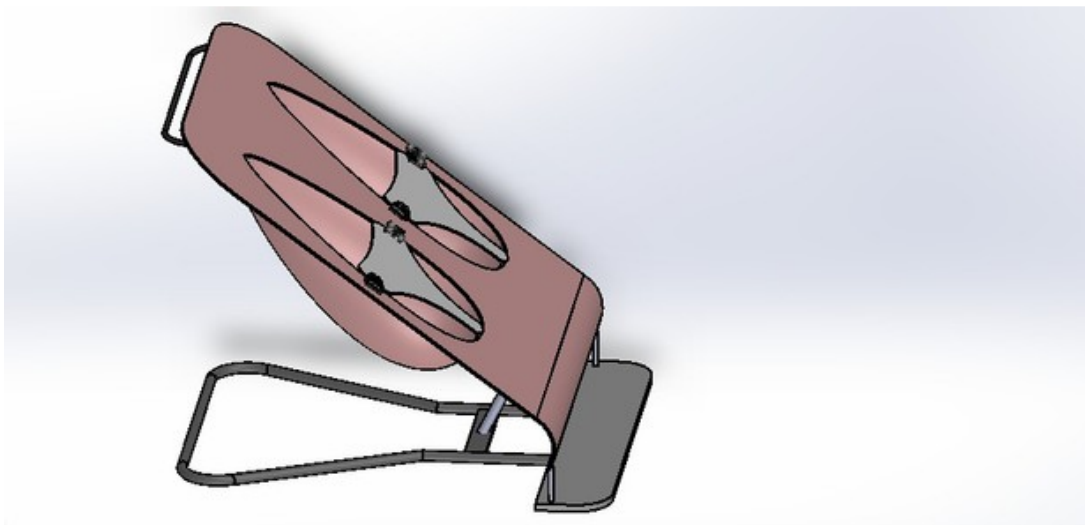
Twin Baby Bouncer

Designed an innovative dual-seat baby rocker featuring a stable rectangular curved-frame structure with flexible polymer-based suspension for natural self-bouncing motion. The concept incorporates a unique scissor-style folding mechanism, adjustable reclining positions and a lightweight modern design focused on safety, comfort, portability and user-centered functionality.

- Flexible polymer suspension
- Scissor-style folding
- Adjustable recline
- Portable & lightweight



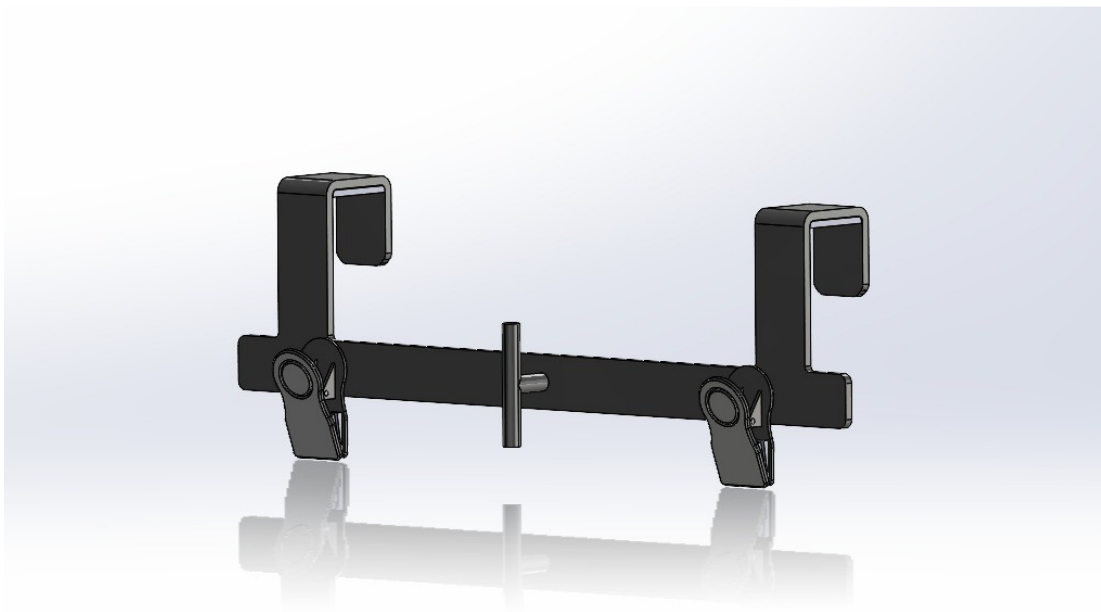
FRONT VIEW



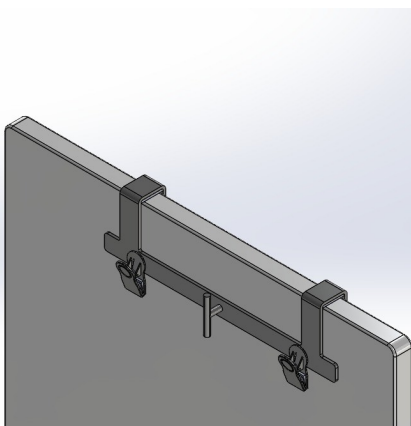
SIDE VIEW, RECLINED

Over-Door Towel Rack

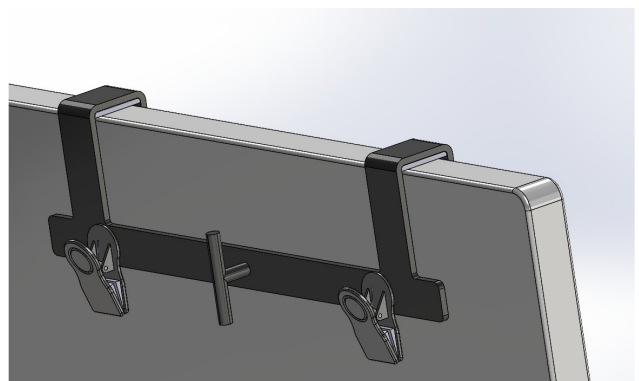
Over-the-door towel rack with two formed hooks that hang over the top edge of a door, a flat cross bar spanning between them, and two spring clips that hold towels in place. A central peg adds an extra hanging point. Shown mounted on a door panel to check hook fit and clearance.



RACK ASSEMBLY

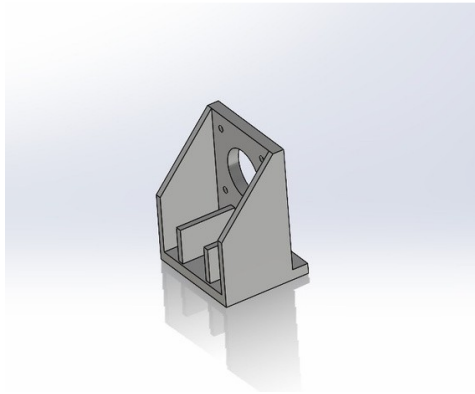


MOUNTED ON DOOR

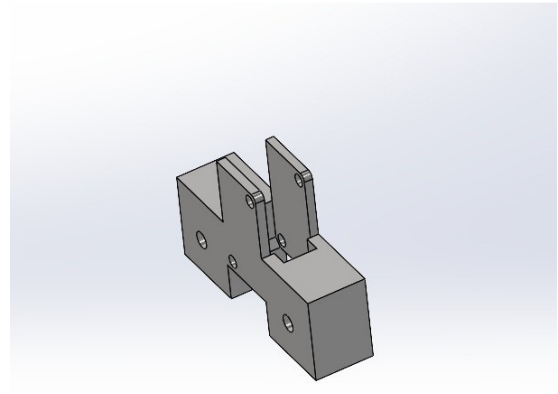


CLOSE-UP OF HOOK AND CLIPS

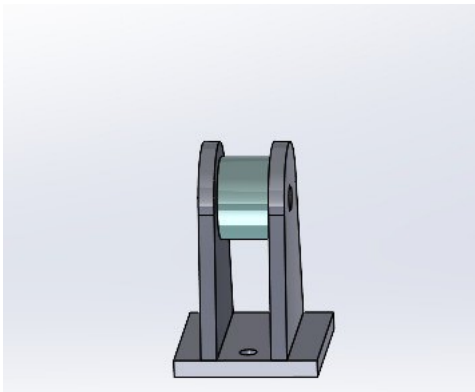
Selected Mechanical Parts



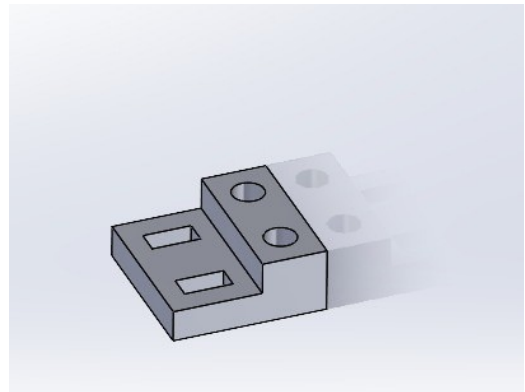
NEMA 17 MOTOR MOUNTING



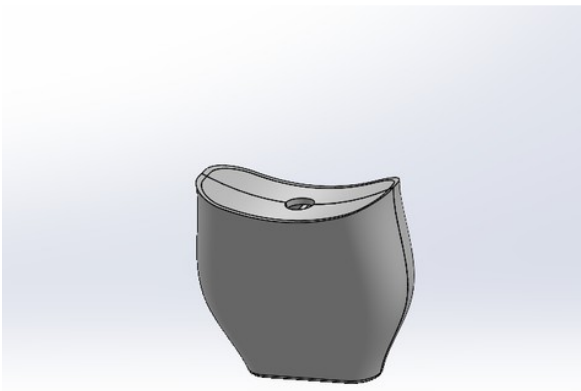
LIMIT SWITCH HOUSING



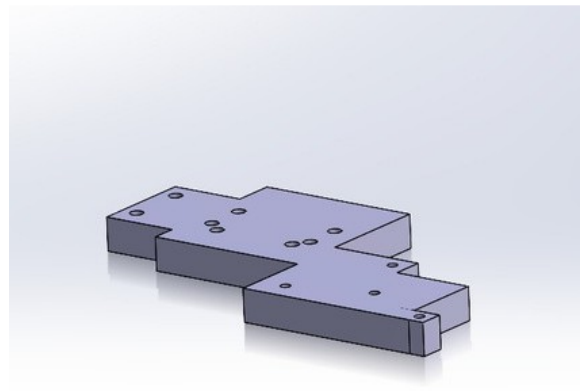
PULLEY HOUSING



BELT GRIP TIE PART



SONIC MOTOR AND PCB ENCLOSURE



BASE PLATE