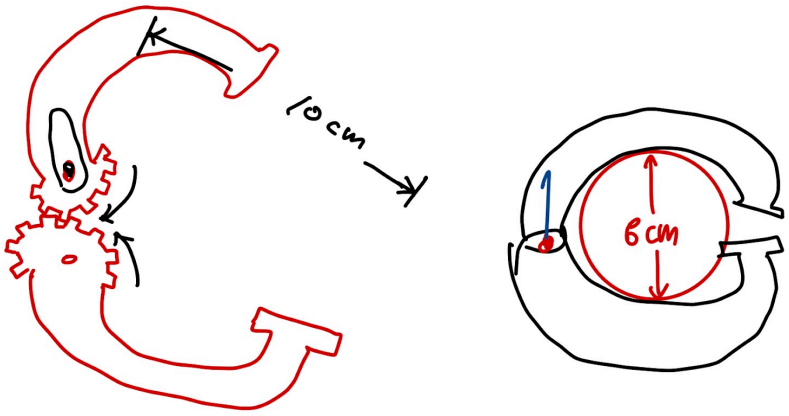
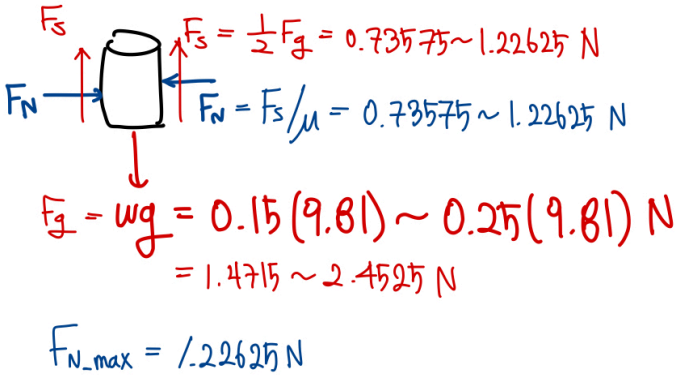



Figure 1. Design of hand part to assist grabbing cup motion



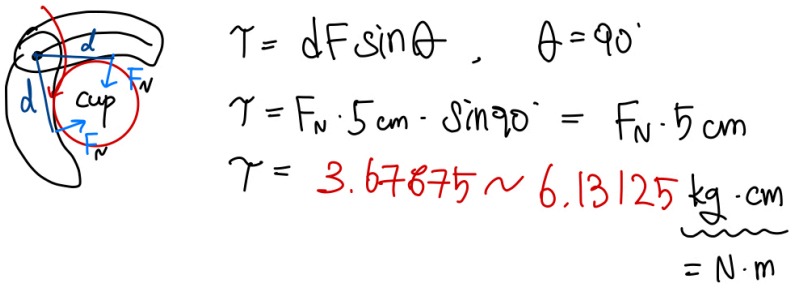




Figure 2. Hand calculation for torque required to grab the cup

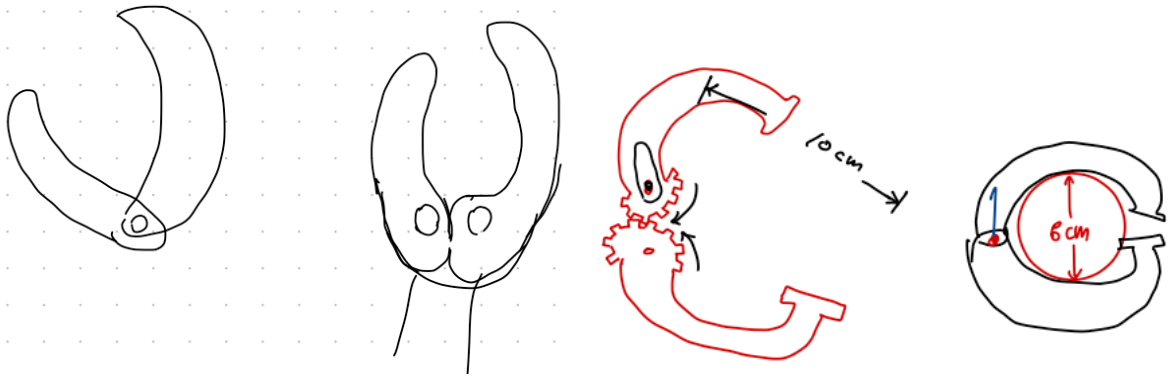



Figure 3. Initial few designs of hand part

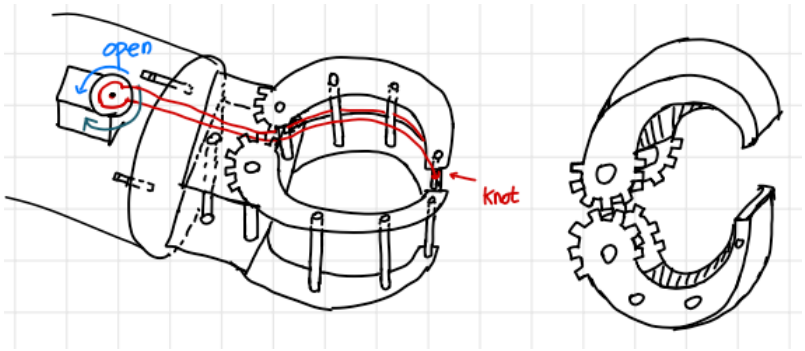



Figure 4. Second design choice

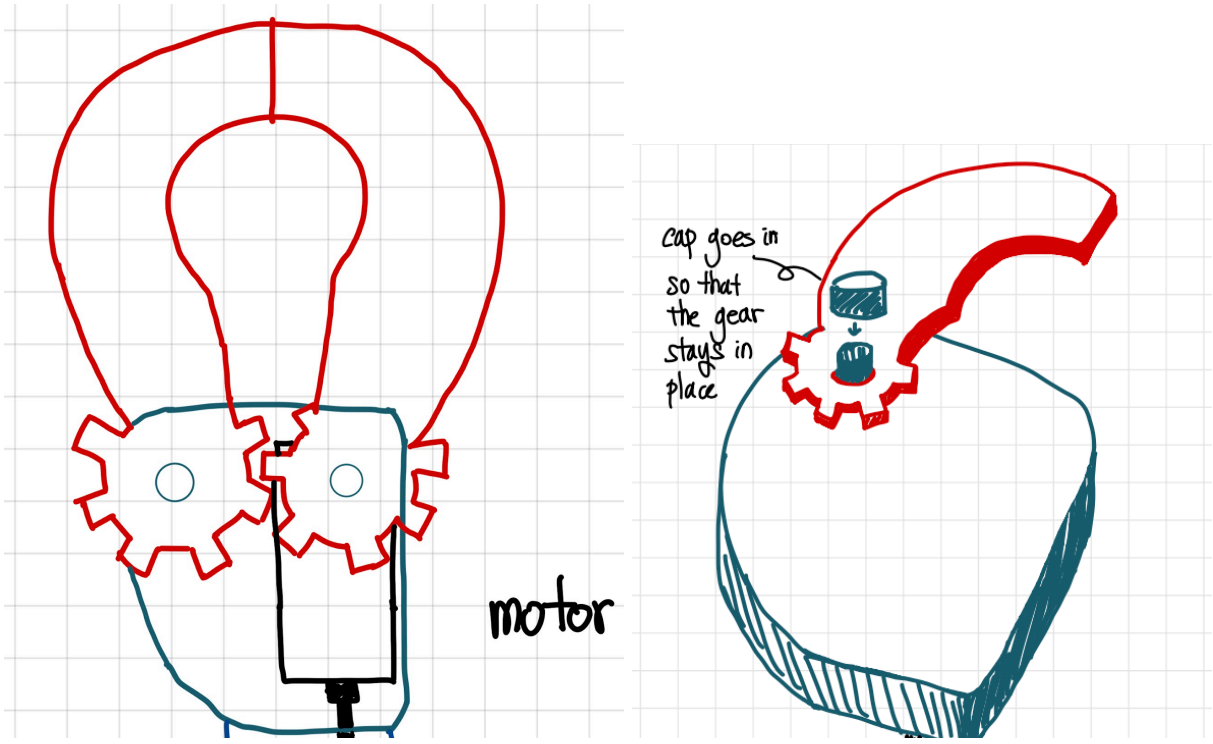



Figure 5. The final hand claw design: the motor and claw direct connection (Left), showing how the left claw is secured in place (Right).

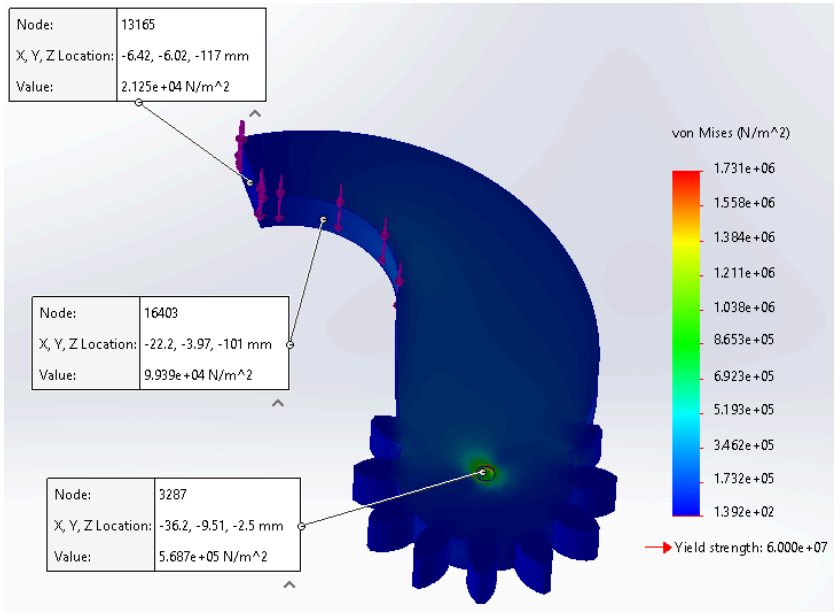



Figure 6. FEA of the right part of the hand with 2.41N external force applied on the contact surface

Figure 7. Selected cup for the tool design procedure

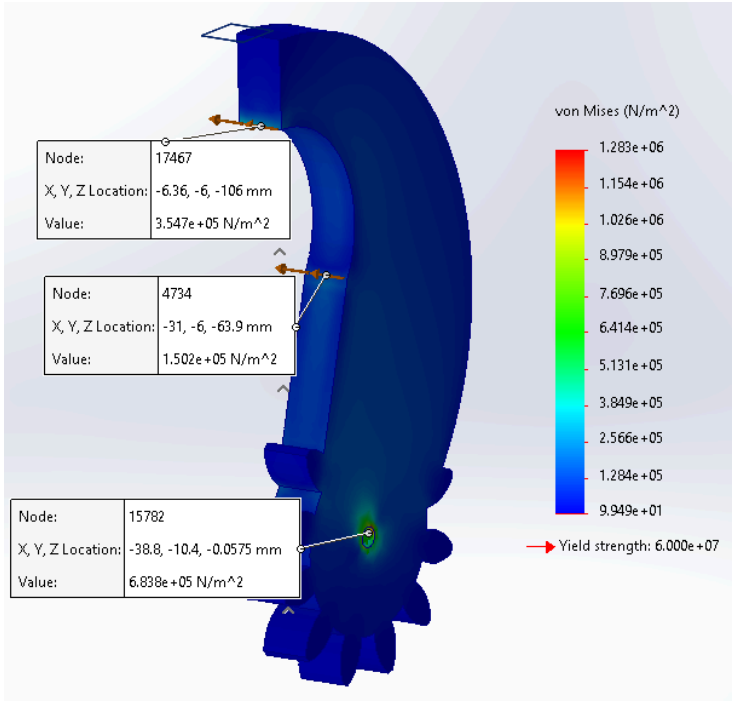



Figure 8. FEA of the right part of the hand with 2.41N external force applied on the edge of contact

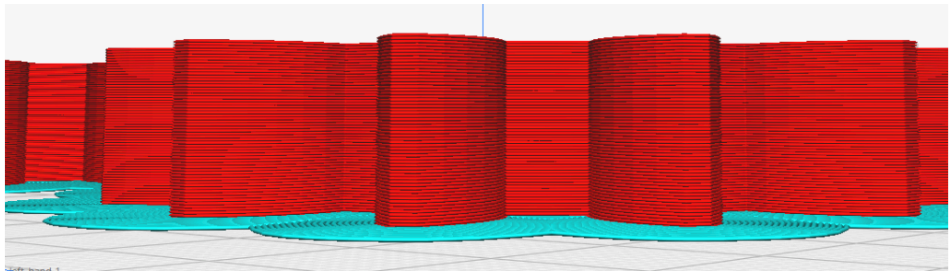


Figure 9. Sliced hand part showing the layers of filament

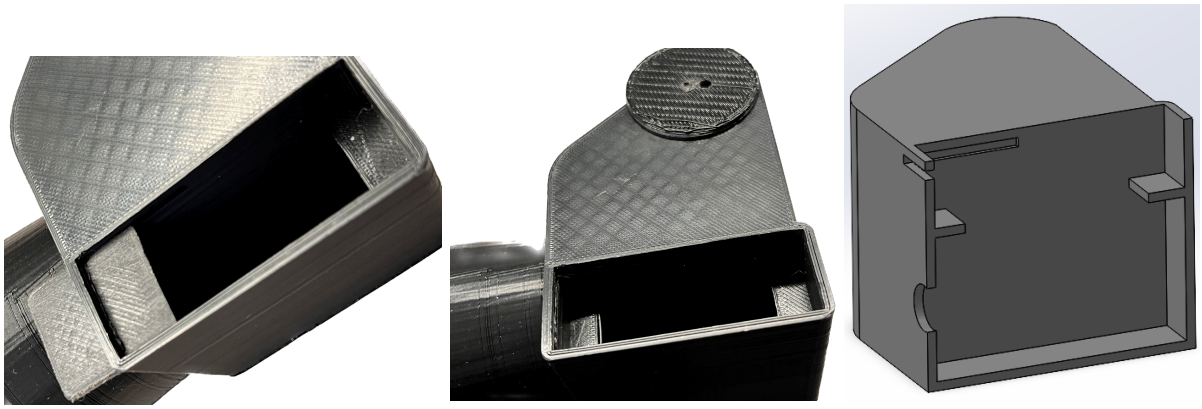


Figure 10. Wrist-Palm part with a motor housing and a slide-in lid (Left). Shelves in the motor housing (Middle). Section view (Right)

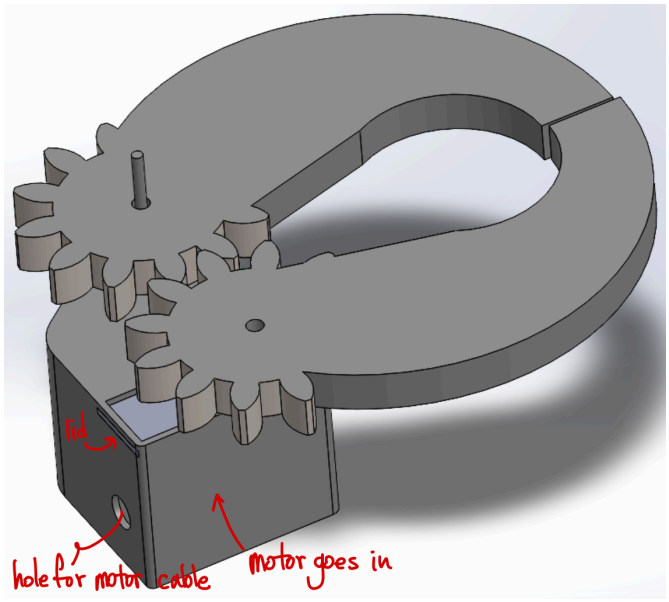



Figure 11. Assembled hand claws and wrist-palm

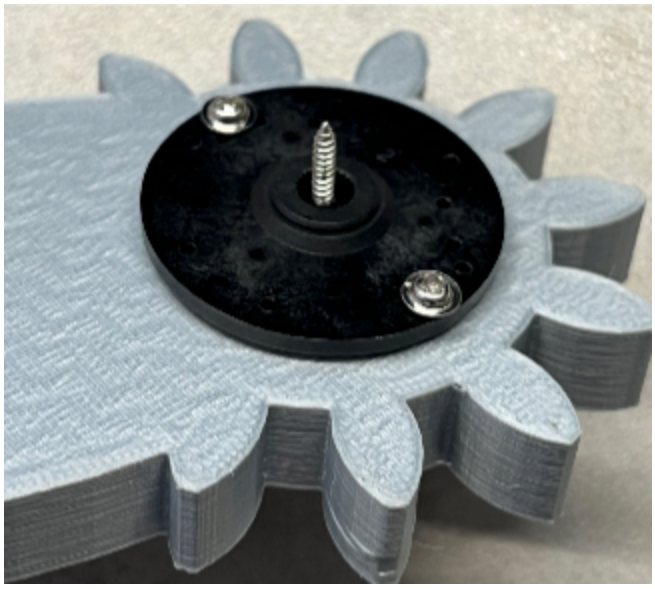


Figure 12. Bottom of the right claw gear part.

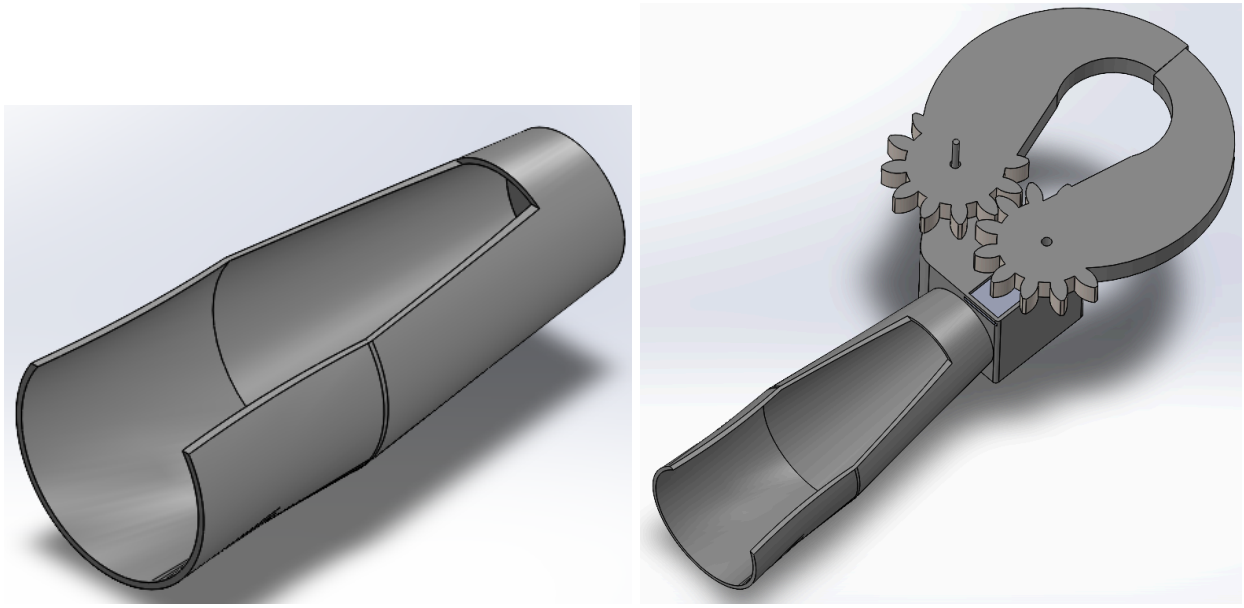


Figure 13. Hollow arm (left). Assembled look (right)

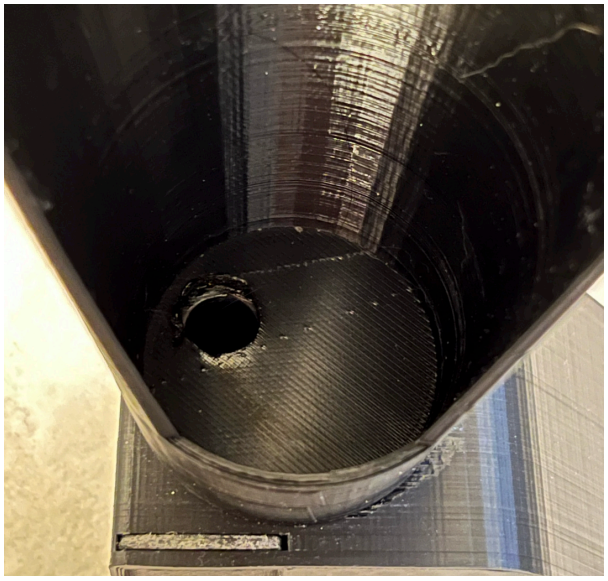


Figure 14. Arm is attached to the wrist-palm attachment so both holes are coincident.

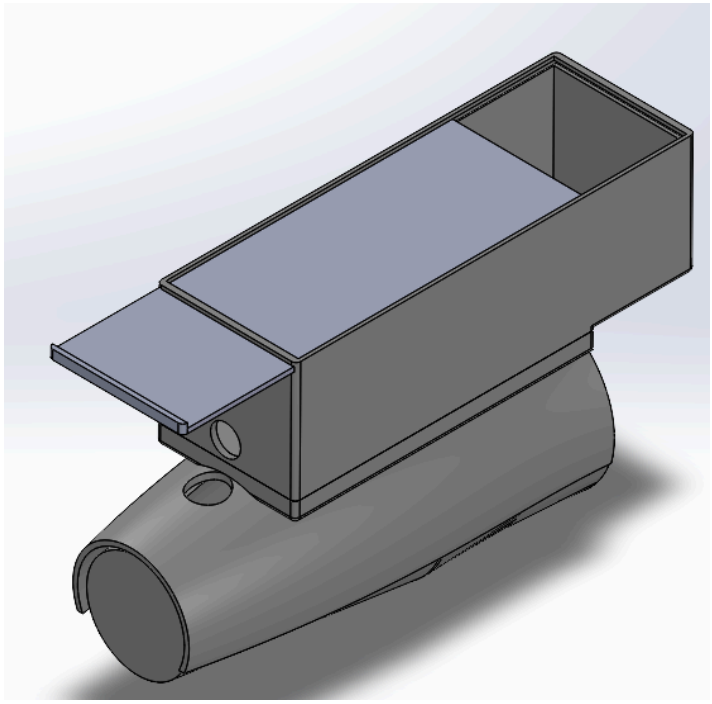


Figure 15. Assembled arm and circuit housing design

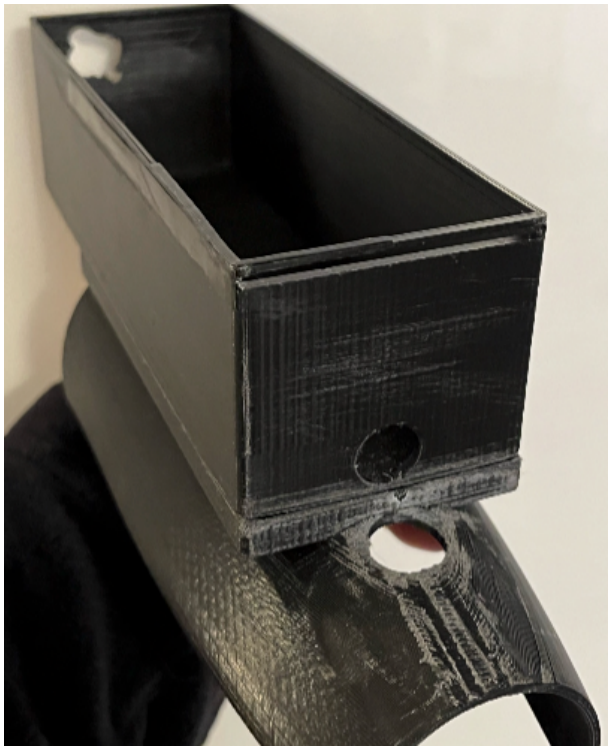


Figure 16. Close-up view of 3D printed circuit housing

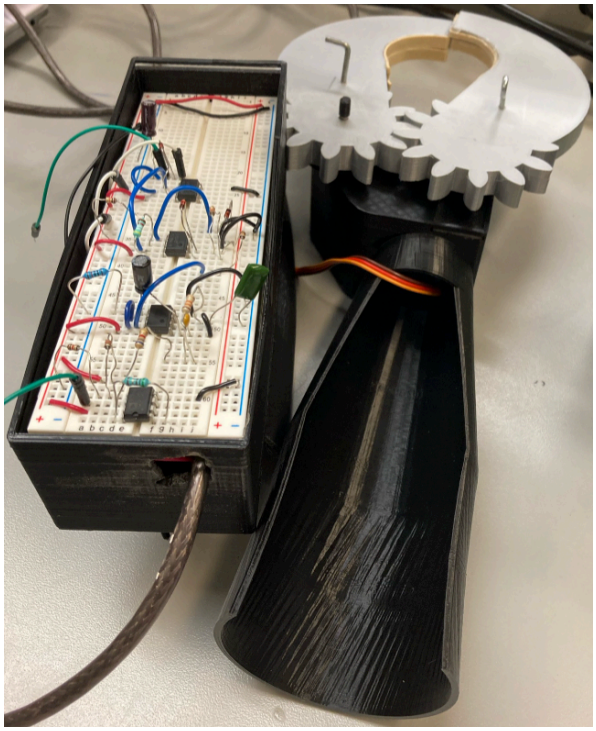


Figure 17. The final look of the design with circuits