



instructables

Sky Tracker V2 (Do Not Make It Though)



by GauranshG

I wanted to design a sky tracker that is easy to make, and is not as bulky as barn door sky tracker. At least I made it not bulky. EASY? well that is a whole different story. So my idea was very simple achieving a extremely high gear ratio in smallest possible and what is better than worm gears. In short it is a simple worm gear based tracker that is laser cut using MDF. Unfortunately I didn't get a chance to completely test it as the gears I designed were not the best. I do have attached 3d gears that should work. This instructable is not a one stop solution (hopefully soon becomes one) but a design I tried out and worked decently. I will take you behind the design process, and share my thought process. So let's go.

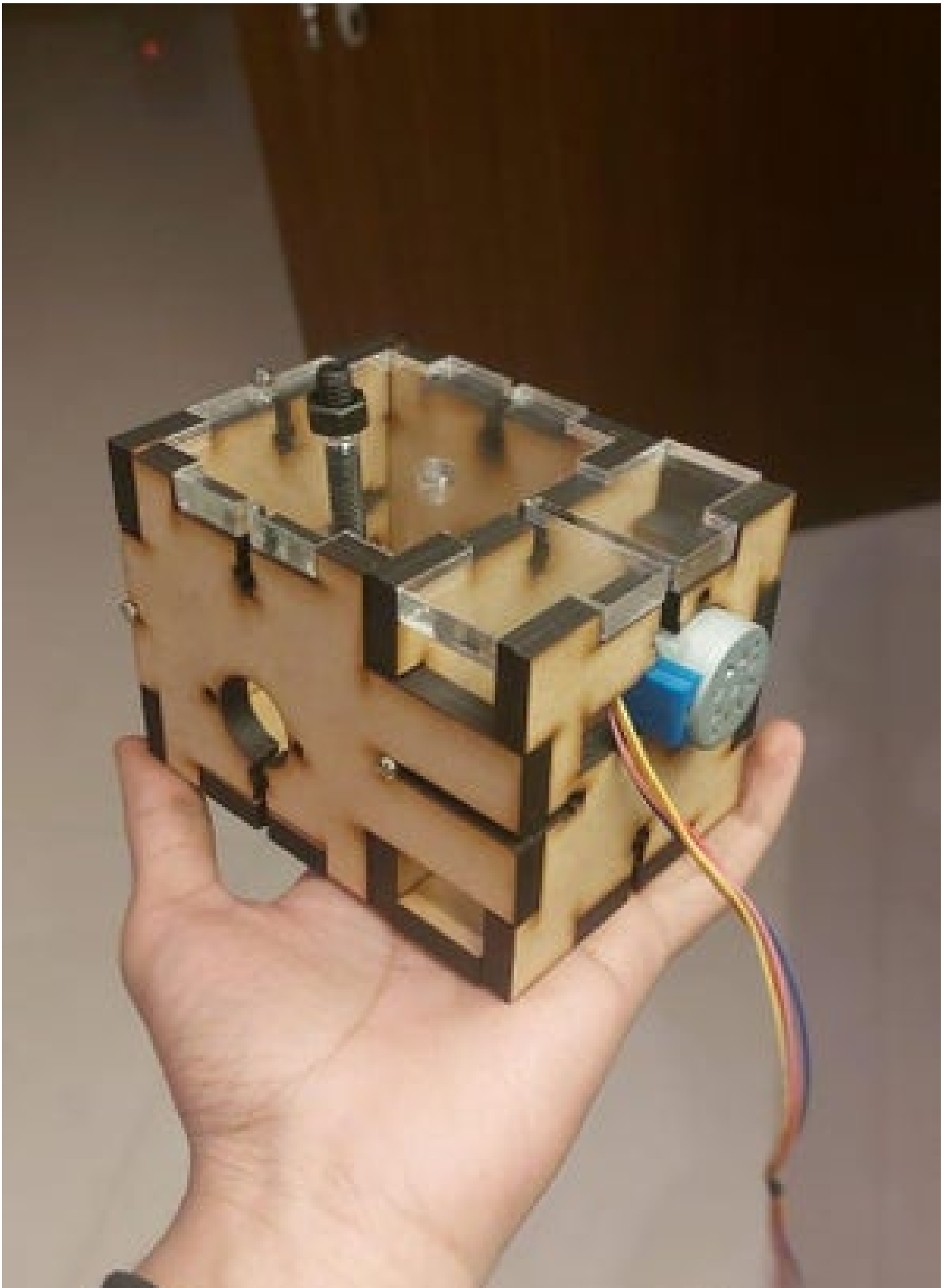
Supplies:

If you have previously made Barn Door Sky tracker, You have most of the stuff already.

Total supplies include.

1. 28byj-48 stepper motor
2. ULN2003
3. Arduino or any other microcontroller
4. 1/4-20 Bolt to mount camera
5. Lots of M3 bolts washers and nuts
6. 3 M8 Bolts
7. Weights (dependent on camera)
8. Laser Cut MDF or better Acrylic (I had to use 2 4mm sheets, single 8 mm sheet will be stronger)
9. Bearings (608)
10. Will to experiment.

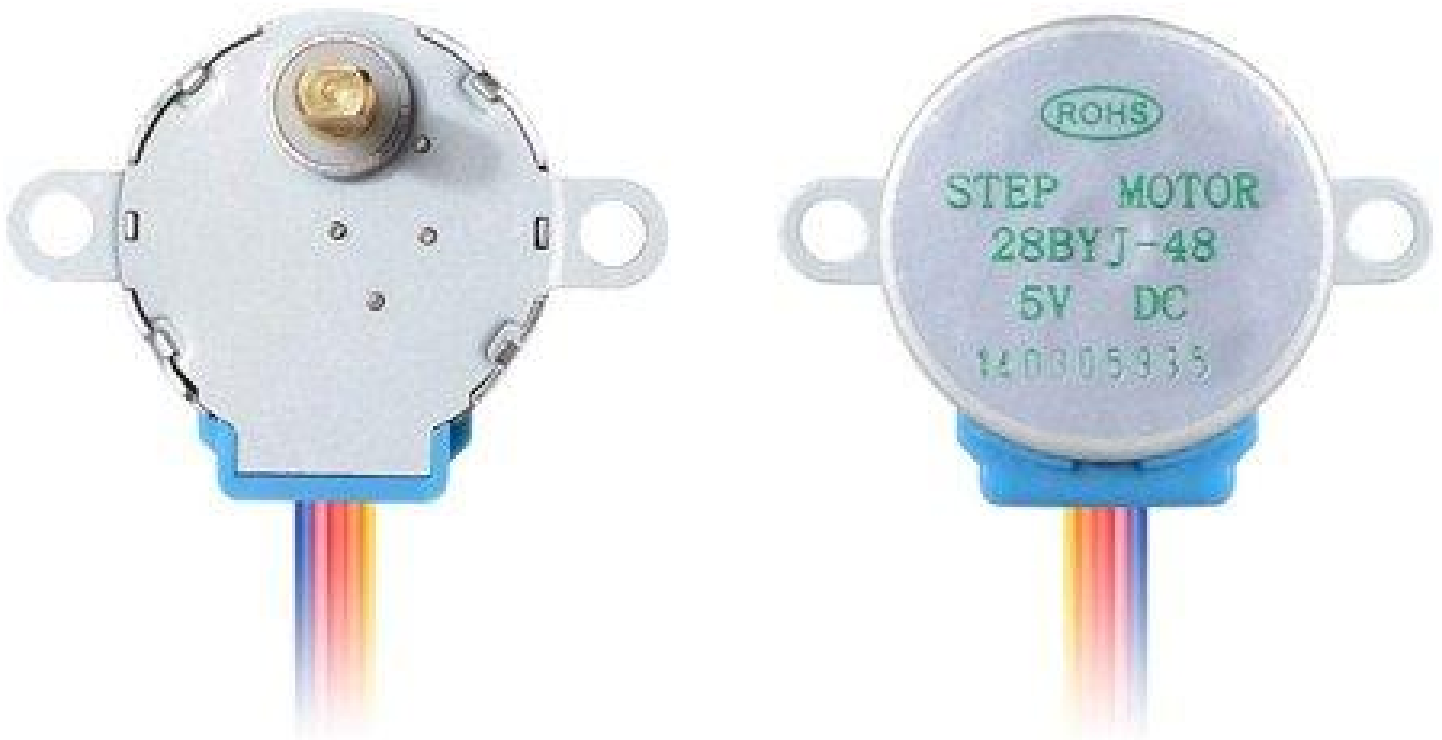


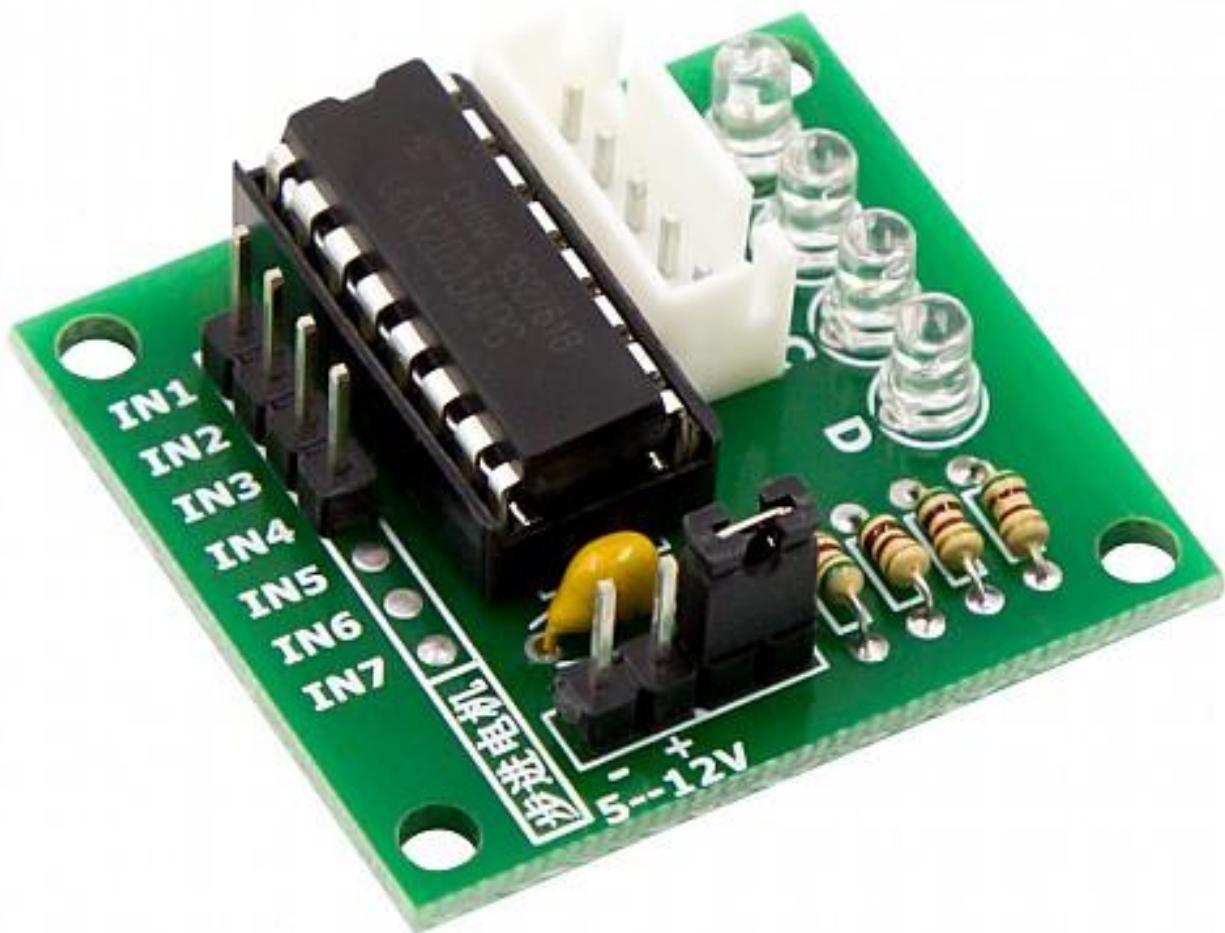




Step 1: Choosing the Motor

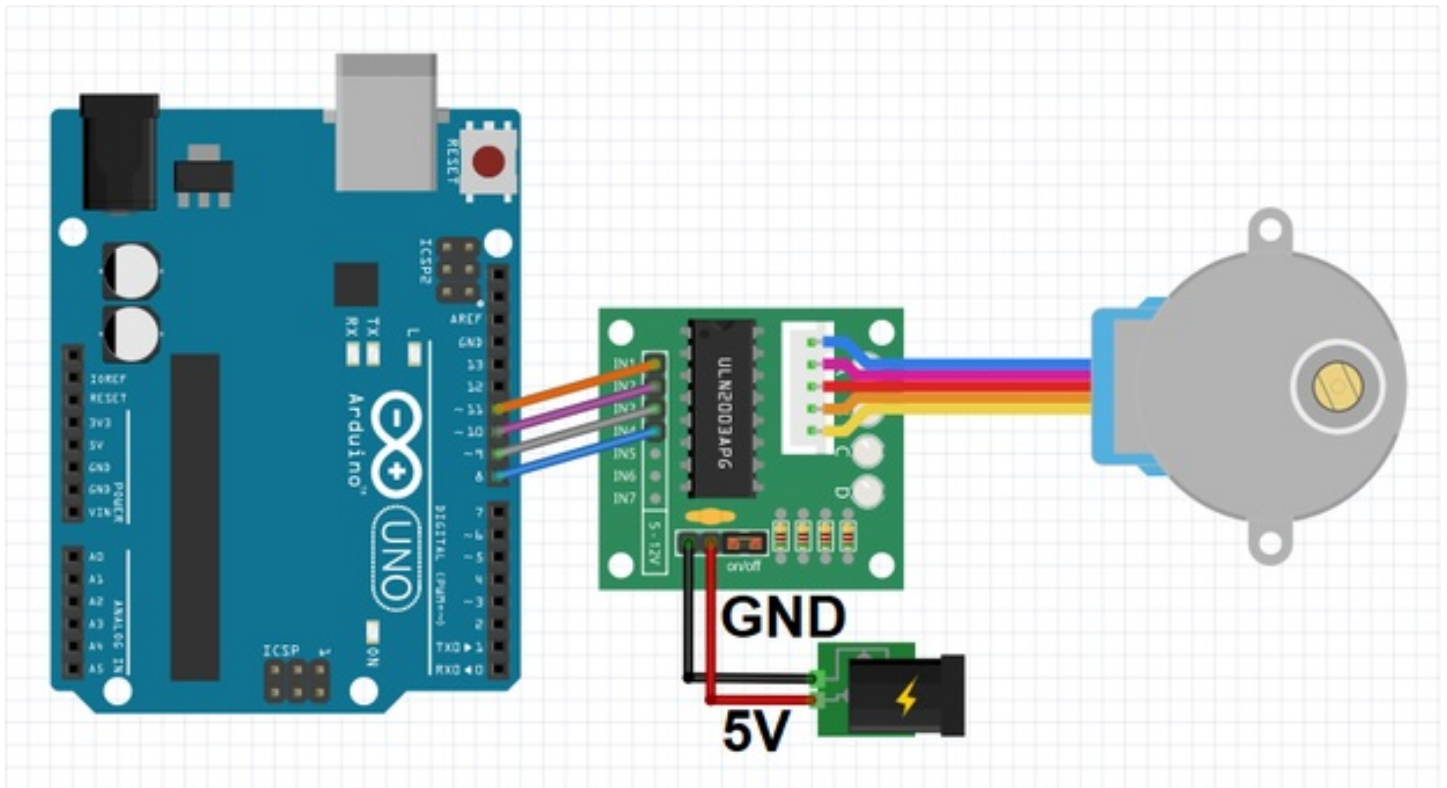
So first things first, choosing the motor, as it will dictate lots of decisions we make in the future. We need a decent motor that is highly precisely controllable and a decent torque. What is better than a stepper motor with extremely accurate control over RPM. I chose 28byj-48 stepper motor due to its high gear ration built in. It has a net steps per revolution of 2048. It gives us a lot smoother motion at a relatively low cost! I modified it to make it bipolar that gives me higher torque but that is not compulsory. You can use ULN2003 motor driver to drive it.





Step 2: Connecting With Arduino

Connection with Arduino is pretty straight forward. Just follow the schematics and you should be good to go.



Step 3: Designing Process

The Design process revolves around two worm gears.

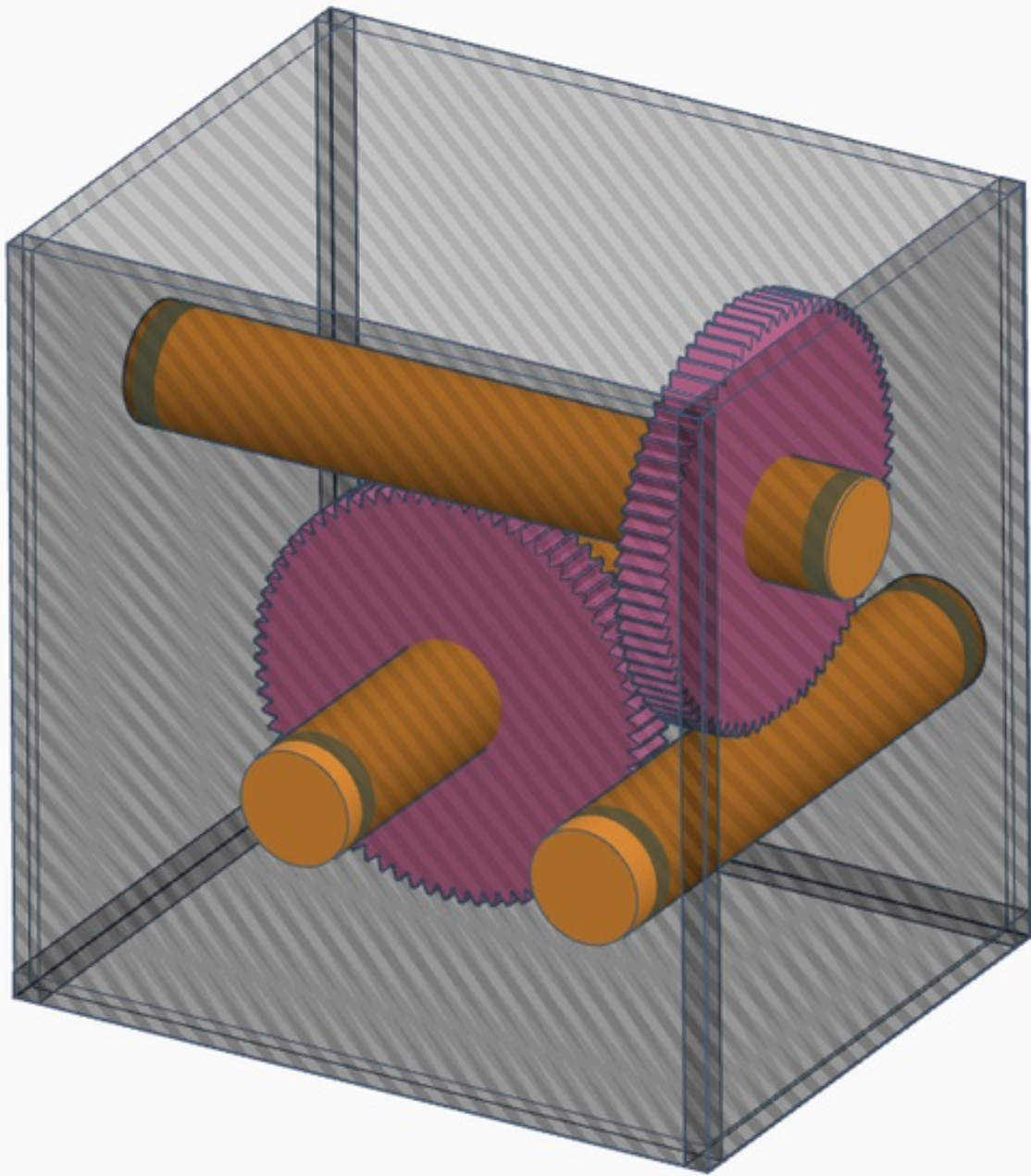
A small enclosure is designed to house the gears and keep them at place.

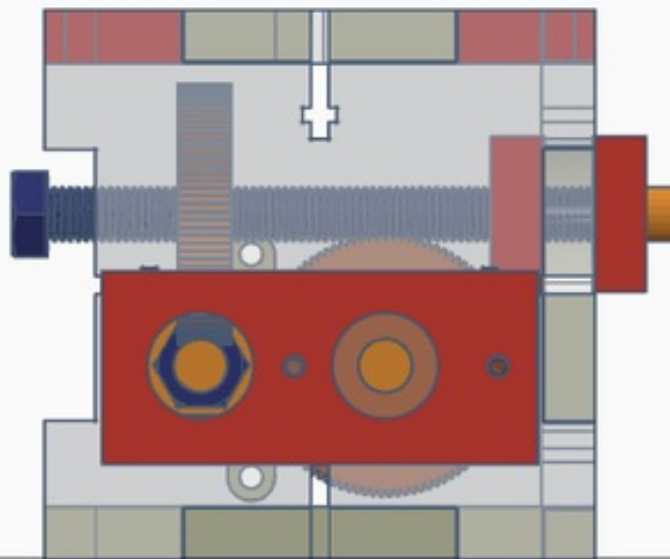
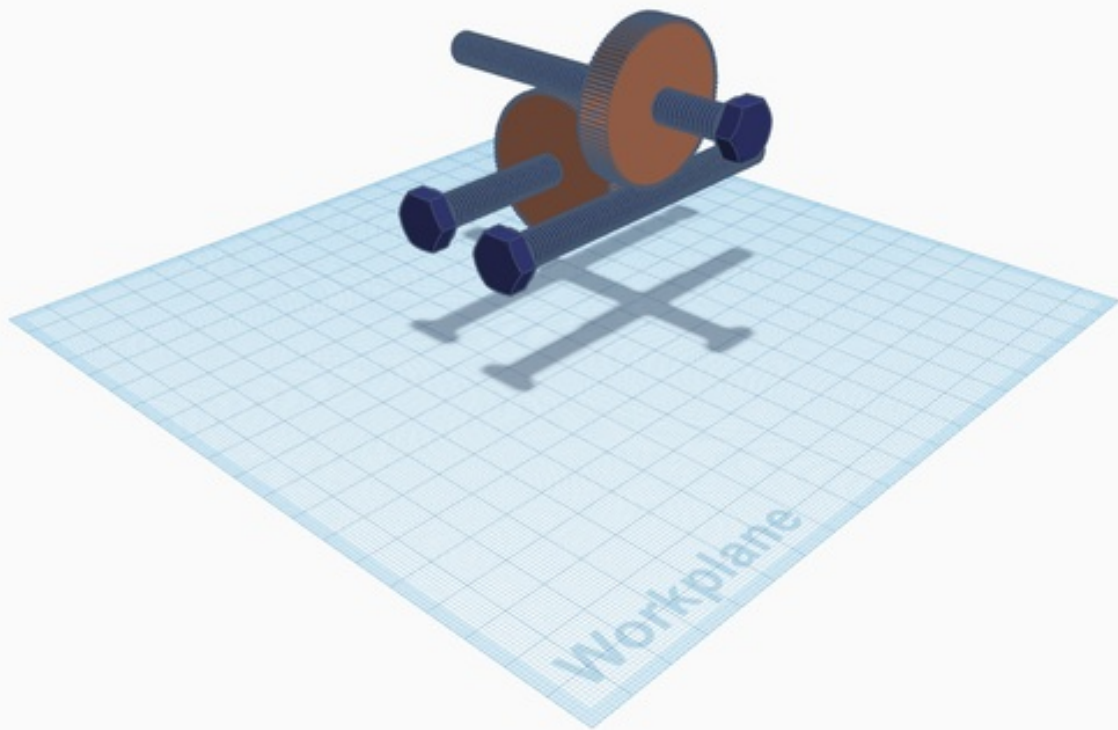
Feel free to play around the design on tinkercad

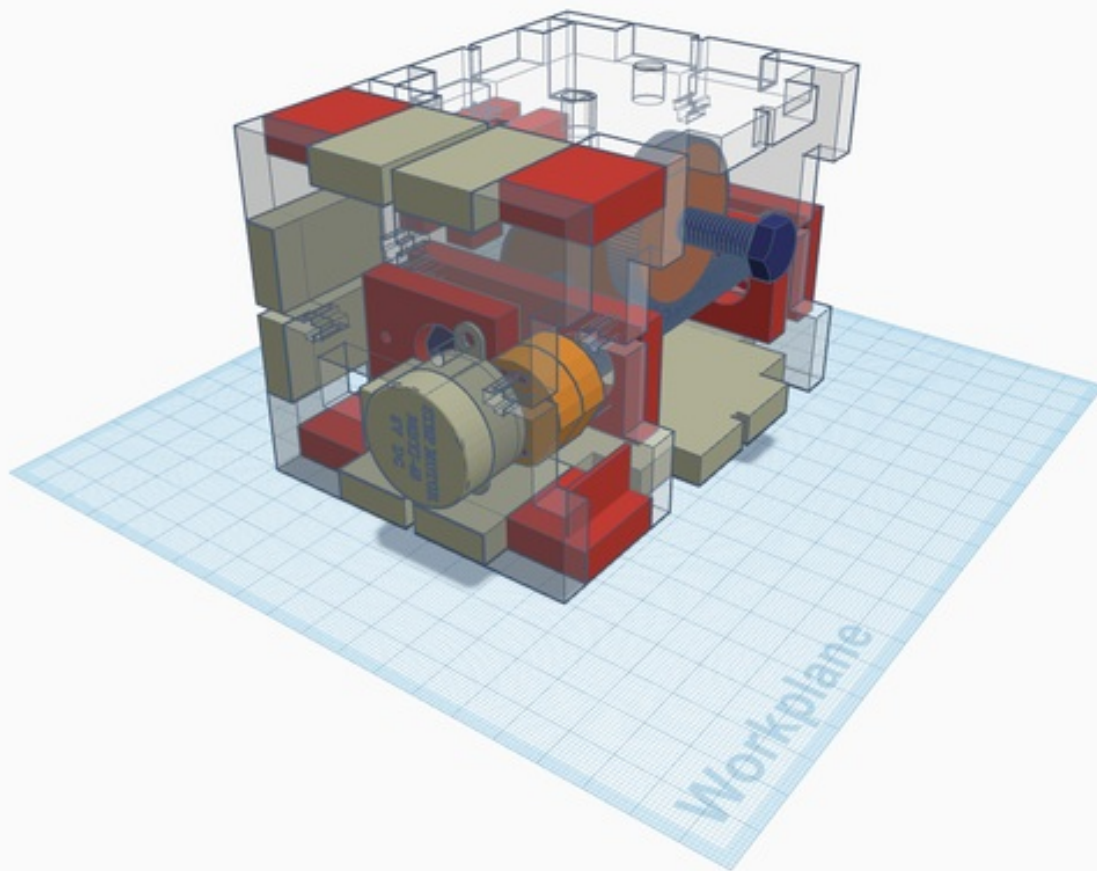
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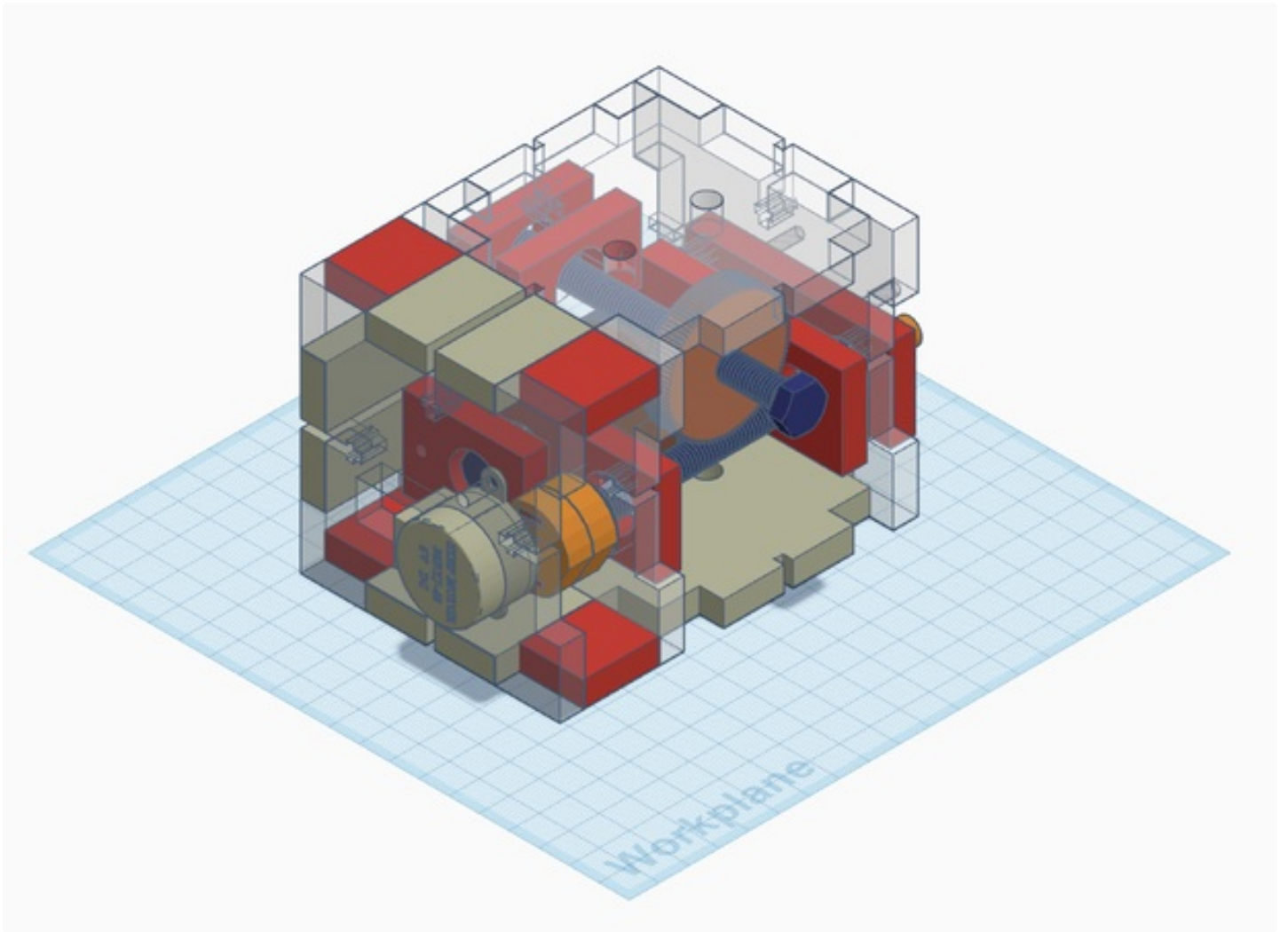
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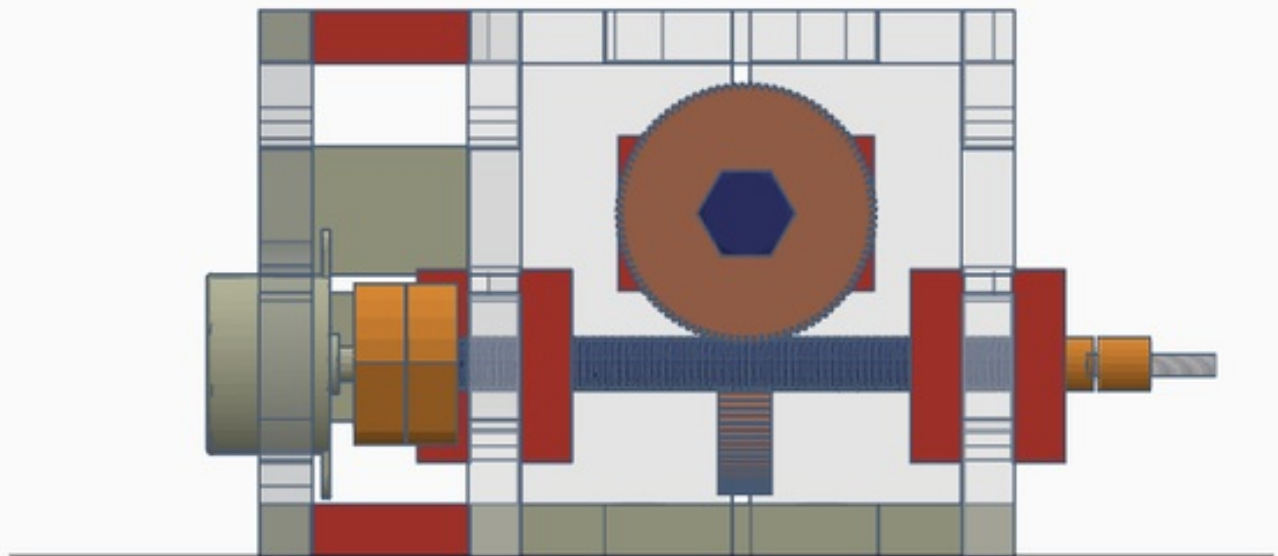
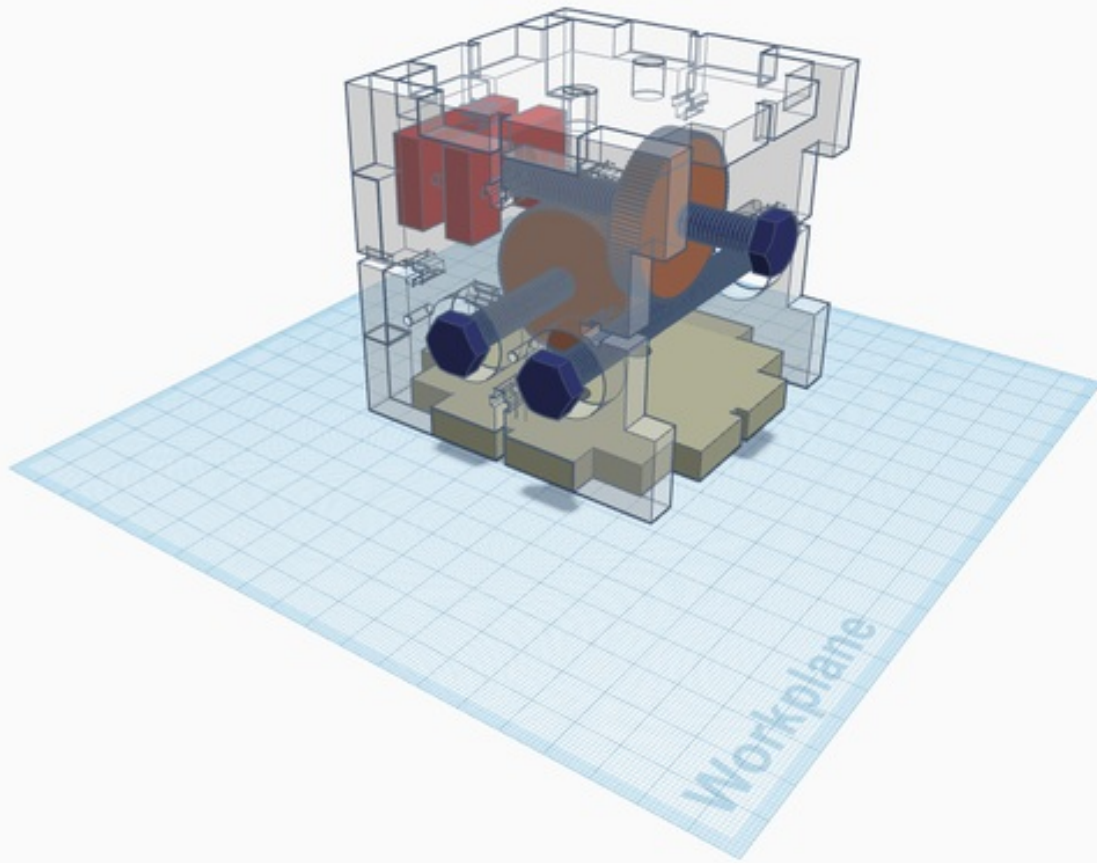
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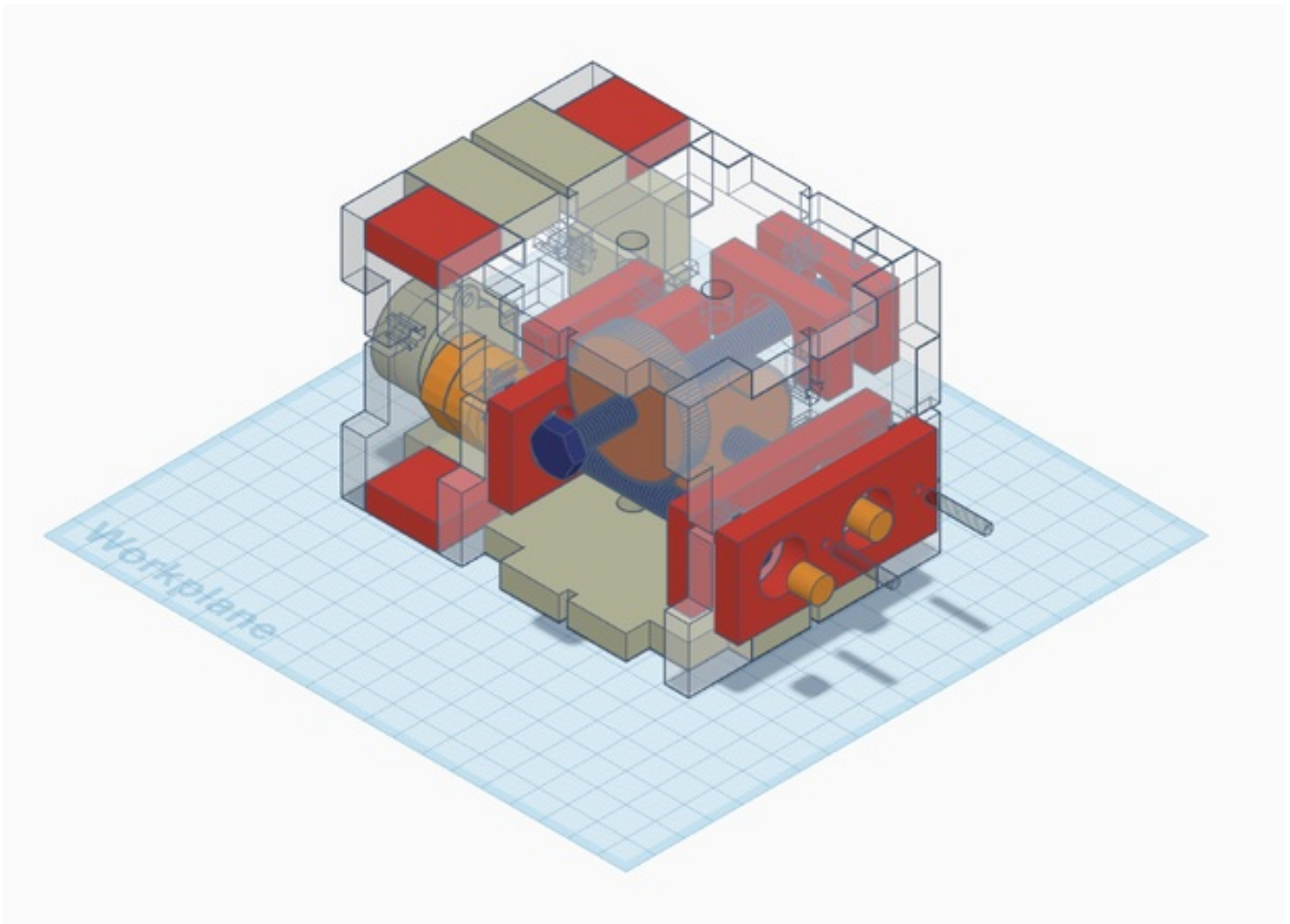






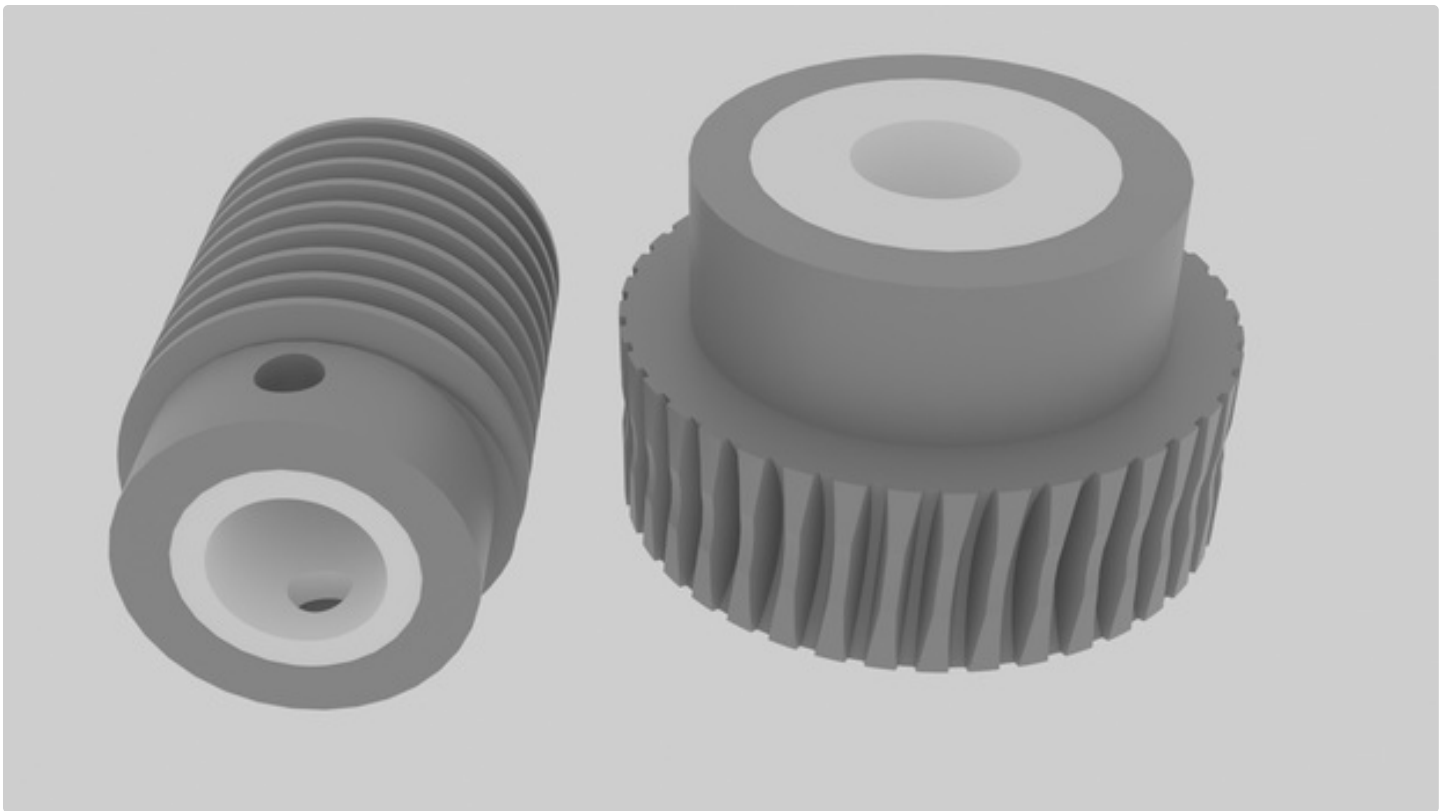






Step 4: Gears

Initially I was using laser cut gears but honestly it is a really bad Idea and I wont suggest anyone. I used M8 bolt as a worm shaft and laser cut the gears. They lacked the required grip and soon the gears were completely destroyed. I suggest going for a 3d printed gears. Feel free to download it and remix according to your needs. I haven't tried these gears but I am pretty sure they will work. If you do use, let me know how it goes.

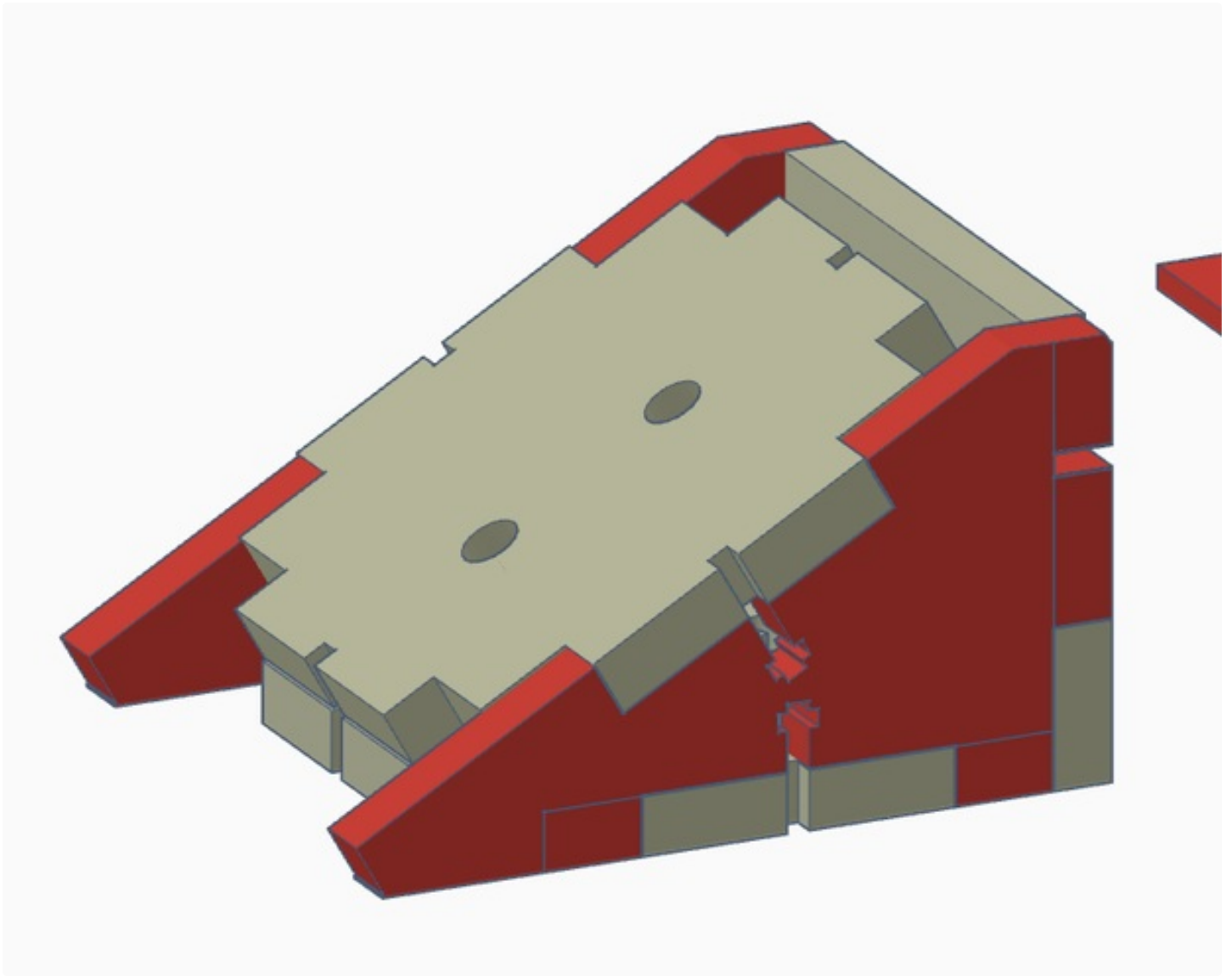


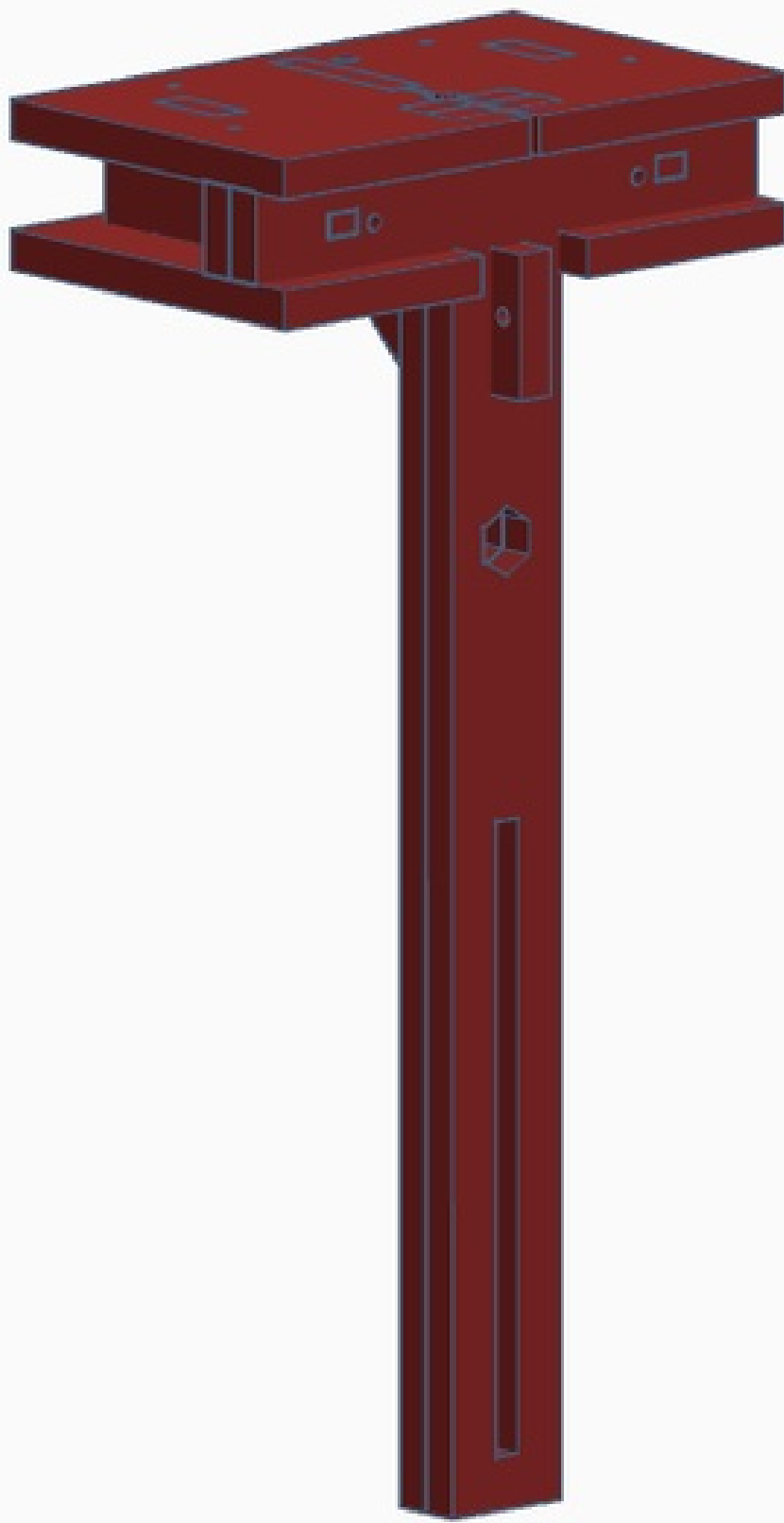
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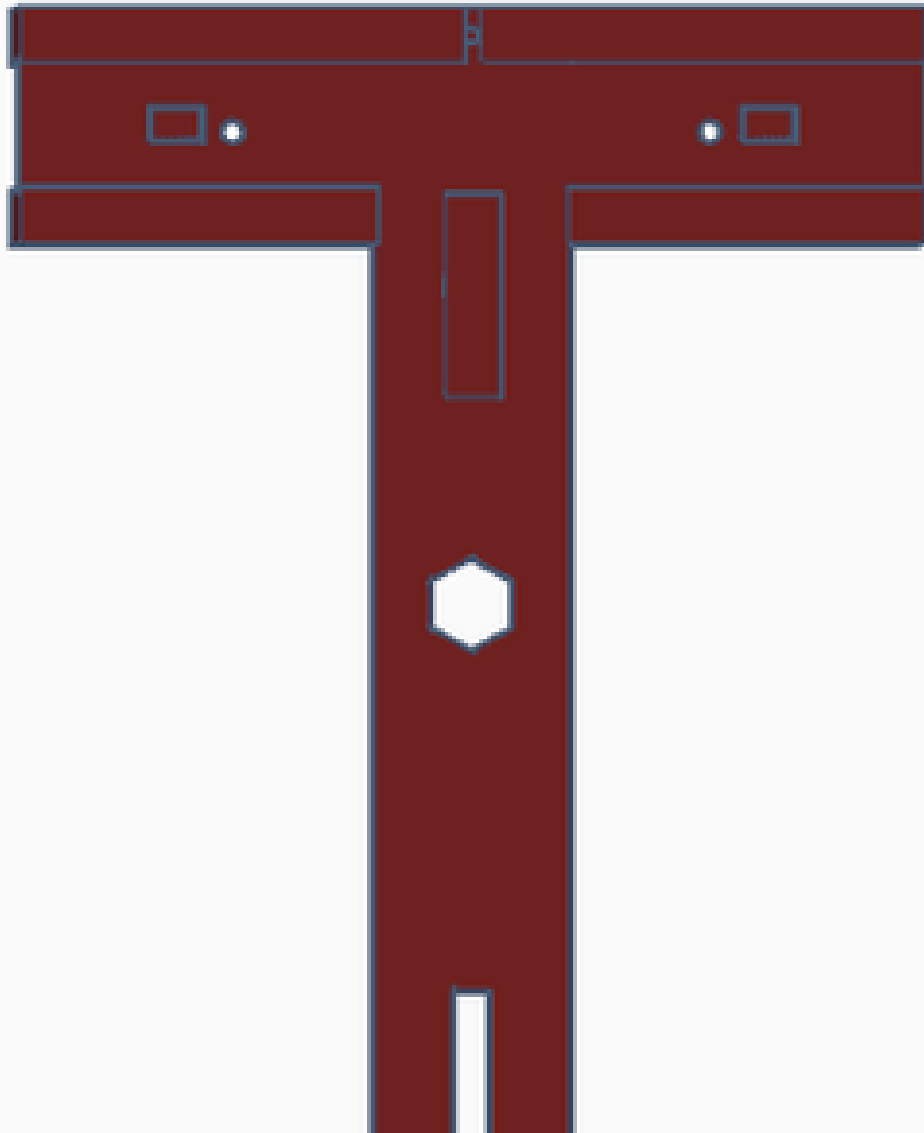
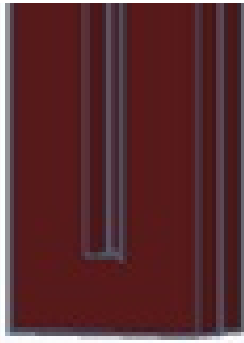
Step 5: Camera Mount and Angle Mount for Tracker

Not gonna lie, these turned out better than expected. The mounts are really strong and sturdy and I won't mind mounting my camera on it. (your mileage may vary)









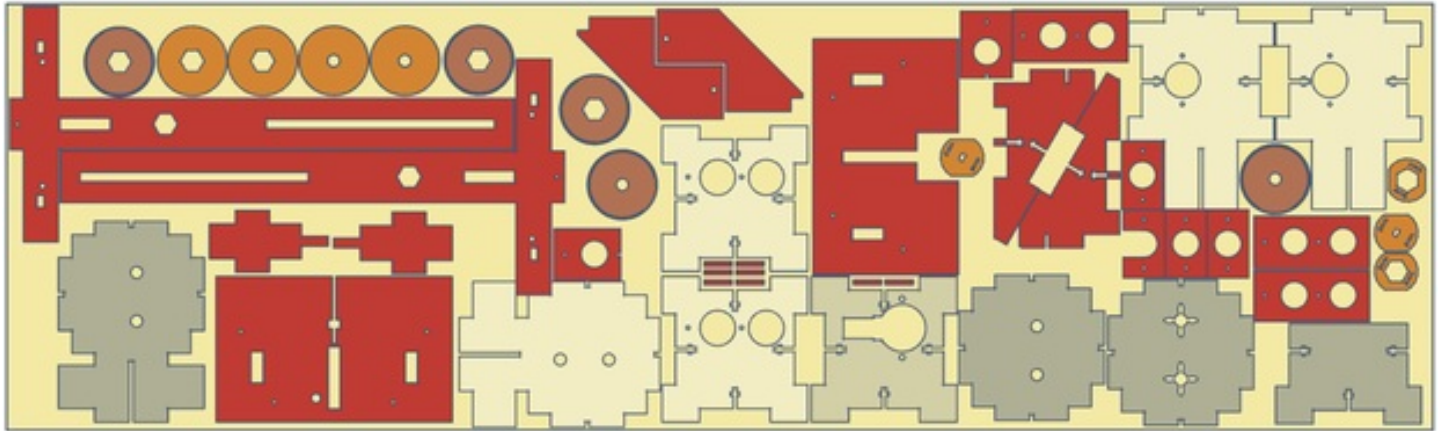


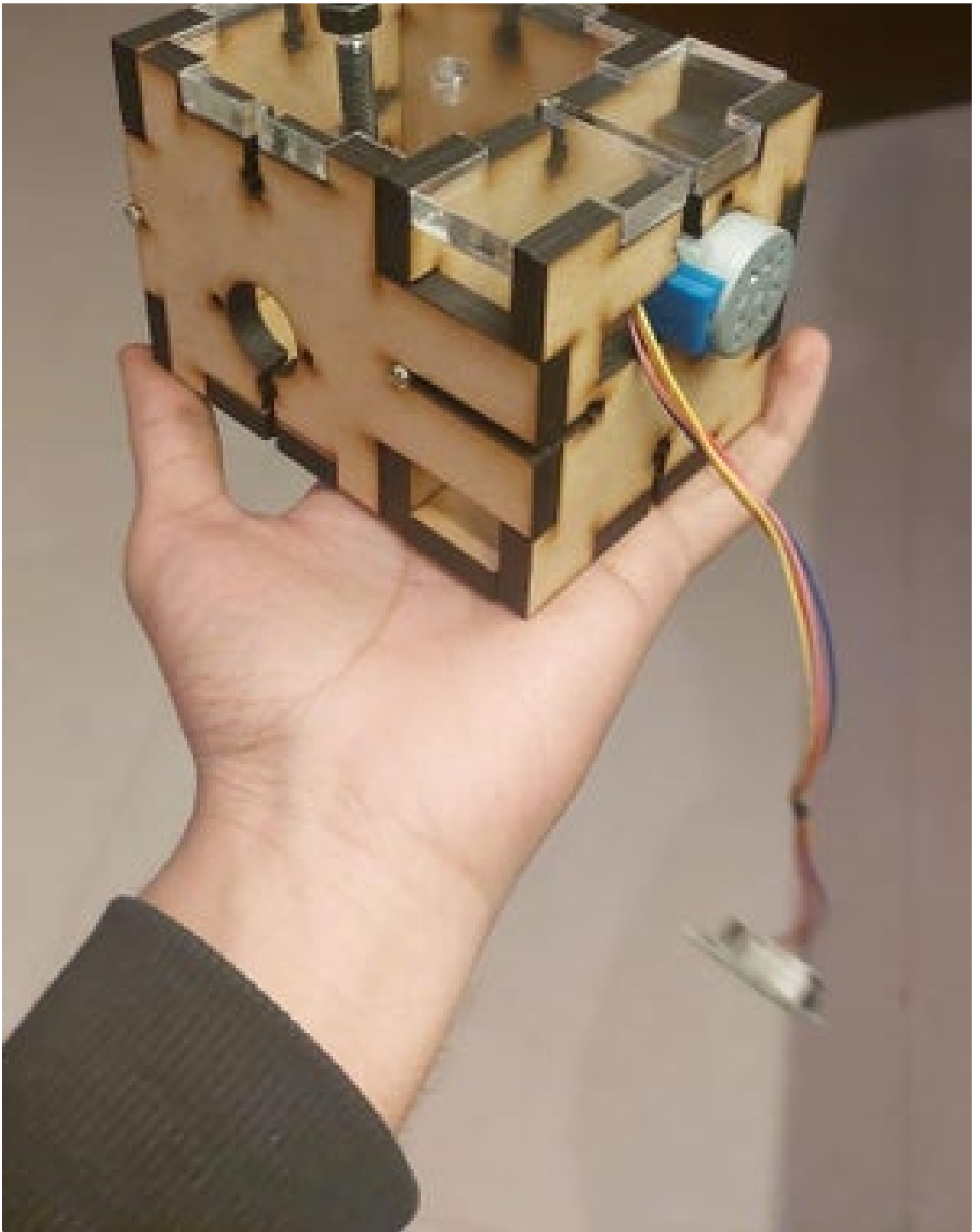
Step 6: Laser Cutting and Assembly

After the design process was complete. I cut 4mm thick MDF (Prefer 8mm acrylic) and started assembling it. Some joints were a little difficult to add but after a little bit of tinkering everything worked out amazing except of course the gears.









Step 7: Conclusion

Thanks for stopping by and giving it a read. In case I missed something please let me know. I would love to revisit this project and make it better.

Also here are some great tools that really helped me out in my journey.

<https://evolventdesign.com/pages/spur-gear-generator>

<https://en.makercase.com/#/>