The Cable Connector

Started on 2/4/2020

In order to solve the problem of loose cables which can result in issues that range from major to minor issues, I decided to create a system of adjustable suction cubs in order to create a product that keeps cables safe and secure

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Problem examples

Loose Cable on mac book USBC with proposed solutions- https://appletoolbox.com/are-your-macbook-usb-c-ports-loose/

Video Example of loose cable. Current proposed solution is to just buy a new cable (What if it is a problem with the port?)- https://www.youtube.com/watch?v=k5r5dRNR8JA

Issues with current solutions

Current professional repair costs

Samsung Charging Port Repair Option	Estimated Price Range
Lint/Debris Removal	$0
DIY Repair	$2 – $30
Professional Repair Service	$50 – $90
Phone Insurance Claim	$49 – $50

From - https://flipsy.com/article/21/how-to-repair-the-usb-charging-port-on-a-samsung-phone

Laptop repair is even more expensive

"This repair price will vary per repair shop and the reason being because this is a soldering job. The part itself cost will cost no more the about $6-$12 but the ability to have some one desolder the old port and solder the new port on.

At my shop this wouldn't be anymore then about 129.99 dollar repair but then again we solder things all the time. (HDMI Replacements, Charger ports for tablets, iphone IC chips, etc.)

The repair shop you went to is probably charging you for an entire new computer or new motherboard." - @kcthreadsntech on

https://www.ifixit.com/Answers/View/523674/The+charger+port+is+broken

https://www.amazon.com/Organizer-Charging-Silicone-Cubicle-Accessories/dp/B082HDX1XC/ref=asc_df_B082HDX1XC/?tag=hyprod-20&linkCode=df0&hvadid=416800542128&hvpos=&hvnetw=g&hvrand=16994884675185864663&hvpone=&hvptwo=&hvqmt=&hvdev=c&hvdvcmdl=&hvlocint=&hvlocphy=9016853&hvtargid=pla-872116464138&psc=1&tag=&ref=&adgrpid=97957278870&hvpone=&hvptwo=&hvadid=416800542128&hvpos=&hvnetw=g&hvrand=16994884675185864663&hvqmt=&hvdev=c&hvdvcmdl=&hvlocint=&hvlocphy=9016853&hvtargid=pla-872116464138 - This solution does allow for sturdy cables and keeps everything in place, but it lacks portability and variability. What if you wanted to put stuff at a different angle, or vertically? This type of device does not allow for that to happen

https://www.youtube.com/watch?v=iifmZIsgwu0 - This solution shows a way to tighten the socket of an antenna tv but it is very tedious and not practical for the average consumer to work with.

Additional information

https://diyaudioprojects.com/Technical/American-Wire-Gauge/ - AWG wiring standards. Diameters do not stretch very big.

The majority of cables tend to have a protective mold just before the end of the wire.

As seen with this product the cables are being held in plays by the mesh that surrounds the tip potential ideas.
https://www.amazon.com/Organizer-Charging-Silicone-Cubicle-Accessories/dp/B082HDX1XC/ref=asc_df_B082HDX1XC/?tag=hyprod-20&linkCode=df0&hvadid=416800542128&hvpos=&hvnetw=g&hvrand=16994884675185864663&hvpone=&hvptwo=&hvqmt=&hvdev=c&hvdvcmdl=&hvlocint=&hvlocphy=9016853&hvtargid=pla-872116464138&psc=1&tag=&ref=&adgrpid=97957278870&hvpone=&hvptwo=&hvadid=416800542128&hvpos=&hvnetw=g&hvrand=16994884675185864663&hvqmt=&hvdev=c&hvdvcmdl=&hvlocint=&hvlocphy=9016853&hvtargid=pla-872116464138

https://www.walmart.com/c/kp/suction-cups - Potential Idea to keep the cable connector in place. Suction cups are very good for security.

2/10/21

Problem Statement

- **What**..Exactly is the problem?
- **Who**..Says there is a problem?
- **Where**..Exactly is the problem happening?
- **When**..Is it happening? How long?
- **How Many People**.. Does the problem impact? Statistics?
- **How..**do you plan on solving the problem

Loose Cable on mac book USBC with proposed solutions-
https://appletoolbox.com/are-your-macbook-usb-c-ports-loose/

Online forum shows several people with this current problem with USB-C and charging ports.
https://www.reddit.com/r/essential/comments/83lrmn/charger_is_loose_wont_stay_in/

"A **loose** neutral wire can cause abnormal arcs around its connection point, usually causing the neutral wire to become unusually hot, burning its insulation and even causing damage to its environment. A **loose** neutral wire is also the cause of most electrical fires."
-https://homex.com/ask/why-are-loose-wires-dangerous

"From 2014 to 2016, an estimated 24,000 residential building electrical fires were reported to United States fire departments each year. These fires caused an estimated 310 deaths, 850 injuries and $871 million in property loss." - FEMA

"Residential building electrical fires resulted in over twice the dollar loss per fire than residential building nonelectrical fires did." - FEMA

The broken USB C is another often talked about topic when it comes to this issue. More often it is the port that breaks rather than the cable.

Proposed solution will keep all wires secure and in place preventing both minor and major inconveniences
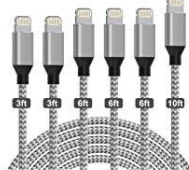
Problem statement:

Through the last few decades, with the rise of technology, we have seen an increasing need for cables. Cables help to provide connections, run systems and it is crucial to a lot of the technology that we use today. Loose cable connections however, are a very prevalent problem with this rise in technology. Not only are loose/weak connections annoying and less than satisfactory inconveniences, but they can also lead to much more serious consequences. Loose cable which carries large amounts of current and potentially causes

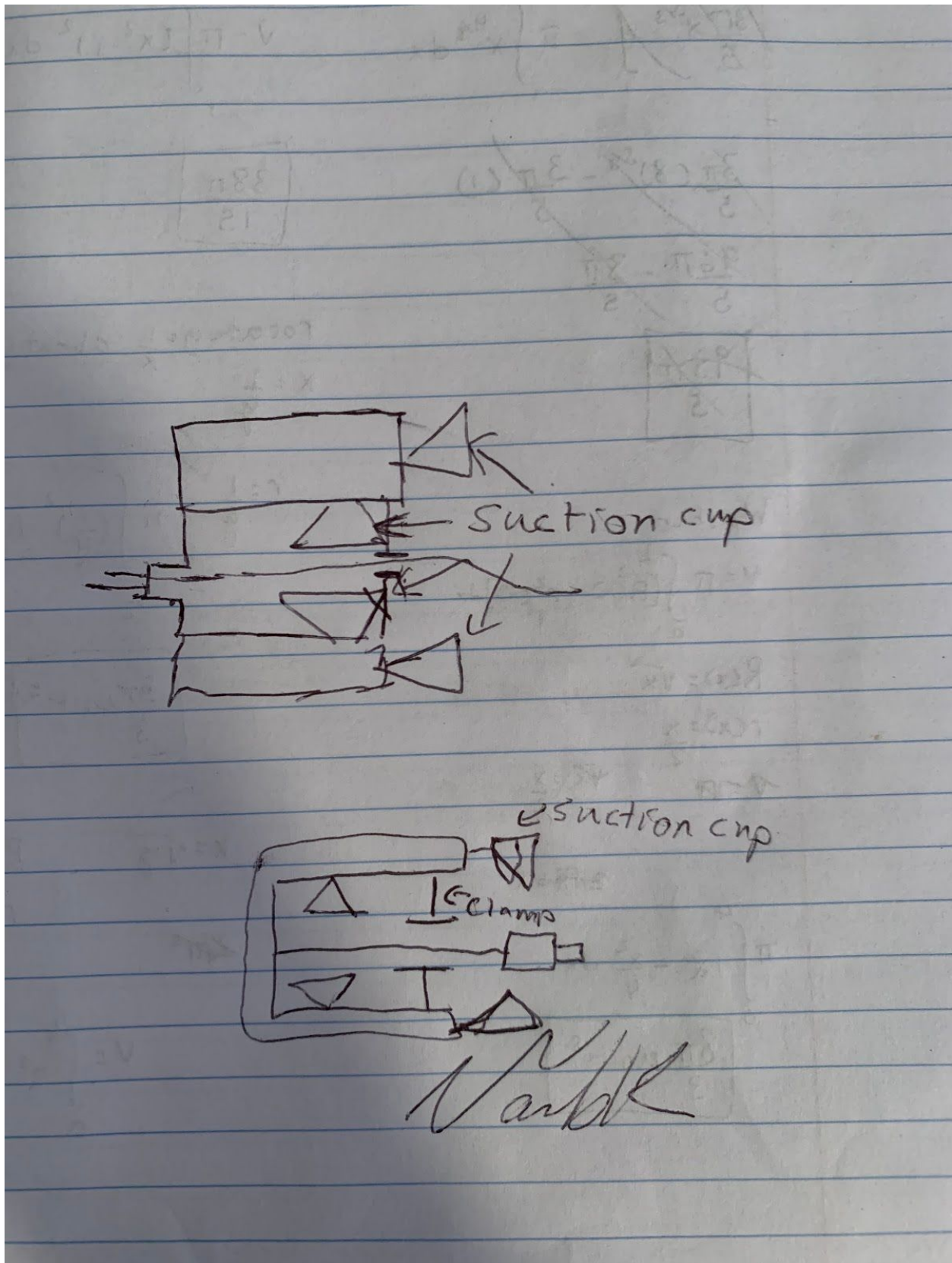very severe problems such as house fires and more.

Proposed solution:

Create a device that holds a cable at its tip and has 4 suction cups (2 facing down and 2 facing forward) that are adjustable and can attach to any surface. This will keep the cable in place and will allow for any necessary adjustments to be made.

My personal problem which inspires me to make this was that my guitar cable would always come loose. It was very hard for me to fix and it would have been much easier if I could have just bought something that would keep it secured in.

Best Sellers in Electronics Cables

#1 UNEN iphone Charger (3/3/6/6/10FT) 5 Pack- Black and Blue
24,042
$13.99 ✓prime

#2 Amazon Basics High-Speed 4K HDMI Cable - 6 Feet
274,926
$7.99 ✓prime

#3 iPhone Charger, YEFOOT [Apple MFi Certified] Cable 6Pack[3/3/6/6/10ft] Nylon Braided Fast...
6,814
$12.99 ✓prime

#4 iPhone Charger,5 Pack (6 FT) MBYY [Apple MFi Certified] Charger Lightning to USB Cable...
9,779
$12.99 ✓prime

#5 iPhone Charger Cable,(3Pack 6Ft) Cabepow Lightning Cable 6 Foot,6 Feet iPhone Charging...
42,873
$7.87 ✓prime

#6 USB C Cable, Anker [2-Pack, 6 ft] Type C Charger Premium Nylon USB Cable , USB A to Type C...
53,306
$11.49 ✓prime

#7 Aux Cord Compatible with iPhone, iSkey 3.5mm Aux Cable for Car Compatible with iPhone 8/7...
10,421
$8.99 ✓prime

#8 Moread HDMI to VGA, Gold-Plated HDMI to VGA Adapter (Male to Female) for Computer,...
29,076
$7.99 ✓prime

Since amazon primarily sells chargers it is important to make this device have a narrow enough end in order to keep the thin wire of the charger secure.

Above is my very first rough sketch of the concept

Clamps For body

Clamps For cable

Clamp For cable head

Main body

Main body extension
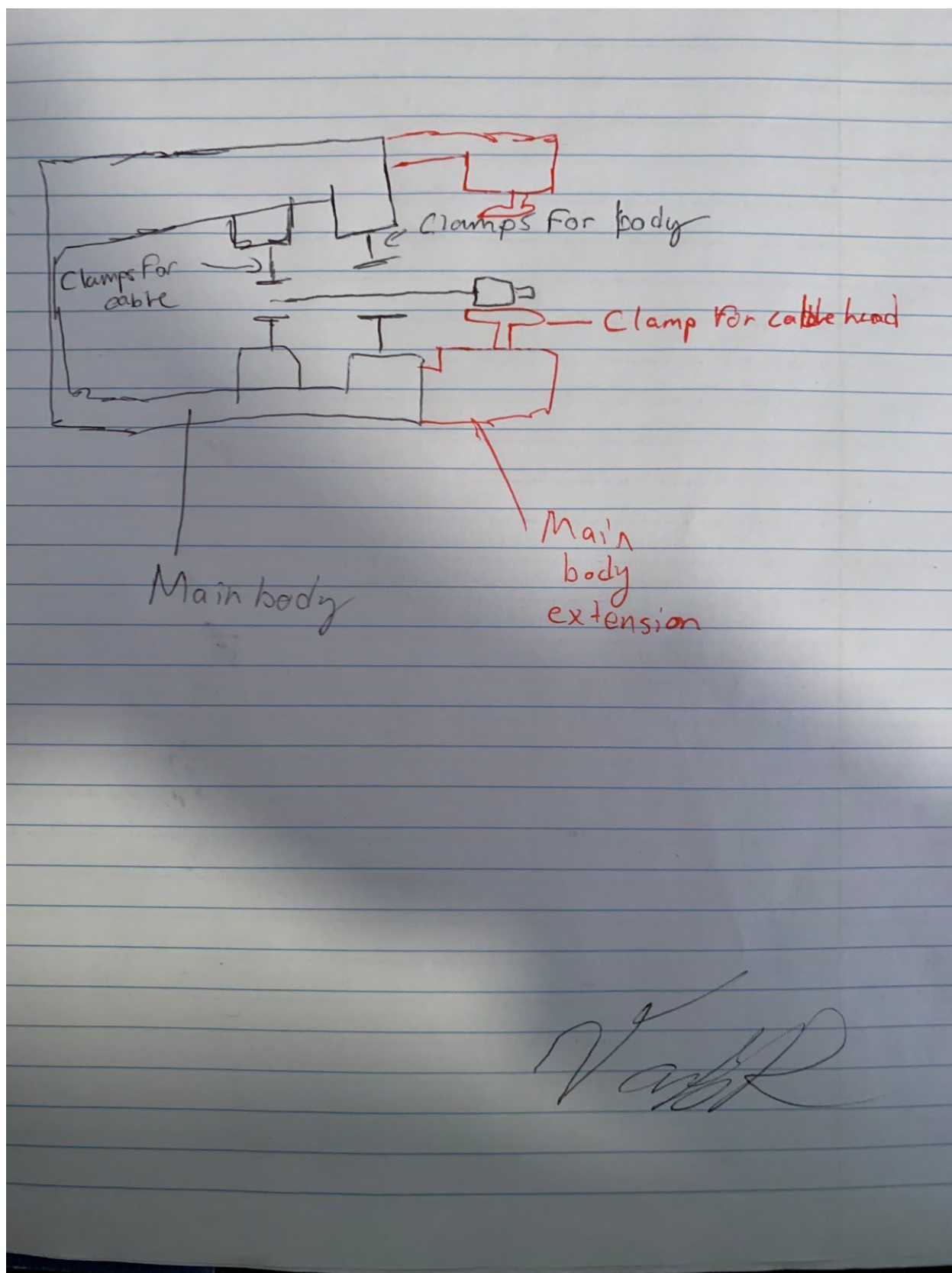
Above is another sketch. I feel kind of conflicted about using suction cups. I do not know how it will work so I am trying out the clamp system but as of right now it seems too intricate and as a result, it is very bulky. I am thinking of making the body that supports the cables smaller without clamps and I might go back to suction cups
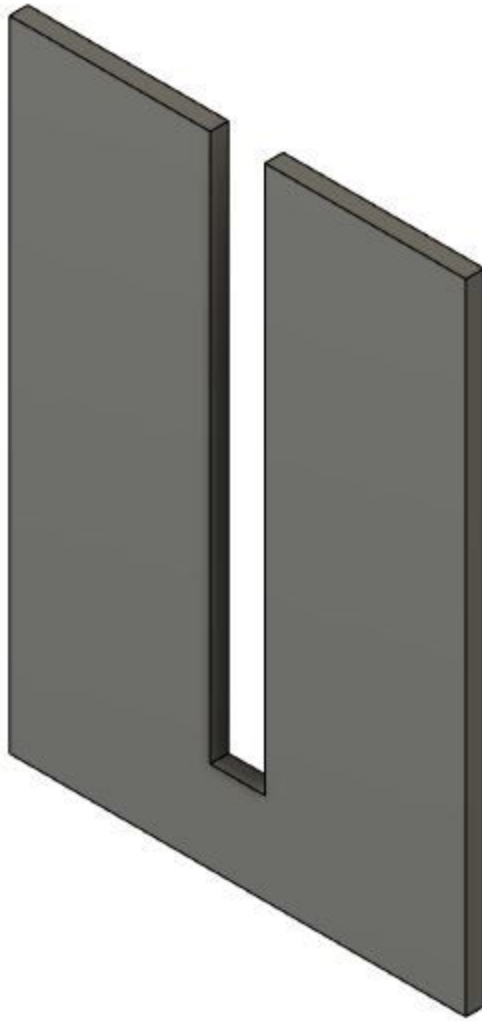
2/16/21 Mainly a sketching day. I came up with the final sketch and design.

Suction cup

Suction cup

Cable

Suction cup

suction cup

Cable

Front

suction cup
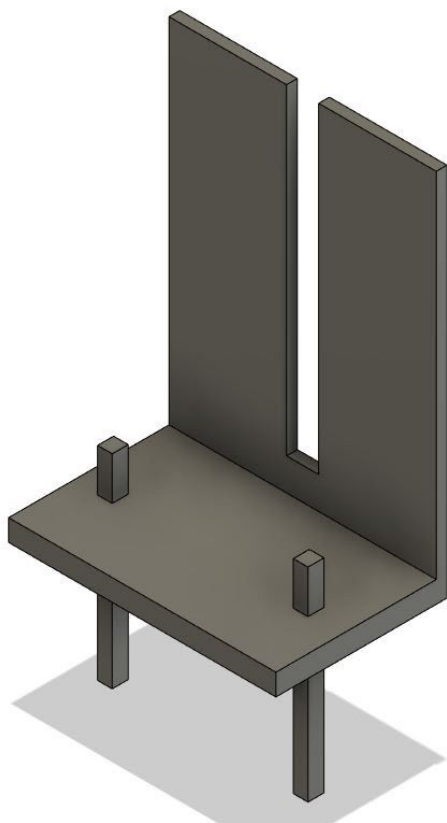
side
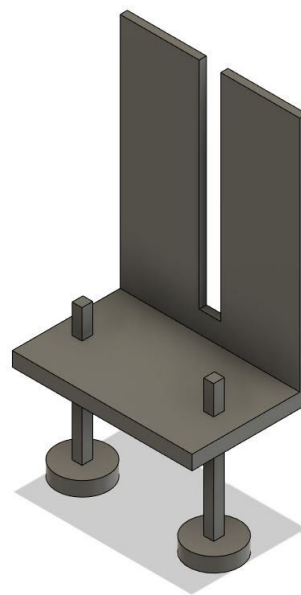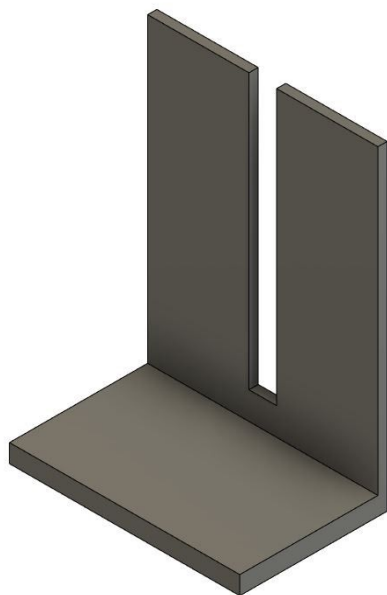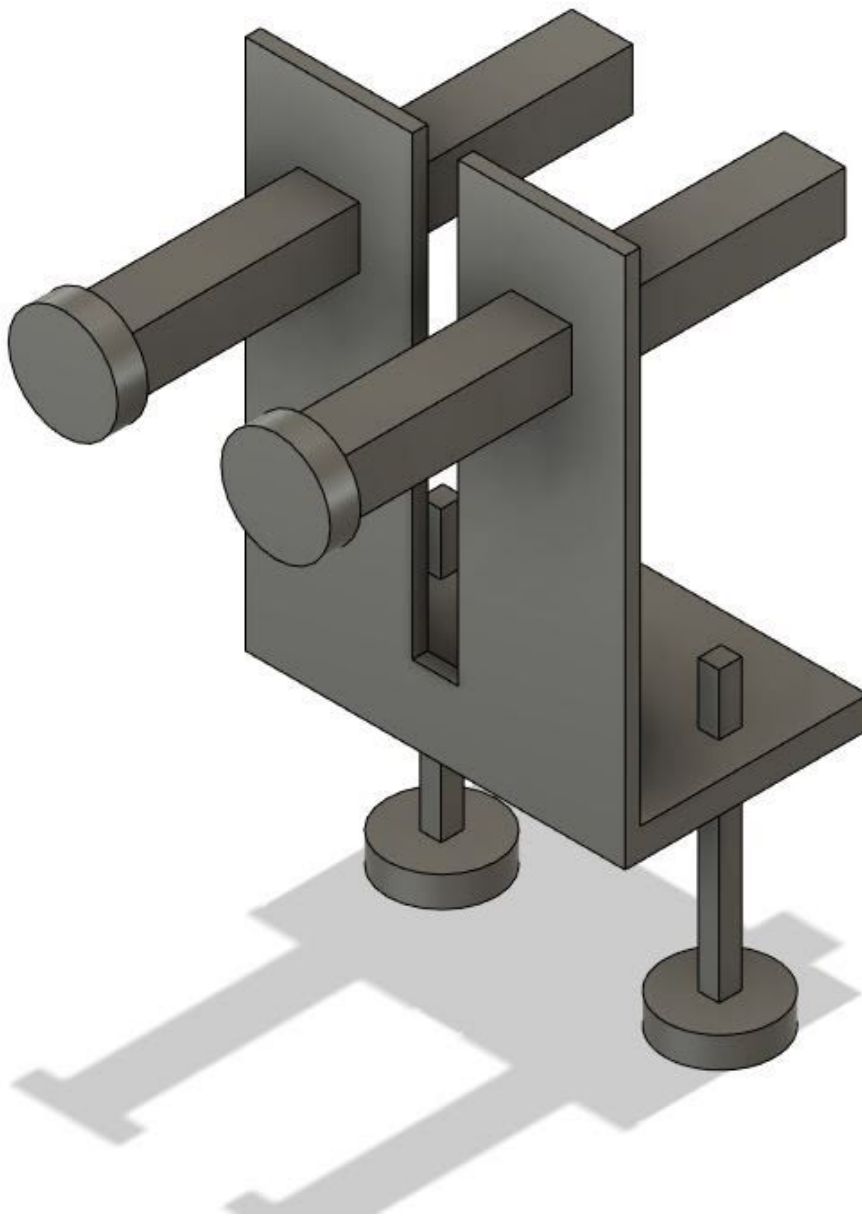
Suction cup

Suction cup
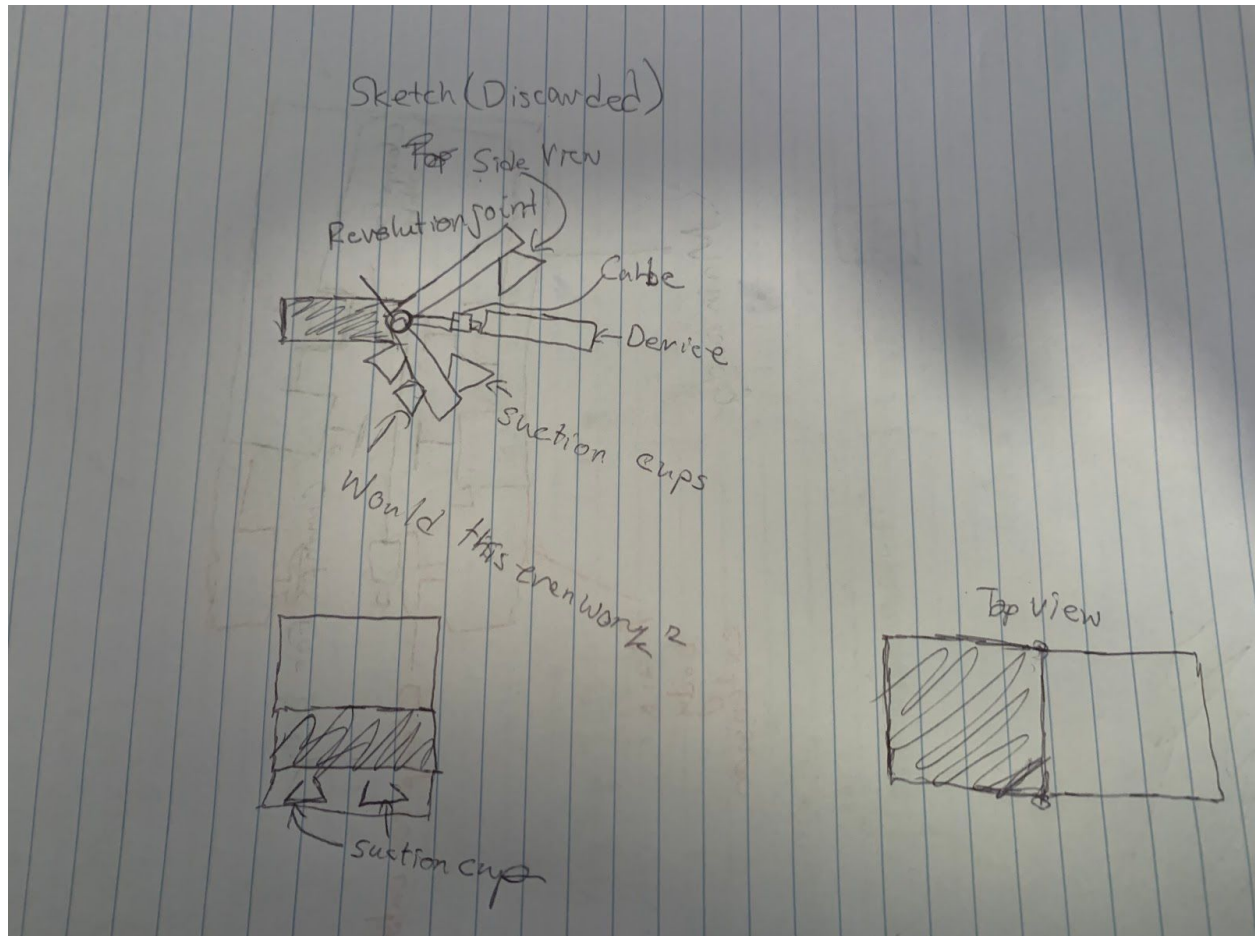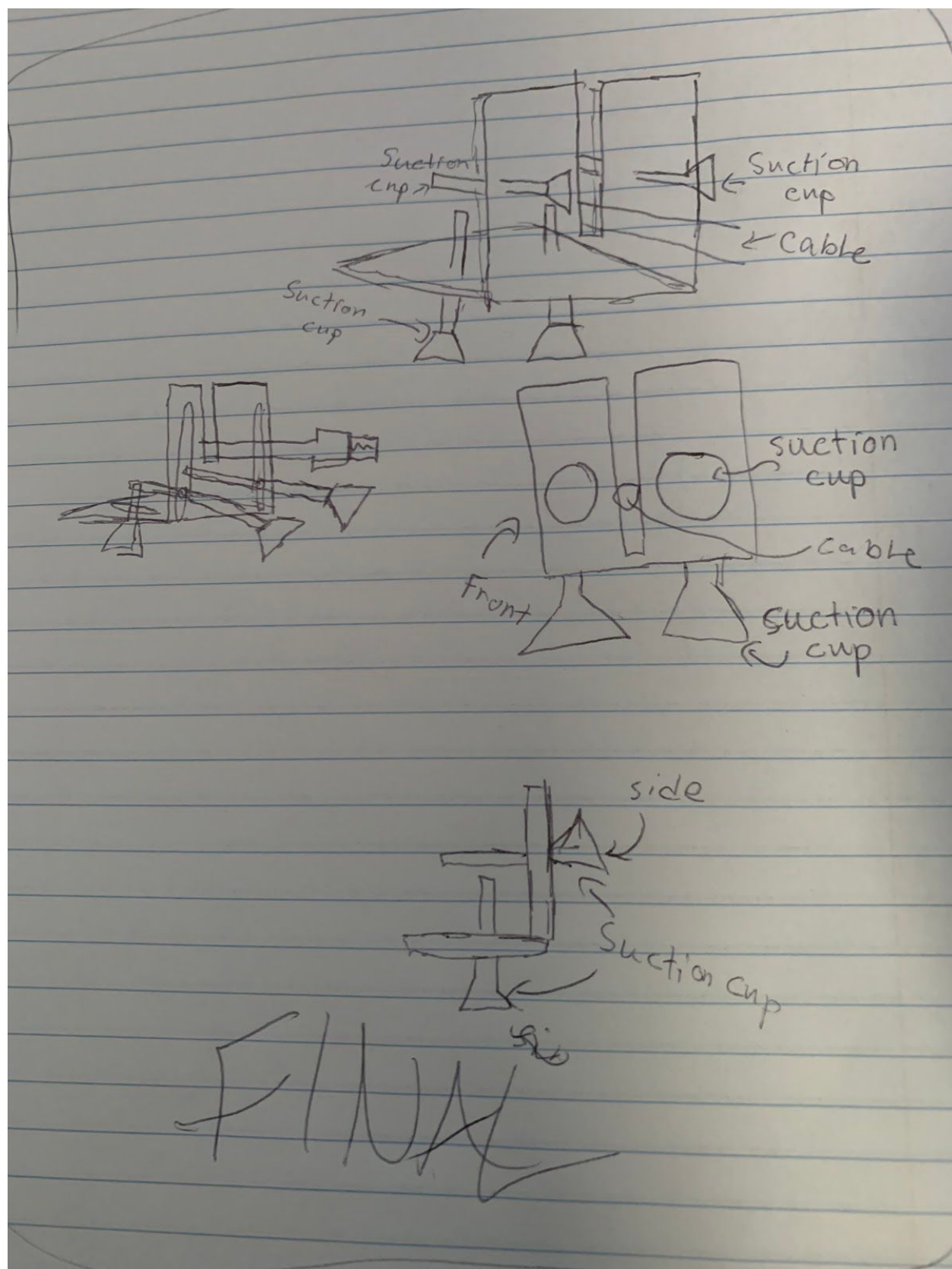
FINAL

2/17/2021 CAD Day

Today I built a rigid model which is going to be very similar to my non working prototype.
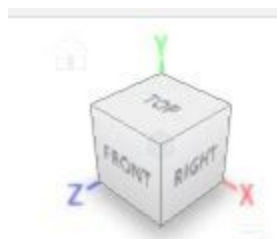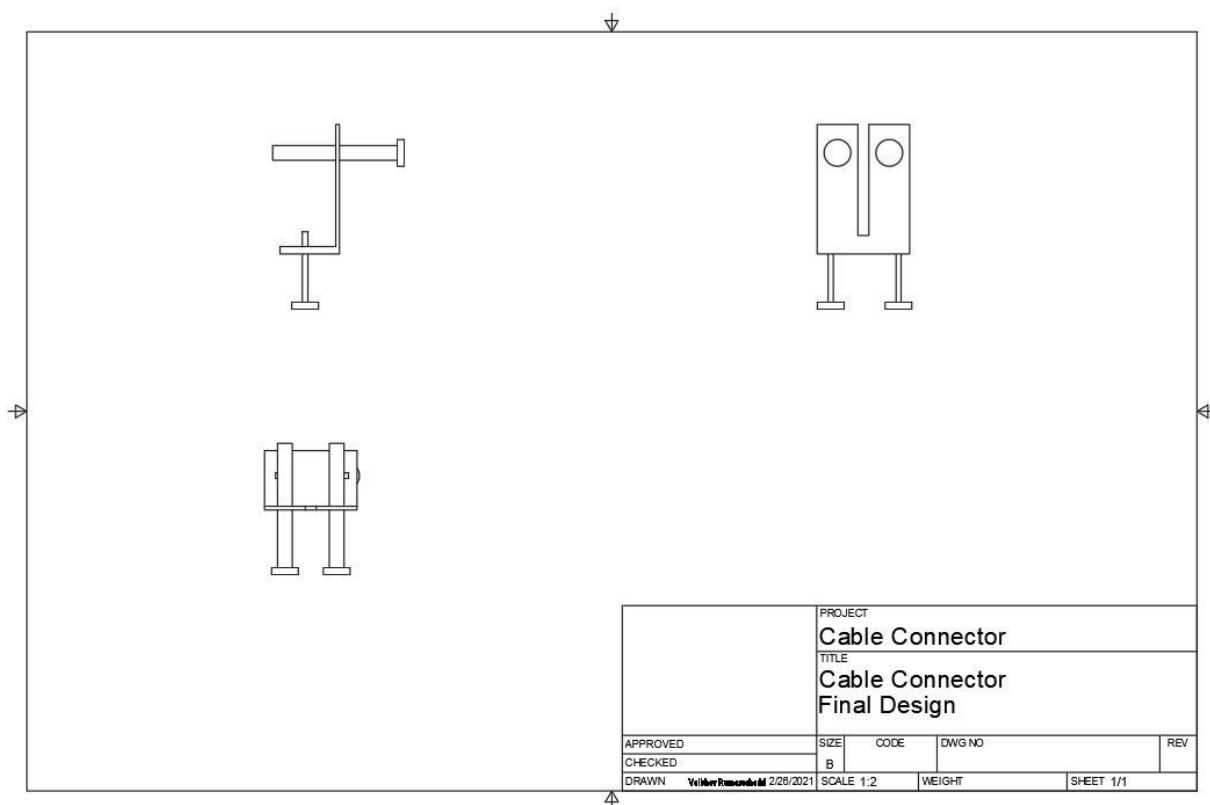
This is the final cad model. As you can see, the little slot in the center is where I plan to put the cable through. I made sure that the slot was small enough such that the protective mold at the tip of the cable could assist in securing the cable in place. The cylinders are

supposed to be the suction cups and the rods they are attached to are supposed to be

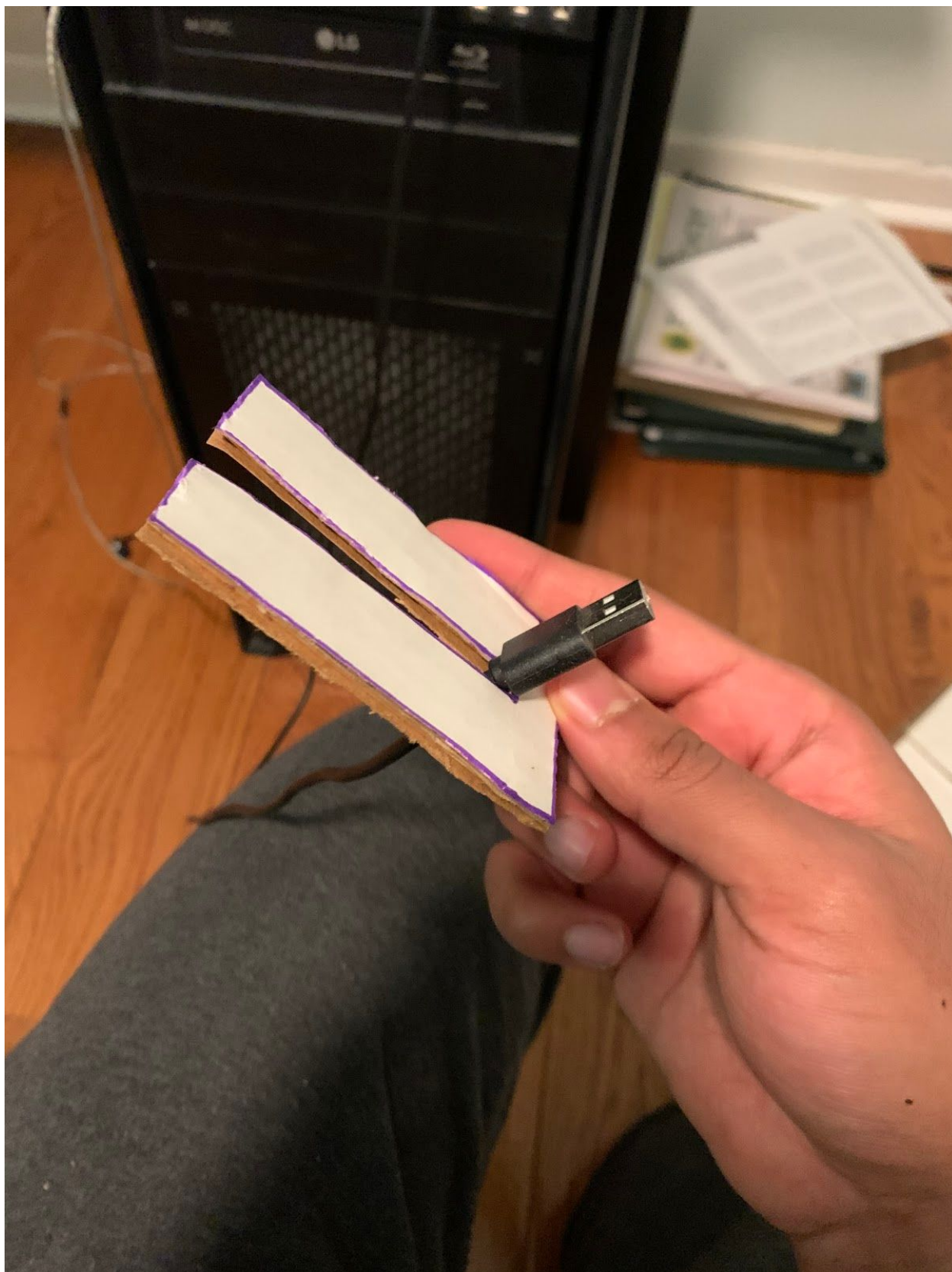adjustable rods. The rods adjust along the y and z axis.   This image is here for reference. One thing that may stand out and look rather odd is that the rods that point in the direction of the z axis are thicker than those that go about the y axis. The reason for this is because if this device is going to hang free with those suction cups, it is going to need some extra support so that it doesn't break.

	PROJECT			
	Cable Connector			
	TITLE			
	Cable Connector Final Design			
APPROVED	SIZE	CODE	DWG NO	REV
CHECKED	B			
DRAWN Velther Remerded M 2/26/2021	SCALE 1:2		WEIGHT	SHEET 1/1

Drawing done from CAD model

2/21/21 Non Working Prototype Building

Testing

The product was tested by creating many mock scenarios. Since there were no real suction cups I tested to see if the suction cup could fit in each scenario. Unfortunately the model could not fit on EXTREMELY curvy surfaces but it did work for the most part