The Hole Wizards™



Multi-Functional Kitchen Gadget

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ENSC 204 | Fall 2025 – Graphical Communication for Engineering

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Meet the Camp-a-Cook, a kitchen multitool with a camping and kitchen use . The fundamental ideas were as follows: create something sturdy enough to be used in a camping scenario, create a compact product that could fit into a camping backpack with ease, and have multiple uses to account for every cooking need a kitchen cook may have.

*All measurements are in inches unless otherwise specified.
*All tolerances are ±.006, gear bores are ±.002, bearing fits ±.00005, and flatness ±.004

There were a number of assemblies that should be noted. The first and foremost assembly was the base, made of 316 stainless cast steel. This is where all the attachments mount into. The base has a foldable crank and gearset to ensure compactness. In cases of a flat surface such as a cooktop threaded-insert suction cups are used to firmly secure the base, but also had heavy duty rolled 3010 steel to screw into wood surfaces that exist in the wilderness, supplemented with the appropriate screwdriver and storage compartment for the screws.

Ultem plastic is used for the gearset and driveshaft to ensure durability, quiet operation, and dishwasher safey. Lubricant is not required for Ultem plastic, providing a low maintenance gearset. Sealed ABEC 9 bearings are used for smooth and low-backlash operation. Ultem plastic is also used for the housing for its FDA compliance. A hand crank allows for use both in the outdoors, and in a kitchen tabletop.

The first attachment, the apple core peeler uses 316 stainless to prevent wear of the main screw on the base, the peeler and coring blade are made of stainless steel to prevent dulling over time. An apple or equivalent is inserted, and the peeler arm pushes against the peel and flawlessly and quickly peels the apple as the peeled apple makes its way through a coring blade, taking out the center.

The second attachment is the meat mincer. The outer shell is made of food safe ABS plastic, the feed screw is made of cast stainless steel, and the knife and grate is made of 316 grade steel to prevent dulling over time. The meat is pushed in from the top and fed to the knife attachment which minces the meat over time. The screwdriver is supplemented to push the meat in as well. The slots are adjusted to accommodate for a bowl.

The third attachment is the multi-grater. The outer and inner shell is made of 316 stainless formed steel, and a steel pressure press is used to form the cutting inserts. This machine is designed for heavy use to grate practically anything that can be grated. The inner and outer piece is detachable for easy cleaning after use. To simplify the linkage, the inner section is held in by the shaft, and the other section slots into the base. No base clips were added since it would be implied that one is pushing down to grate, therefore pushing it into the base.

The final design was chosen by combining a number of previous iterations into a single coherent iteration. This was done so that each component could be tested individually, and could then be put together after each design was confirmed to be working. The final design was also chosen to prioritize camping functionality slightly over kitchen functionality, but still be a competitive kitchen-only product.

Camping Kitchen Multitool

- Problem:

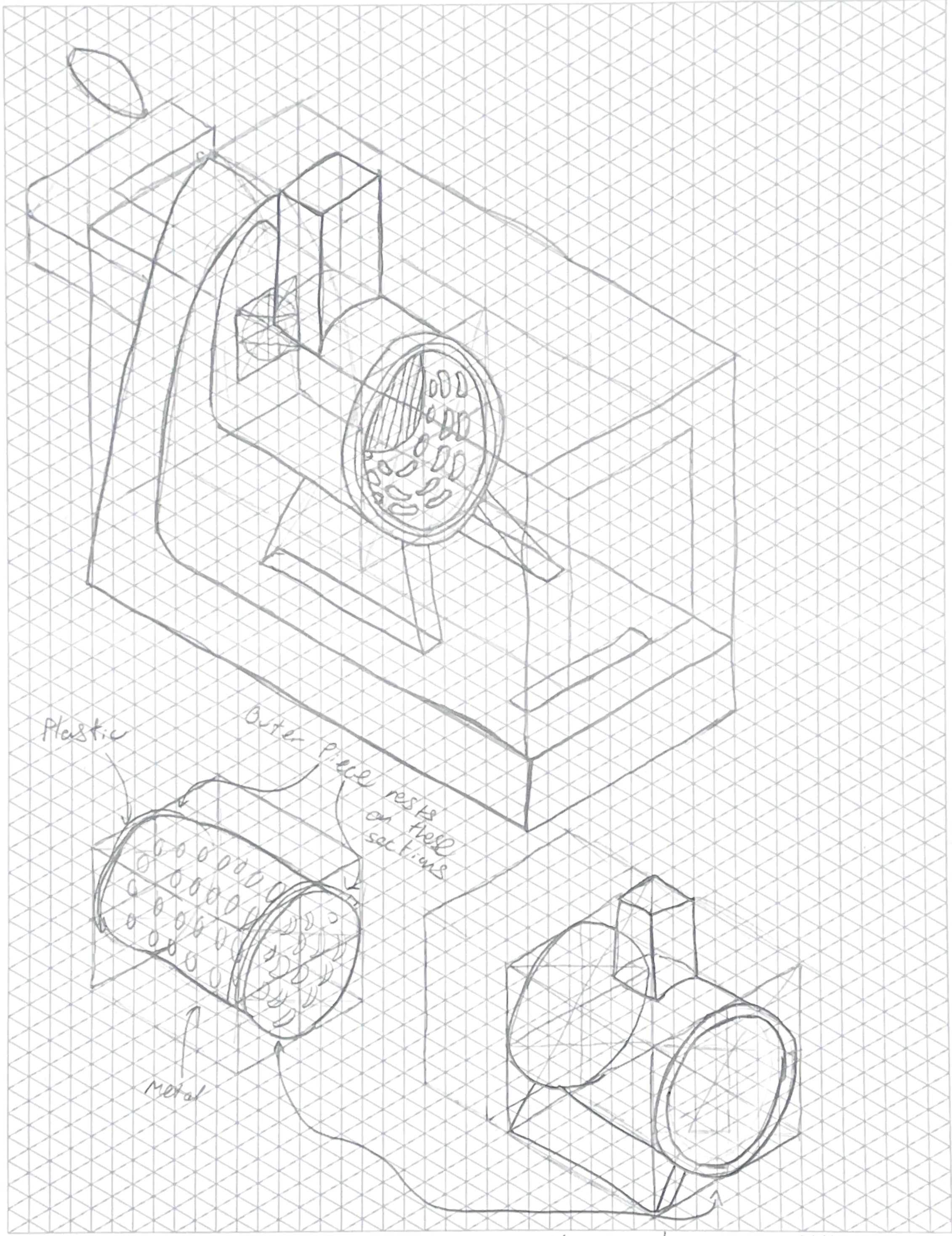
  Kitchen multitools are heavy, do not provide any scalability / interchangeability, and are not portable in the slightest

- Solution:

  Kitchen gadget / multitool that converts rotational motion of a hand crank into various tools for cooking.

Features:

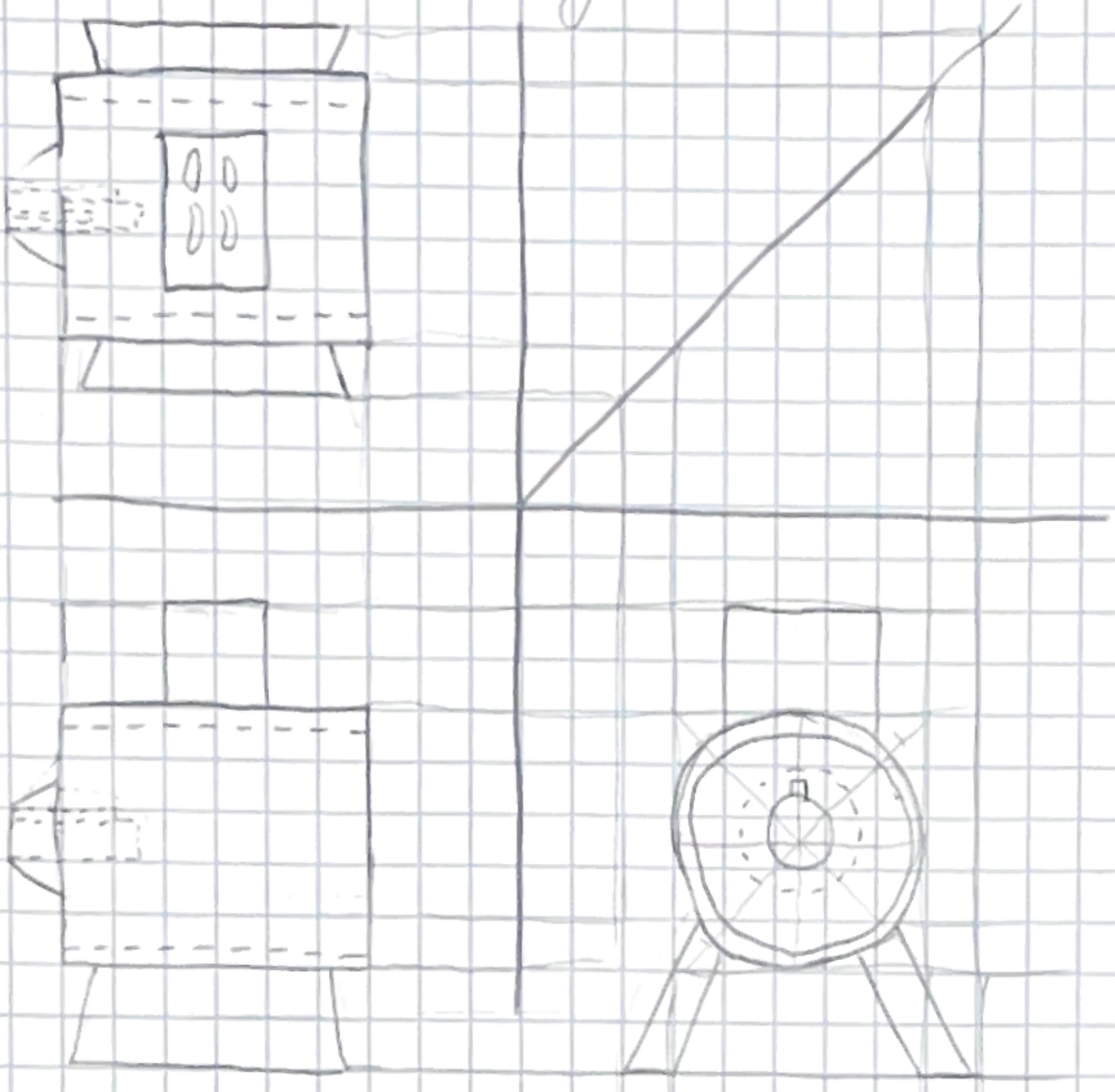
- Stainless Steel Sheet metal base for food safe anti-corrosion properties - Grade 304
- Brass bushings for gearset and handle
- Grade 304 Stainless Steel for gears
- Keyed shaft and locking mechanism for ease of interchangeability



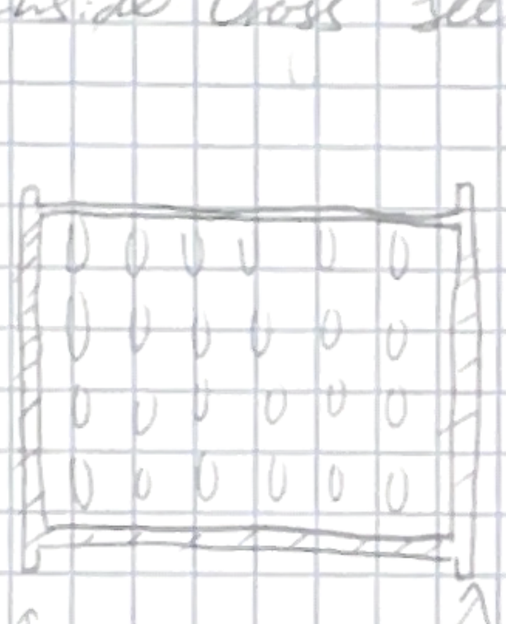
Inner piece rests on outer piece at these points

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Cheese grater

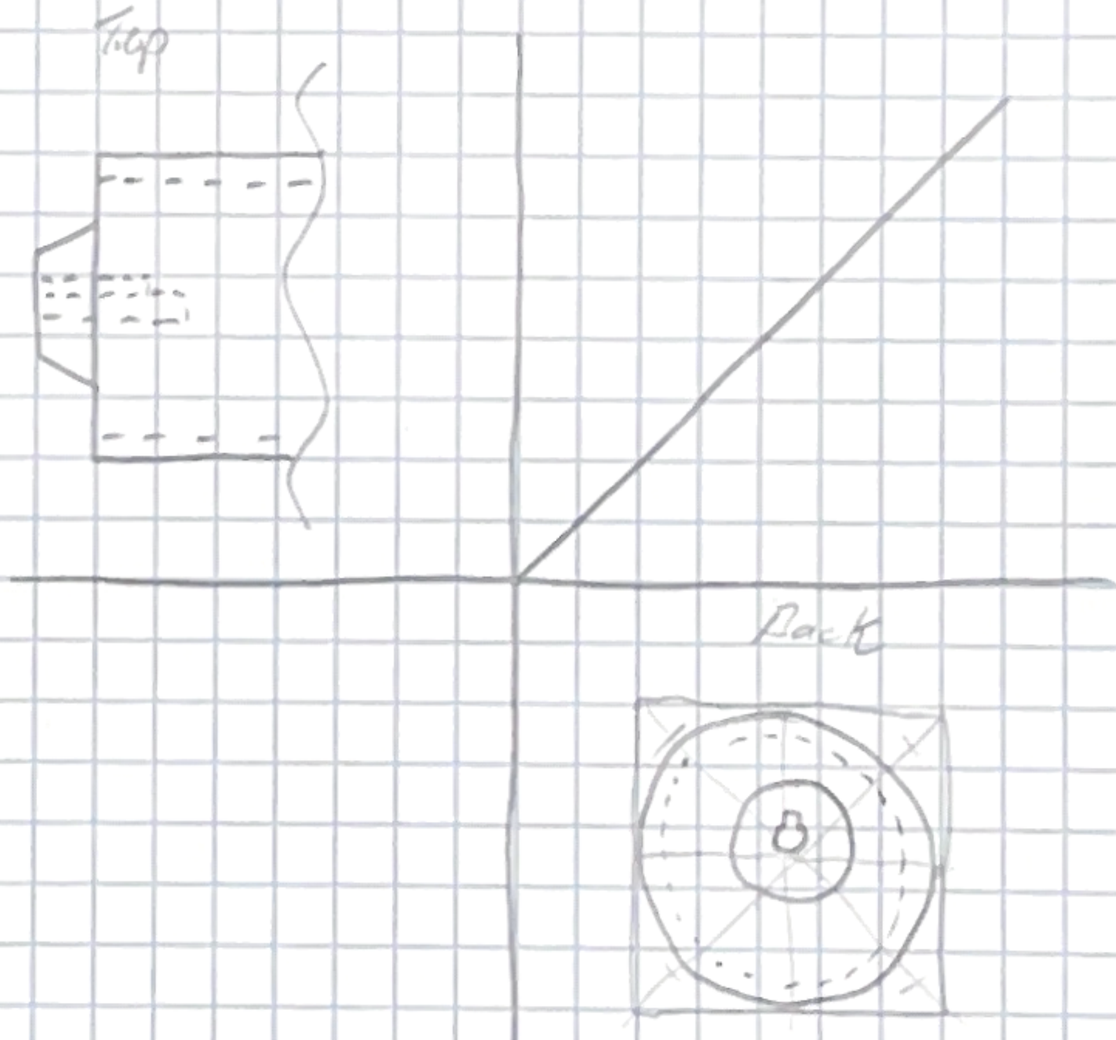


Inside Cross Section

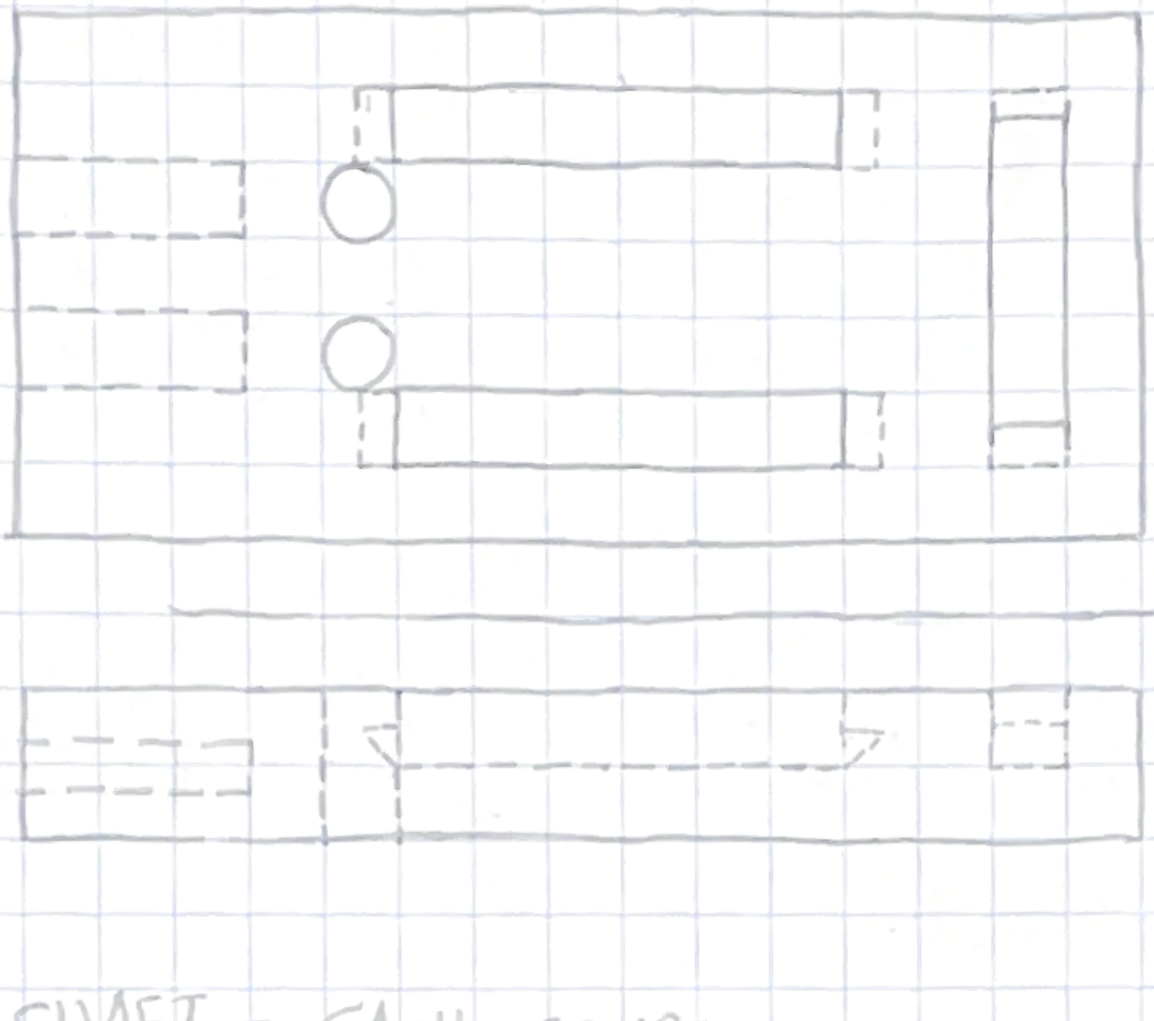


Rolls on these plastic ridges

Keyed Rear Diagram only



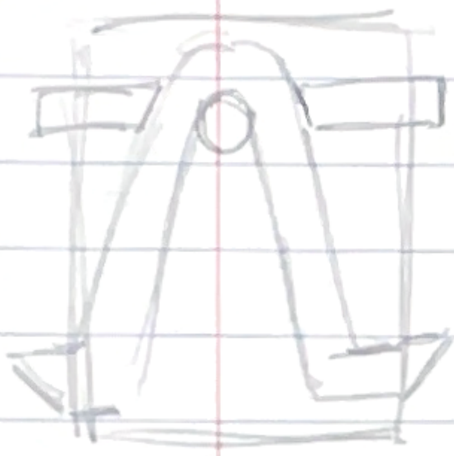
BASE - EACH SQUARE
1 INCH



SHAFT - EACH SQUARE
1 INCH



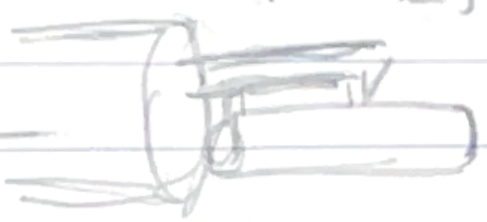
FIVE STAR.



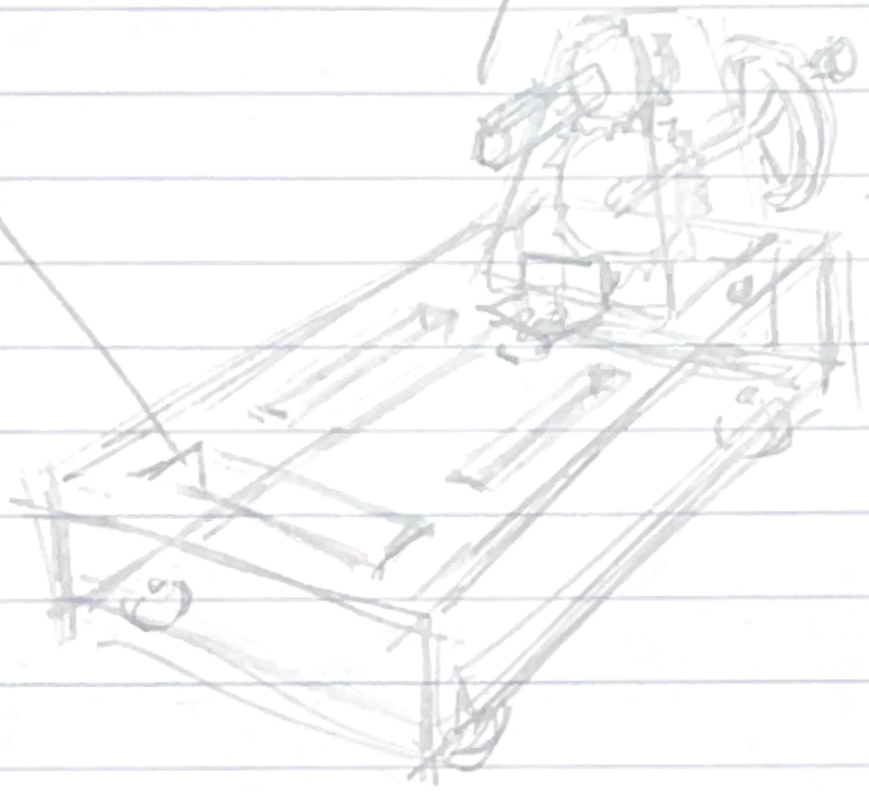
MALE END NEEDS A SLOT LIKE THIS



FEMALE END NEEDS A HOOK ON THE KEYWAY



MALE END





BOLTED ON FRONT

SWAPPABLE GEARBOX



BOLTED ON BACK

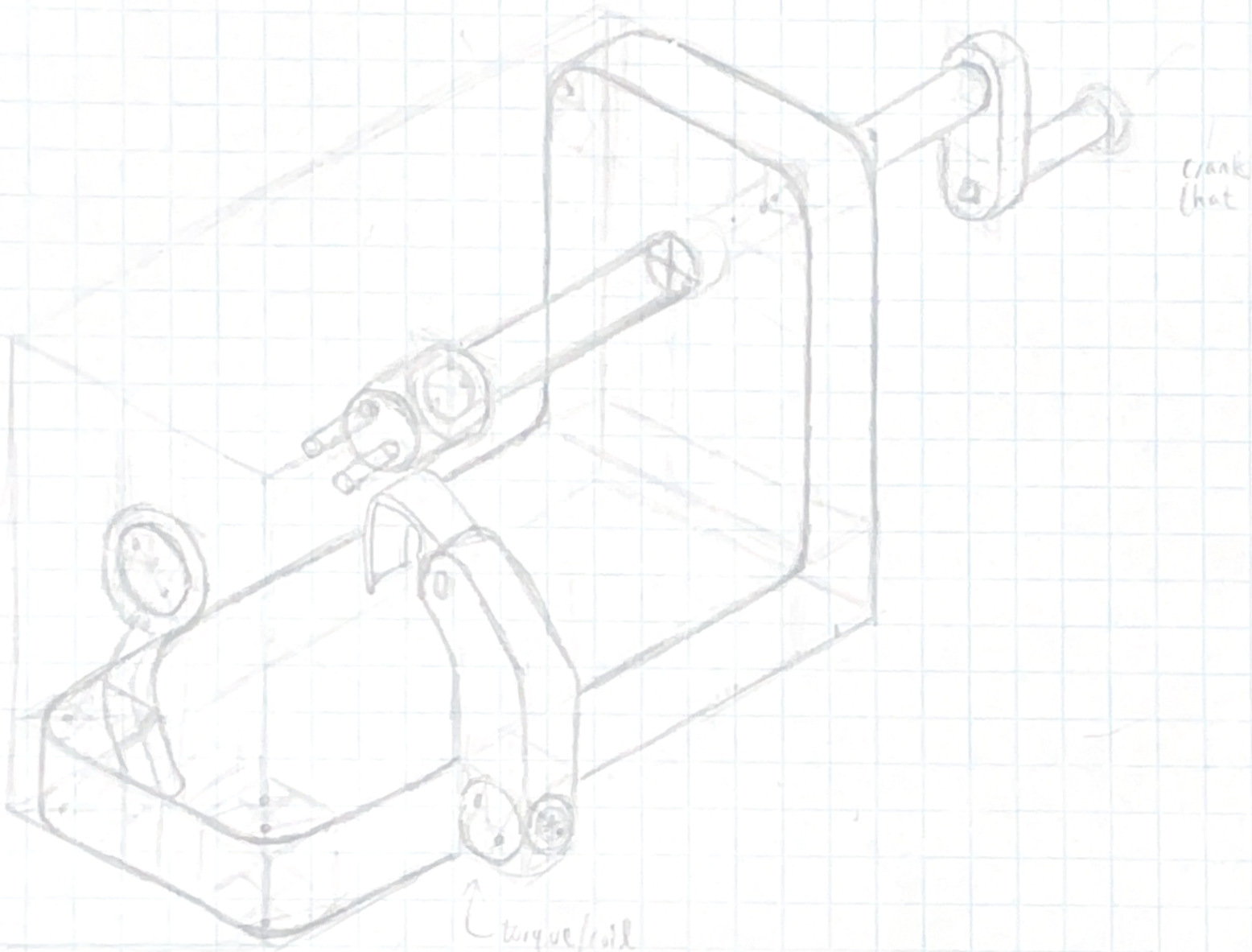
Hilroy

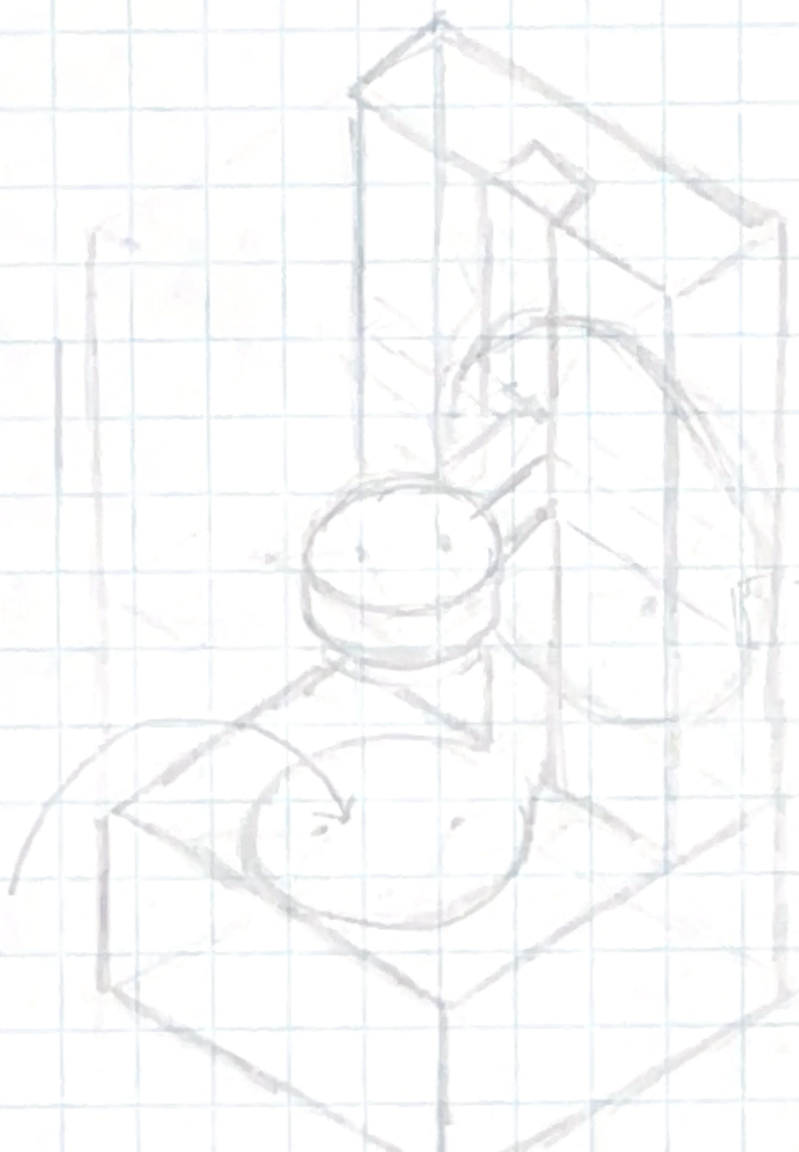
Jingdan Lai

Apple

Processing

Module

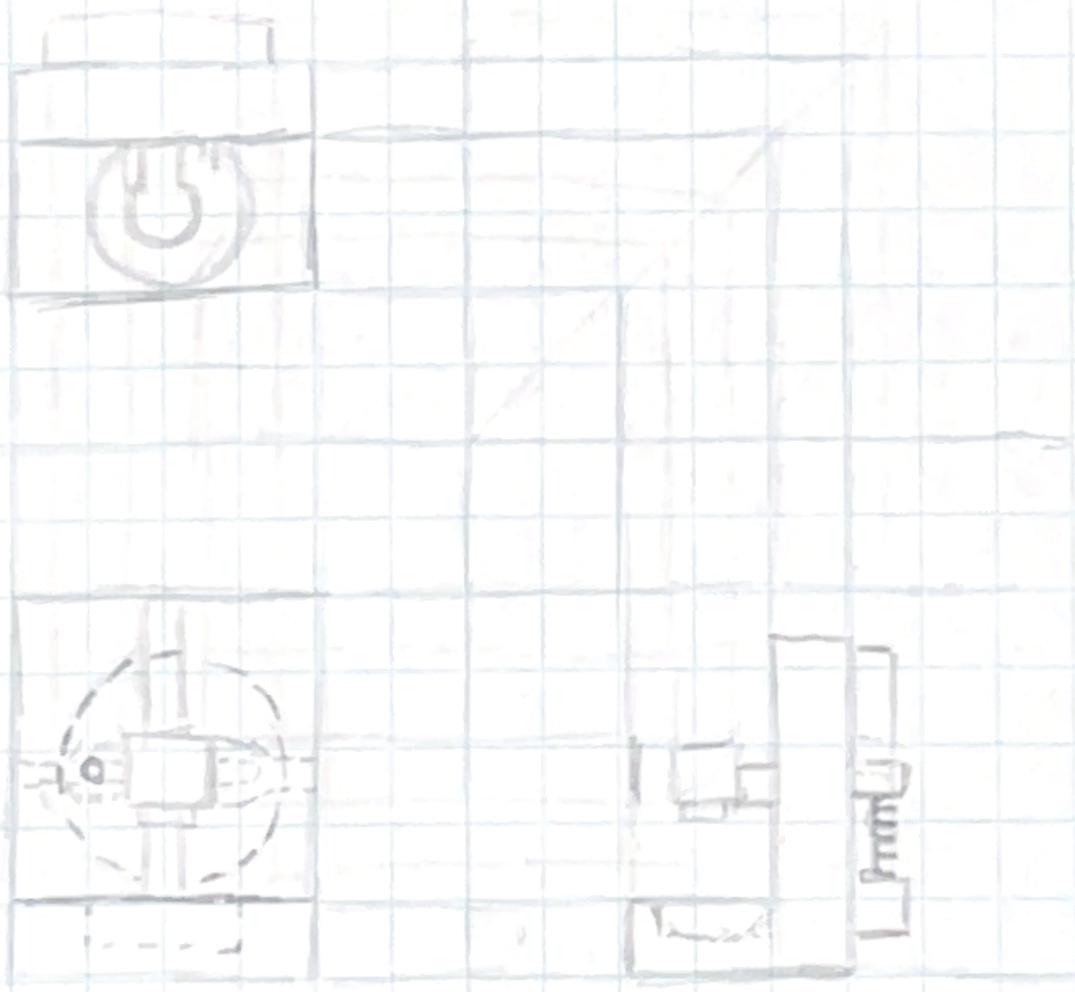


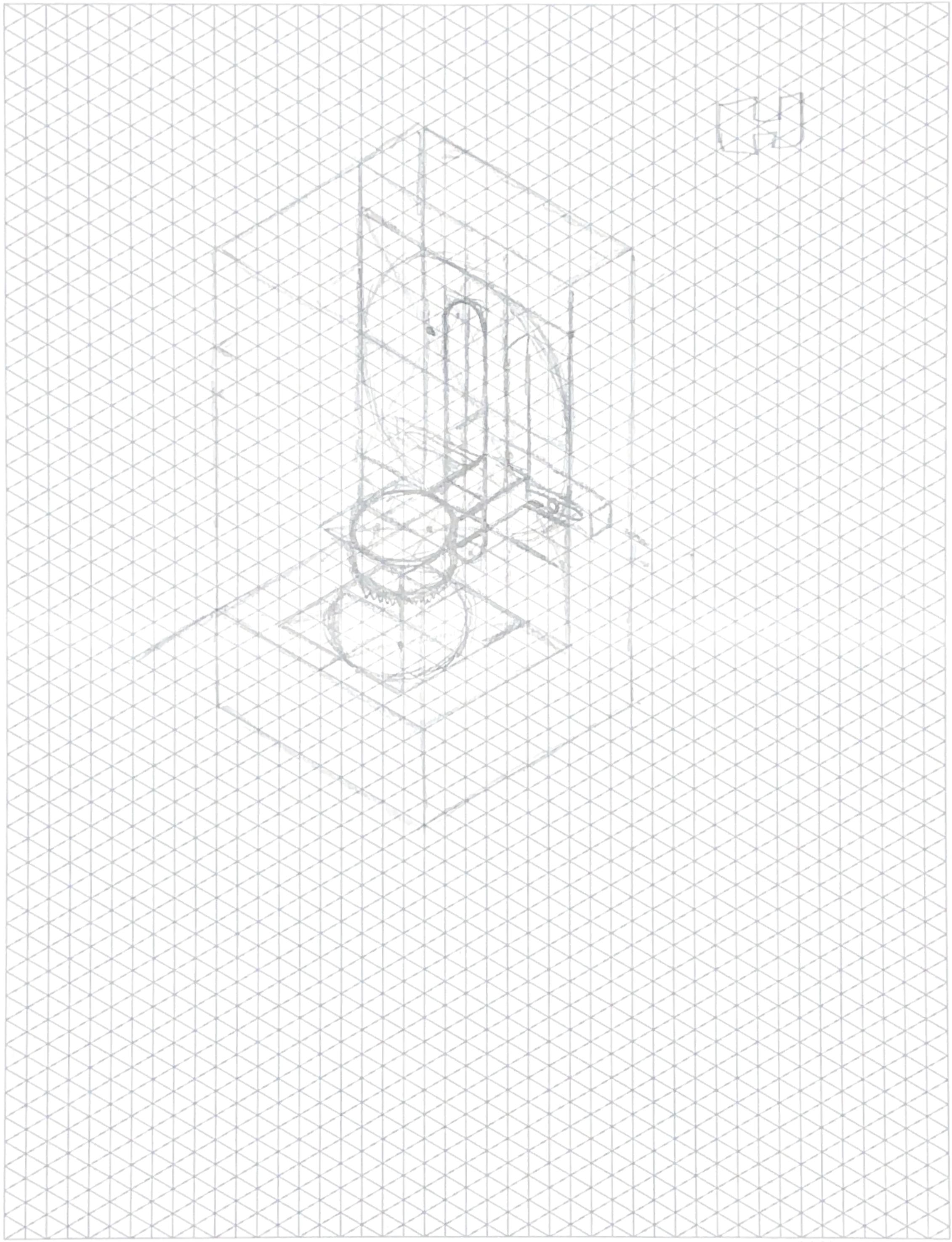


scotch yoke



attaches to crank

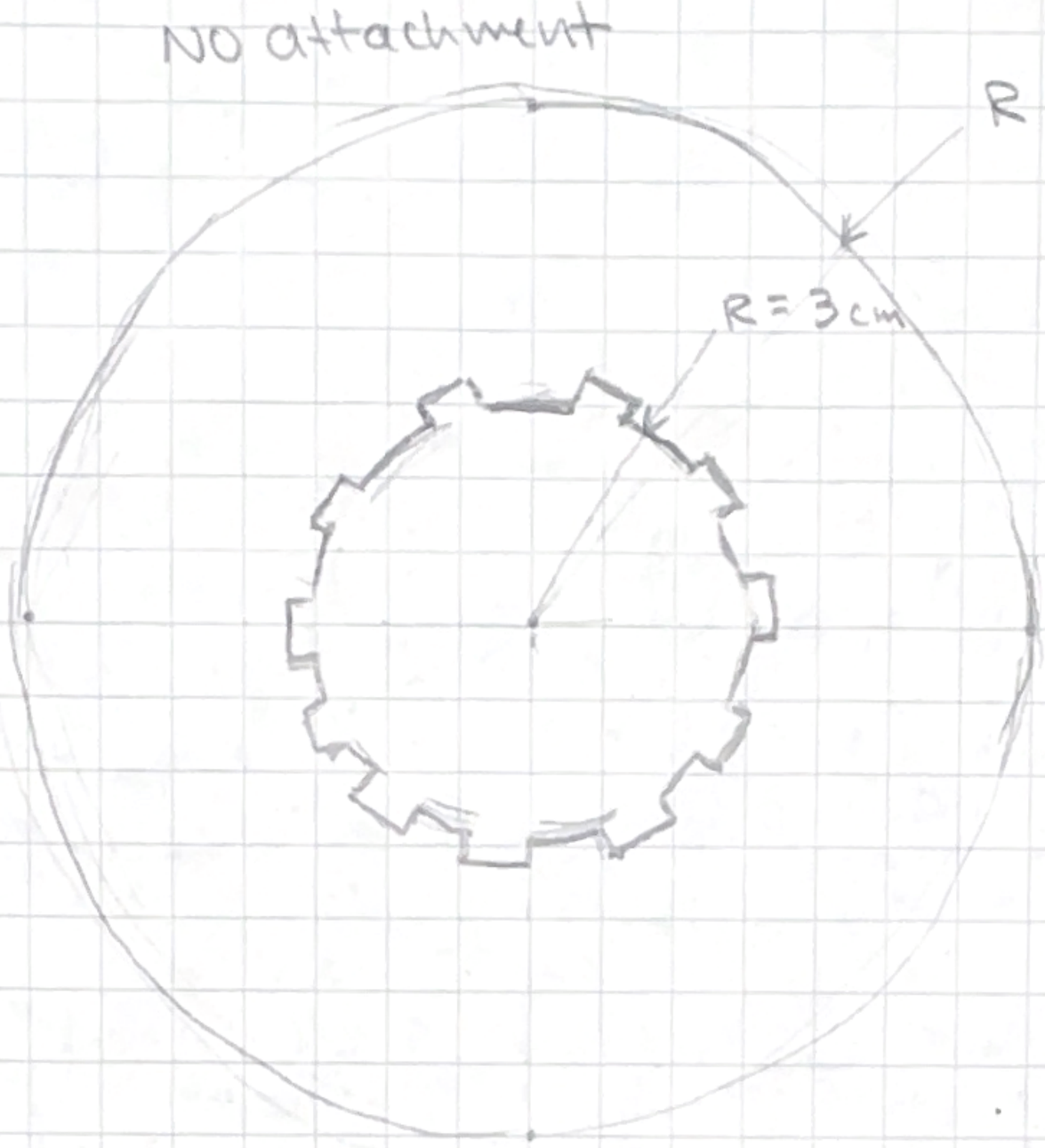




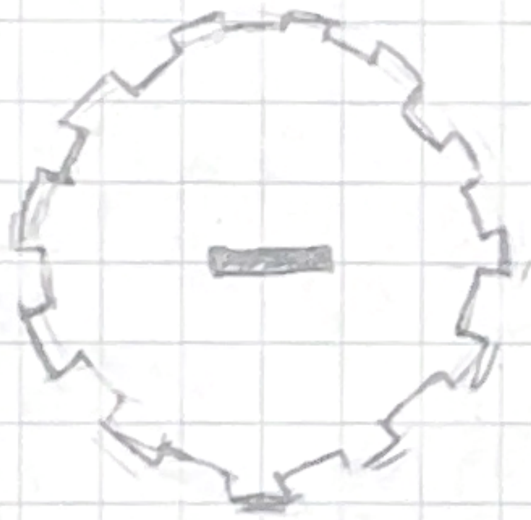
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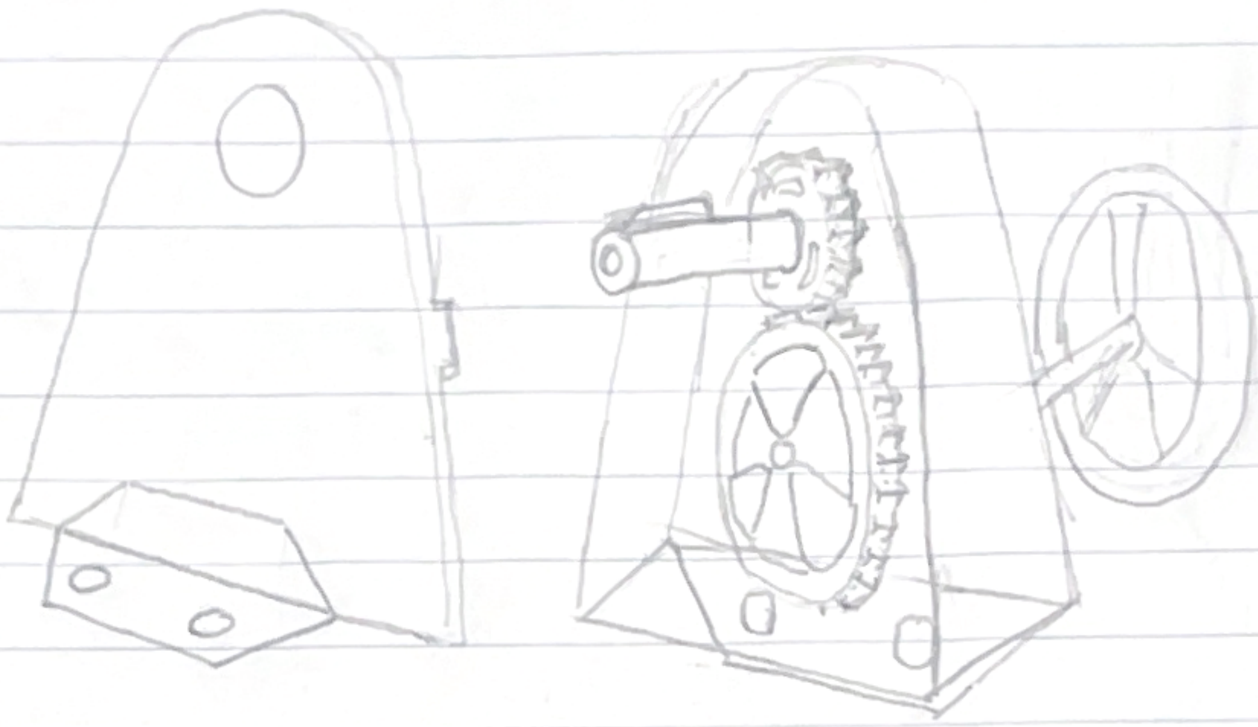
Lid Size D = 28 cm DATE: / /

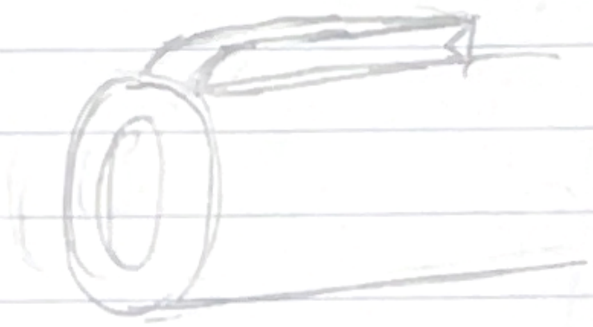
1 grid = 2 cm

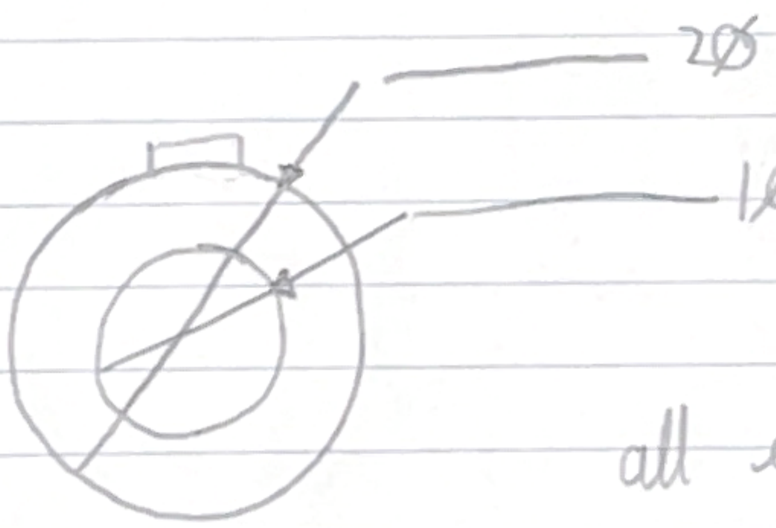


Attachments



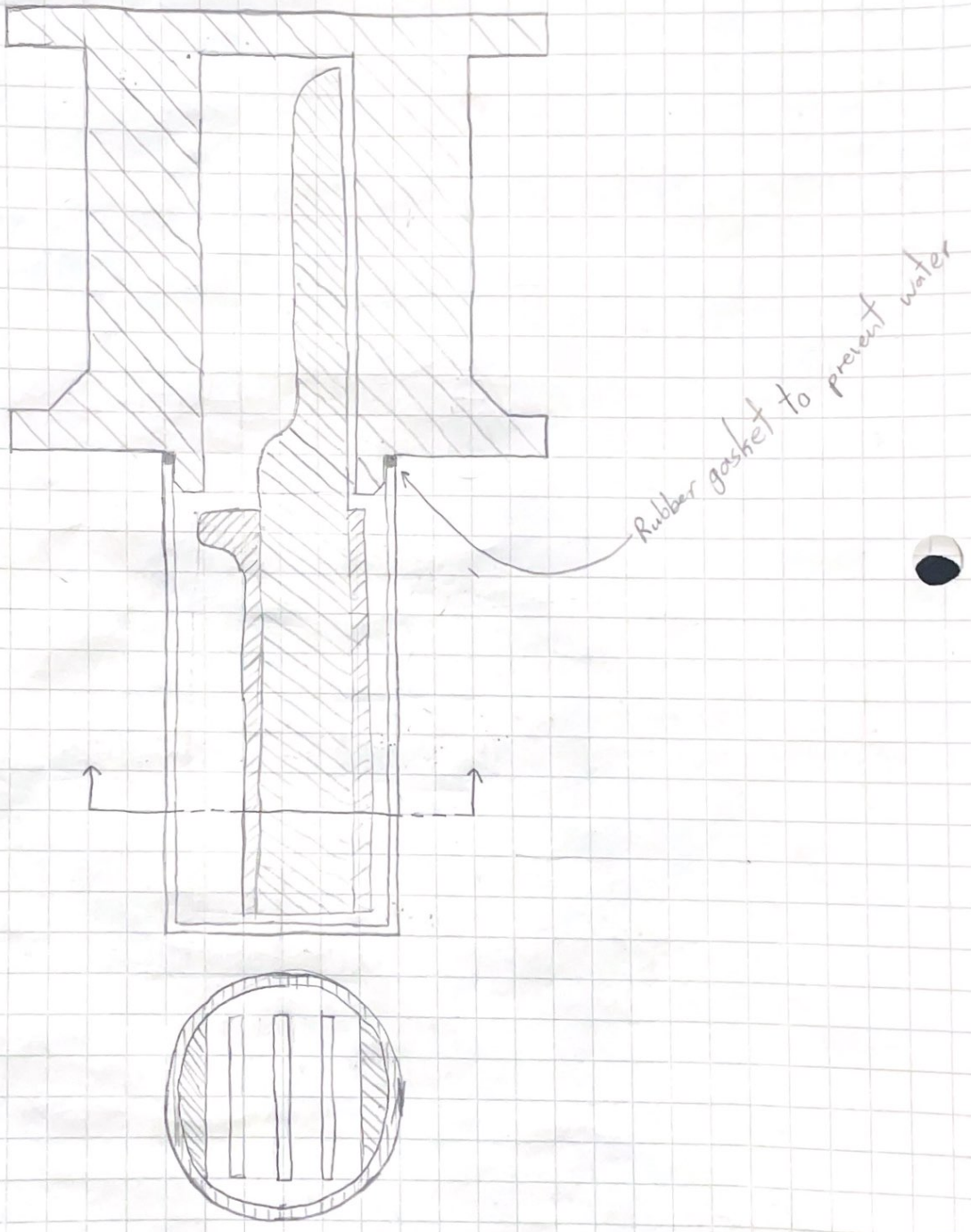




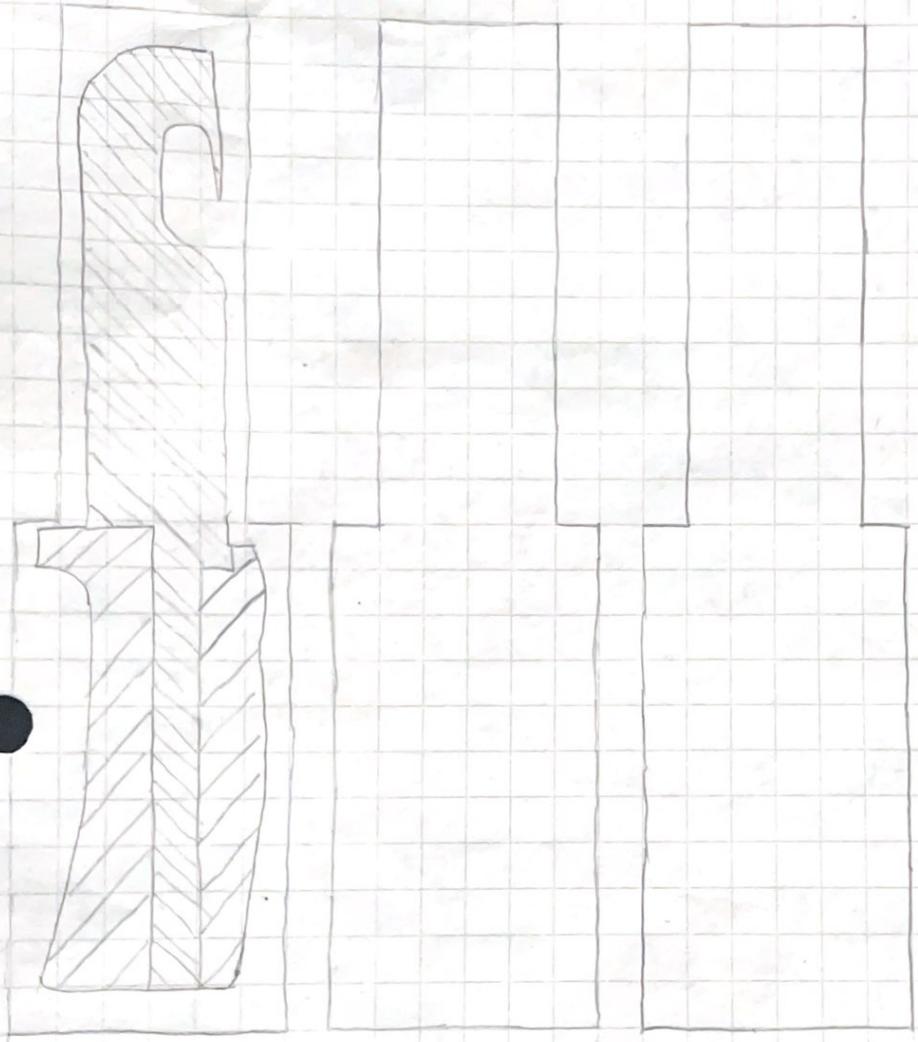


all in inches

Hilroy

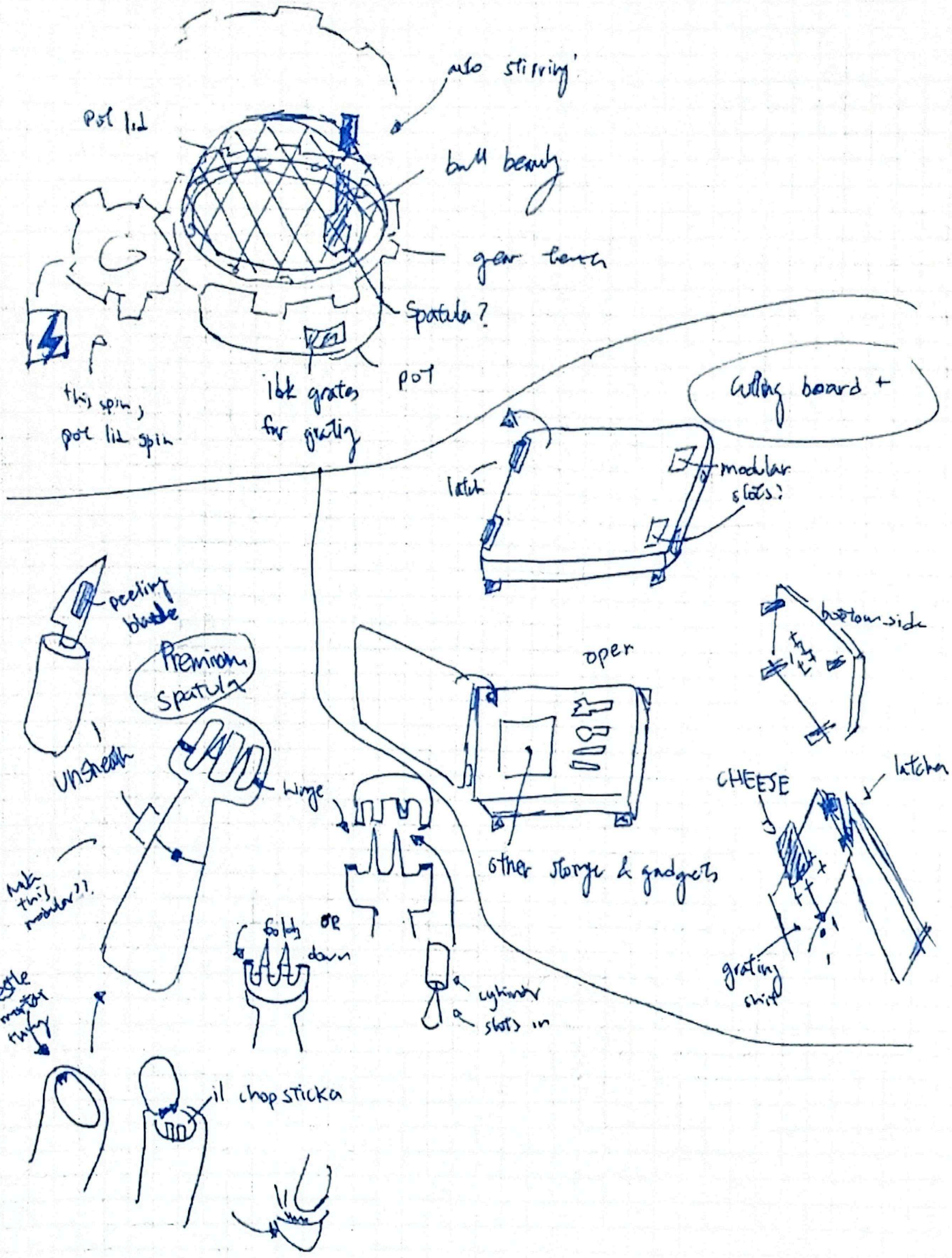

Rubber gasket to prevent water

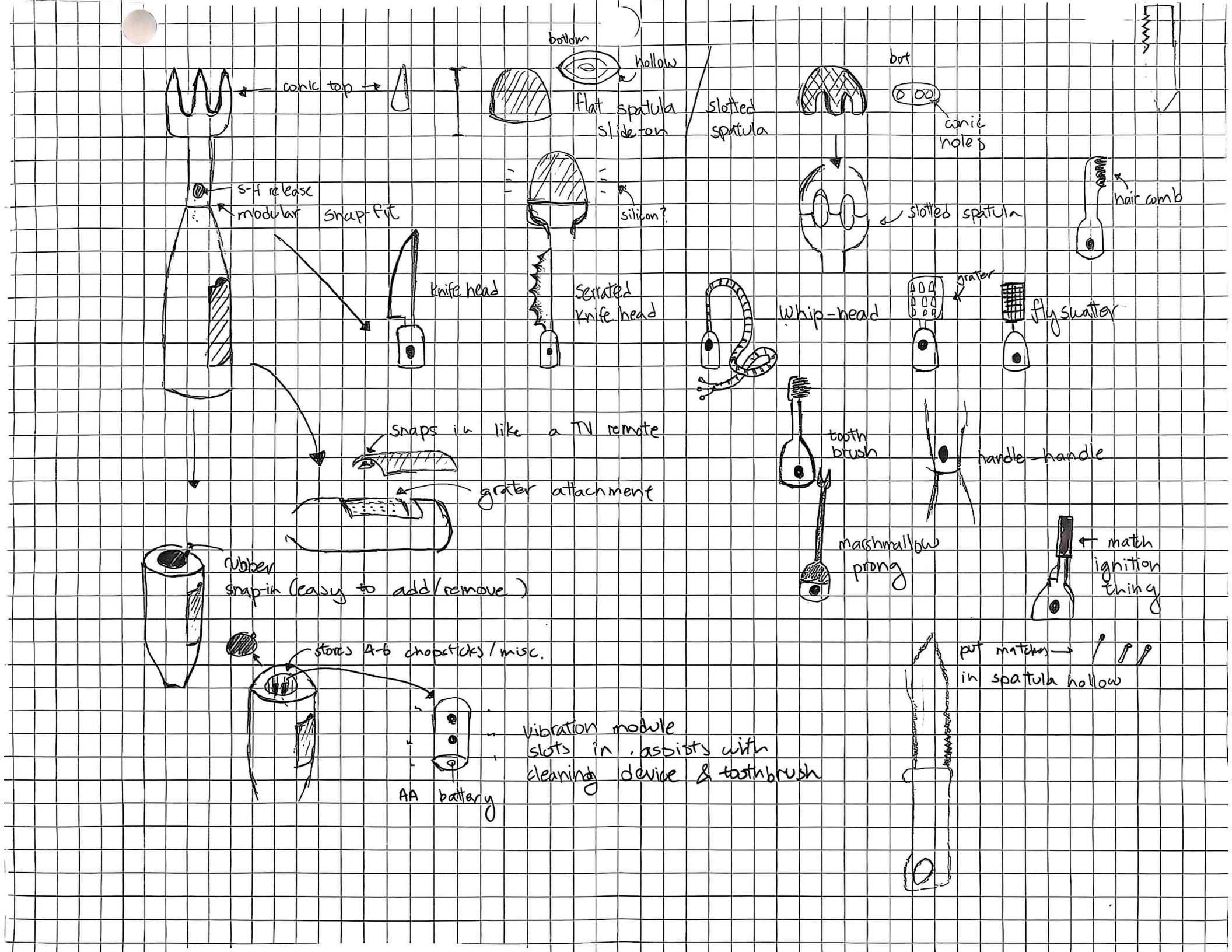
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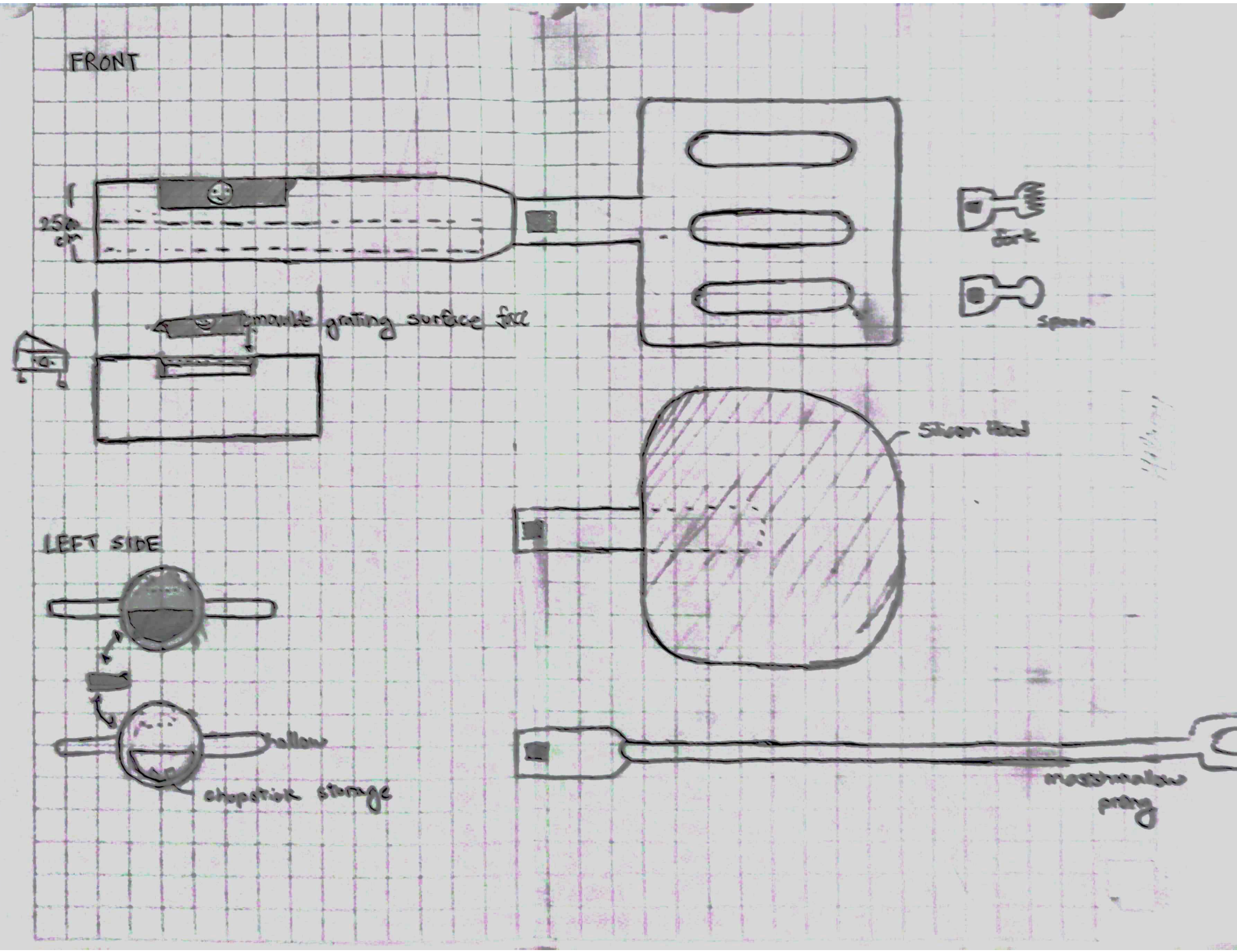


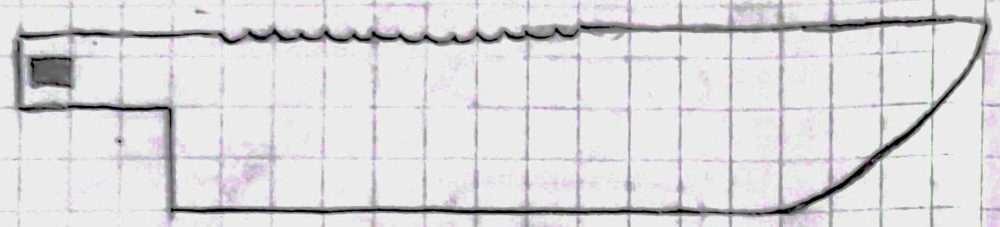
Hilroy

Auto stir Pot

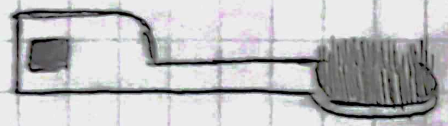



conic top
bottom
hollow
flat spatula
slide-on
slotted spatula
bot
conic holes
s-f release
modular
snap-fit
silicon?
slotted spatula
hair comb
knife head
serrated knife head
whip-head
grater
fly swatter
snaps in like a TV remote
grater attachment
tooth brush
handle-handle
rubber snap-in (easy to add/remove)
marshmallow prong
match ignition thing
stores A-B chopsticks / misc.
vibration module slots in. assists with cleaning device & toothbrush
AA battery
put matches in spatula hollow

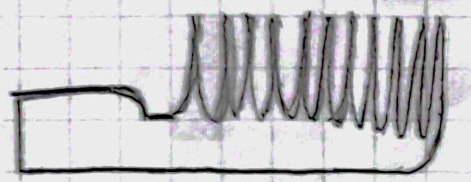

FRONT
25cm or
Removable grating surface lid
fork
spoon
Steam Rod
LEFT SIDE
hollow
chopstick storage
marshmallow prong



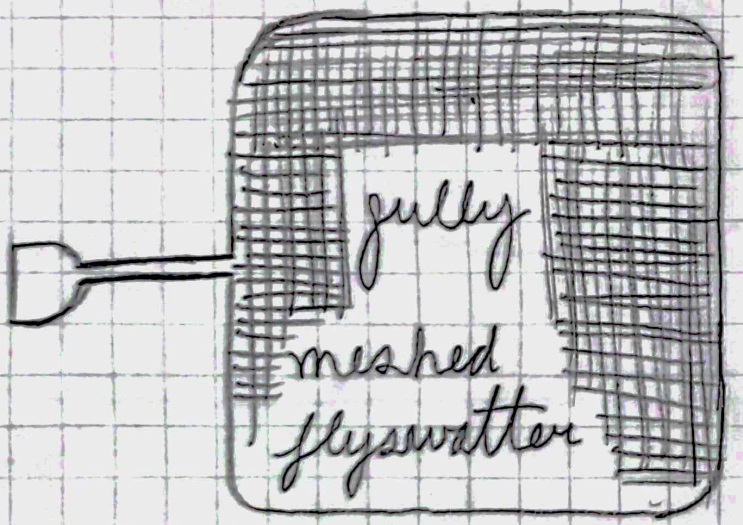
knife



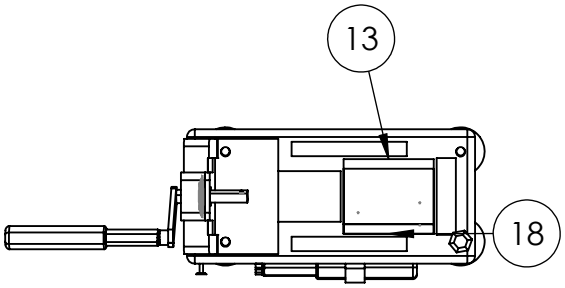
toothbrush

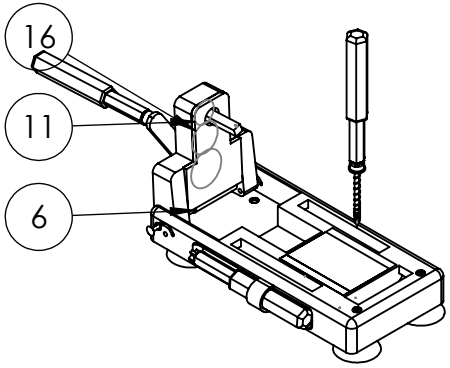


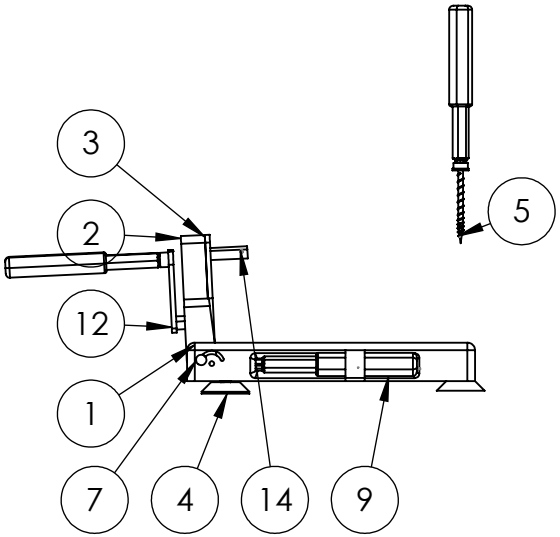
hairbrush

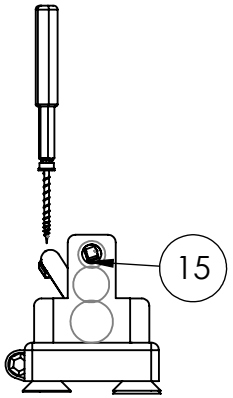


DATE: / /









ITEM NO.	PART NUMBER	QTY.
1	Base	1
2	Gear Housing	1
3	Gear Housing Lid	1
4	Suction Cups	4
5	Wood Screws	4
6	Plunger Housing	1
7	Plunger	1
8	Spring For Plunger	1
9	Screwdriver	1
10	Drive Gear	1
11	Intermediate Gear	1
12	Handle Attachment	1
13	Lid	1
14	Driveshaft	1
15	Driveshaft Insert	1
16	Crank Gear	1
17	Gear Holder	1
18	Lid Cover	1
19	Handle	1

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NEXT ASSY | USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED:

DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL ±
ANGULAR: MACH ± BEND ±
TWO PLACE DECIMAL ±
THREE PLACE DECIMAL ±

INTERPRET GEOMETRIC TOLERANCING PER:

MATERIAL

FINISH

DO NOT SCALE DRAWING

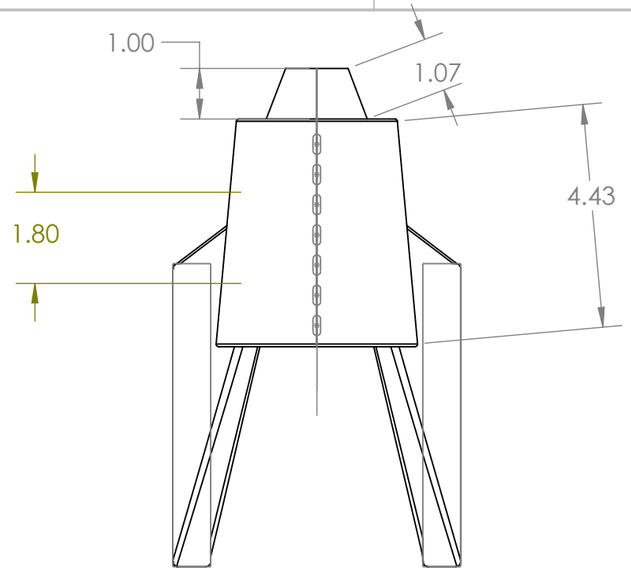
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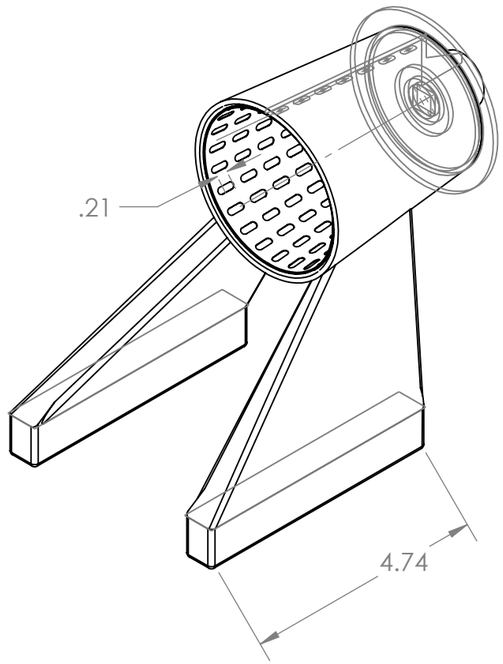
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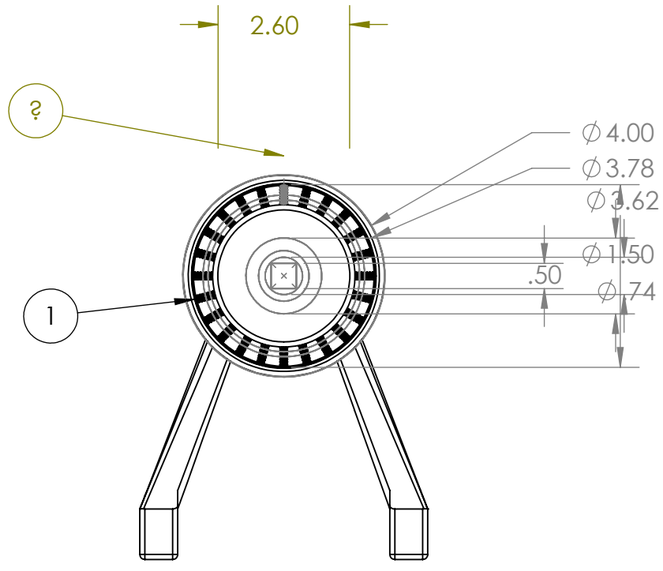
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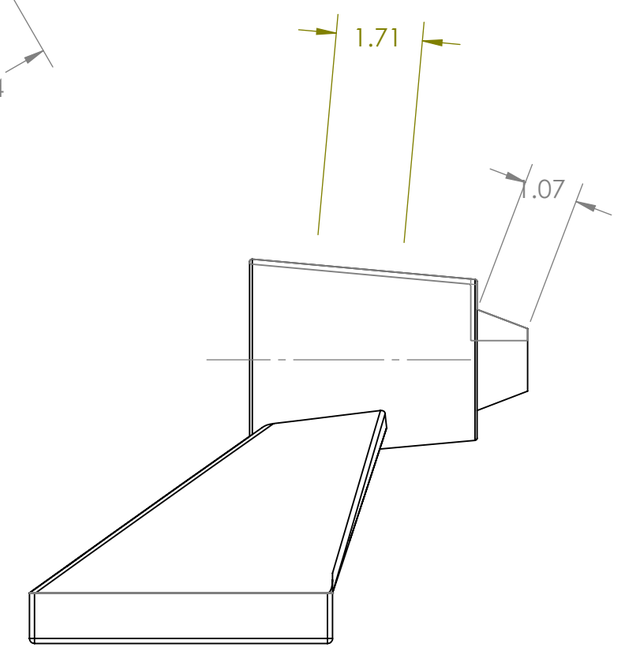
SCALE:1:10 | WEIGHT: | SHEET 1 OF 1





ITEM NO.	PART NUMBER	QTY.
1	Grater inner	1
2	Grater outer	1





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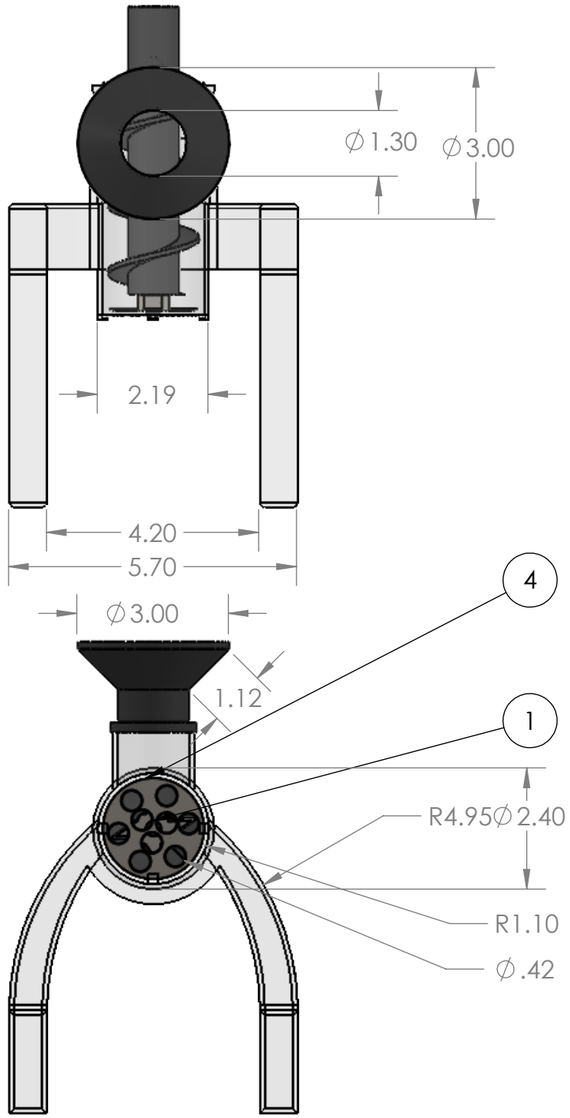
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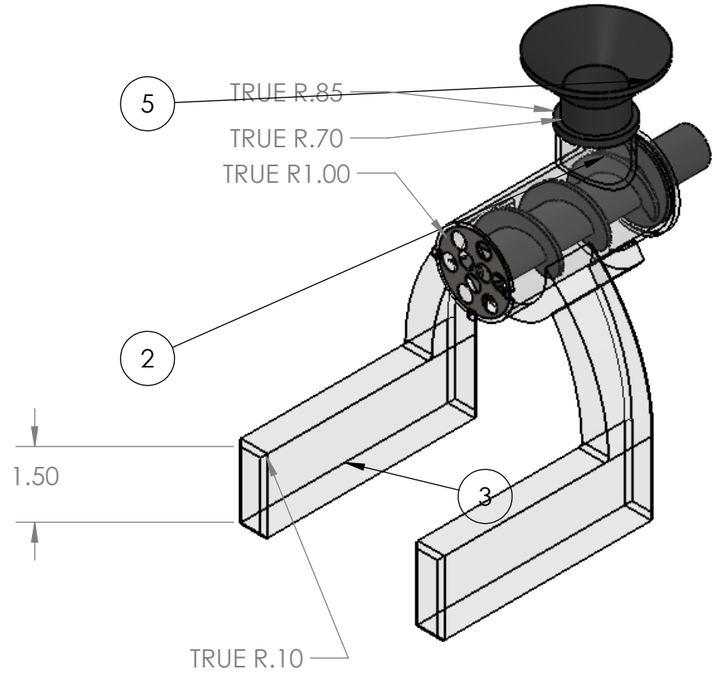
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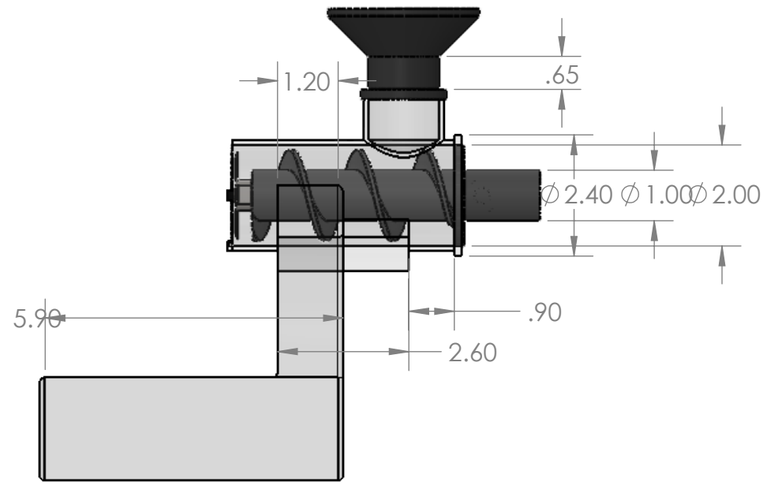
TITLE:

SIZE	DWG. NO.	REV
B	Grater Assembly Drawing	
SCALE 1:3	WEIGHT:	SHEET 1 OF 1

ITEM NO.	PART NUMBER	QTY.
1	Blade	1
2	Screw Insert	1
3	Funnel	1
4	Gate	1
5	Funnel Top	1







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NEXT ASSY	USED ON	FINISH
APPLICATION		DO NOT SCALE DRAWING

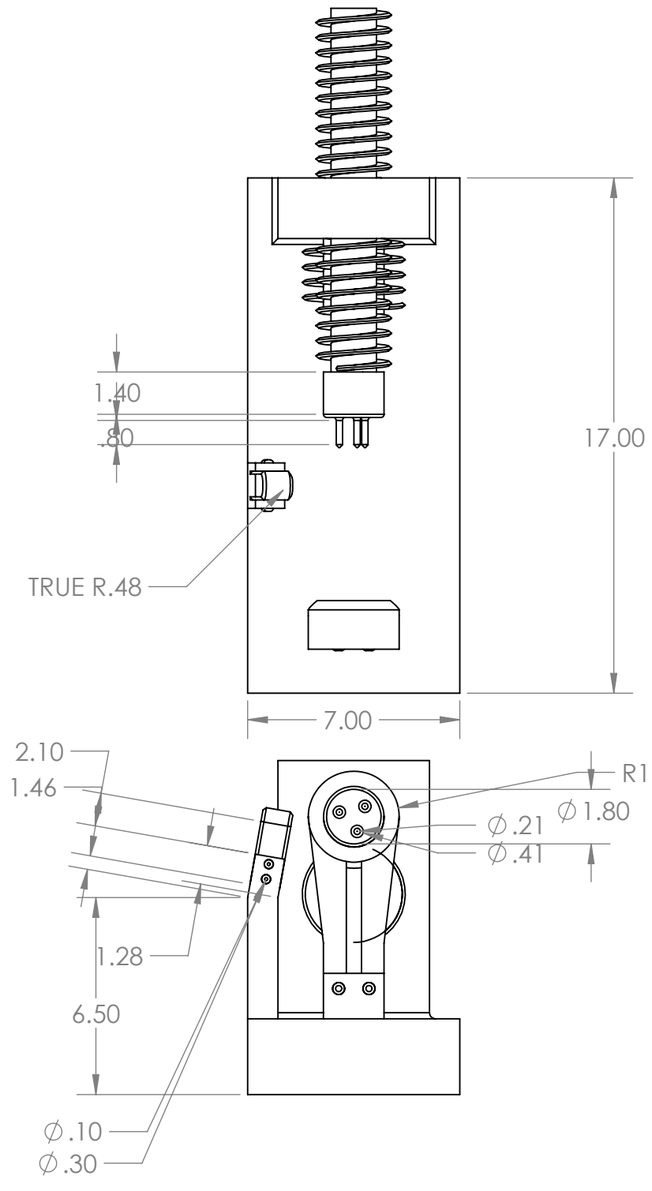
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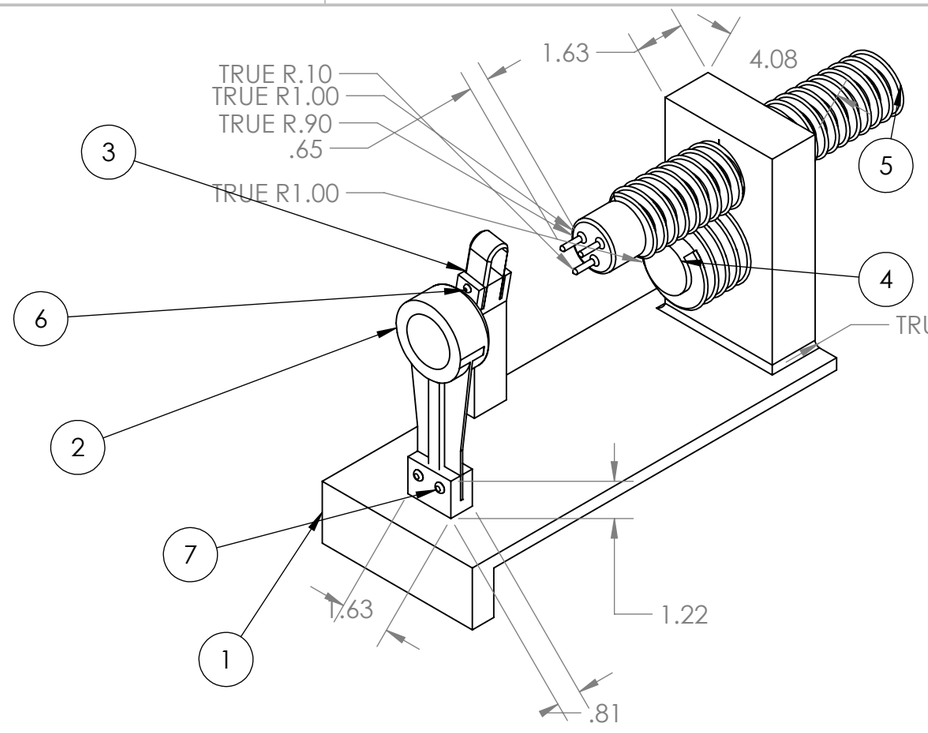
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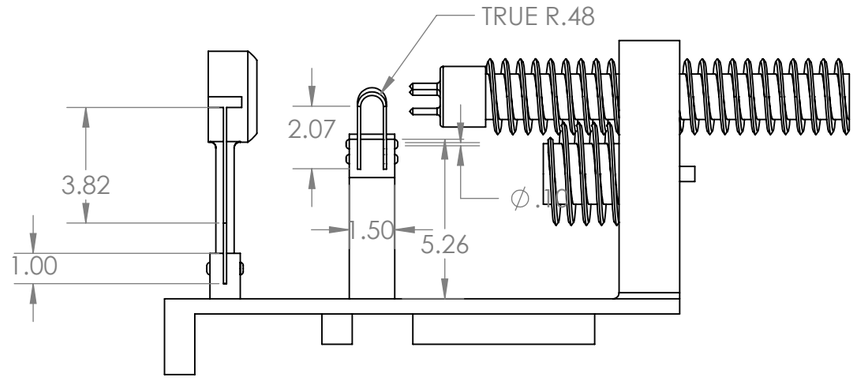
Meat Grinder Drawing

SIZE	DWG. NO.	REV
B		
SCALE 1:3	WEIGHT:	SHEET 1 OF 1





ITEM NO.	PART NUMBER	QTY.
2	ApplePeelerCoreBlade	1
3	ApplePeelerSlicerBlade	1
4	WormGear	1
5	ApplePeelerShaft	1
6	Pin1	2
7	Pin2	2



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			CHECKED		
			ENG APPR.		
			MFG APPR.		
		INTERPRET GEOMETRIC TOLERANCING PER:	Q.A.		
		MATERIAL	COMMENTS:		
NEXT ASSY	USED ON	FINISH			
APPLICATION		DO NOT SCALE DRAWING			

TITLE:

SIZE	DWG. NO.	REV
B	Apple Peeler Drawing	
SCALE 1:5	WEIGHT:	SHEET 1 OF 1