

WHAT AM I PASSIONATE/INTERESTED ABOUT?

- BIKES - AUDIO/HIFI
- COFFEE - 3D PRINTERS
- CAMERAS - DESIGN
- COOKING - HIRING
- TRAVEL - TRANSPORT

WHAT ARE CURRENT COMMUTING PAIN POINTS?

- COST?
- ENVIRONMENT?
- WEATHER?
- TIME?
- TRAFFIC?

HOW DO PEOPLE COMMUTE?

- DRIVE
- PUBLIC TRANSPORT
 - BUS
 - TRAIN
 - FERRY
- PERSONAL TRANSPORT
 - BIKING
 - SCOOTER

COMMUTERS

IS THERE A WAY WE CAN MAKE COMMUTING:

- LESS STRESSFUL?
- FASTER?
- MORE PLEASANT?
- GREENER?
- ENJOYABLE?

WHAT ARE THE RISKS OF COMMUTING?

- SAFETY?
- LIABILITY COSTS?
- TARDINESS?
- HEALTH?

SECURITY

BIKE PARKING

MODULAR?
PORTABLE?

OLYMPICS 2032

BUILT-IN LOCKING SYSTEM
- ALARMS?

BIKE LANE
BARRIERS?

ITEMS NEED TO BE:

- EASY TO ATTACH
- SECURE
- EASY TO REMOVE

DEVICE NEEDS TO BE:

- INSTALLED ON DIFFERENT PARTS OF THE BIKE
- USER FRIENDLY
- ADAPTABLE - ADD ON TO EXISTING ITEMS
- SELF LOCATING + ALIGNING
- USABLE FOR MULTIPLE SECURING POINTS OF SINGLE ITEM AT SAME TIME

QUADLOCK SYSTEM



- USER INSERTS DEVICE AT 45°
- TWISTS TO ALIGNED
- DEVICE LOCKS INTO PLACE
- TO REMOVE:
 - PRESS BLUE TAB + TWIST 45°

ADVANTAGES:

- VERY QUICK + EASY TO USE
- VERY SECURE DESIGN
- 1 INPUT TO ATTACH
- 2 INPUTS TO DETACH
- VERY FEW ROTATIONAL FORCES FOR APPLICATION

LIMITATIONS:

- PRODUCT ONLY SUPPORTS PHONES
- TWISTING MECH PREVENTS THE USE OF DEVICES REQUIRING 2 SECURING POINTS (I.E. BAGS)

IBERA G-2 PANNIER SYSTEM



ADVANTAGES

- ATTACHES TO MOST BIKE RACKS
- STURDY SYSTEM

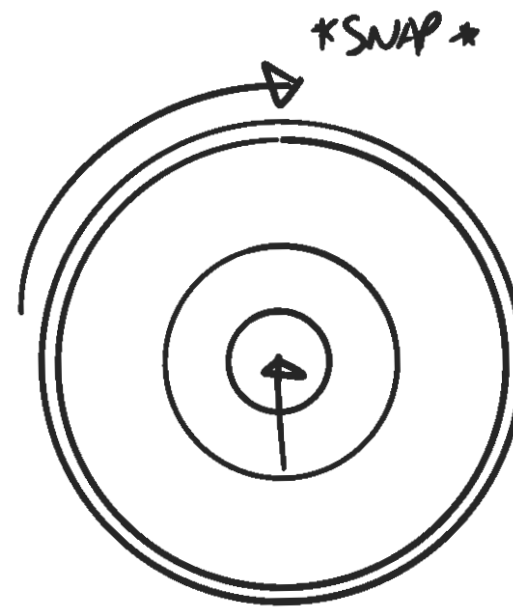
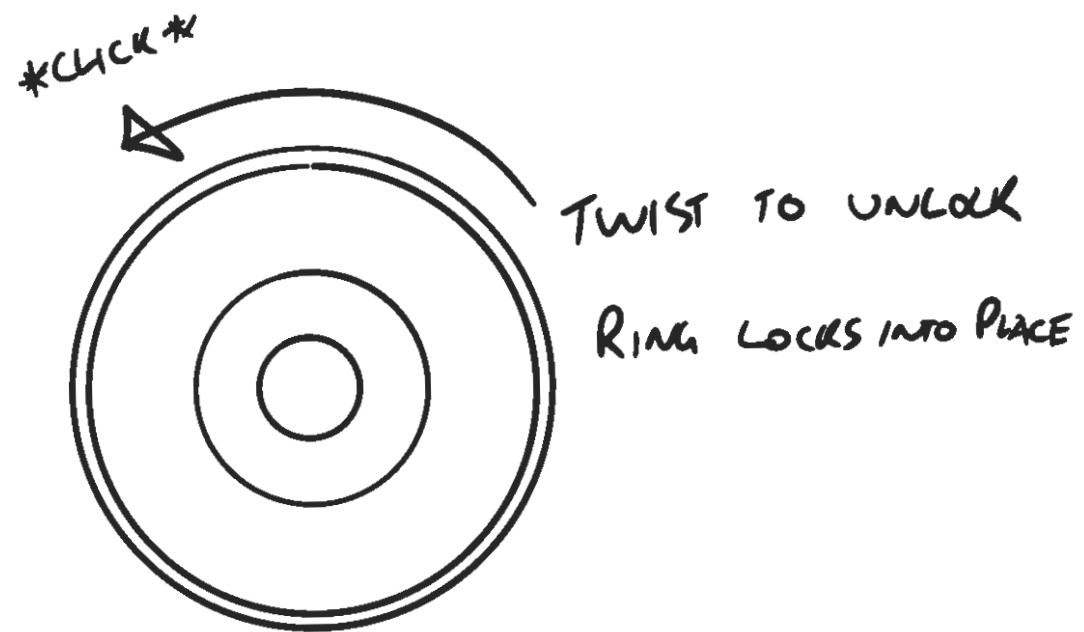
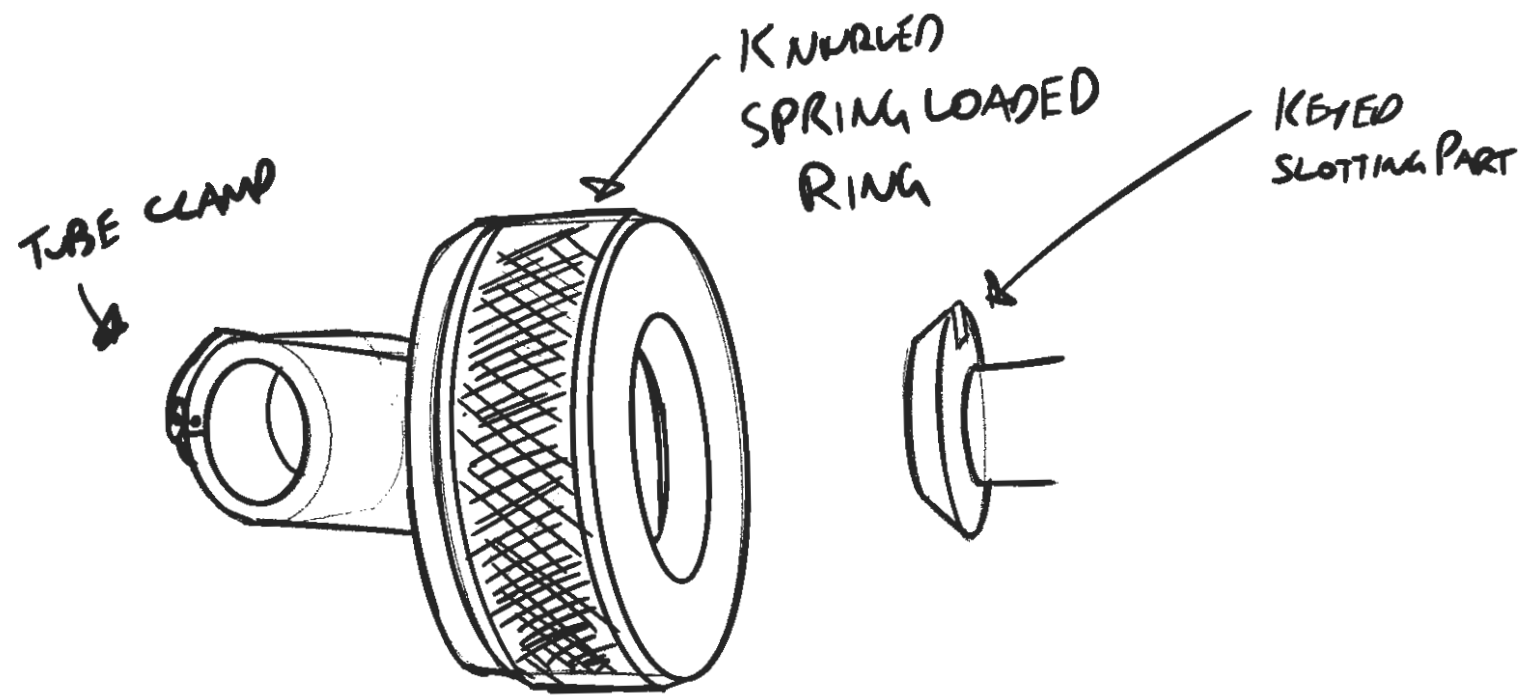
DISADVANTAGES

- PROPRIETARY SYSTEM
- ONLY WORKS WITH OFFICIAL BAGS
- OVERLY BULKY DESIGN

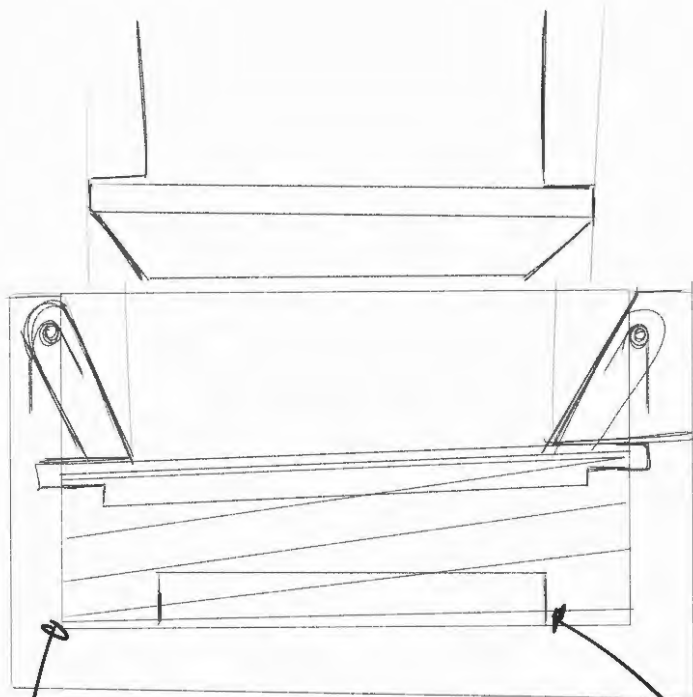
FIDLOCK TWIST TOOLBOX



MAGNETIC



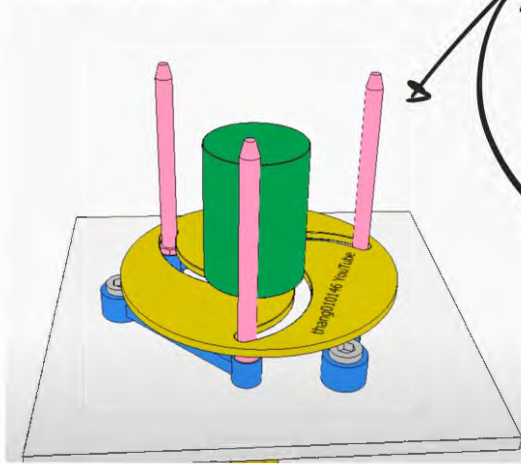
ONCE ACCESSORY IS MOUNTED, MAGNET ATTRACTS + ACCESSORY ACTUATES THE CLICK SPRING, LOCKING DEVICE INTO PLACE, SECURELY



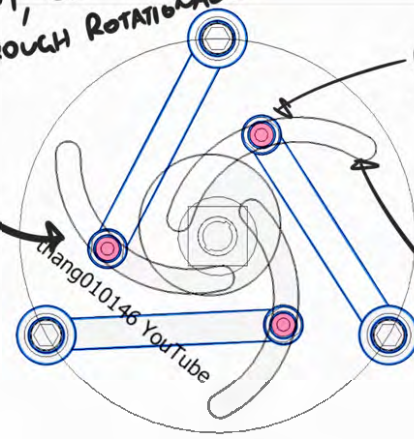
COMPRESSION SPRING

MAGNET

3PIN CENTERING MECHANISM



PINS SLIDE INSIDE SLOT, CENTERING THE CYLINDER THROUGH ROTATIONAL MOTION



REPLACE PINS WITH LOCKING GROOVE
- WAY TO MAINTAIN ALIGNMENT TO CENTRE?

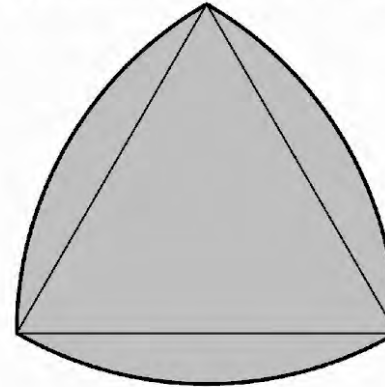
CAM INSTEAD OF DISC?
- SPRING LOAD PIN ARMS?

- TORSION OR TENSION SPRINGS

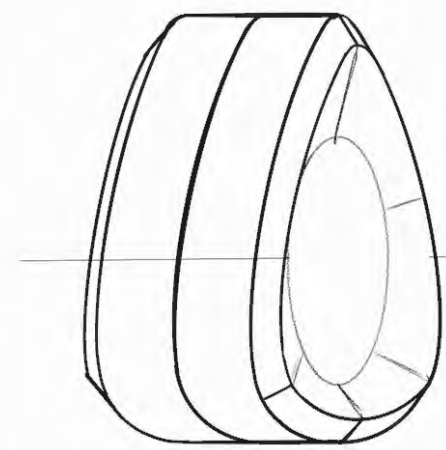
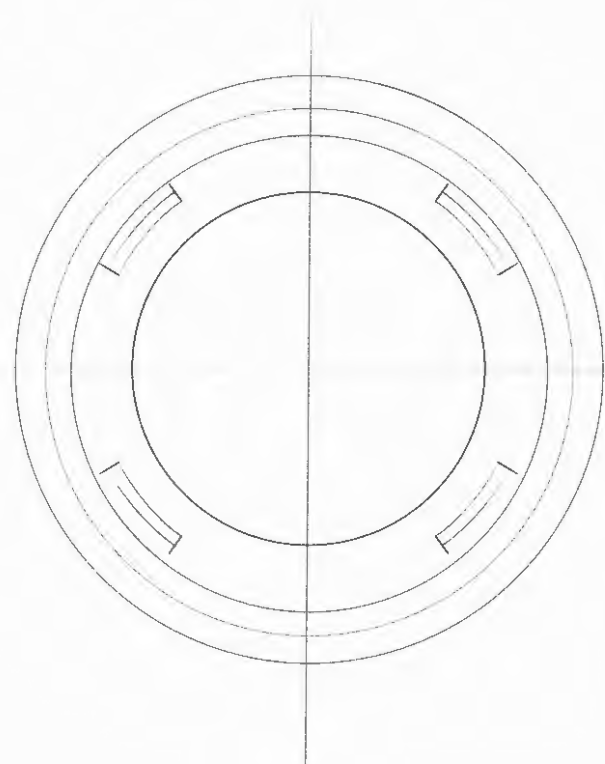
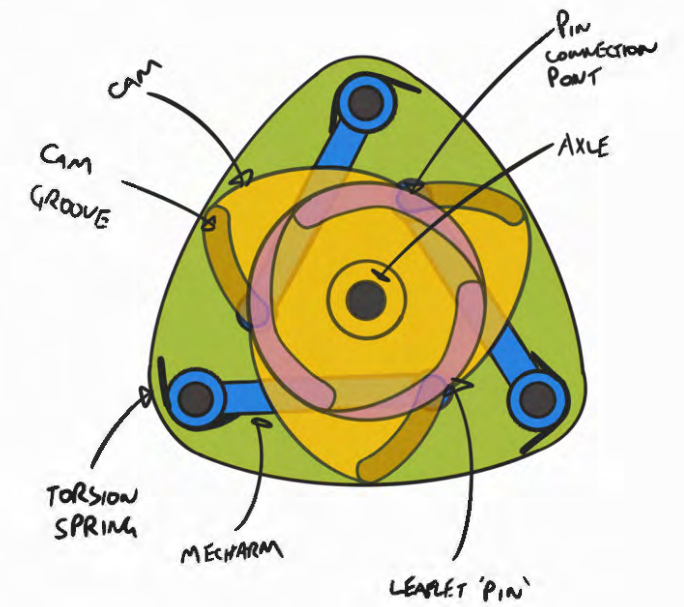
Single Torsion Helical Springs



REULEAUX TRIANGLE



CURVED TRIANGLE WITH CONSTANT WIDTH
(ALSO A COOL SHAPE)



GOODWILL BRIDGE (SOUTH)

TEMP 21°
SUNNY

NOTES

- NOT MANY STUDENTS (ASSUMED)
- ALOT MORE SCOOTERS THAN BIKES
- MOSTLY RENTALS, VERY FEW OWNED
- SPORTS CYCLING DO NOT SLOW AT INTERSECTION
- ALSO NO STORAGE
- MOST BIKES + SCOOTERS AWARE OF SURROUNDING
- CARS OFTEN SLOWER THAN BIKES
- MOST TRAFFIC TOWARDS BRIDGE

TALLIES (9:19 → 9:48)

BIKES

100

STORAGE

- BACKPACK	- CRATE (FRONT/REAR)
32	4
- PANNIER	- FRAME BAG
11	2
- NOTHING	- CARGO BIKE
49	2

ELECTRIC

15

ACOUSTIC

85

SPORTS

28

UTILITY

72



GOODWILL BRIDGE (NORTH)

TEMP 22°
SUNNY

NOTES

- A LOT LESS BUSY ON THIS SIDE
- MOSTLY SCOOTERS ~ 70/30 SPLIT

TALLIES (10:00 → 10:30)

BIKES

69

STORAGE

- BACKPACK	- CRATE (FRONT/REAR)
24	1
- PANNIER	- FRAME BAG
6	2
- NOTHING	- CARGO BIKE
35	1

ELECTRIC

8

ACOUSTIC

61

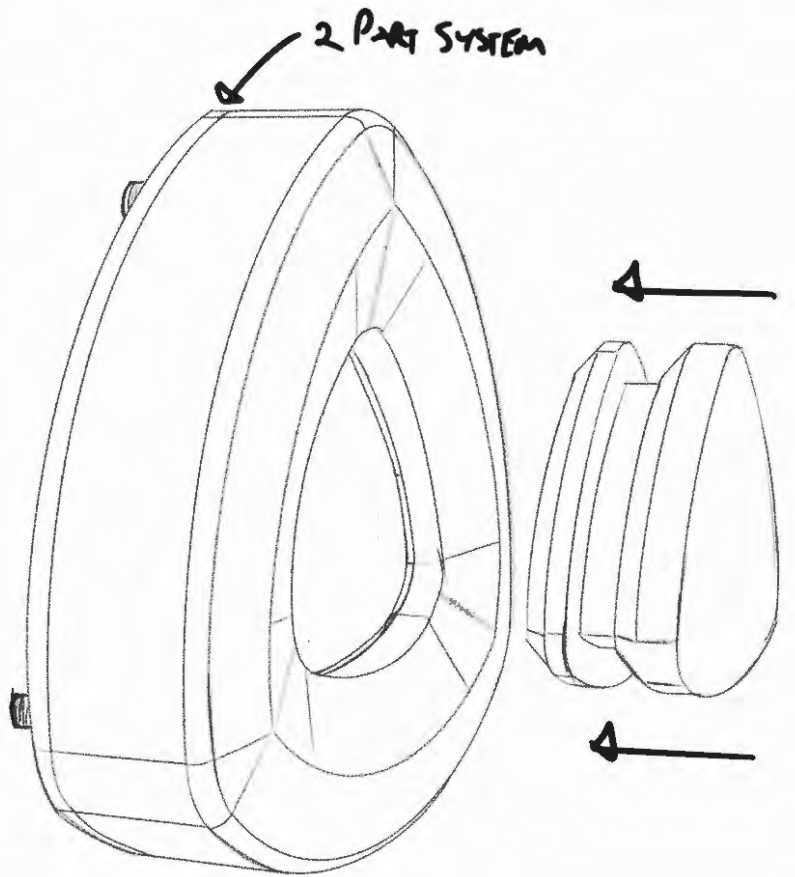
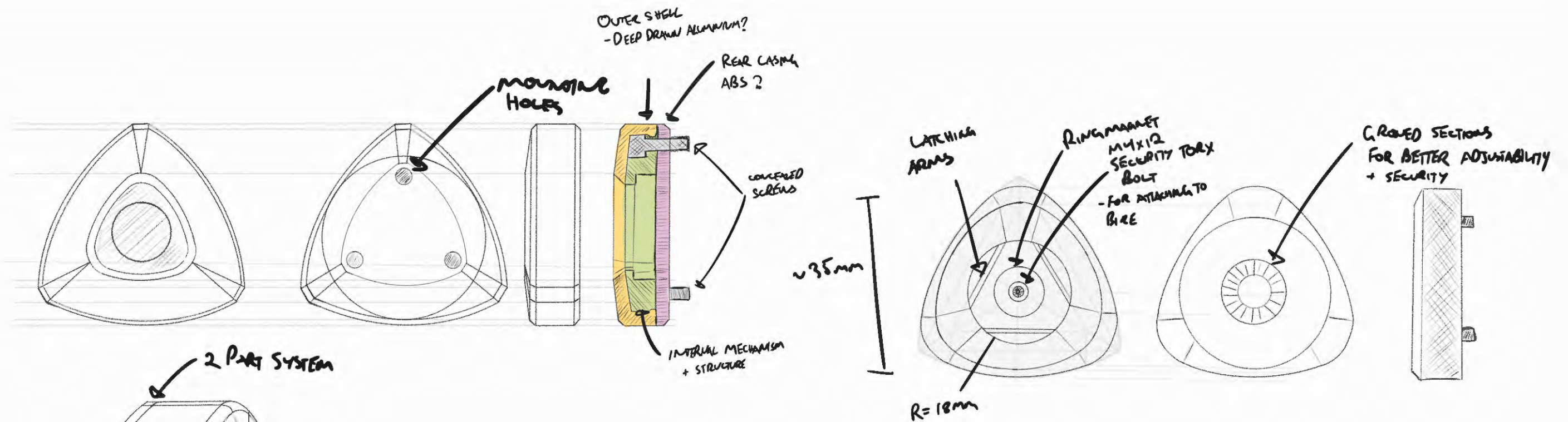
SPORTS

16

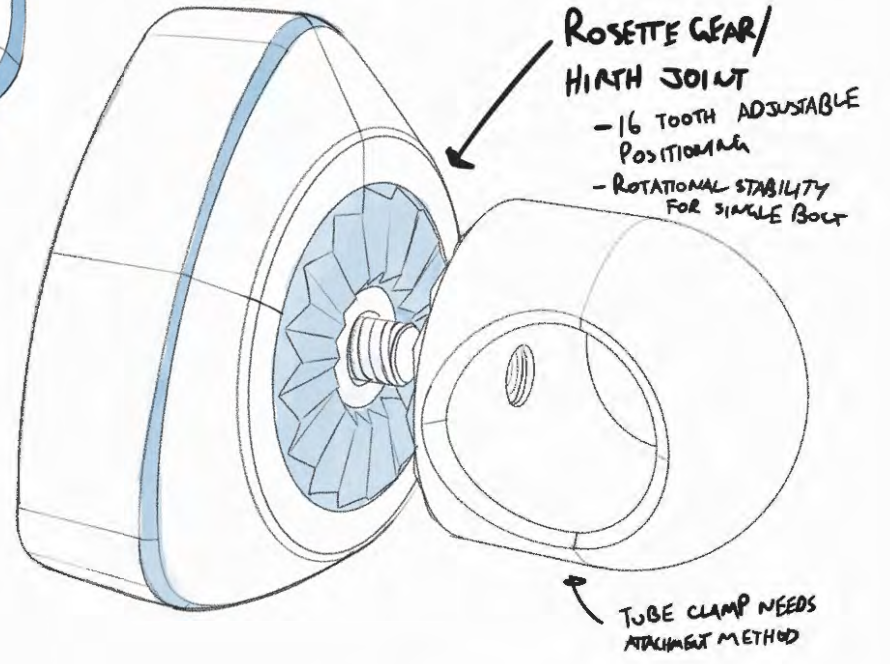
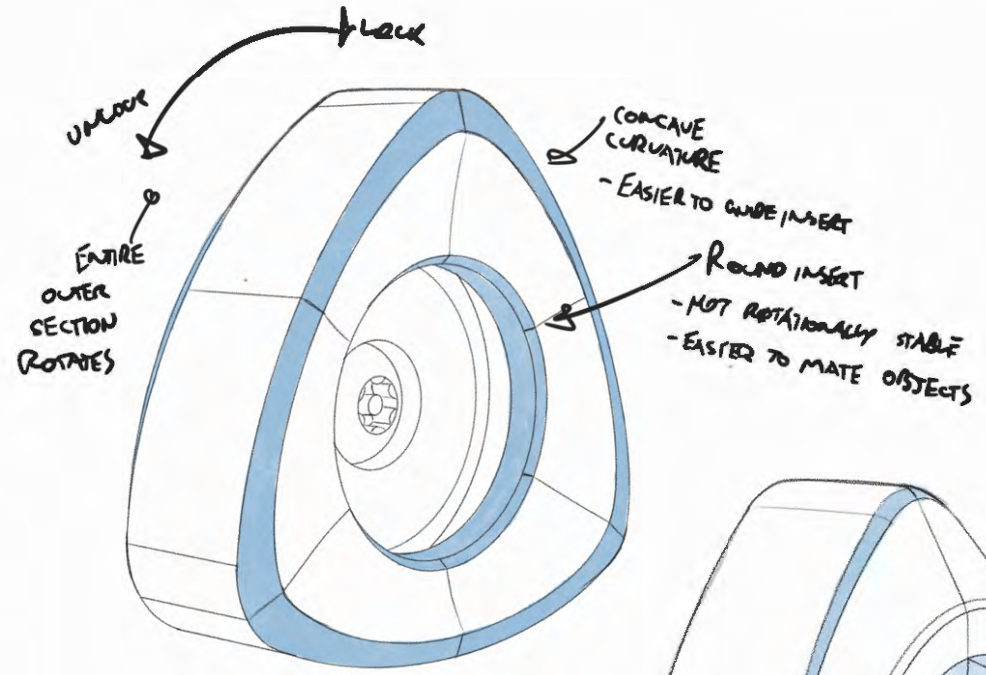
UTILITY

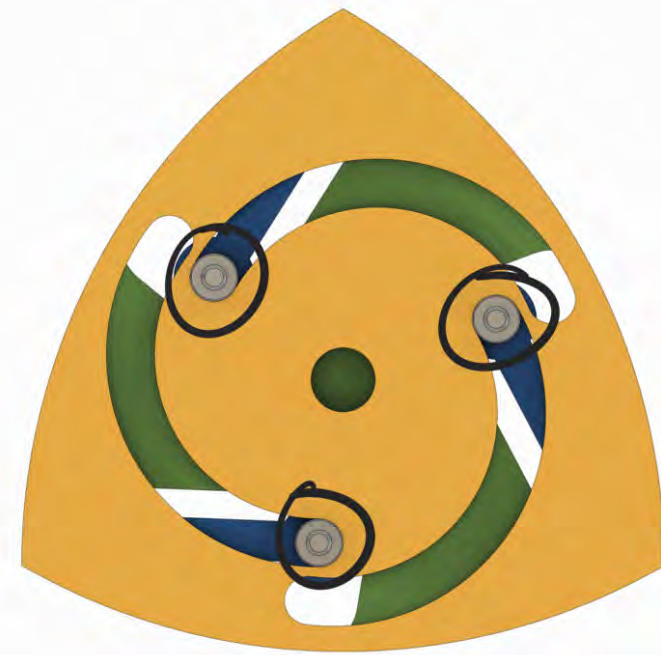
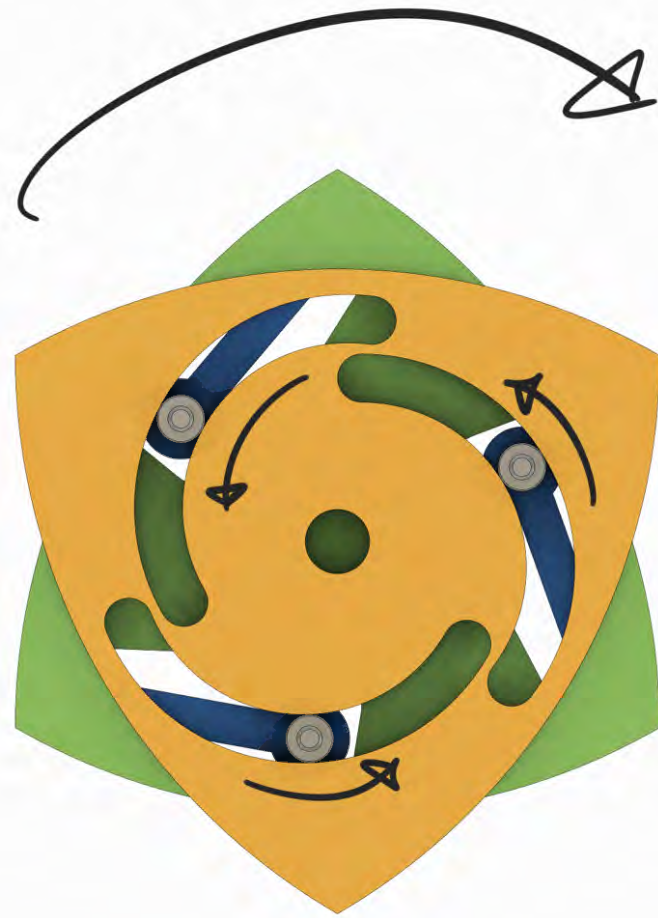
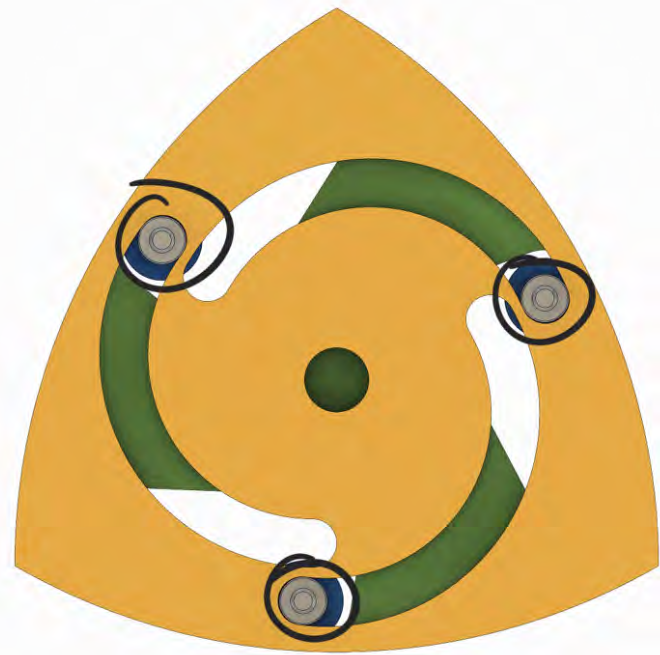
53





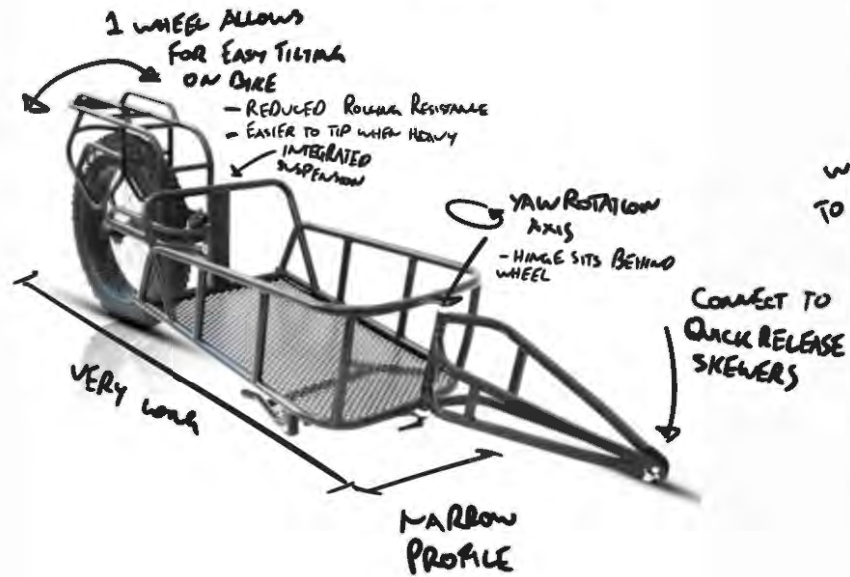
- NO CONSIDERATION FOR MECHANISM
- OUTER SHELL NEEDS TO ROTATE
- TRIANGLE INSERT
 - ROTATIONAL STABILITY
 - GEOMETRY COMPLEX



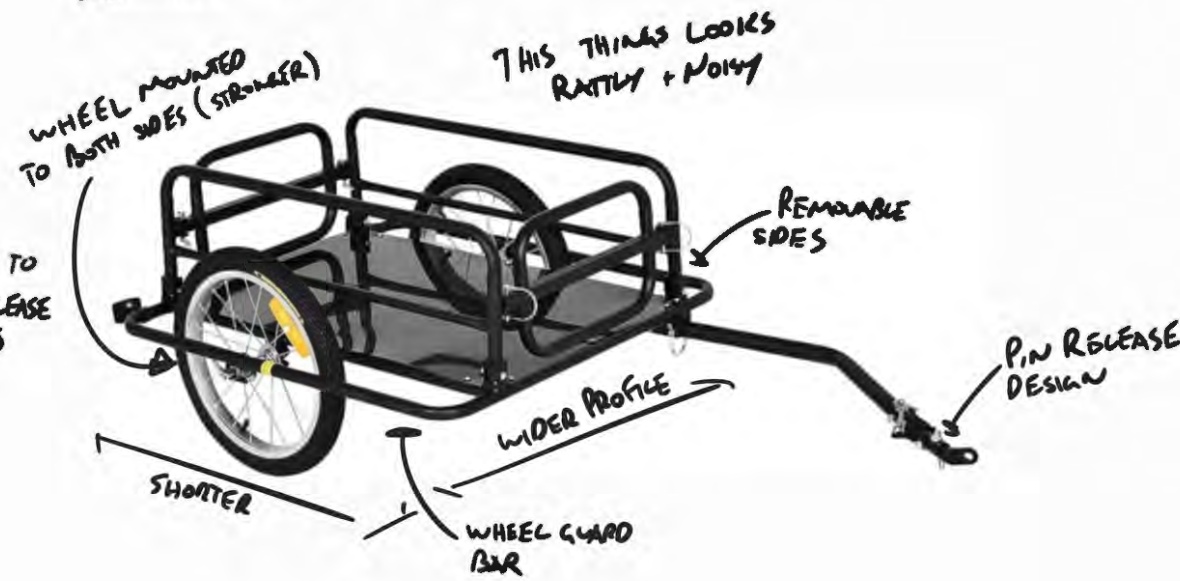


BIKE TRAILERS (CARGO)

SINGLE WHEEL DESIGN (\$549)



2 WHEEL SIDE AXLE MOUNT (\$300)



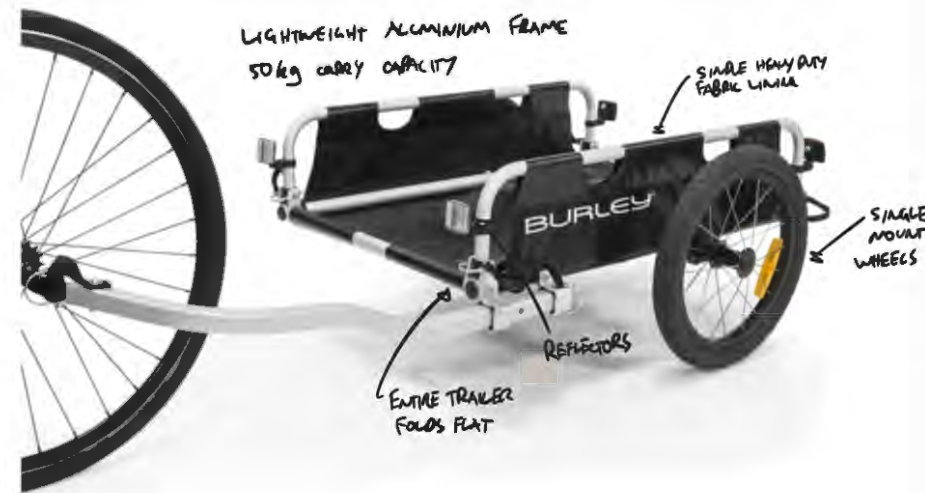
IS THERE A WAY TO COMBINE ALL THE PROS OF EACH DESIGN WITHOUT THE CONS?

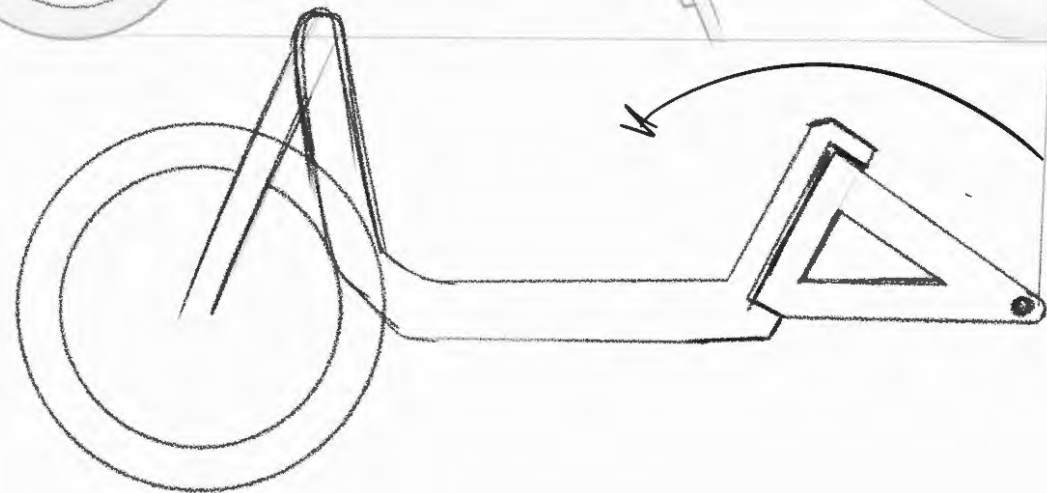
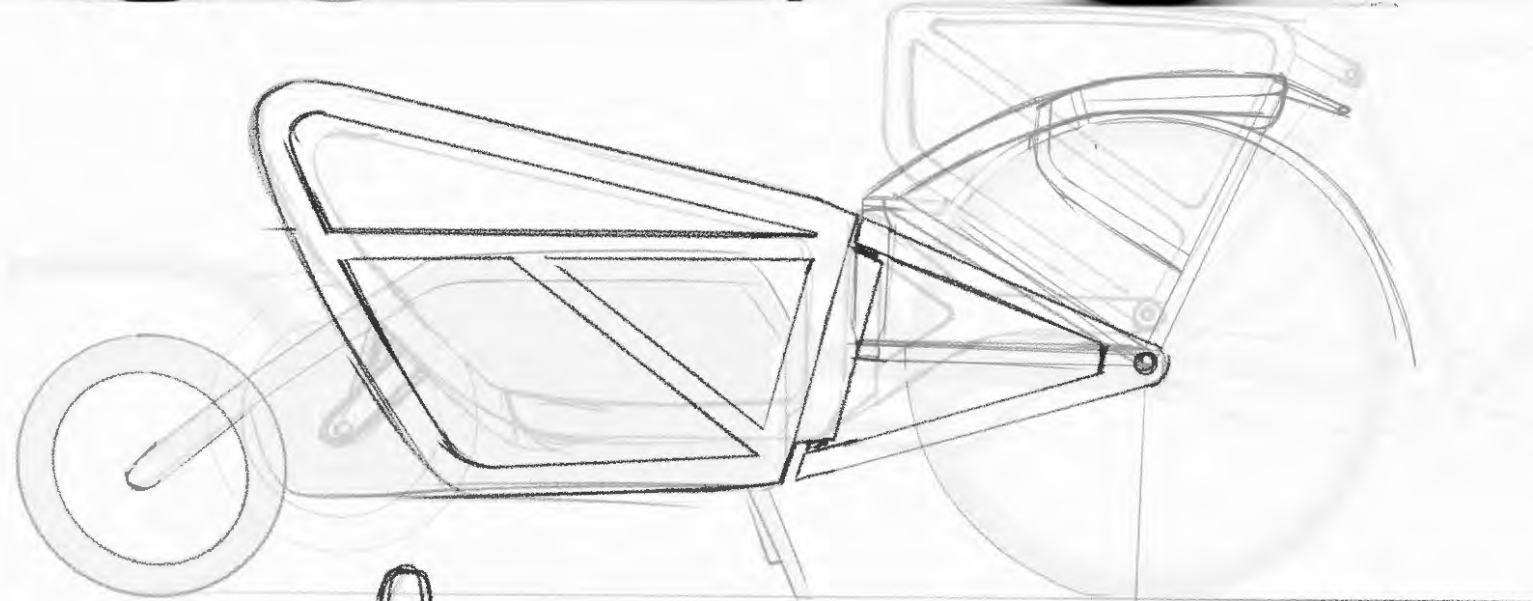
- CAN WE DESIGN IT SO AN ADULT CAN BE CARRIED IN IT? (LOAD LIMIT OF 80KG+)
- CAN WE IMPROVE THE DETACHING/ATTACHING PROCESS?
- CAN WE IMPROVE THE VERSATILITY?

2 WHEEL 'BUDGET' SEAT POST MOUNT (\$150)

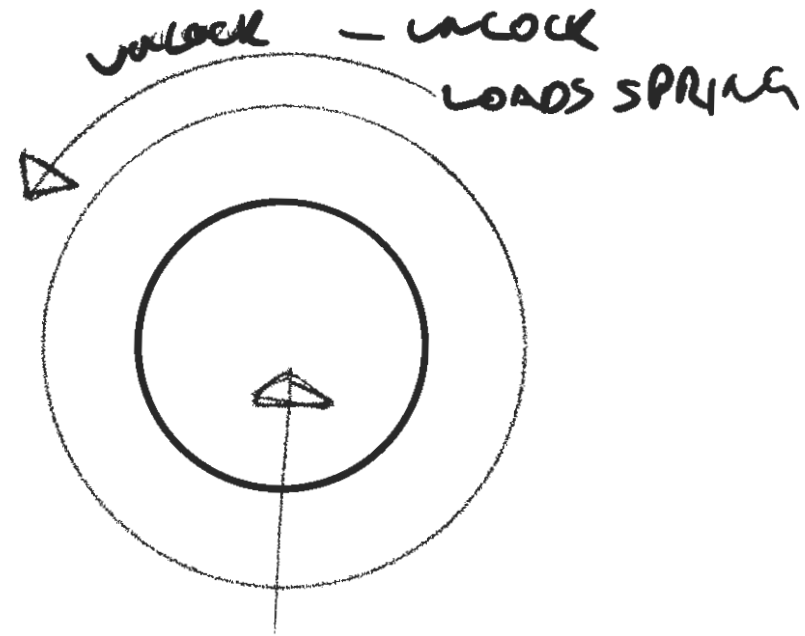
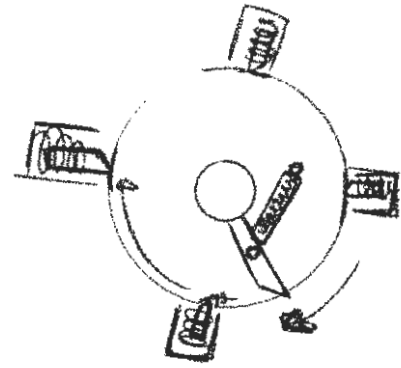
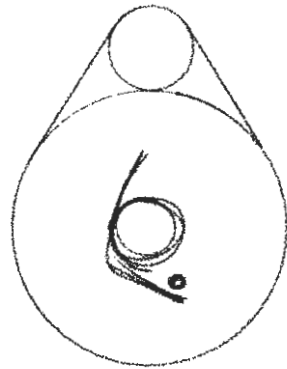


BURLEY FLATBED CARGO TRAILER (\$540)

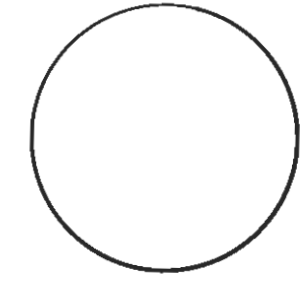
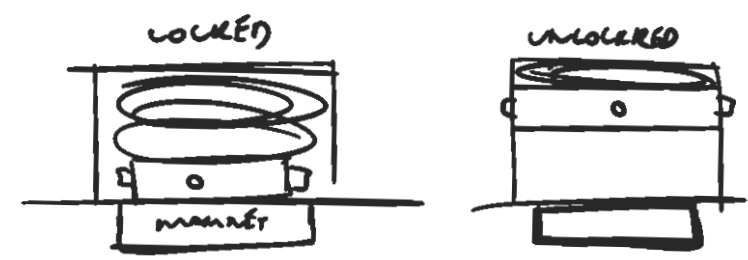
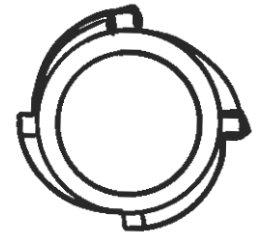
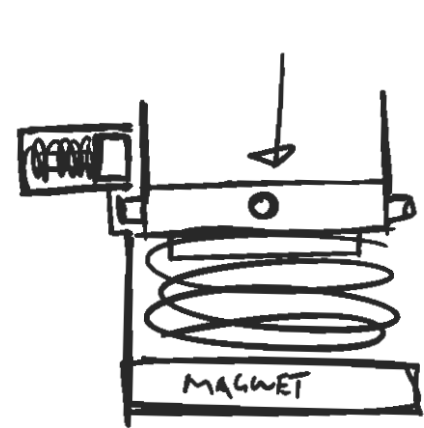
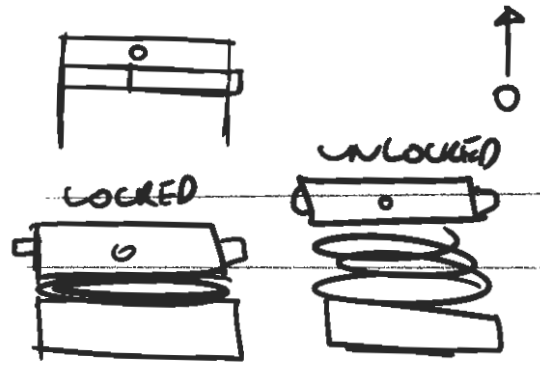




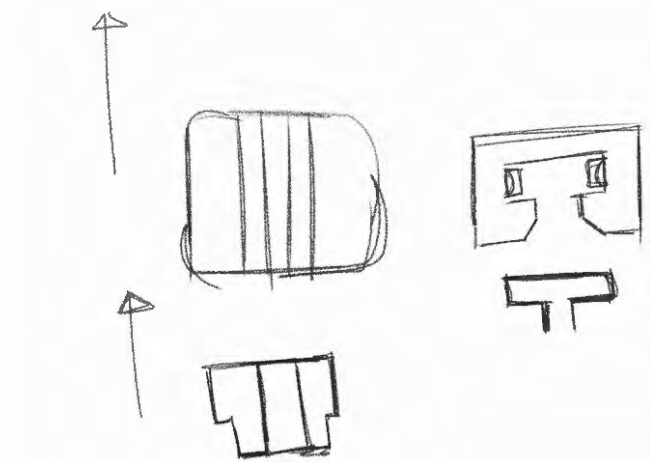
I LIKE THE FAT BEDNESS
OF THIS DESIGN



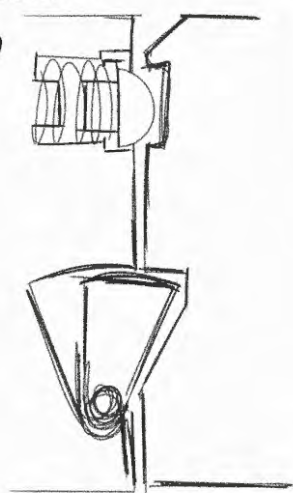
LOCK
- LOCK RELEASES SPRING



MM NOT COME HERE

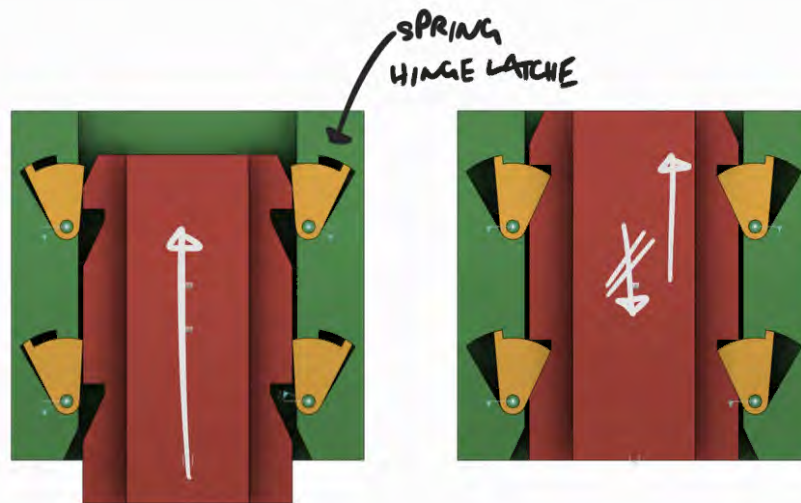


Pow Pin
LATCHES
POSITION

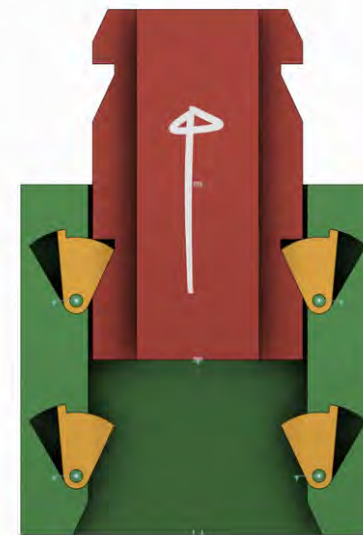


PULL UP TO
REMOVE

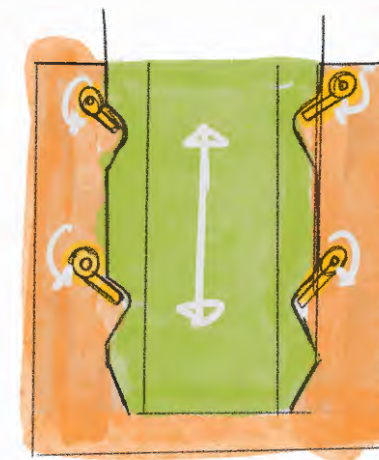
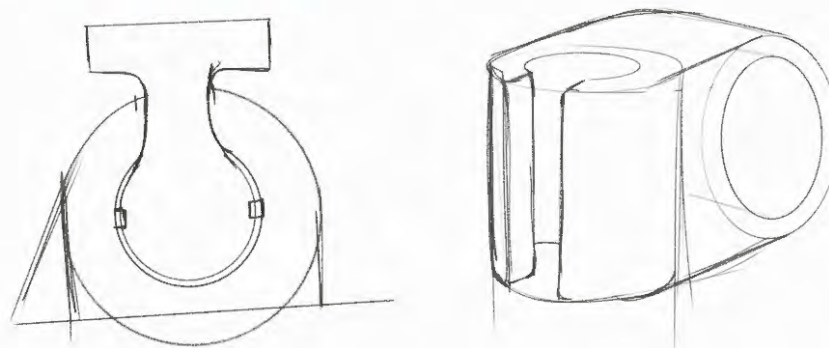
SLOTS IN
UPWARDS



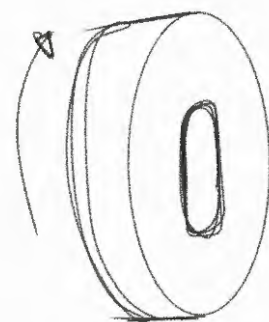
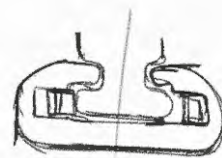
SPRING
HINGE LATCH

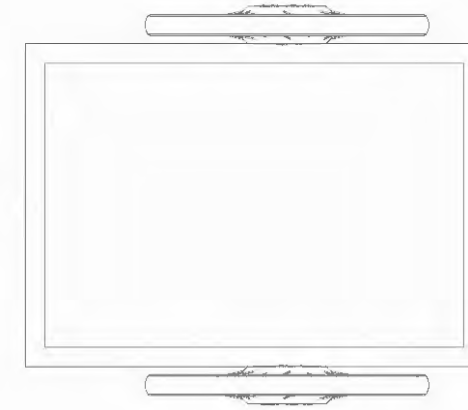
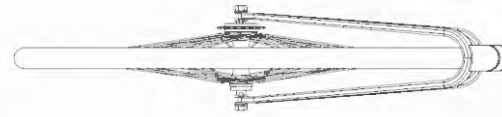
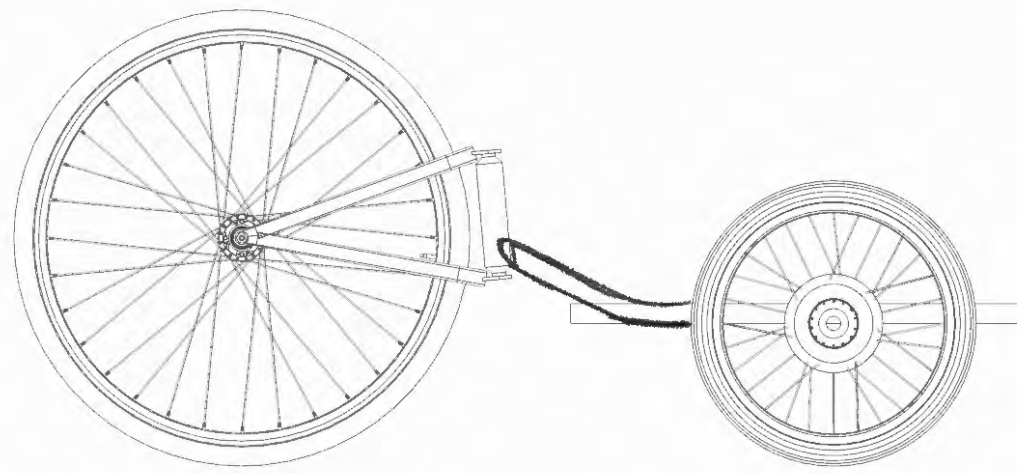
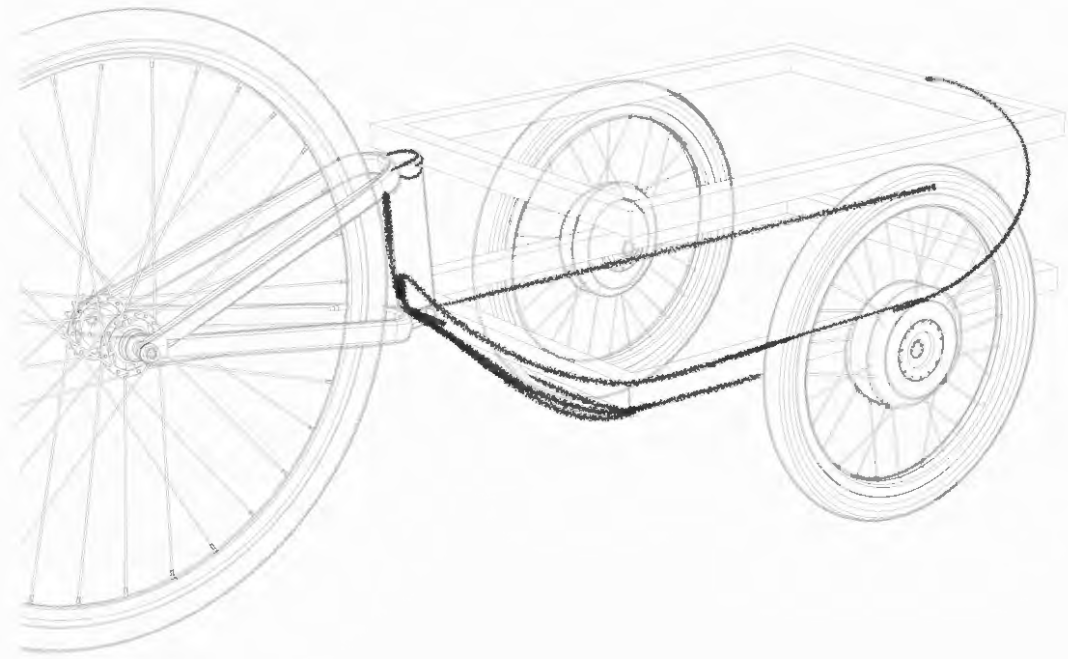


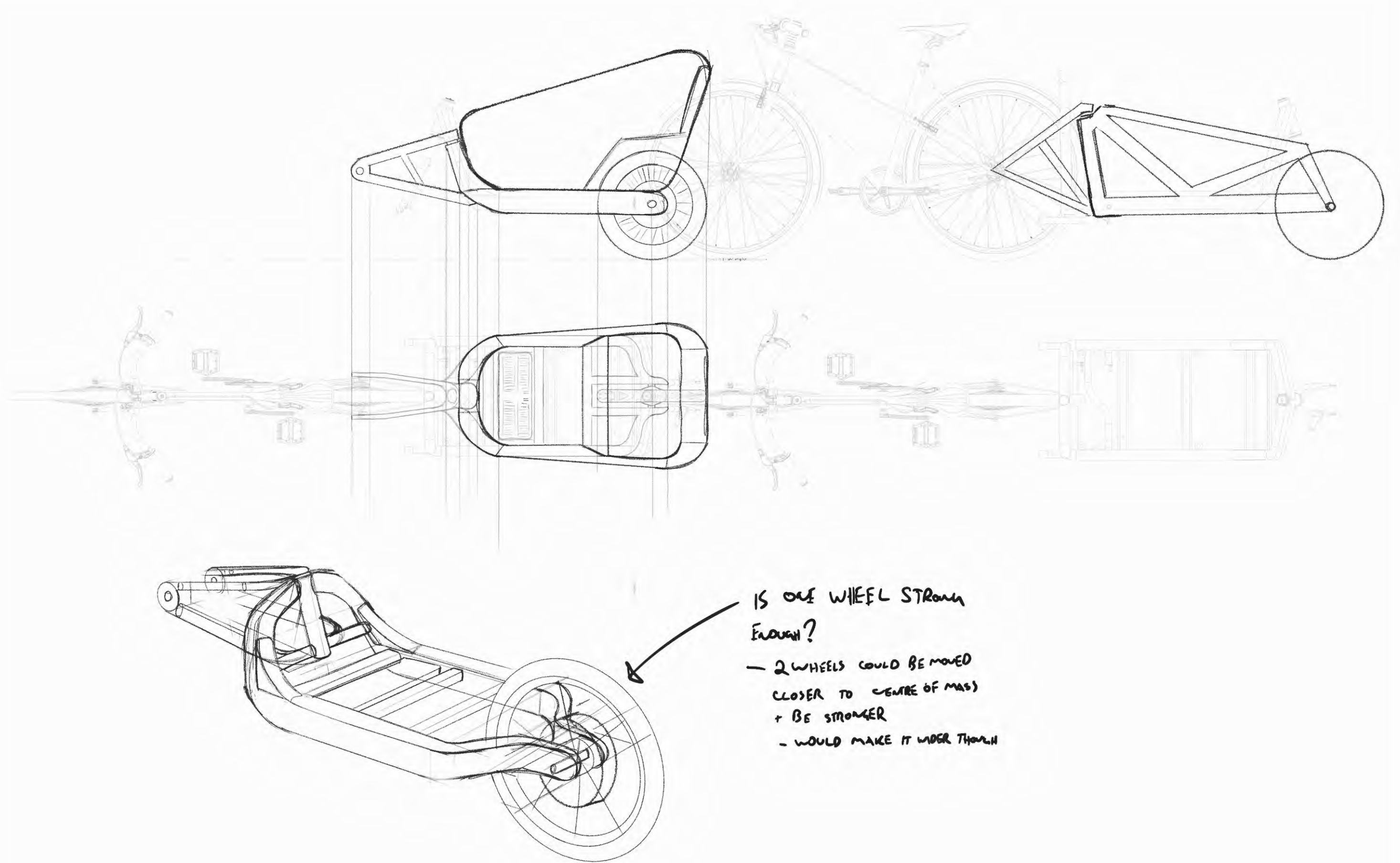
POTENTIAL USER
COMPLEXITY WHEN
INSERTION
- NOTHING TO STOP INSERT GOING
ALL THE WAY THROUGH

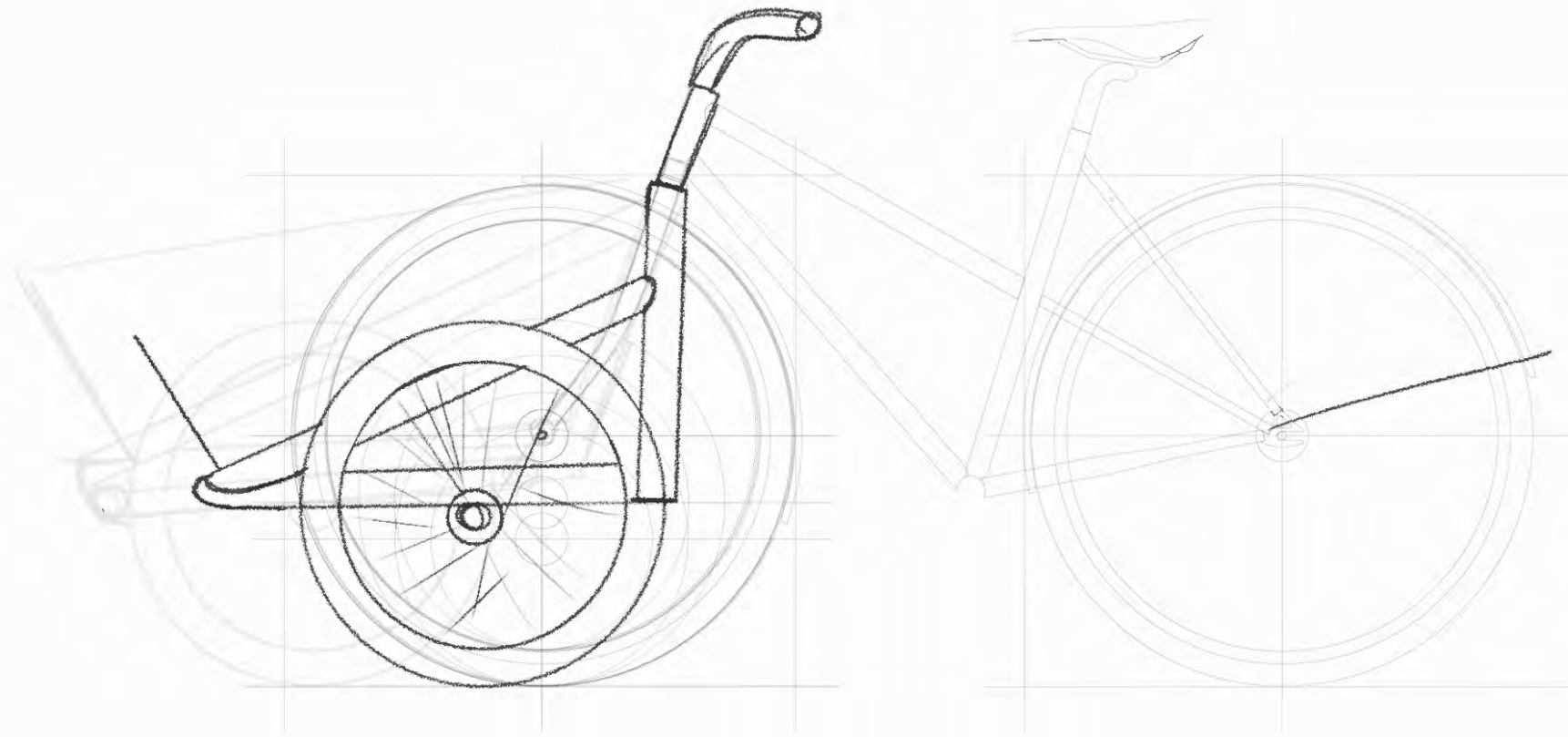


OH BOY ITS A GLORIFIED
BUCKLE, GOOD ONE MUX





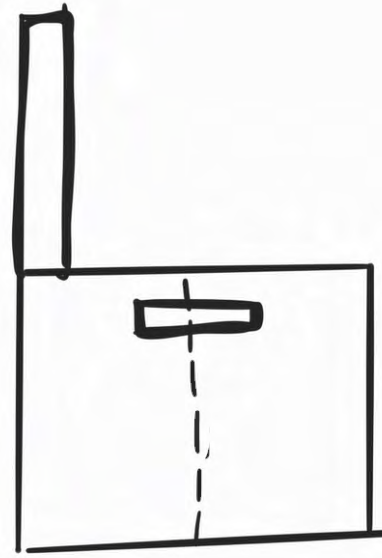
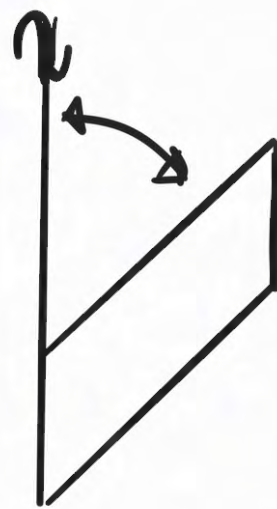
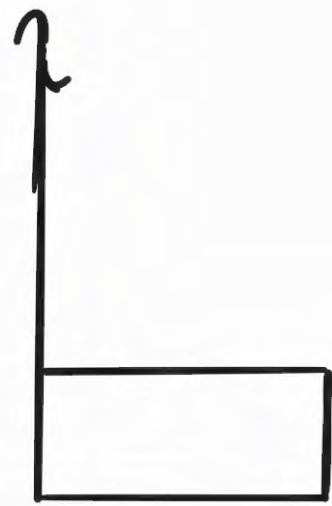


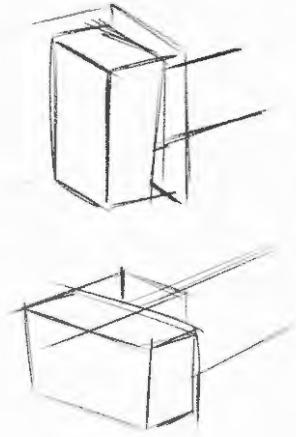


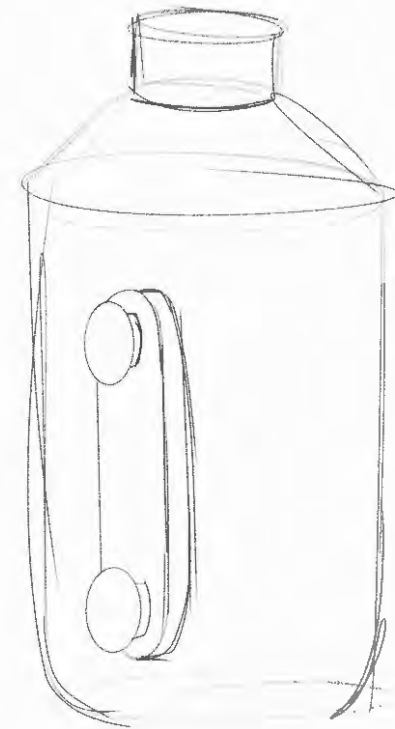
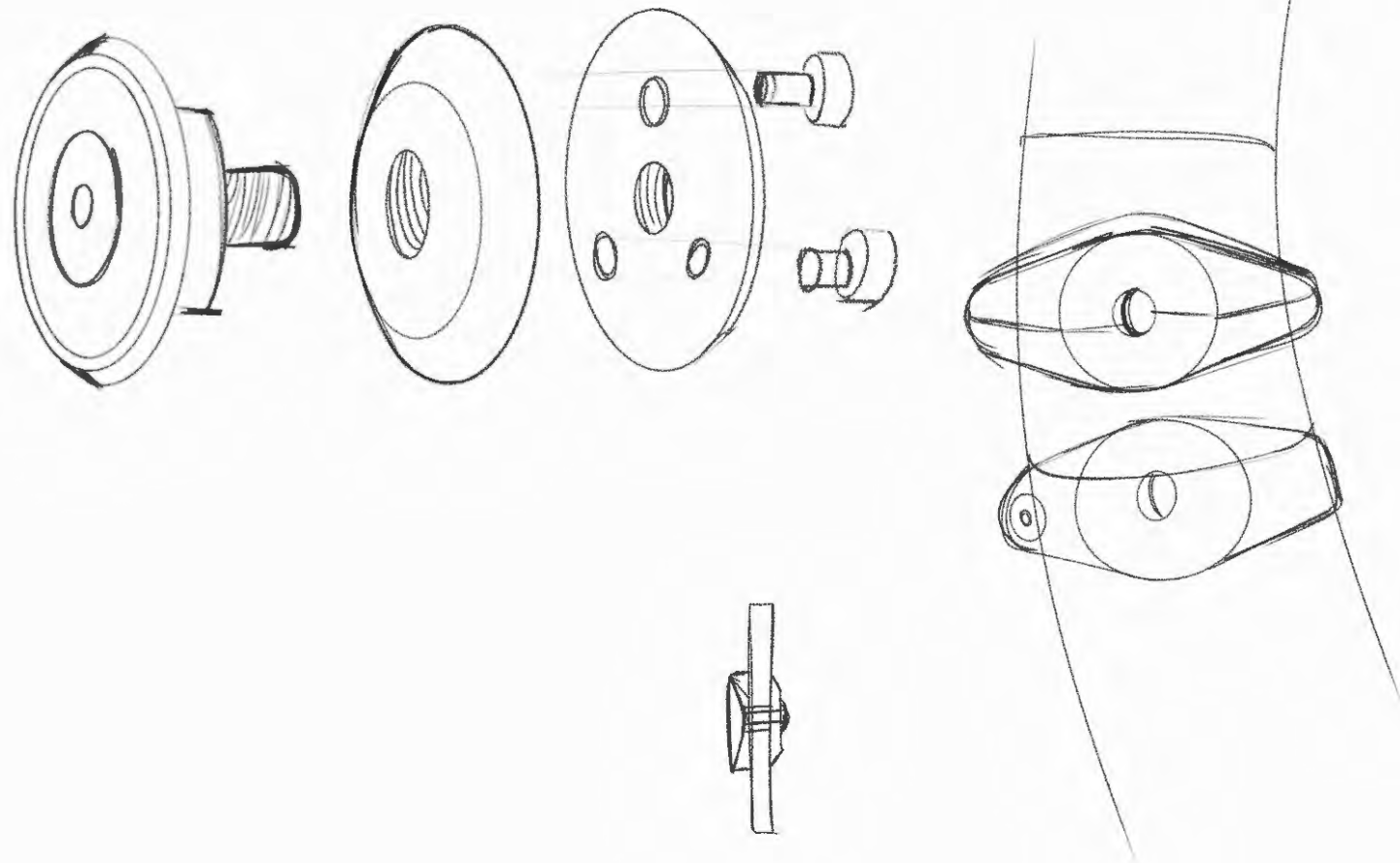
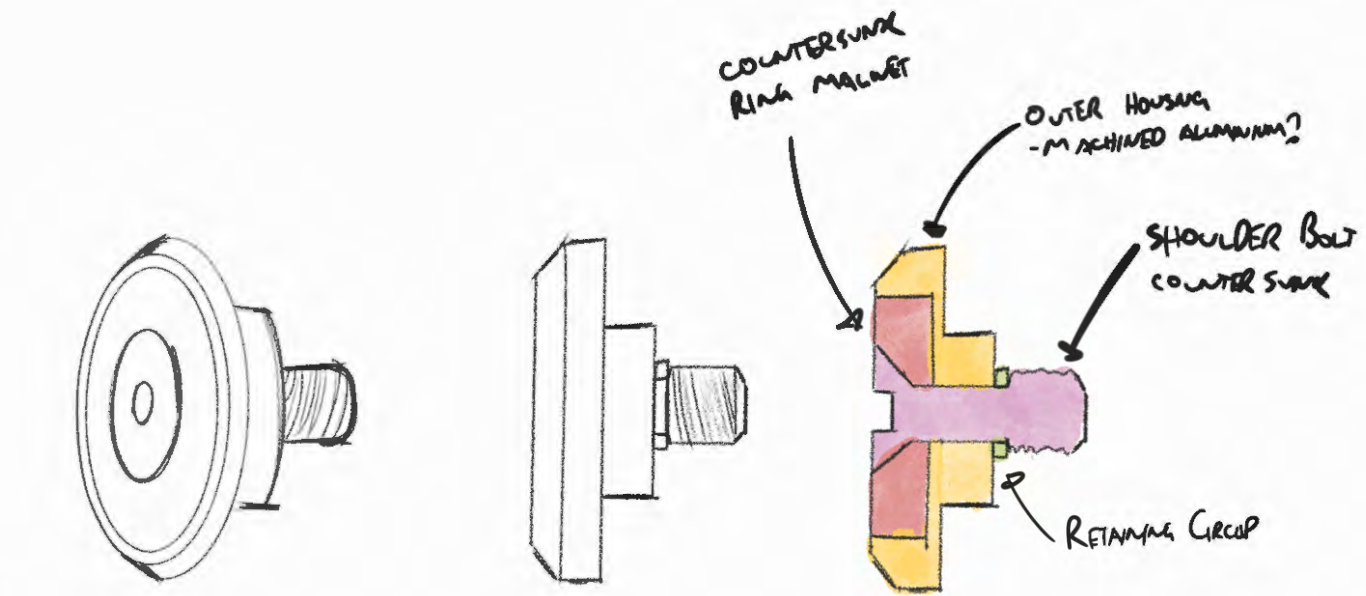
DNB311: CAPSTONE

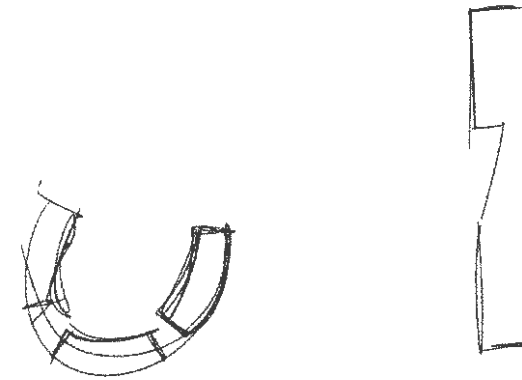
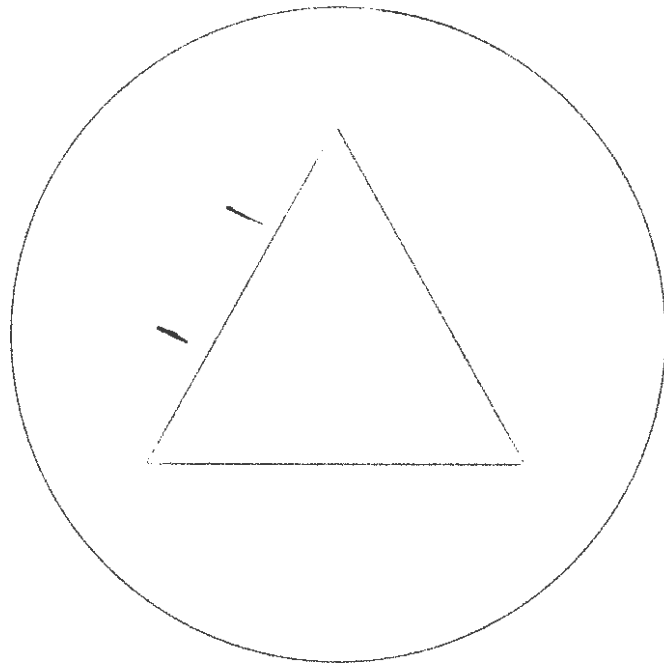
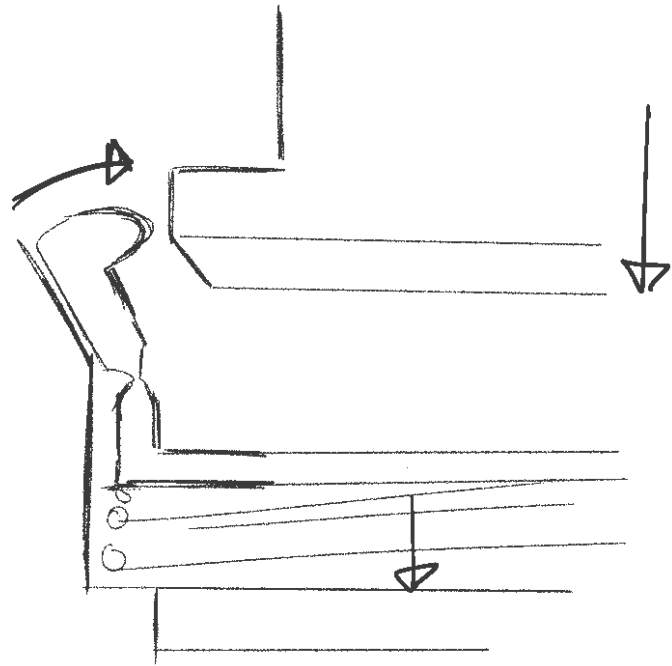


NICHOLAS BENTLEY
N10690751

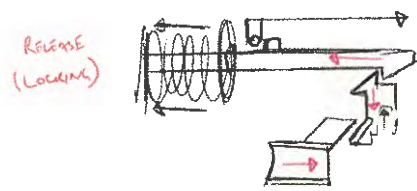


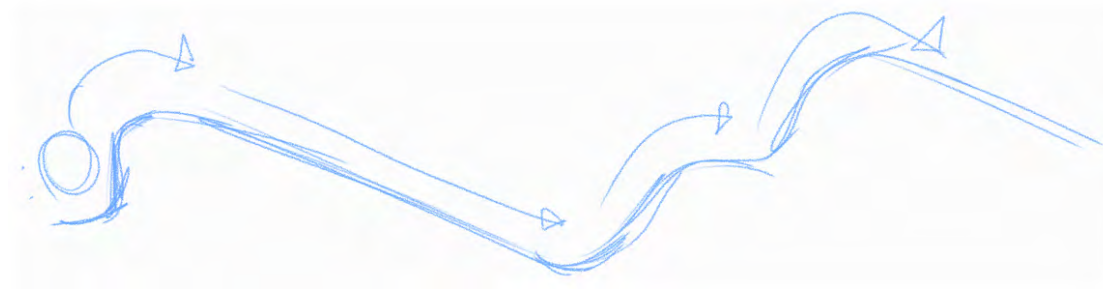
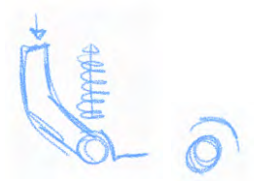


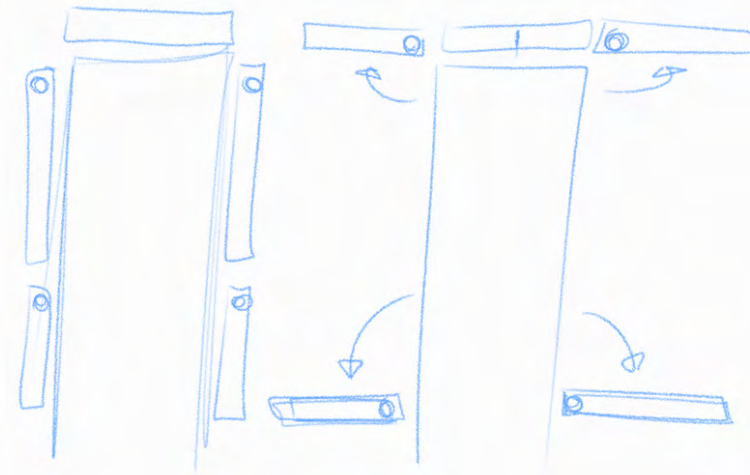
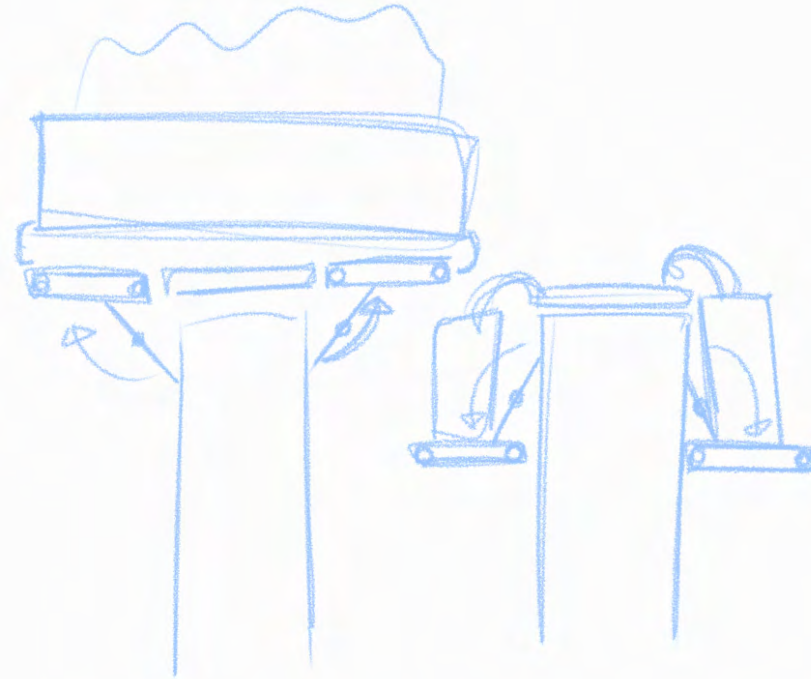
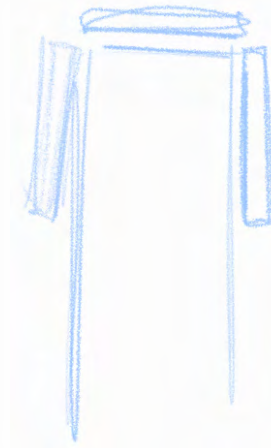
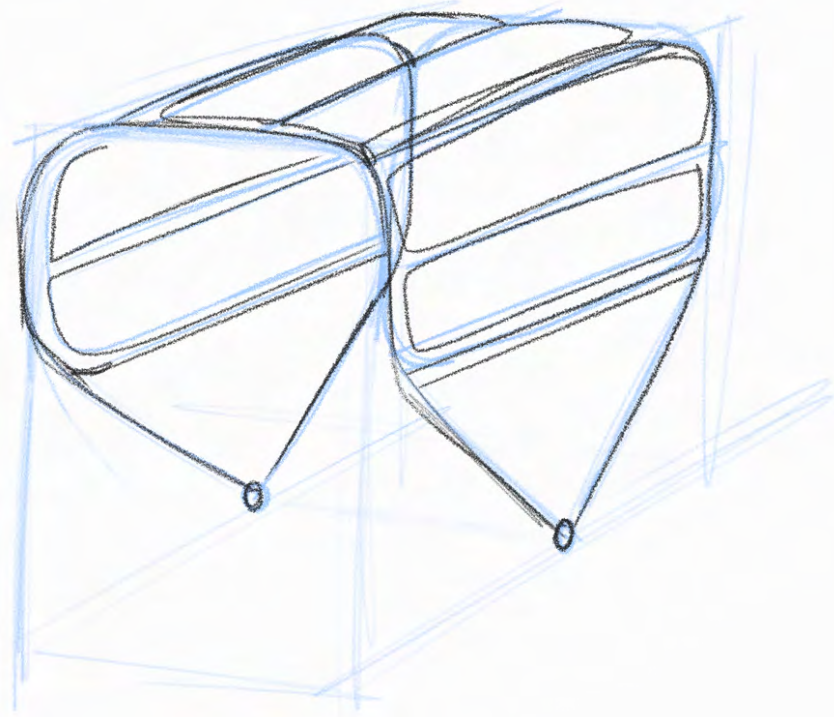


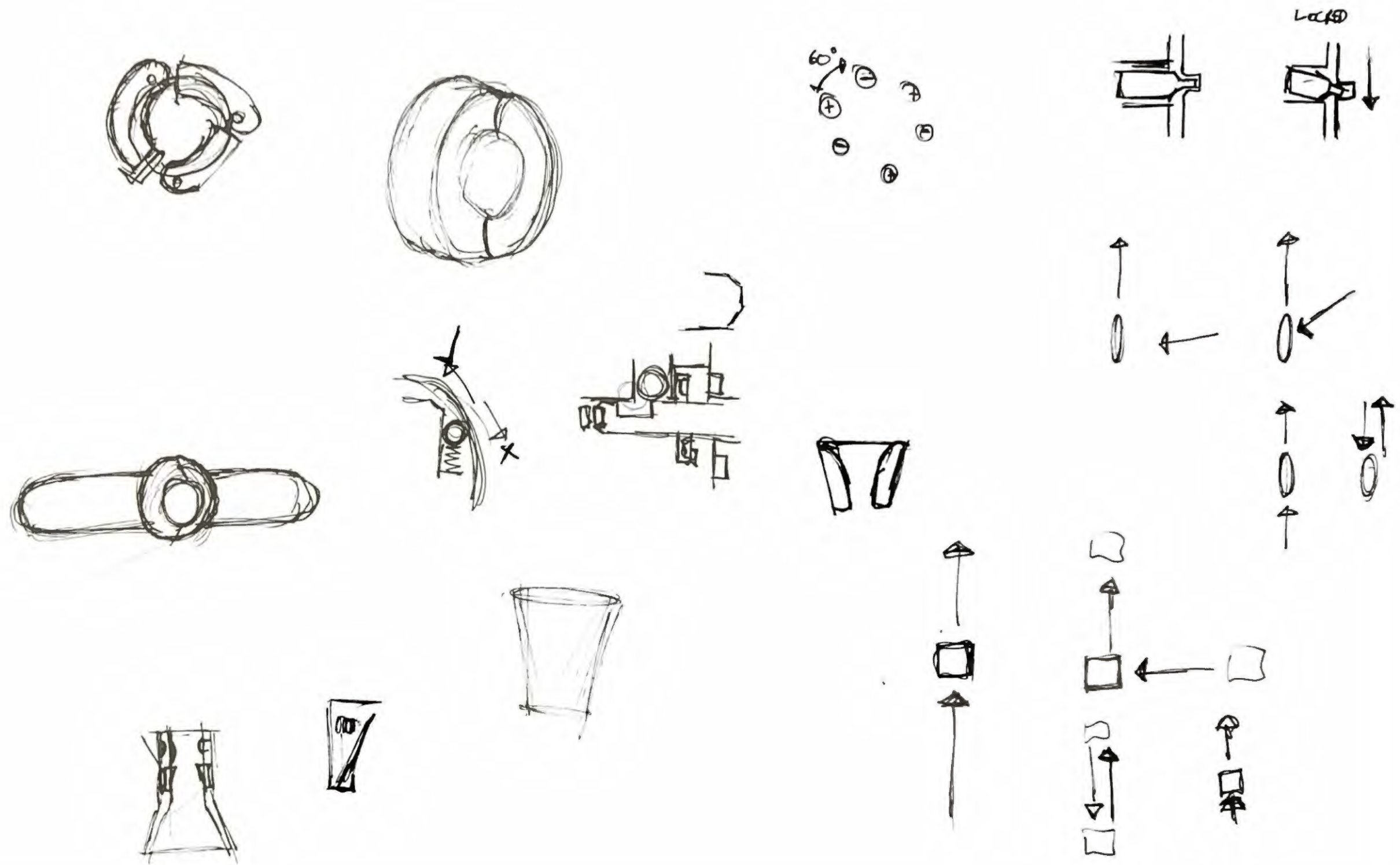


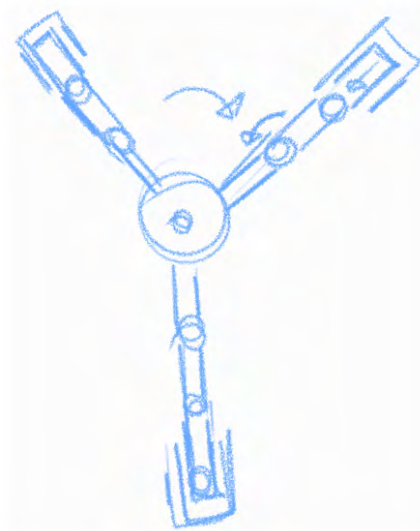
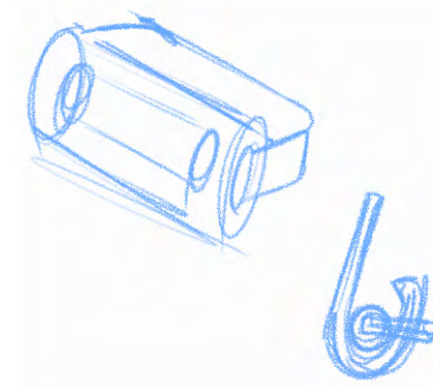
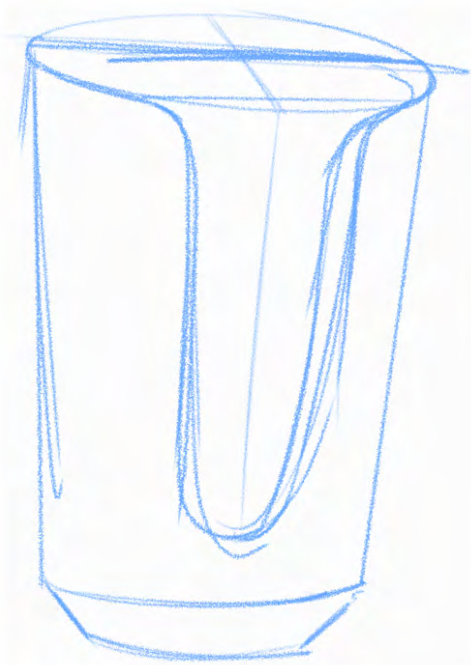
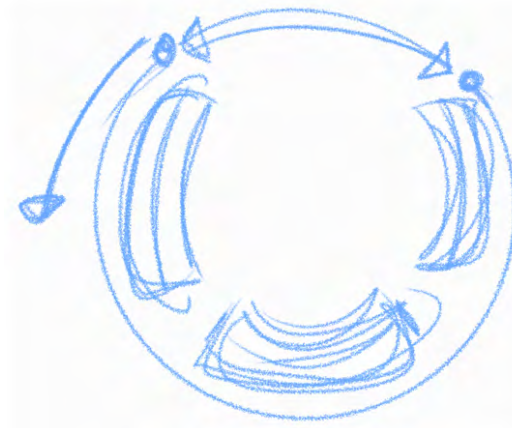
1. PRIME SPRING DURING LATCH RELEASE
 - CLICK AT END INDICATES RELEASE

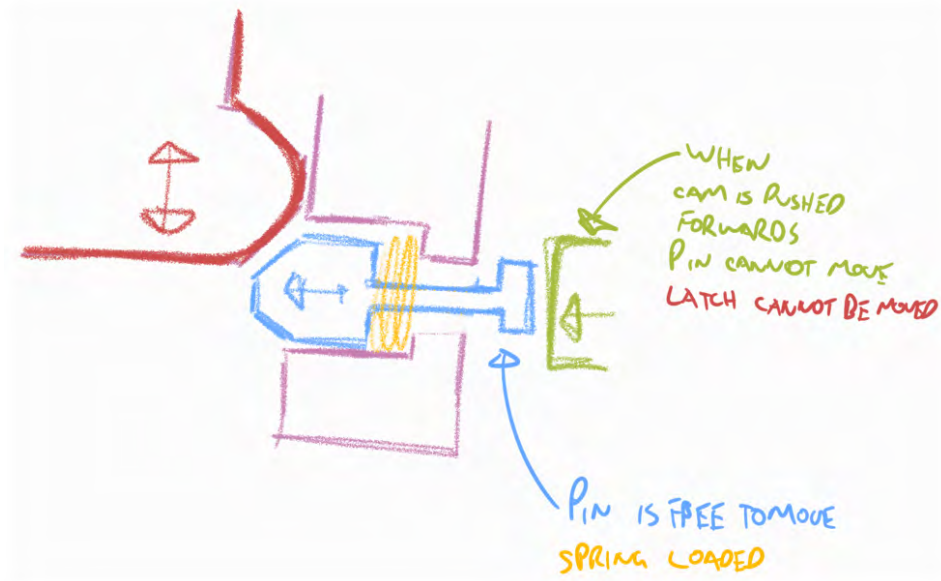
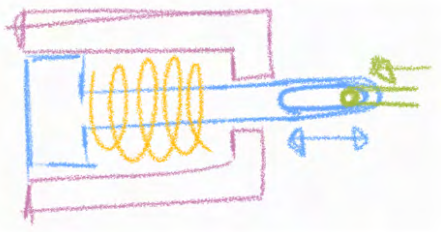
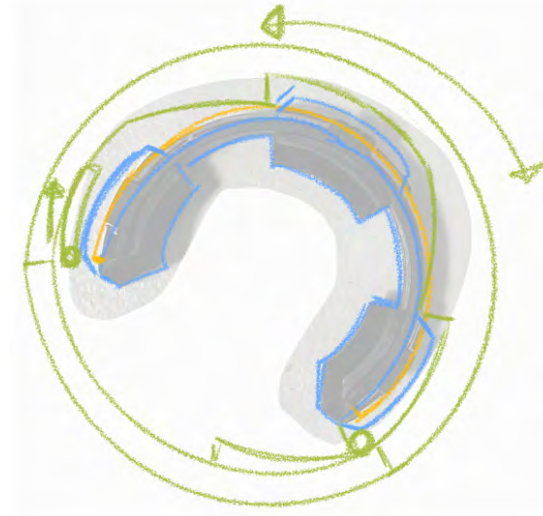
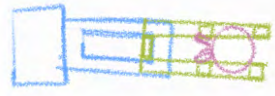
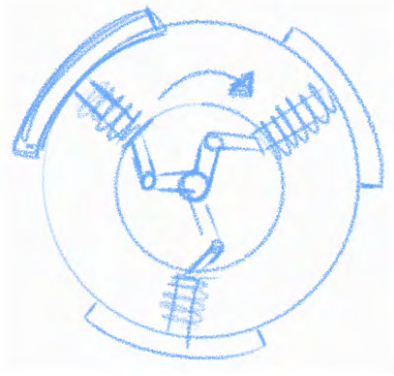


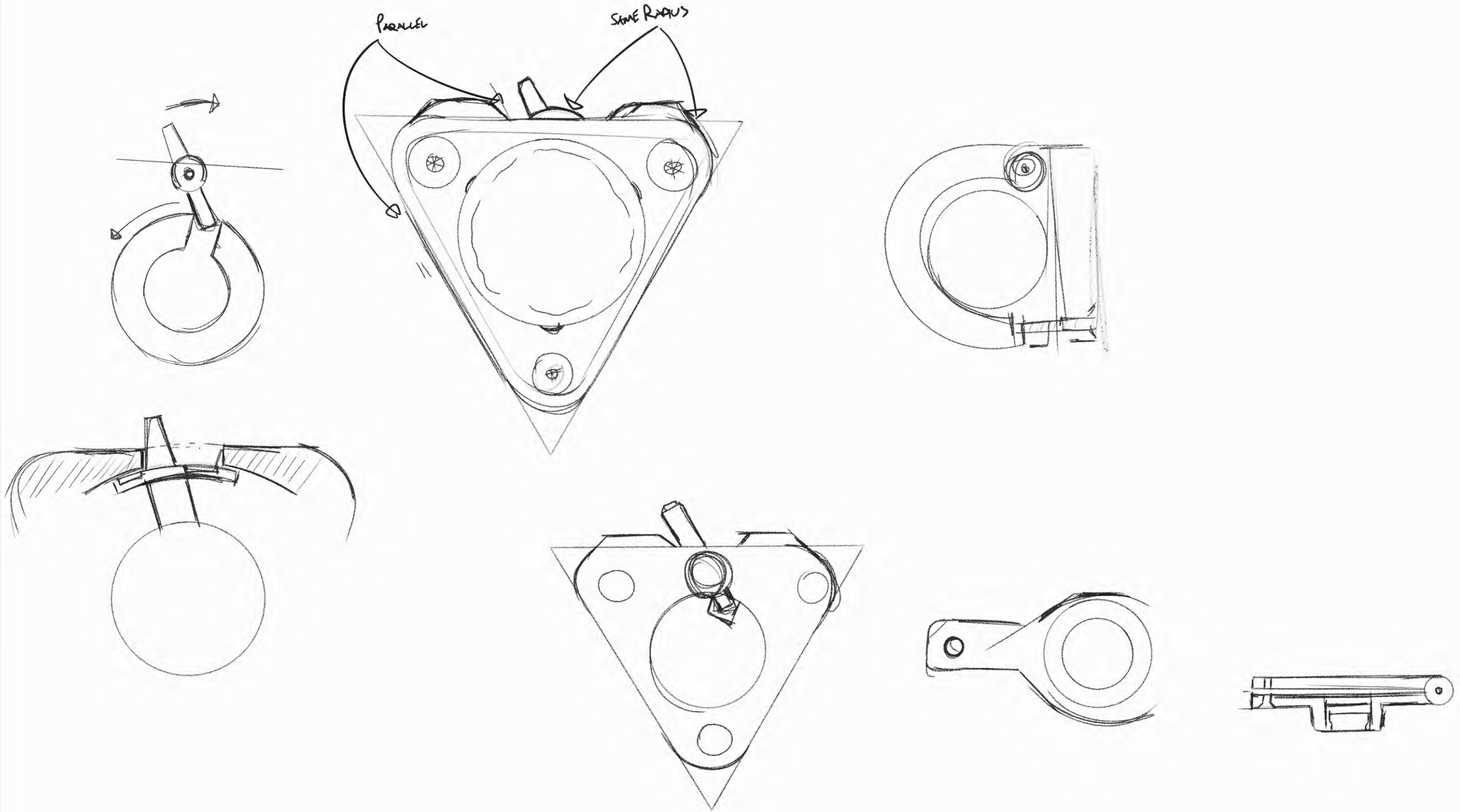


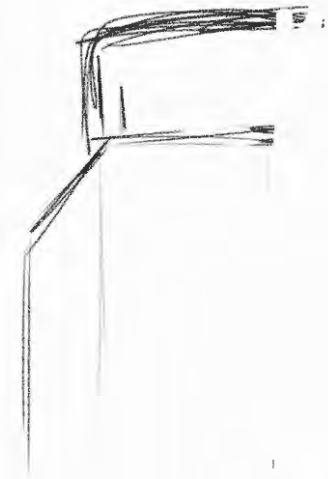
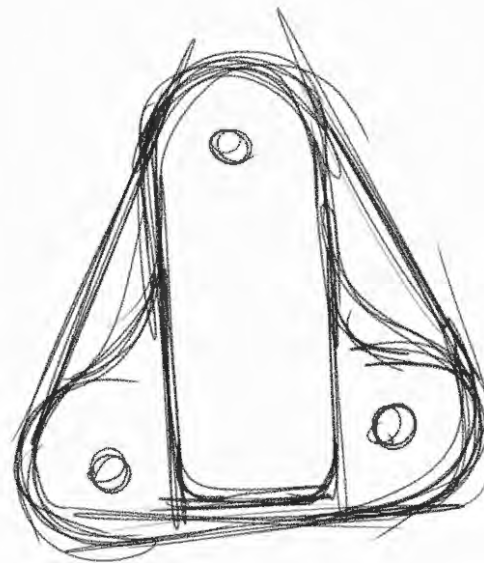
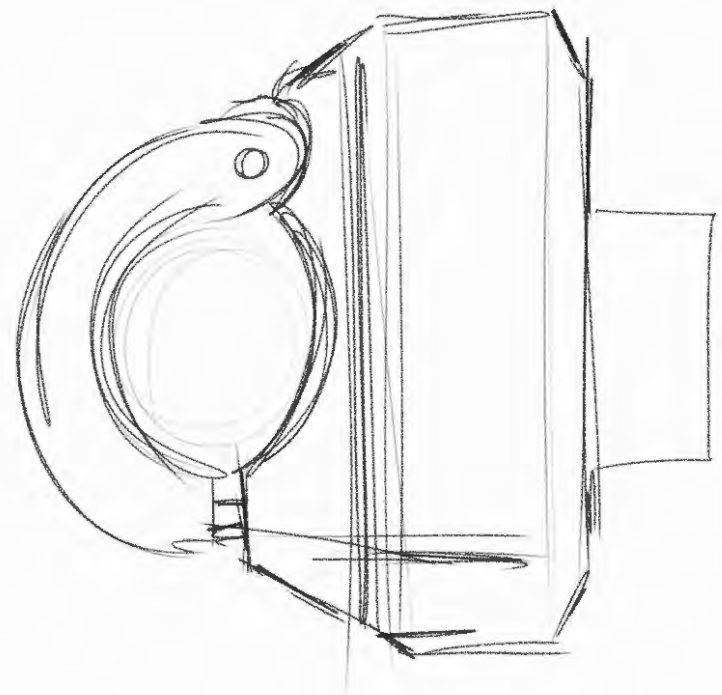










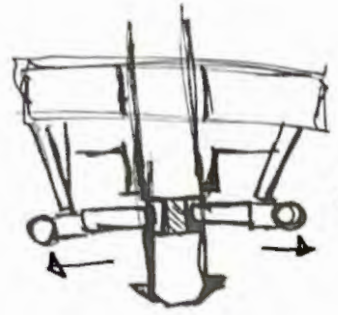


DMB311 : CAPSTONE

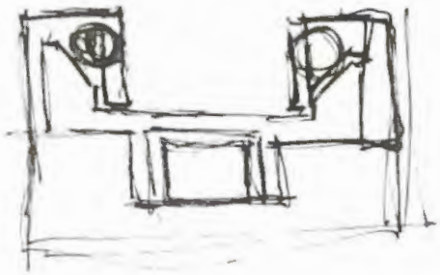
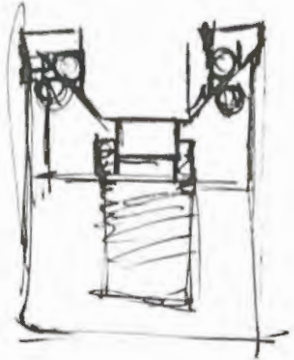
BIRE MOUNT ALL



NICHOLAS BENTLEY
N10690751



BALL CLAMP MECHANISM

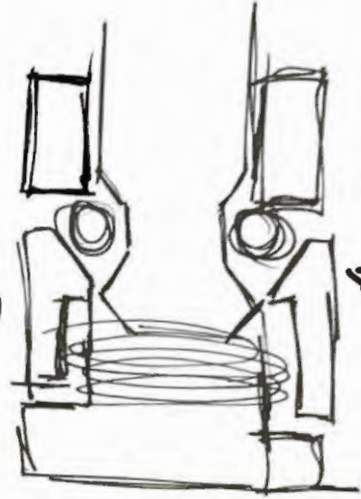


SPRING DETENTS



SPRING MECH FROM OTHER DESIGNS

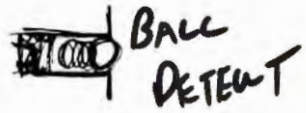
SPRING



SLIDING RAMP



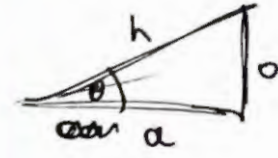
MALE COMPONENT



BALL DETENT



FLATTER DESIGN



COIL/SPRING
PITCH/ANGLE
MATHS JARGON

$\theta = \text{COIL ANGLE}$
 $a = \text{COIL D}$
 $o = \text{COIL PITCH}$

$\tan \theta = \frac{o}{a}$

$a \tan \theta = o$

$\theta \tan^{-1} \theta = a$

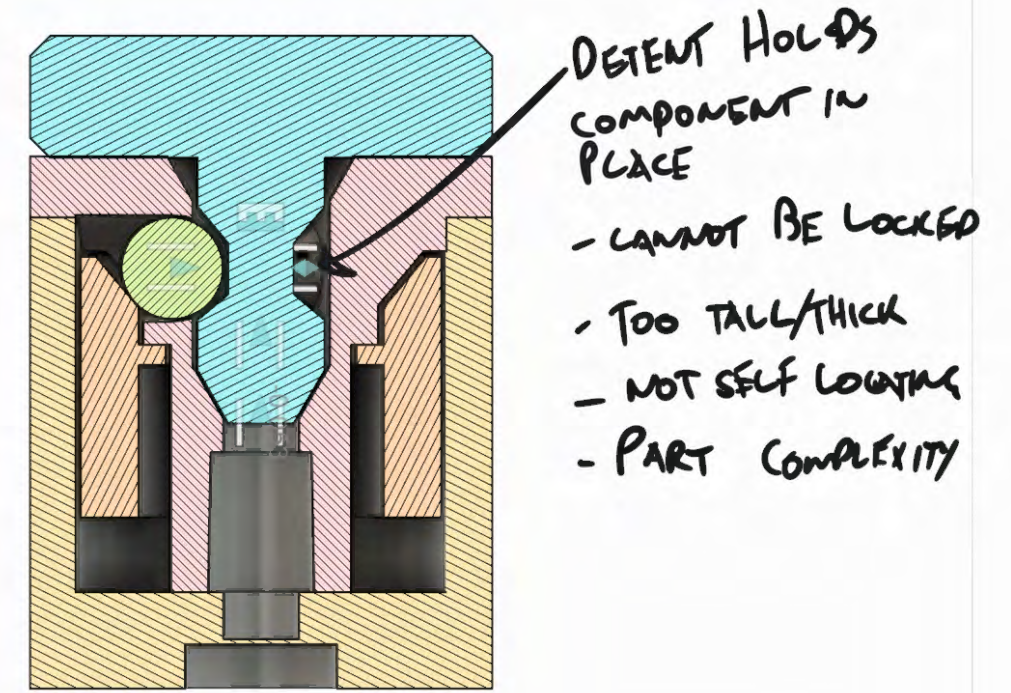
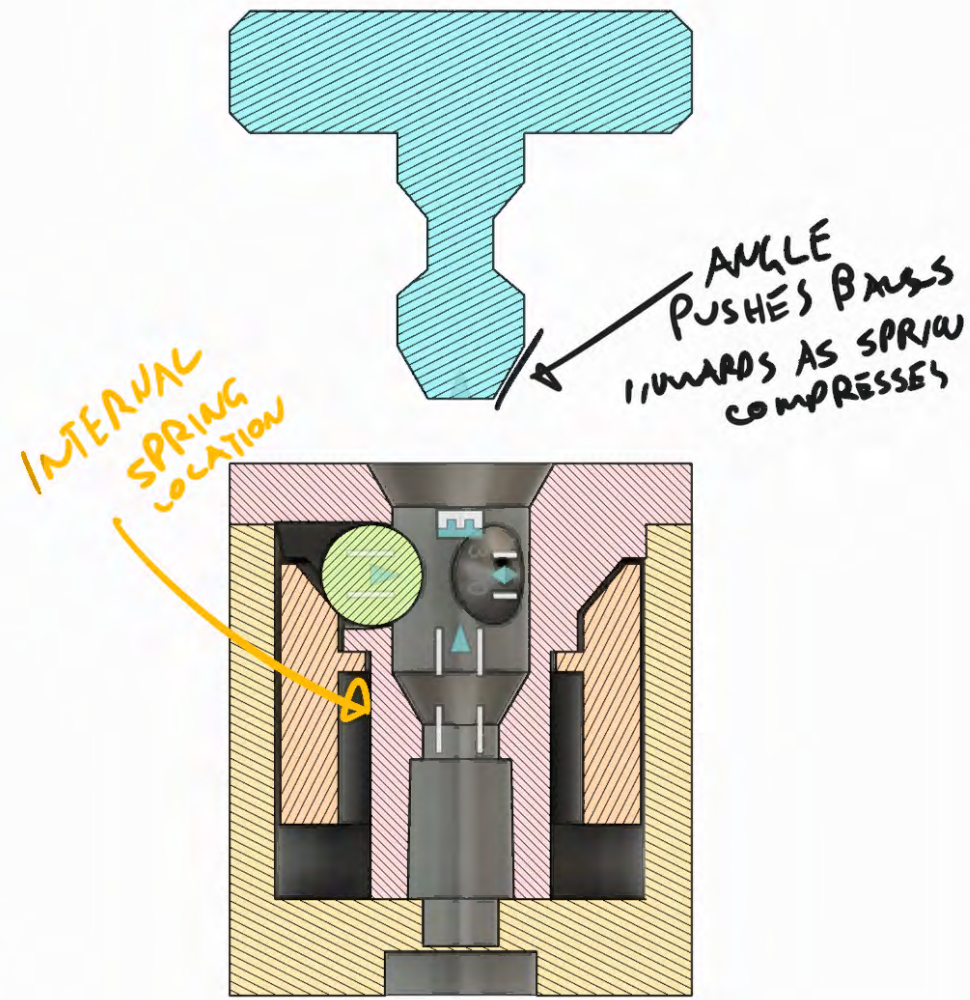
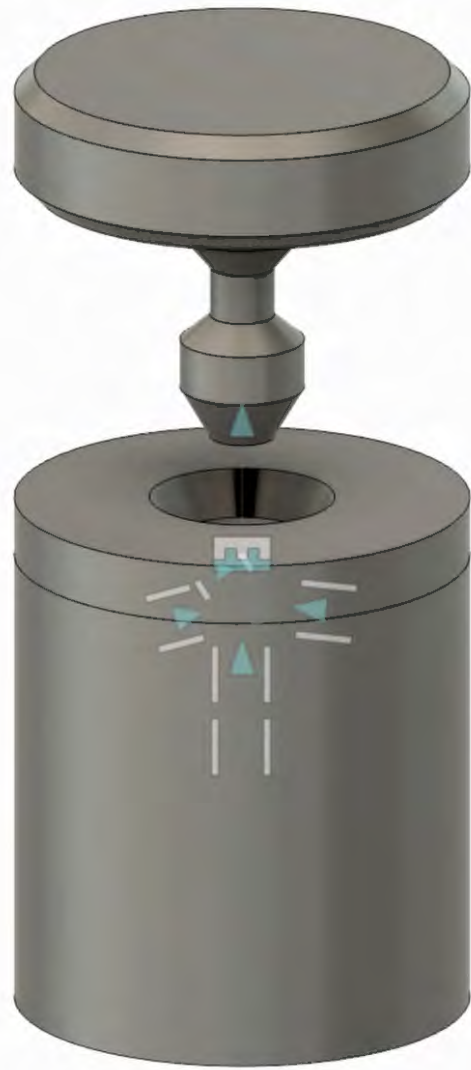


COIL D · π

$\tan \theta = \frac{o}{a}$

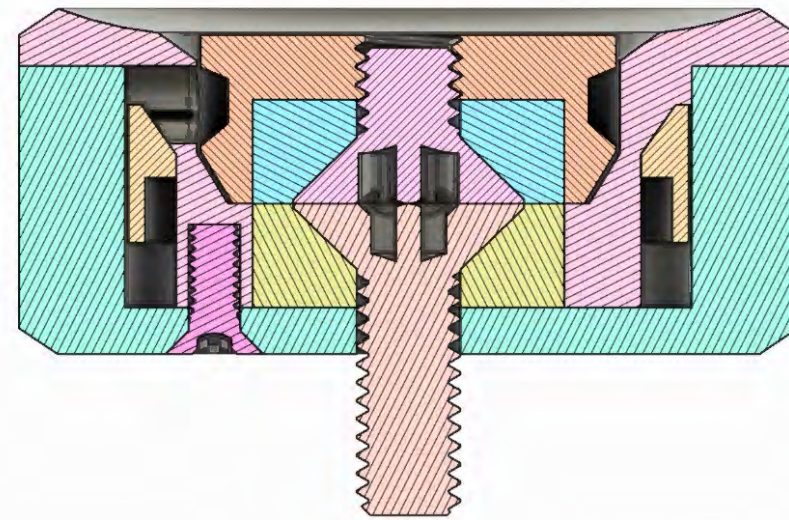
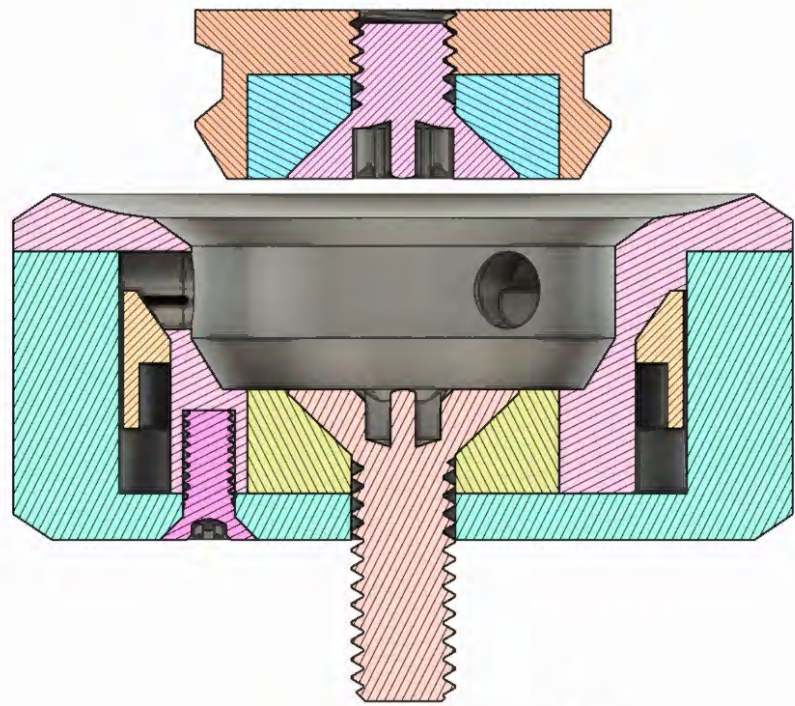
$a \cdot 75 \tan \theta$





BILL OF MATERIALS



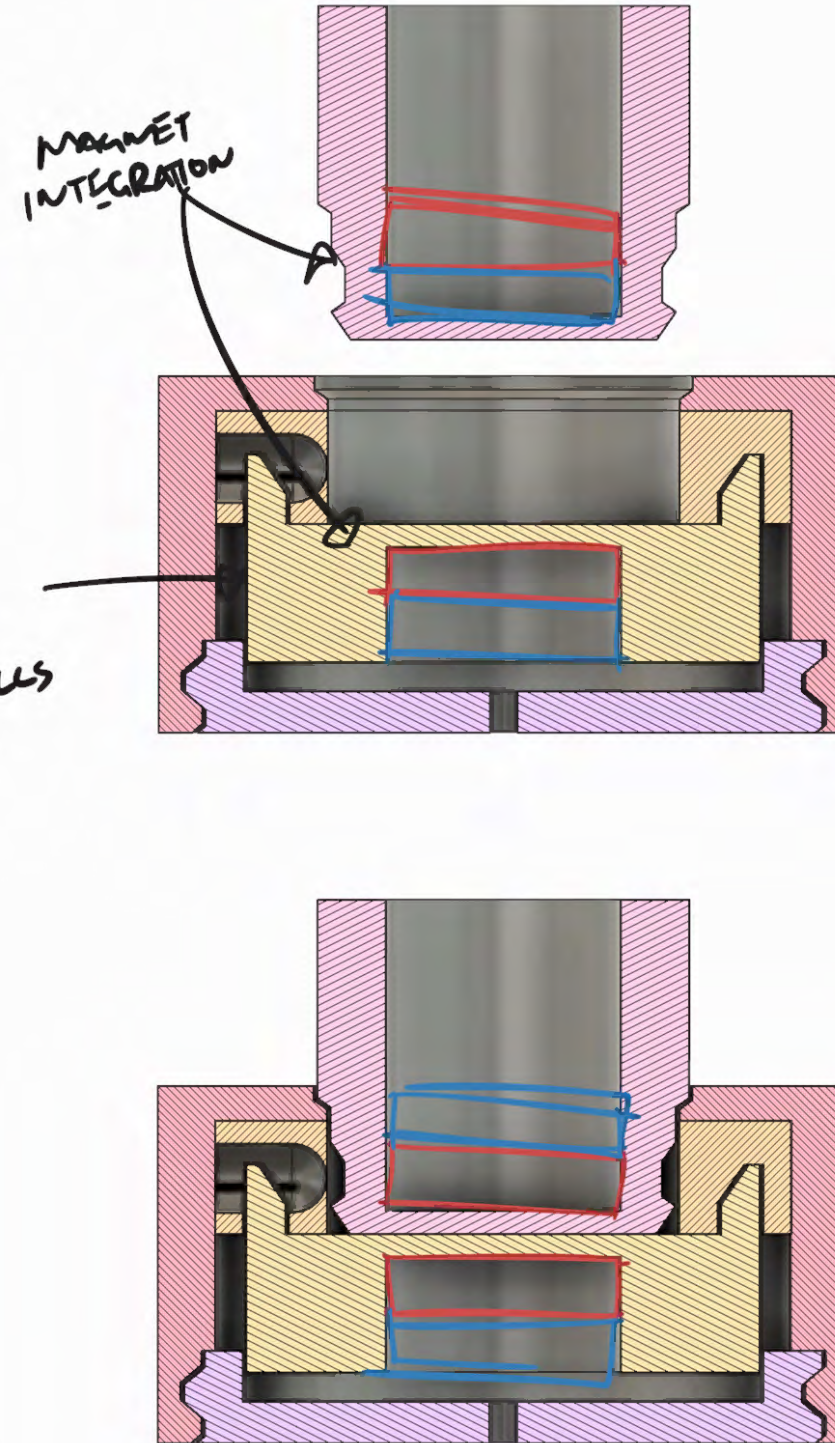
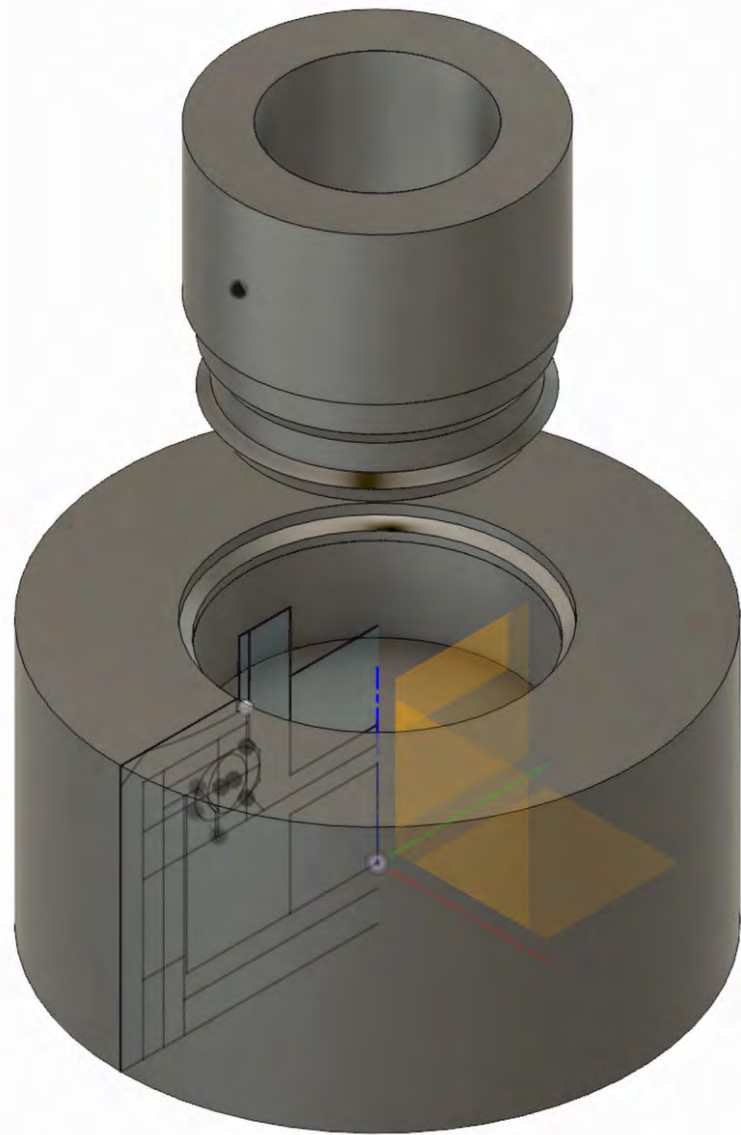


Pros

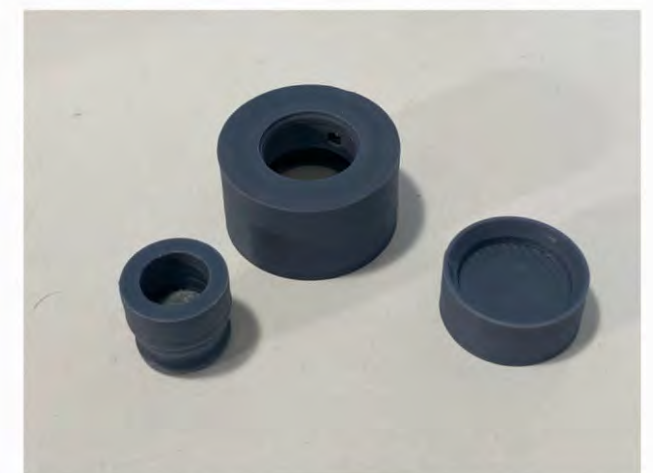
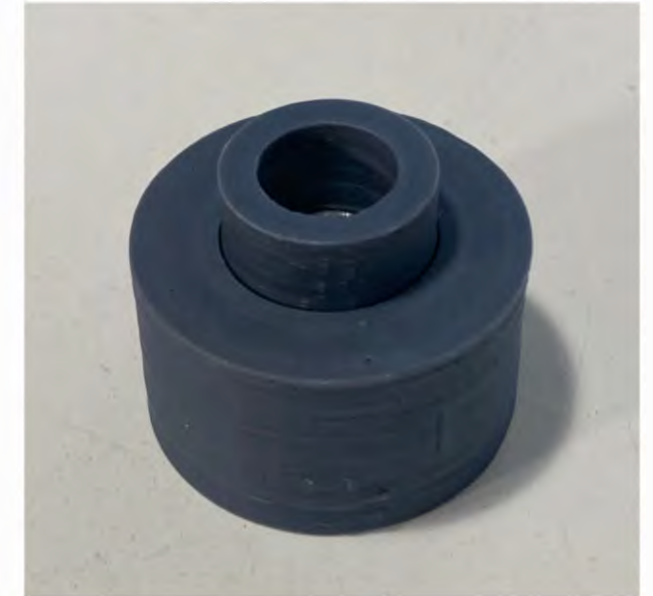
- FLATTER DESIGN
- INCLUDED MAGNETS FOR SELF LOCATING
- HARDWARE CONSIDERATIONS

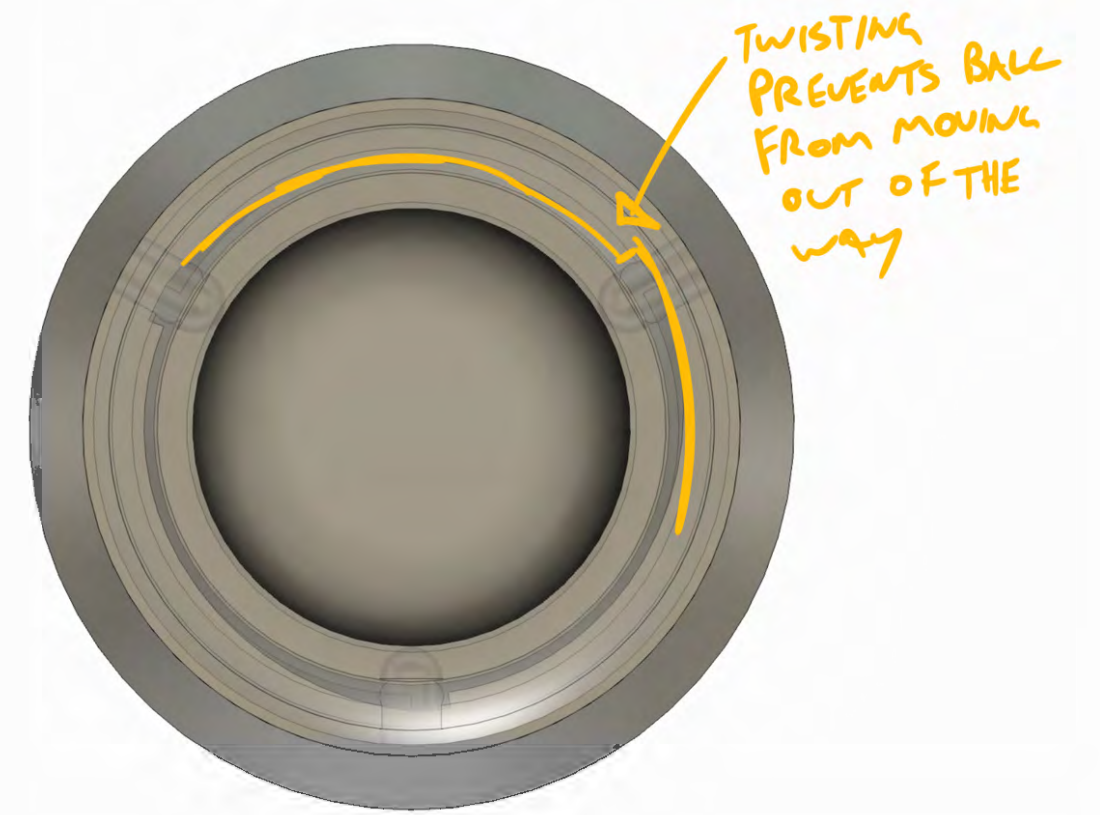
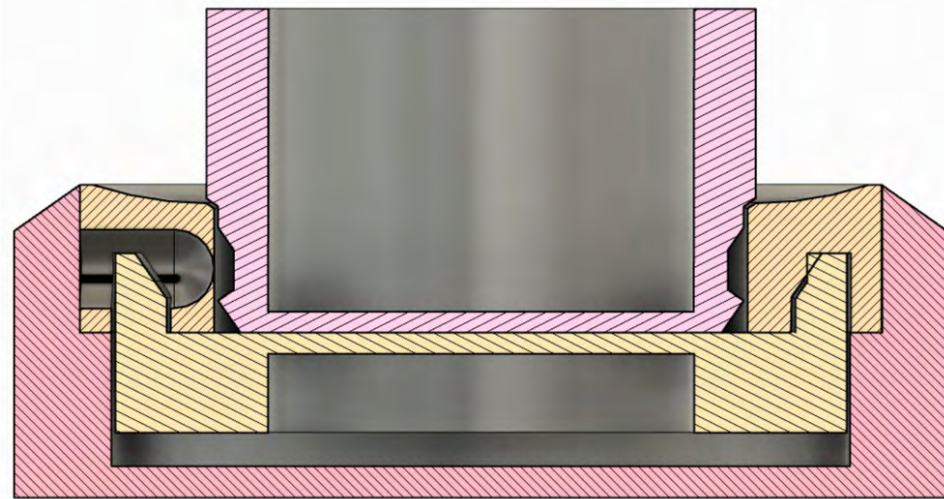
Cons

- ASSEMBLY SCREWS WEIRDLY PLACED
- NON STANDARD SPRING
- PART COMPLEXITY

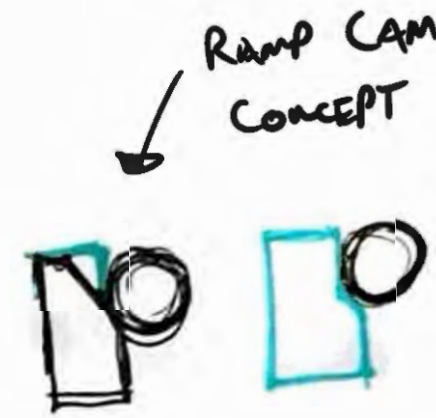


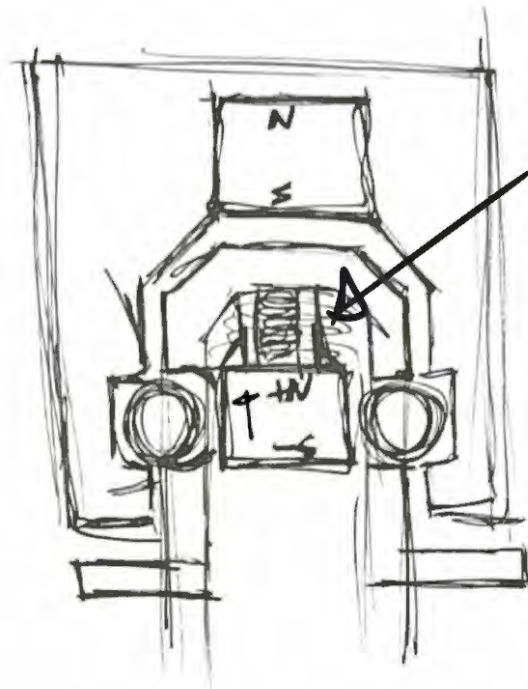
PROTOTYPE



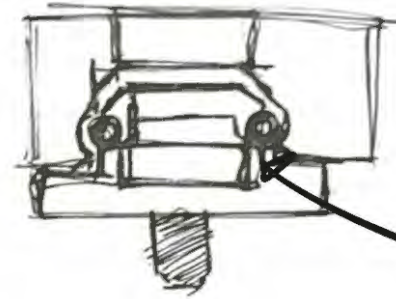


THIS DESIGN IS MESSY.
A GROUND UP CONCEPT IS REQUIRED





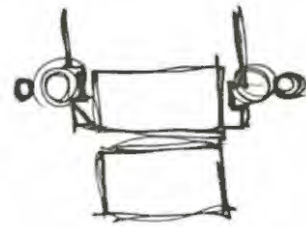
SPRING LOADED
MAGNET PUSHES
BALLS INTO GROOVE



SLIDING MAGNETIC
INTERNAL RAMP
- REMOVES SPRING REQUIREMENT



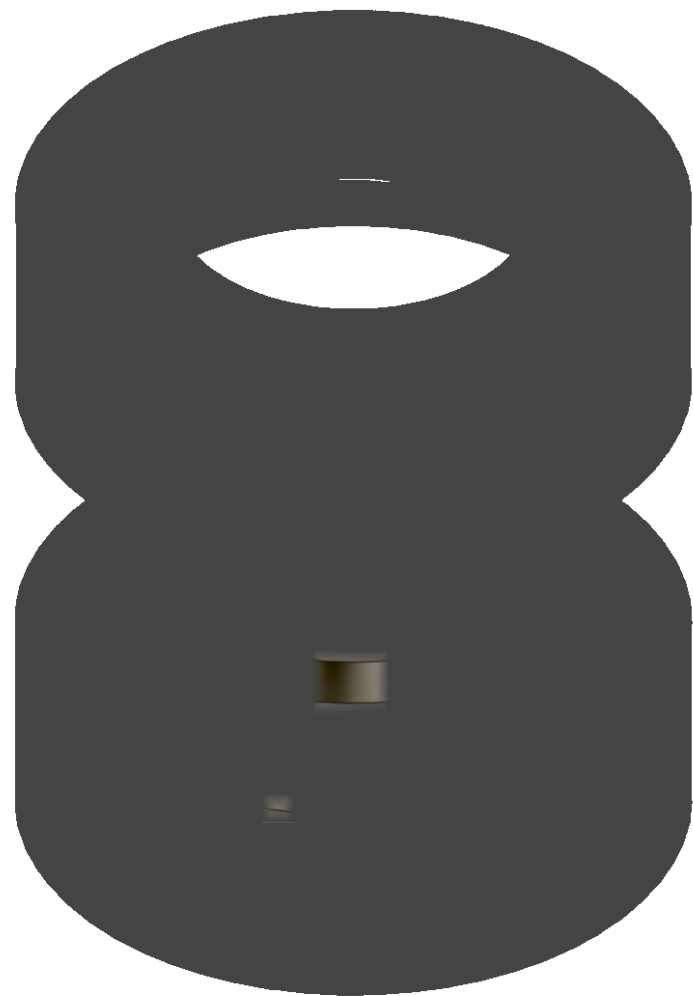
TUCK COMPRESSION
SPRINGS



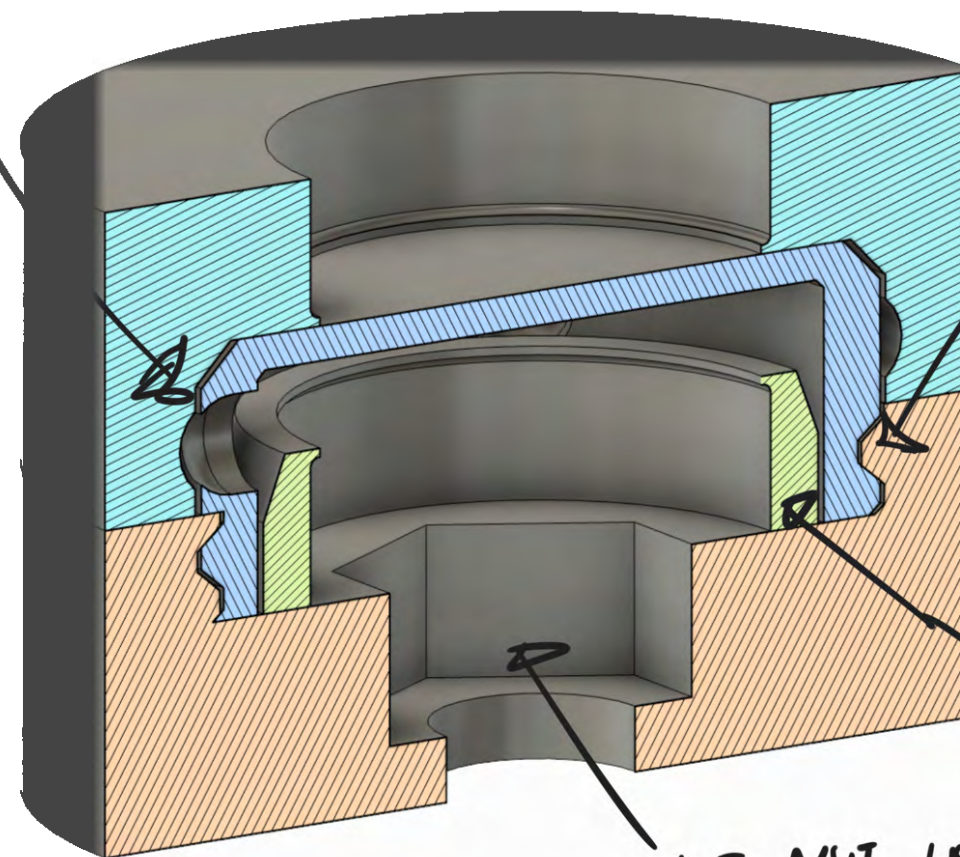
CANTILEVER DESIGN



MAGNETS ATTRACT
INSERT OUT OF
ALIGNMENT



MECH IS
NOW INSIDE
MALE COMPONENT

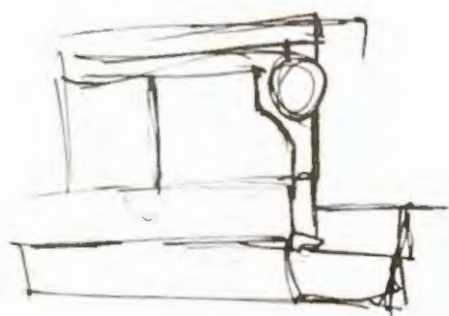


THREADED
PART SCREWS
PARTS TOGETHER

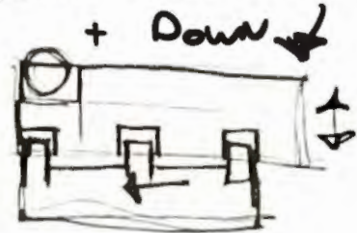
SLIDING MAGNETIC
CAM

MS NUT INSERT
-SCREWED ON LIKE A NUT

STILL TOO THICK



RAMP CAN TWIST
AND STILL MOVE UP
+ DOWN



MAGNET ATTRACTS BALL
INSTEAD OF PUSHING

SHOPPING LIST

MAGNETS

14x4 DISC

10x5 DISC

18x3 DISC/RING

SPRINGS

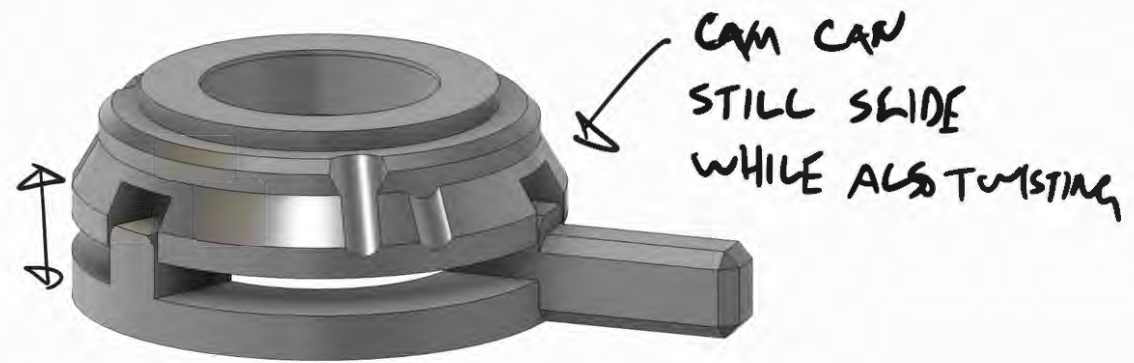
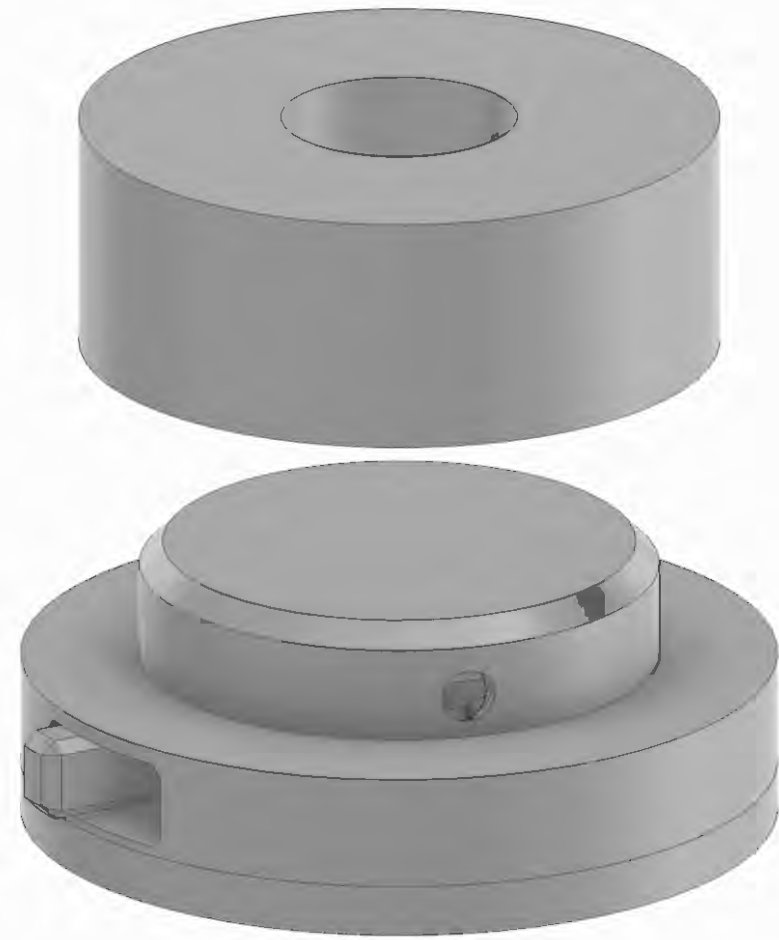
18x5 COMPRESSION

BALLS

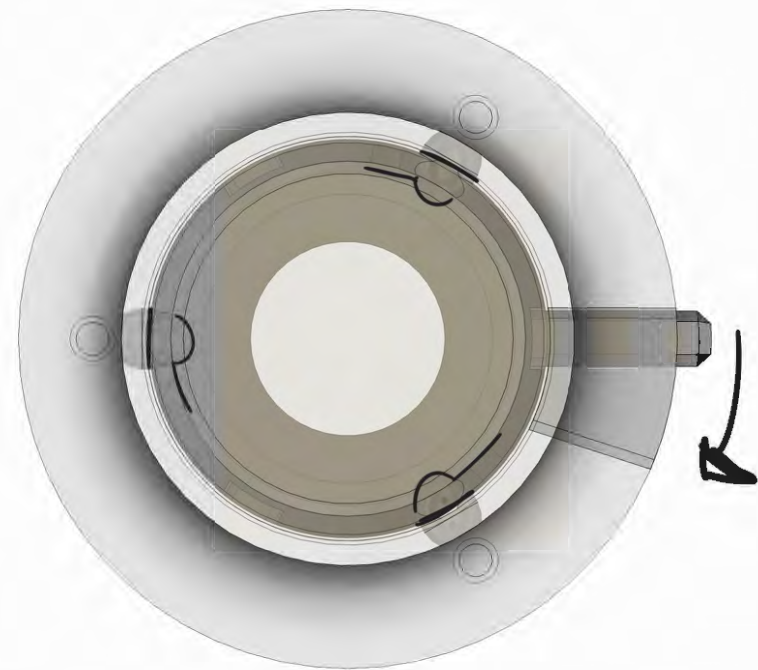
3mm

ALUMINUM ROUND STEEL

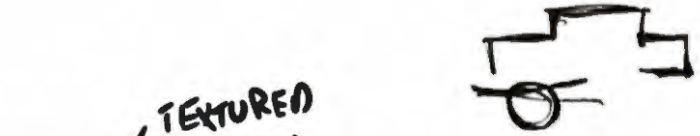
4mm



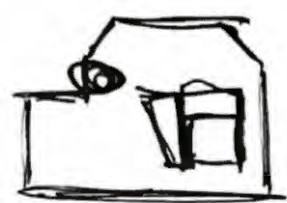
- SWITCH IS TOO SMALL
- NO MOUNTING POINTS
- FUNCTION IS GOOD
WORK ON FORM



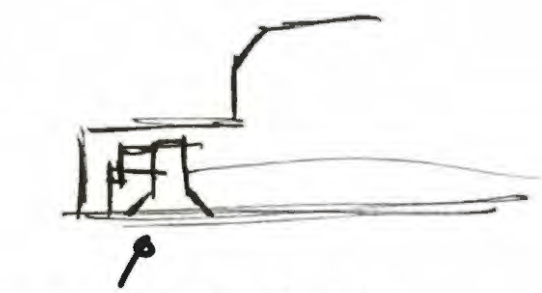
TEXTURED SWITCH
 - LOW PROFILE
 - DIFFICULT TO ACTUATE



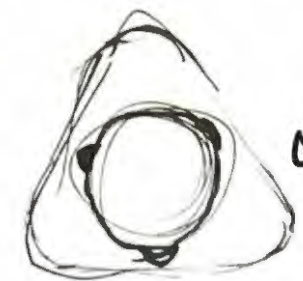
MECH TO ALLOW
 A TWISTABLE RING



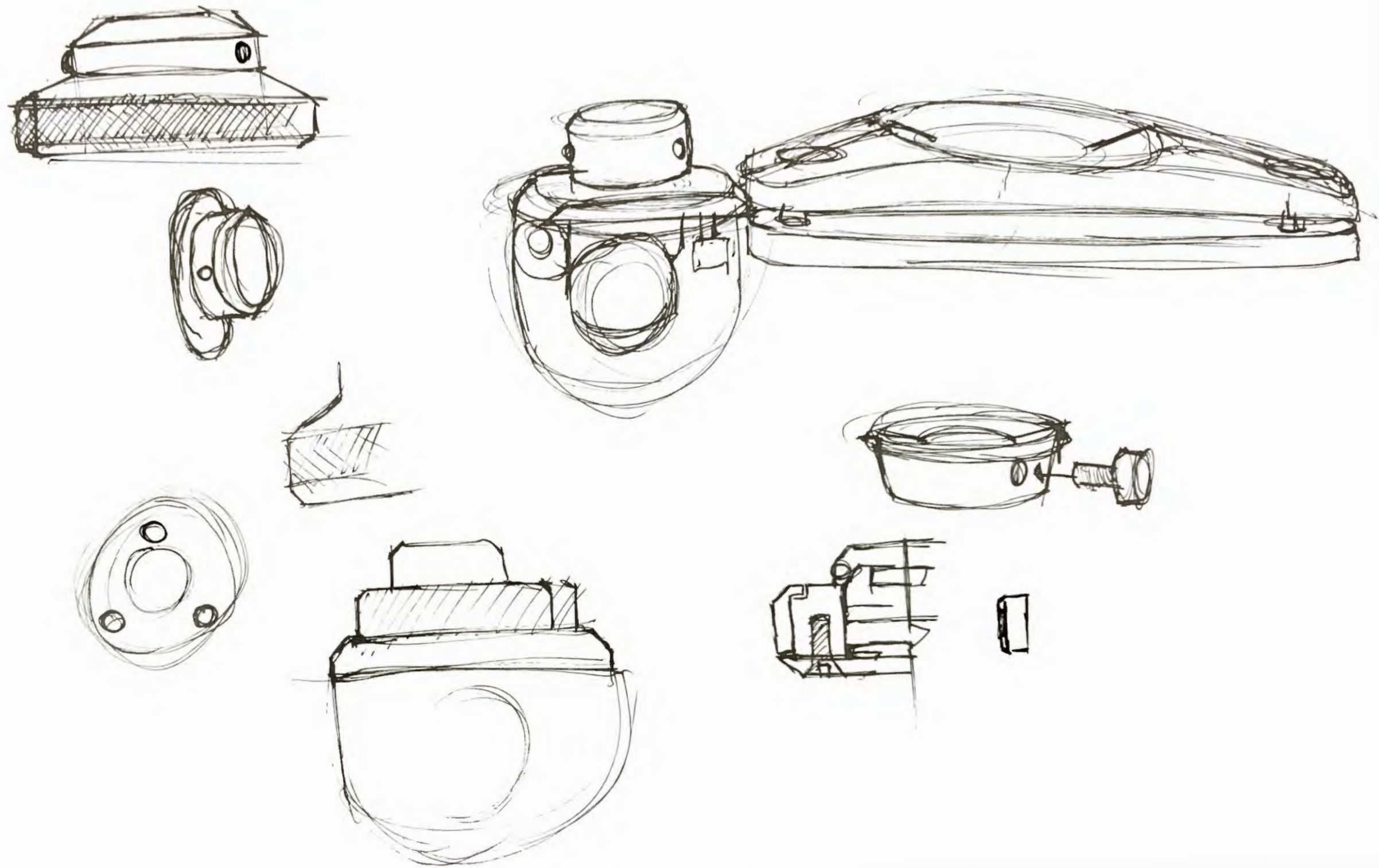
SLIDE SWITCH



MOUNTING SYSTEM
 M2 COUNTER SINK SCREW



TRIANGLE
 EXPLORATION

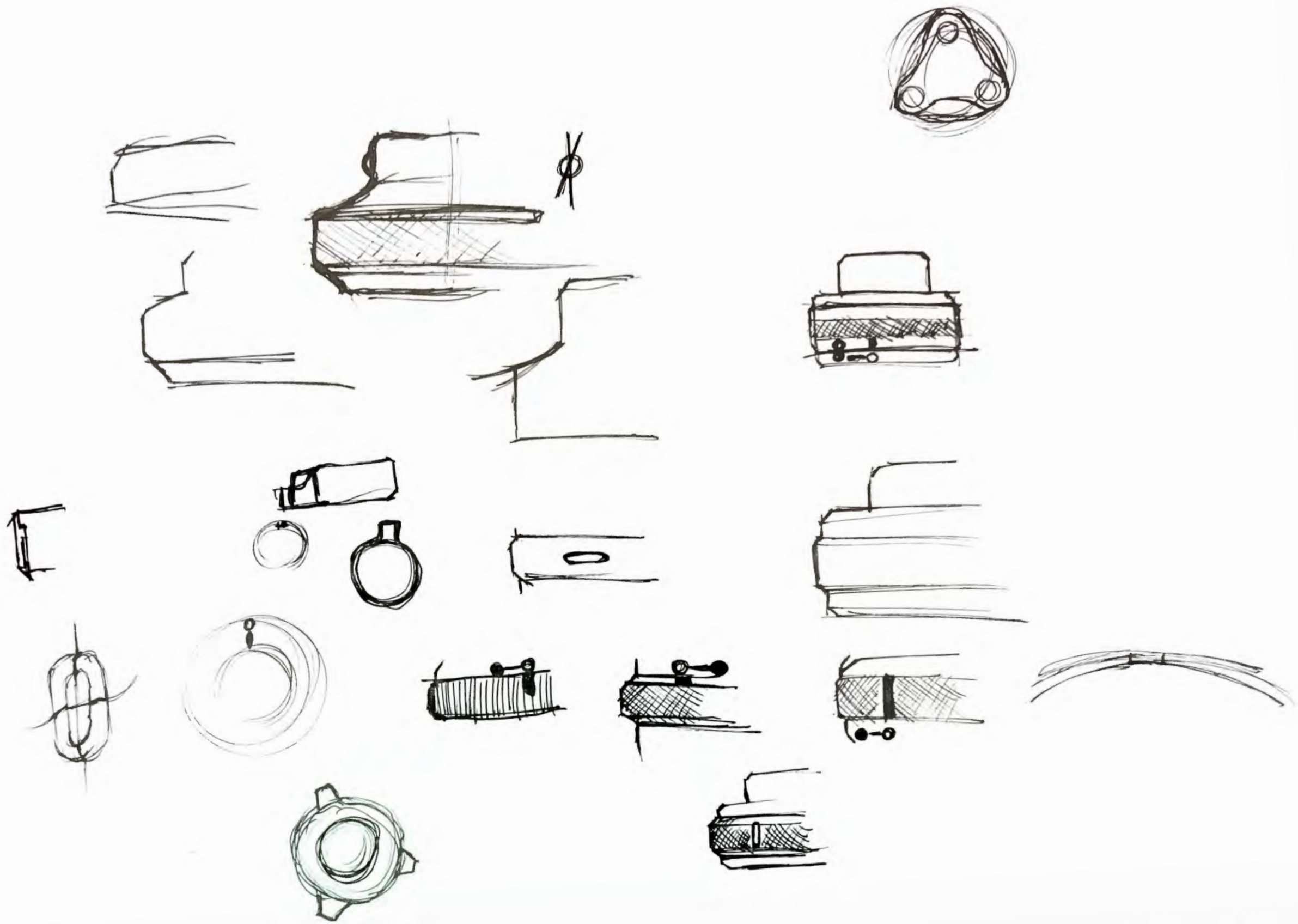


DMB311 : CAPSTONE

FORM + ACCESSORIES

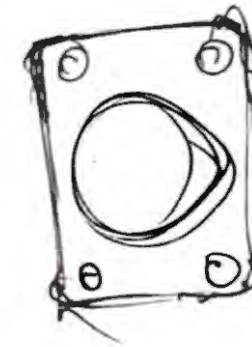
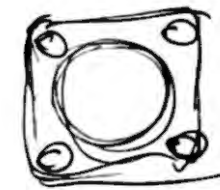
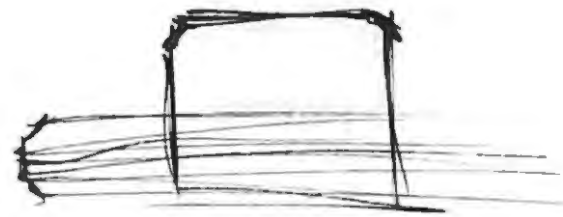
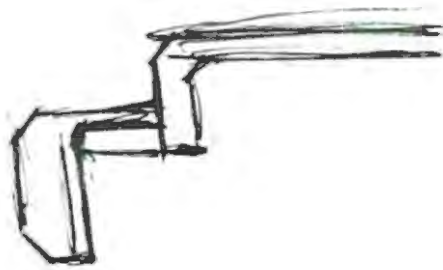
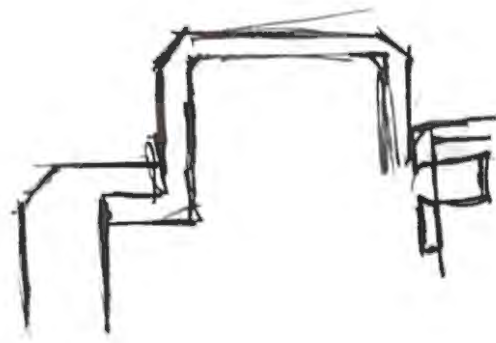


NICHOLAS BENTLEY
N10690751

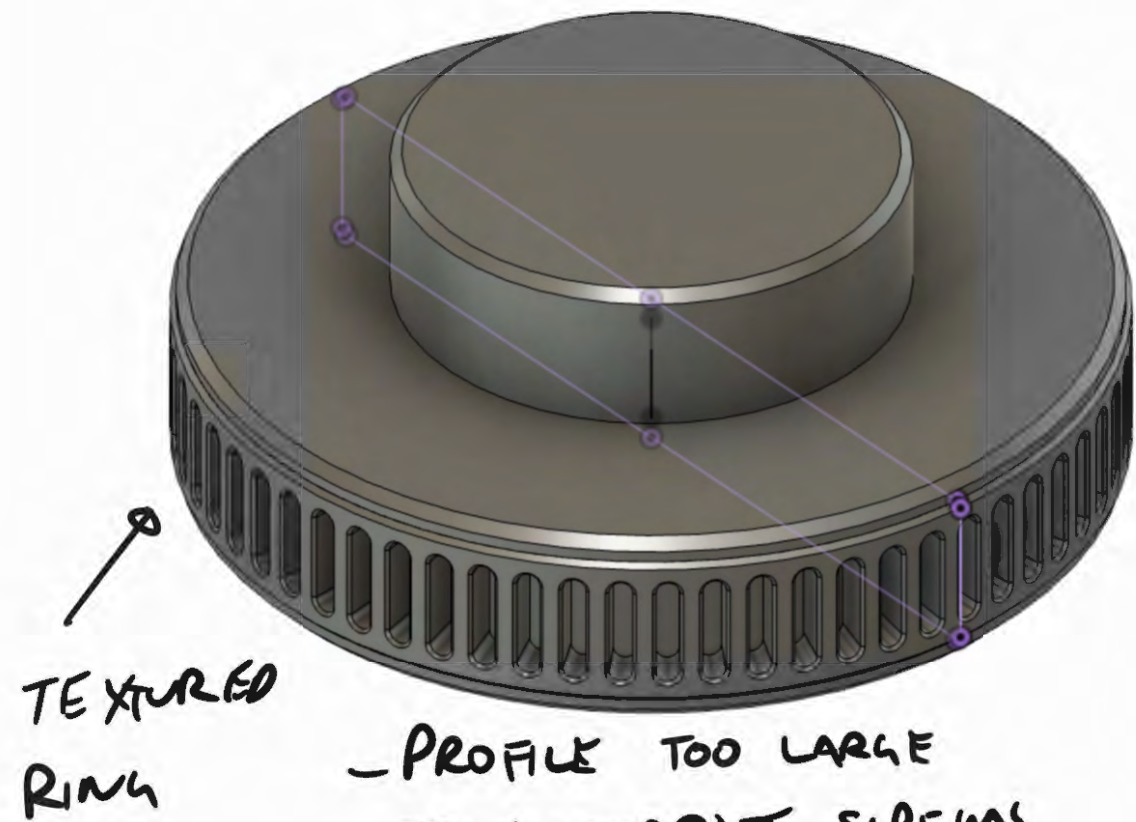


DMB311 : CAPSTONE

Twist-Ring Exploration



ROUND TWIST RING DESIGN



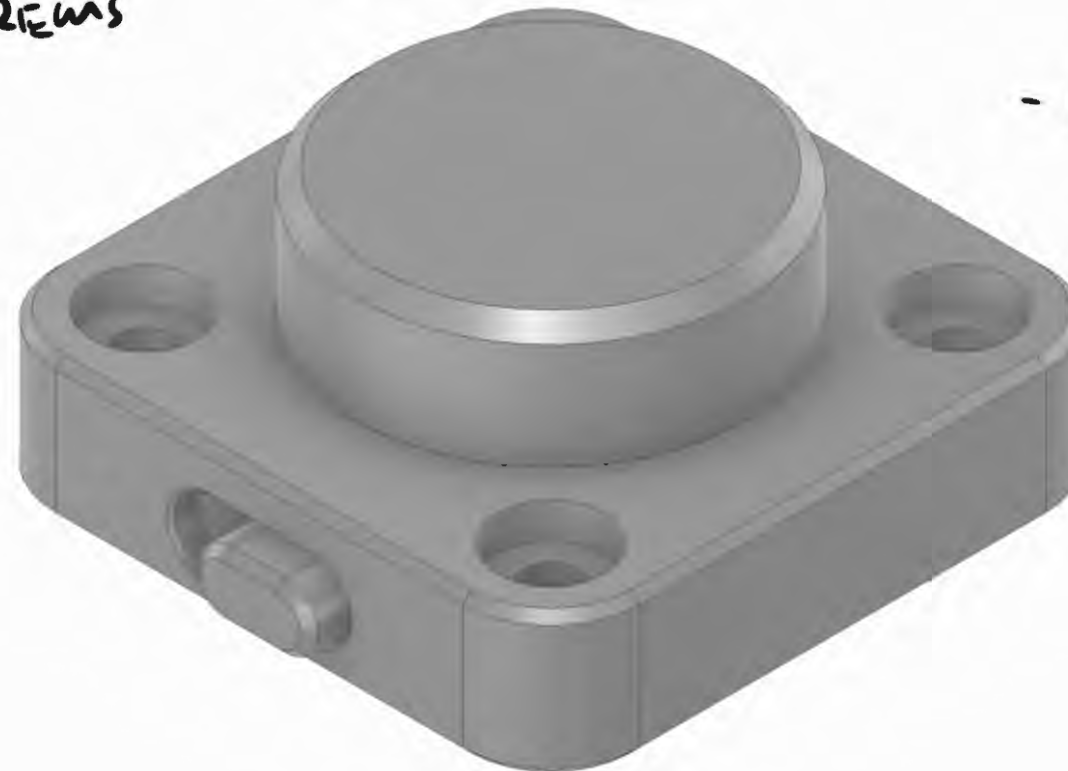
- PROFILE TOO LARGE
TO ACCOMMODATE SCREWS

TRIANGULAR PROFILE

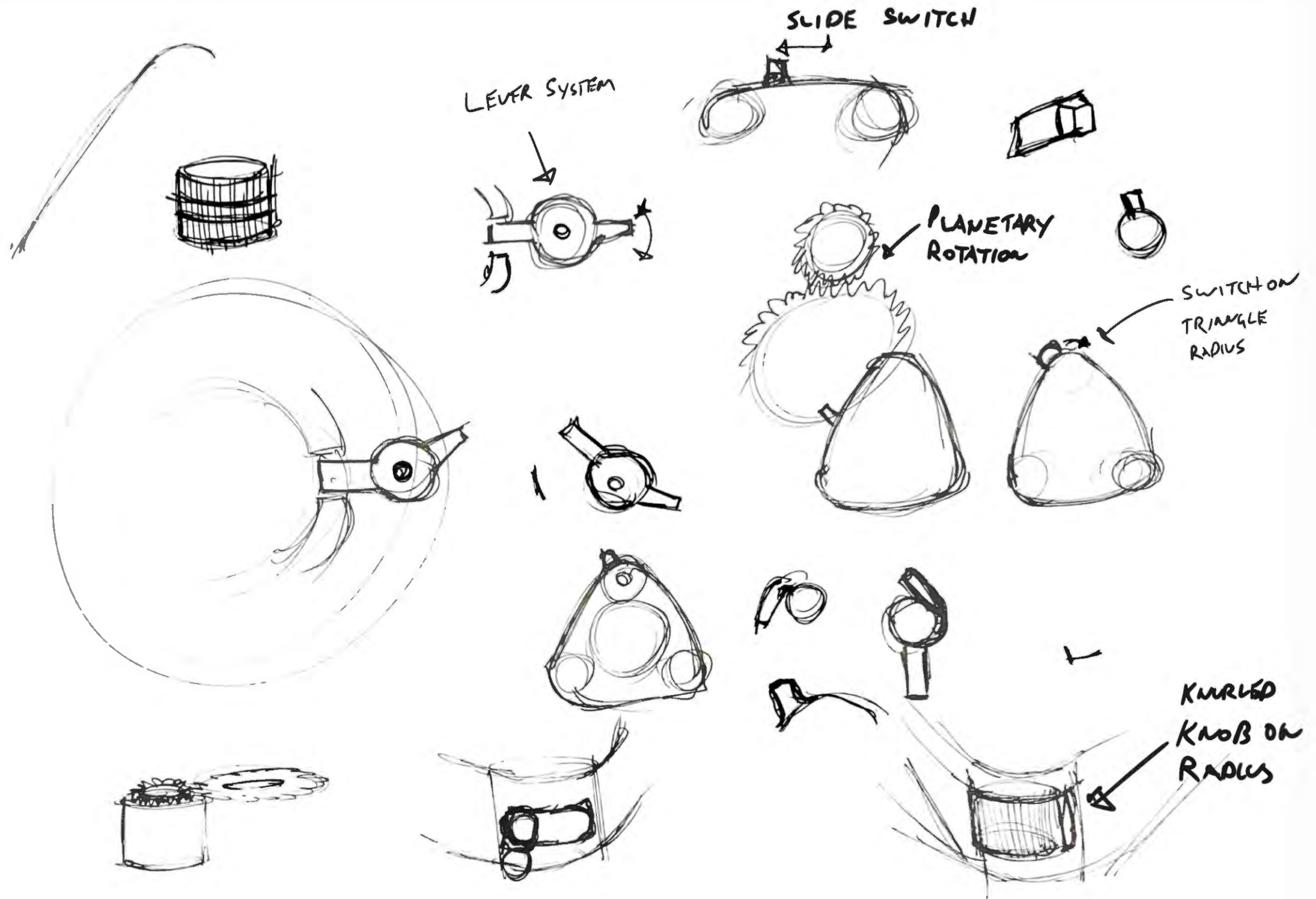


- SPACE EFFICIENCY
- 3 POINT SECURITY
- UNIQUE SHAPE + DESIGN

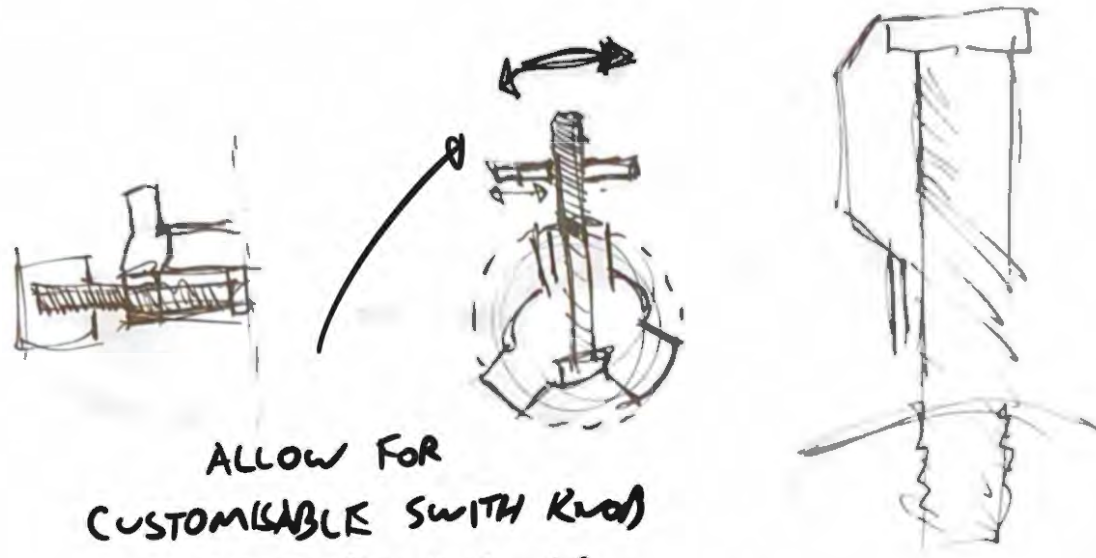
SQUARE PROFILE



- AESTHETICALLY PLEASING
- GOOD SPACE FOR SCREW MOUNTING
- SPACE EFFICIENCY CONCERNS

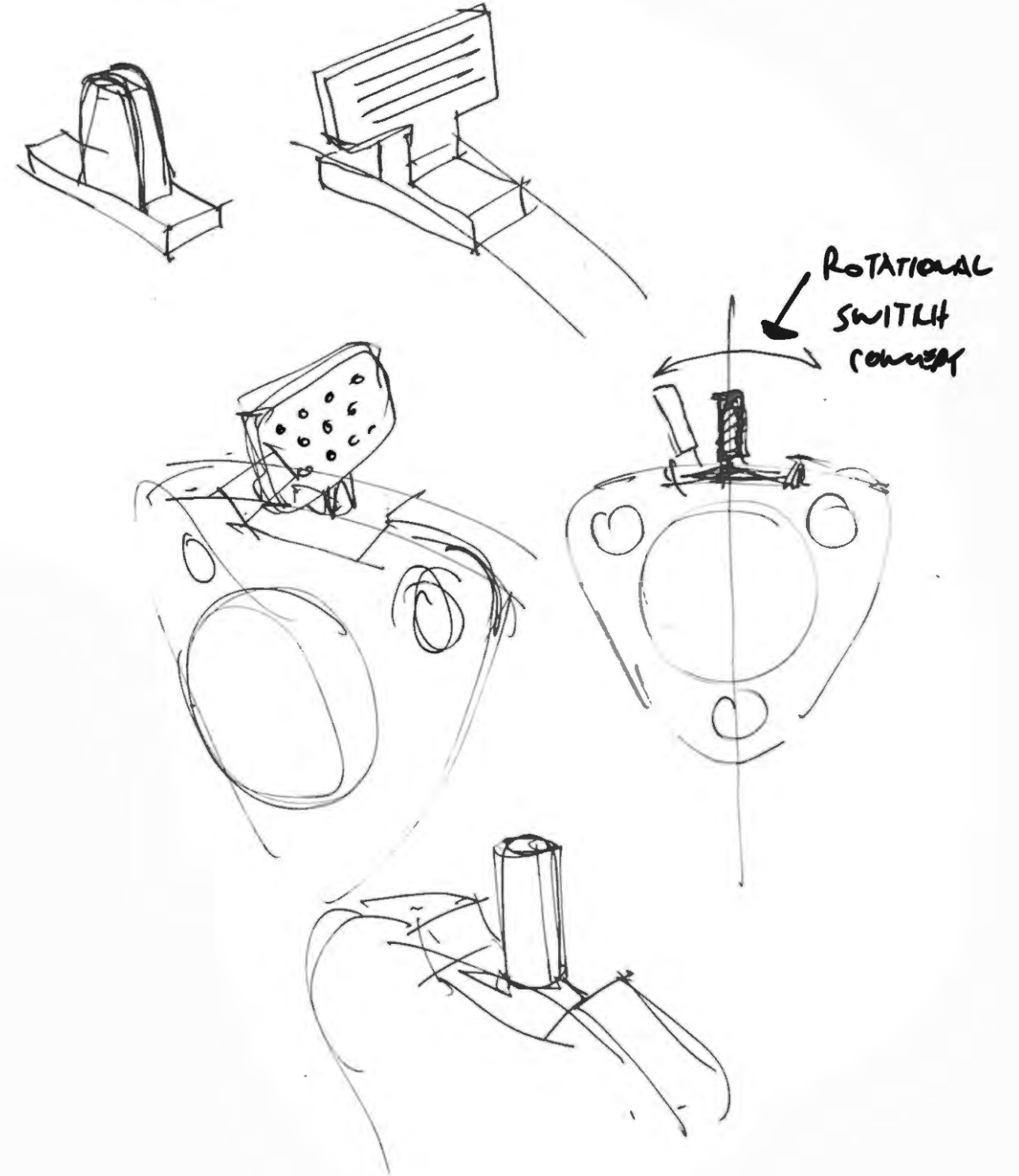


INTERNAL THREADED SWITCH

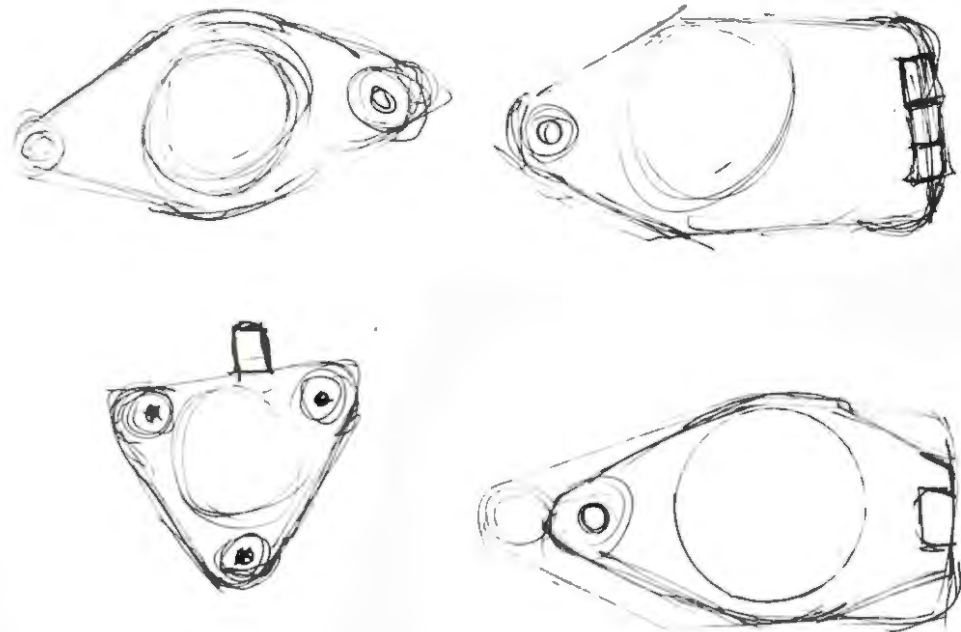


ALLOW FOR
CUSTOMISABLE SWITCH KNOB
- THREAD DOUBLES AS
STEEL CORE, INCREASING STRENGTH

SLIDE SWITCH EXPLORATION



BAG STRAP ACCESSORY EXPLORATION



So I kinda forgot to document this part, so have an abridged version



WET SANDING



SPRAY PAINTING



DRILL WET SANDING?



BAG CLIP MOUNT TEST

