

**Cycle Lock  
Research**

**Futuring Design  
Industrial Design Project I**

**May - June 2018**

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**ID 2017-19  
Industrial Design Centre, IIT Bombay**

## ***Acknowledgment***

Our sincere and heartfelt gratitude to **Chandrashekhar Wyawahare** for giving us such an amazing opportunity to intern at his firm. His feedbacks were a constant source of learning and inspiration for us.

I would also like to thank all my colleagues at Futuring Designs studio –who through their constant help and guidance, enriched my learning curve and thought processes. Specially, **Raghav Sridharan** and **Pooja Kulkarnil** who always gave us encouraging nudge to do better have now at the same time providing us with enough and more freedom . We feel we have attained a good degree to independence and confidence as a designer. I would also like to take this opportunity to appreciate my friends and family for their constant love and encouragement.

Also not the least, I would also like to thank my faculty **Ms. Purba Joshi** who was there to provide guidance and helped clarify any doubts throughout the entire journey.



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Date: 20<sup>th</sup> June 2018

#### INTERNSHIP REPORT

**Vinod Louis Joseph Swamy** completed his design Internship with us at Futuring Design Pvt.Ltd, Pune, India from **02<sup>nd</sup> May 2018 till 20<sup>th</sup> June 2018**.

**Vinod** is an intelligent and motivated individual. As a design Intern, with the help of the core design team, he produced quality work.

He worked on  
Research

Projects  
Cycle locks

We found him sincere, talented and hardworking, and result oriented during his tenure. He showed team spirit and focused on developing innovative ideas. In the project he worked self-contained, creatively and credibly.

He comes across as a nice person to work with.

We take this opportunity to wish him success in his future endeavors.

With Best Regards

Chandrashekhar Wyawahare  
Director  
Futuring Design Pvt. Ltd



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With Best Regards

Chandrashekhar Wyawahare  
Director  
Futuring Design Pvt. Ltd

# Futuring Design Pvt. Ltd.

*“Futuring design” is a new product development company based in Pune. founded by Chandrashekhar Wyawahare and Shantanu Panse.*

*Their Focus being :  
Design Research  
Industrial Design  
Product Development Engineering  
Prototyping & Model making  
Batch manufacturing*





# Futuring Design Pvt. Ltd.

*Design Research  
Industrial Design  
Product Development Engineering  
Prototyping & Model making  
Batch manufacturing*



Building Hardware  
Consumer Appliances  
Transportation  
Electronics  
Medical products  
Homeware  
Professional products  
Lighting  
Workspace  
Product packaging



and more..

# Cycle Lock Project

*Client : Godrej Locking Solutions and Systems*



- Blue sky project  
(Open ended
- undefined user group)
- User Study
- Market study

-

# Indian Bicycle Industry

\$ 1.2 Billion Industry  
200 Million Exports

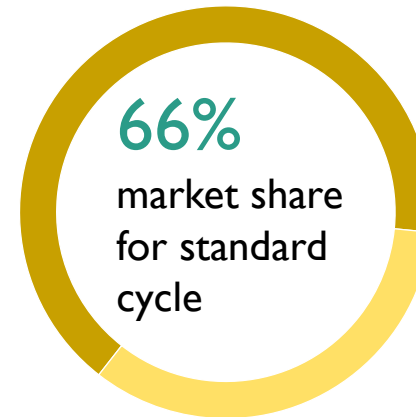


**1 in 10**

Cycles in the  
world is produced  
In India

15+ million units  
produced annually

2-3 million units  
exported to African and South-East  
Asian countries



**LUDHIANA**  
bicycle  
manufacturing hub.

1,500 factories

25,000 cycles/day.



**Kids Cycle**  
6.4% market share

# Indian Bicycle Industry

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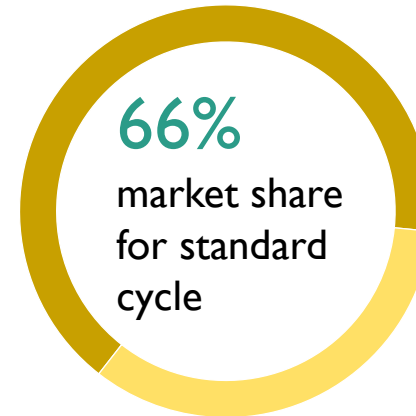


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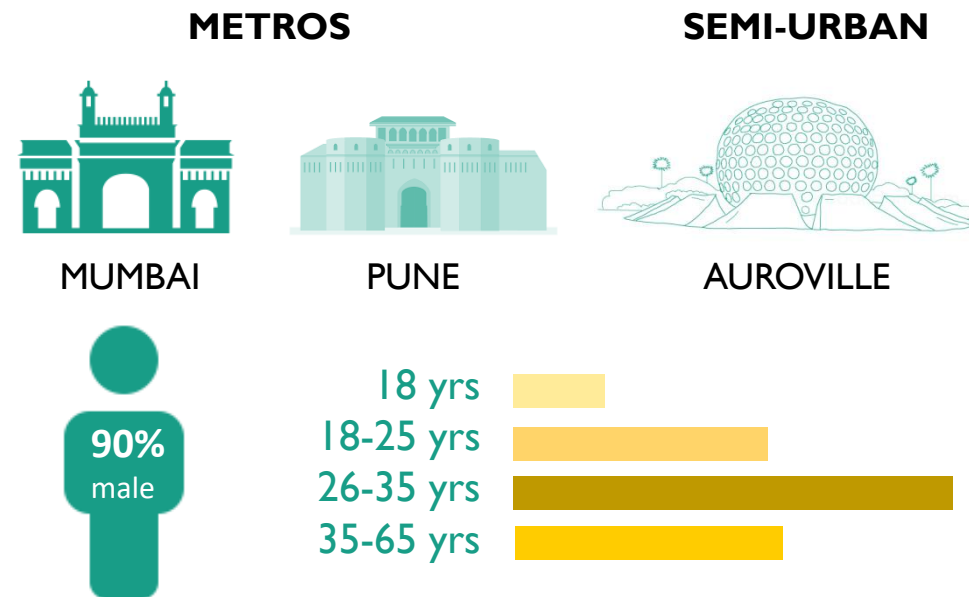
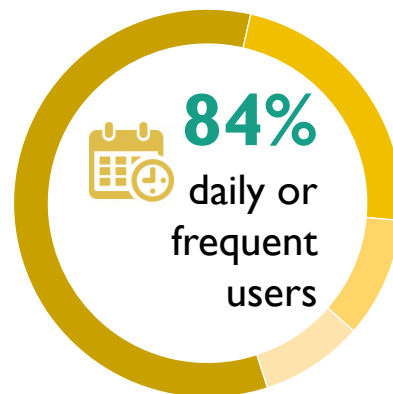
25,000 cycles/day.



**Kids Cycle**  
6.4% market share

# Survey

103 respondents





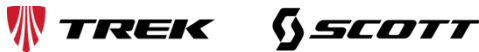
## Fitness Freak



*Sports Enthusiast, Fitness Freaks*

*Age Group - below 18, above 35*

*Investment - Predominately ₹60000+*



## Recreational Rider



*Young Professionals, Entrepreneurs,  
Adventure Lover, Travel Enthusiast*

*Age Group - 18-35*

*Investment - Around ₹30000 - ₹60000*



## Utilitarian Cruiser



*Students ,Young Working Adults ,  
Daily Commute, Last Mile Connectivity,  
Environment Conscious*

*Age Group - upto 35 yrs*

*Investment - Not more than ₹15000*





# PBS

## Public Bike Share

*Pune Bicycle Plan 2017*

*Bicycle Zones – Shared parking of PBS and privately-owned cycles, No parking charges  
Cycle Tracks - No motorized vehicles*

*Target Level of Service over 3 years:*

*3 cycles for every 100 residents - 1 lakh cycles in aggregate*

*4+ trips per cycle per day - 4 lakh PBS trips per day*



*5,000 Smart Bikes + E-Bikes*

*Pricing: ₹10/hr | ₹99/month*

*Locations: Bangalore, Chandigarh, Delhi NCR, Jaipur, Pune*



*600 Cycles*

*Pricing: ₹5/0.5hr*

*Locations: IIT Kanpur, IIT Madras*



*2,000 Smart Bikes + Cycling Activities*

*Locations: Gurgaon, Hyderabad, Jaipur*



*3,000 Smart Bikes*

*Pricing: ₹1/0.5hr*

*Locations: Agra, Bangalore, Chennai, Gurgaon, Hyderabad, Jaipur, Kolkata, Lucknow, Mumbai, Pune, Udaipur, Varanasi*





## PEDL

Savitribai Phule Pune University

*Mobile App, IoT Lock, GPS Tracking, QR Code*



## PROS

- Convenient - single hand handling
- Intuitive
- Safety Feature - prevents tampering
- Cycle Integrated
- Sturdy
- Self-locking Feature - if not in use
- GPS Tracking - incase of theft
- Solar Powered
- Cashless Service via Paytm



## CONS

- Requires Internet Connectivity
- GPS Alignment Issues
- Looks Bulky
- Doesn't Allow Multiple Bookings

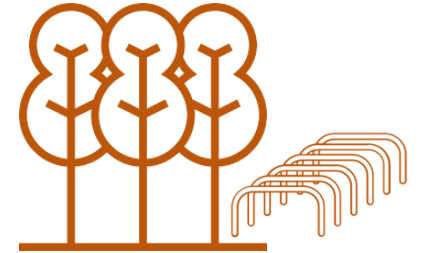
# Parking

*Issues faced while cycles are parked:*

1. Cycle Falling
2. Cycle Identification
3. Gear Tampering
4. Lack of Infrastructure
5. Fear of Theft – Cycle & Accessories



78% of people lock it around a pole or tree.



Parking Space:







Savitribai Phule Pune University

## Lack of Infrastructure

*"It is always hard to find a pole to tie the cable lock to the frame."*

Amarnath

*"Locking places not available - not many places to safely lock bicycles."*

Yuvjeeth HS

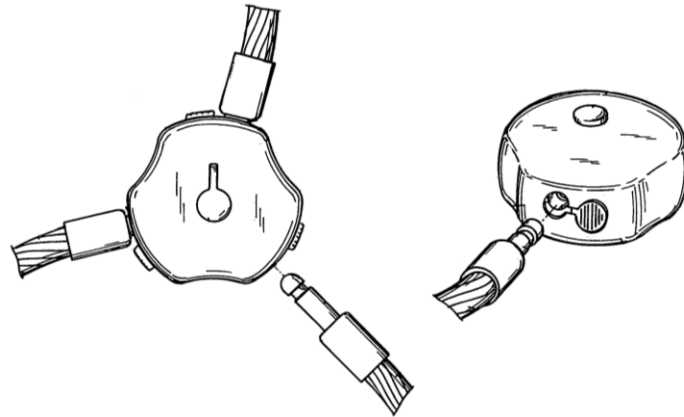


Pune City

## Attach to External Element

*"The cycle can be lifted and stolen if not locked with a pole or a tree - so a lock that secures itself to the ground. My brother's cycles got stolen like that."*

Mihika



**US7131298B1**

Cable Lock – Multidirectional Inserts

## Ability to Lock Various Parts

*"In my cycle, I can disassemble both the wheels and seat just by pressing a lever. Would prefer a lock which locks all the parts which can be disassembled."*

Ramesh Kumar Gandepalli



# Cycle Theft

*"As a single piece, a stolen cycle will be sold maximum for Rs 600-700. But when dismantled, the parts fetch anywhere between Rs 1,000 and Rs 1,300,"*

CCB Bangalore City Police

20%

of people have had their cycle stolen at least once.

85%



have had their cycle stolen from outdoors.

All cycles are stolen by

**LIFTING**  
**CUTTING**  
**PICKING**



Places from where cycle was stolen





**53%** of people think that their cycle is not secure with the lock they currently use.

## Theft Alarm

*“Something which alerts me or make some noise for sometime if someone try to break it.This could be a feature where I can switch it on if required.”*

Dinoj Joseph

## Theft Tracking

*“It should have a really full proof method to track and locate the bike in case of theft.”*

Siddhesh Mhatre

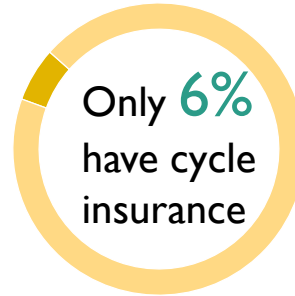
*“Using an in-seat stem sensor based lock with GPS tracker for instant mobile alerts.”*

Rajiv Narayan



# Insurance

*The international requirement of cycle insurance policy is to use an appropriately rated lock according to the value of the bicycle for the insurance to be valid.*



Upto 3 years

-Bajaj Finance  
-Toyoto Tsuho Insurance  
(Tie up with Cycle brands)

Cycle Lock Rating bodies:



UK Sold Secure and Thatcham



The Netherlands ART



Sweden SSF



Germany VDS

\*Only cycles more than ₹15000 were insured



**No** cycle  
lock rating  
body in  
India



Sold Secure(UK) rating for cycles:

**Gold Rating** sustain 5 min attack

**Silver Rating** sustain 3 min attack

**Bronze Rating** deter **impulsive** attack



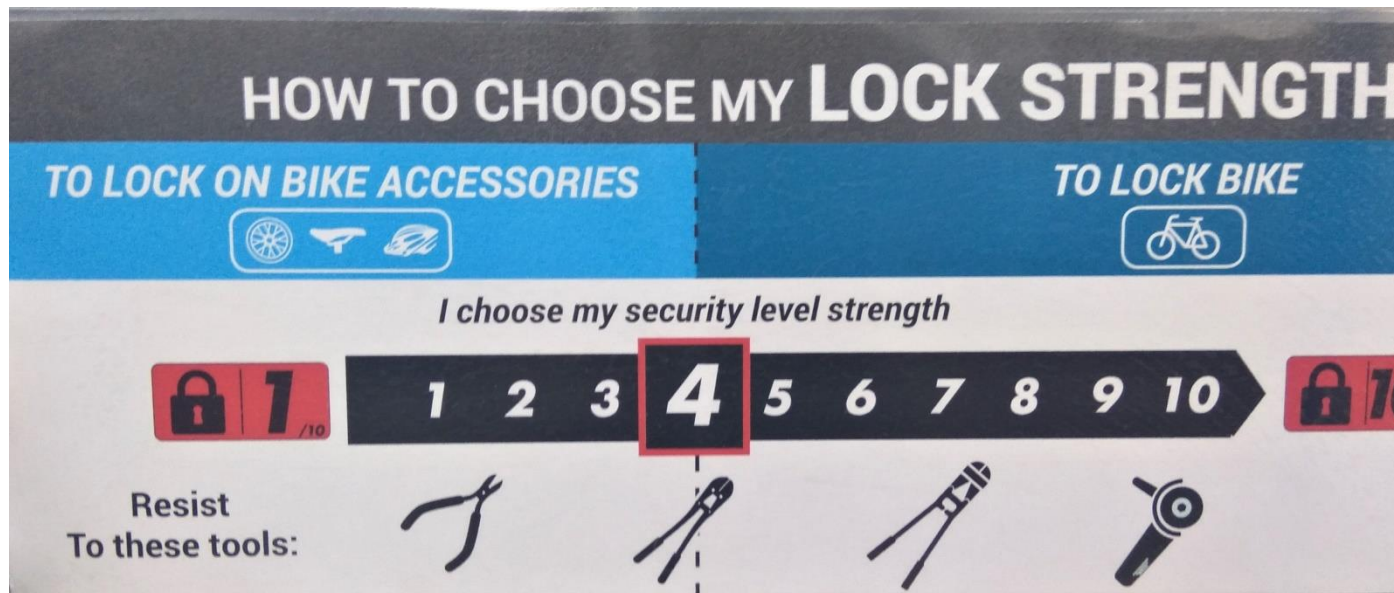
**Pune Bicycle Plan 2017**

*Possibility of insurance coverage for all cyclists in the city*

## Lack of high rating locks

*Decathlon has its own rating system depending on the tools required to break the lock.*

*However, the locks sold have a maximum of 4 rating - despite the fact they are only to lock the accessories.*

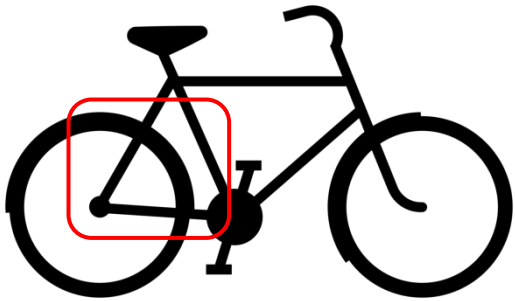




# Market Study

## Cycle Lock

*Flexible*



### ● Cable Lock

-Granit Steel O Flex 1000/80 by ABUS-

Overlapping Steel Shell Protection for Inner Steel Cable



### ● Retractable Cable Lock

-Milkman by Knog-

Compact Size of 75x75x20mm,  
Fits into Back Pocket



### ● Chain Lock

-KryptoLok Series by Kryptonite-

Weather Resistant Nylon Sleeve,  
9mm 4-Sided Chain Links



### ● Strap Lock

-Litelok Gold by LITELOK-

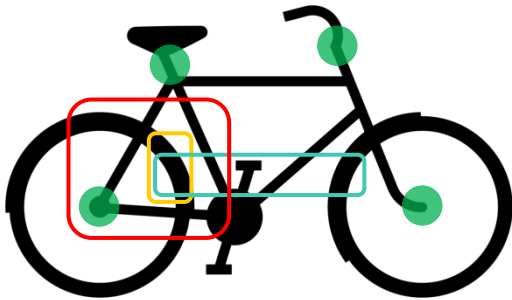
Lightweight - Weighs 1.1 Kg,  
Wearable Belt Design



# Market Study

## Cycle Lock

*Rigid*



### ● Ring Lock

-AXA Solid Plus by AXA-

Provision to link Plug-in Chain or Cable,  
Online Key Service



### ● Pitlock

-Hexlox Set by Hexlox-

Hex Bolt with Unique Key Coded Lock Inserts,  
All Weather Cap



### ● U-Lock

-Brute Series by On Guard-

Anti-Rattle Bumpers,  
Micro-Light Key



### ● Bow Lock

-TiGr Bow Lock by TiGr-

Mounting Straps with Silicon Rings,  
Short, Standard & Long Sizes

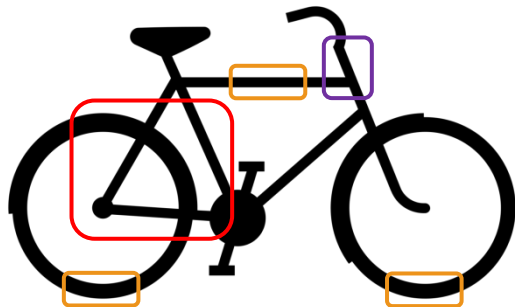


# Market Study

Cycle Lock

*Semi-Rigid*

*Miscellaneous*



● **Folding Lock**  
-Bordo Series by ABUS-

Velcro Straps/Silicone Cover for Mounting,  
Anti-Theft Alarm



● **Cuff Shackles**  
-8290 Eurdpro by Master Lock-

9 Pivot Links for Flexibility,  
\$3,500 Anti-Theft Guarantee



● **Wall Lock**  
-AIRLOK by Hiplok-

Rubberized Mouth, Impact Resistant Casing,  
Indoor/Outdoor Use



● **Steering Lock**  
-Stemlock by IXOW-

Easier Parking, Storage and Transport



































Failure by:

Lifting

Cutting

Loose Links

Picking

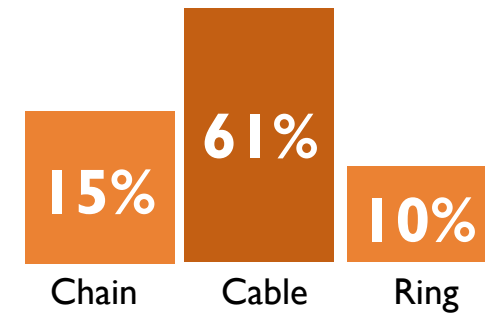
											
											
											
											
											

# Indian Market

*Decathlon Amanora, Hadapsar  
Modern Cycle Company, Chinchwad  
Track and Trail Modern Cycles, Chinchwad  
Toyzer Cycles, Chinchwad  
Giant Starkenn Cycling World, Chinchwad*



Popularity of Locks:



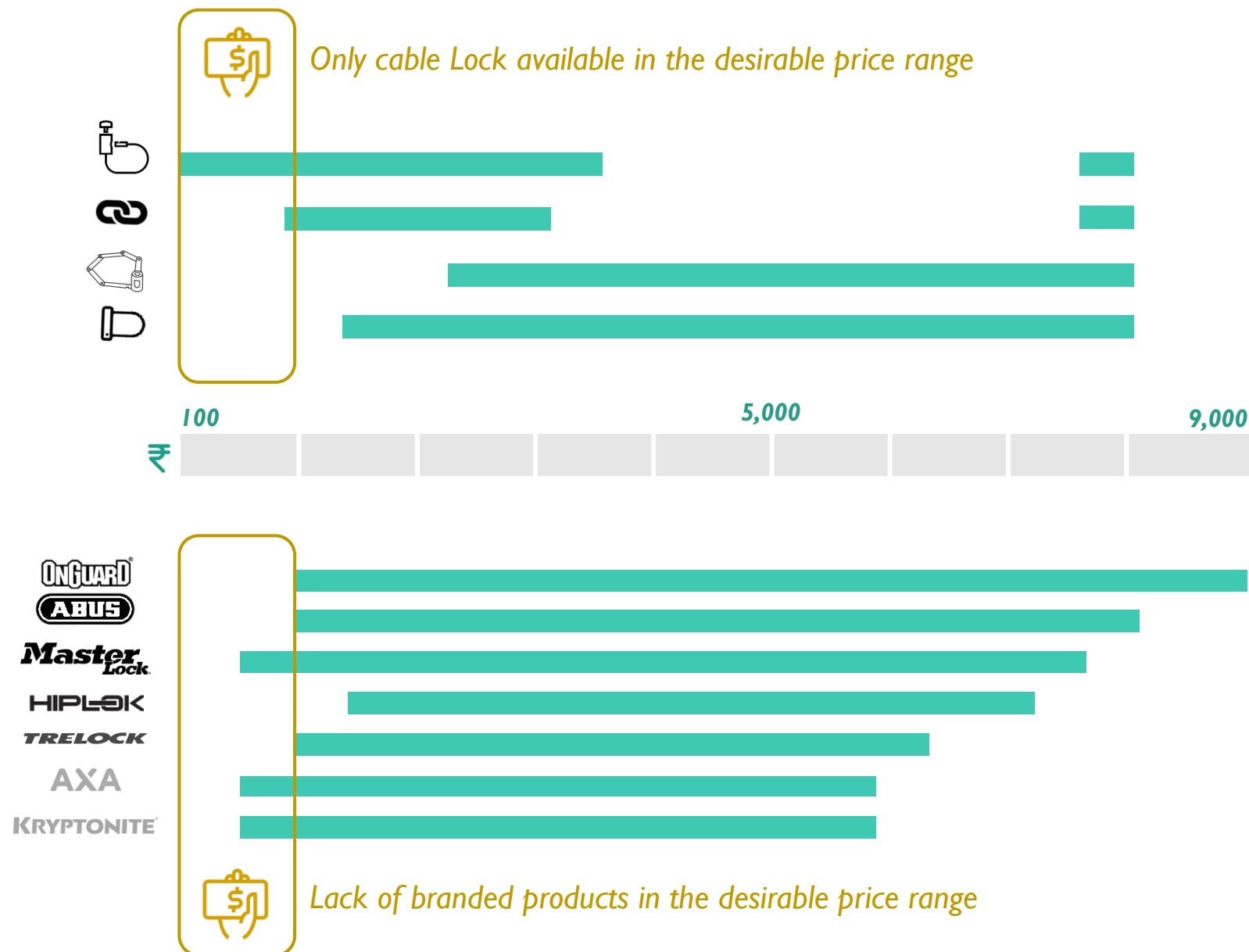
Place where they bought bicycle lock from:





# ₹ Indian Market

bumsonthesaddle.com  
wiggles.com  
trackandtrail.com  
bikein.com  
choosemybicycle.com  
giantstarkenn.com



Cable Loop/Coil - Key



₹

100

150

200

400

600

1,900

Cable Loop/Coil - Combination



₹

300

400

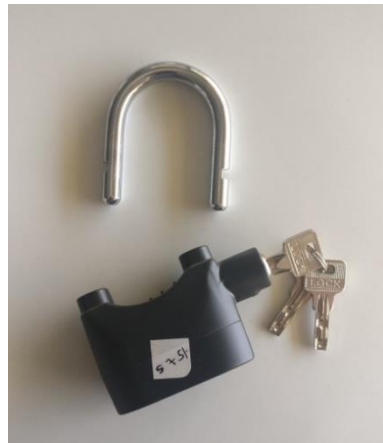
500

600

600

950

Padlock with Alarm



U-Lock



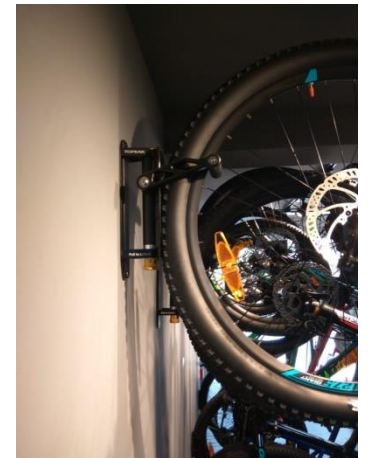
Rear light / Cycle Lock



Chain Lock



Wall Mounted Unit



₹

579

600

600

3,800



# Time-Motion ⌚ Analysis

*Environment set with a utility cycle and 5 lock types commonly available in the Indian market.*

*Each was tested under the same scenario – unlocking from rear wheel, mounting and unmounting from frame, locking rear wheel – with 6 users from the 3 user groups.*





**Cable  
Loop Combination**

Length: 90cm



**Cable  
Coil Key**

Length: 150cm



**Cable  
Coil Combination**

Length: 90cm



**U-Lock**

Length: 16cm  
Width: 7cm

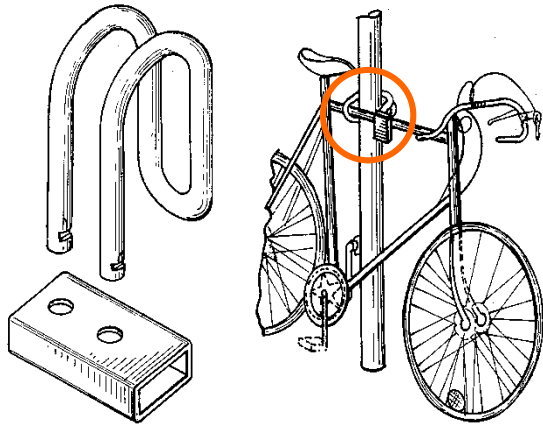


**Chain & Padlock**

Length: 90cm

<b>Locking/Unlocking</b>	8.8	4.6	22.8	8.2	7
<b>Mounting</b>	24	28.8	27.9	12.9	49.05
<b>Unmounting</b>	10.7	15.3	15.9	16.8	16.8
<b>Total</b>	43.5	48.7	66.6	37.9	78.6

\*all values are in seconds



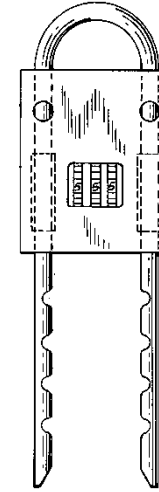
**US4920772A**

*U-Lock Variation for Ergonomic Usage*

## Cumbersome Locking Procedure

*“It is difficult to use a key to unlock the lock, then extend the cable and get it through the rear wheel, past a pole and then lock the cycle.”*

Ruth Thomas



**US4571965A**

*U-Lock - Adjustable Length*

## Cable Tangling

*“Have to wrap up or untangle the lock around the seat post tube everytime!”*

Vineet

## Insufficient Length

*“My lock is sometimes not long enough to encircle a secure structure like larger tree, post or pillar.”*

Siddhesh Mhatre



# Materials

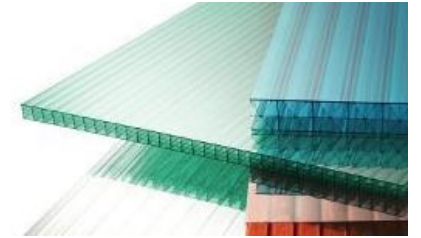
## Material



*Zinc/Aluminium  
Hardened/Carbon Steel*



*Polyamide*



*Polycarbonate*

## Manufacturing Process

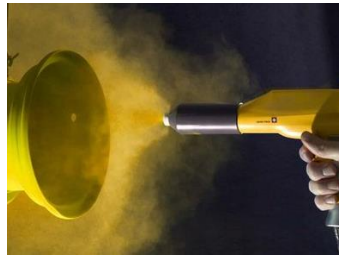


*Die Casting*



*Injection Moulding*

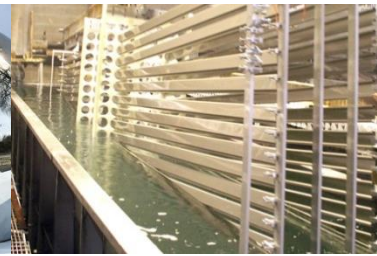
## Finishing



*Powder Coated*



*Chrome Plating*



*Anodization*



*Urethane Enamel Finish*

## Wear & Tear

*“The locks get damaged due to rain or less lubrication or get corroded and require maintenance.”*

Vishnu Shenoy

## Excess Weight

*“Heavy locks are just a burden to carry! Plus there is excess weight of the lock while riding as well.”*

Ajinkya

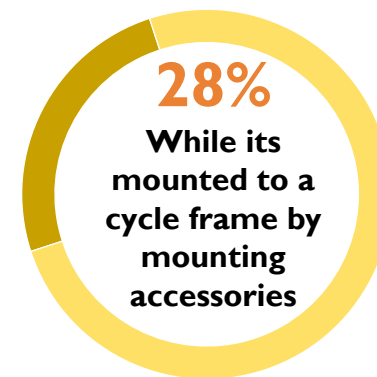
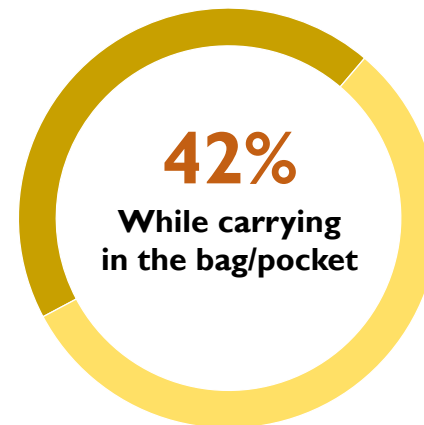
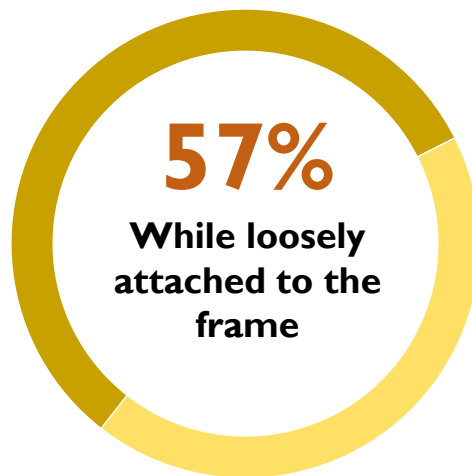
*Insight: There are no high security light weight locks to cater to the high-end cycle owners.*



# Market Study

## Mounting Devices

### Obstruction by Lock while Cycling



# Market Study

## Mounting Devices



Elastic Mount



Claw Mount



Quick Release Bicycle Clamp



Clamp Mount

# Market Study

## Mounting Devices



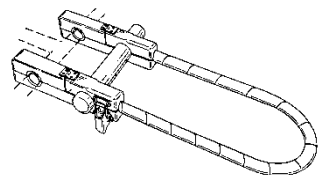
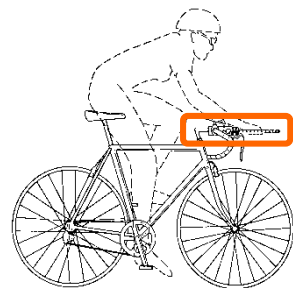
Holster Mounts



Integrated Mounts



Strap Mounts



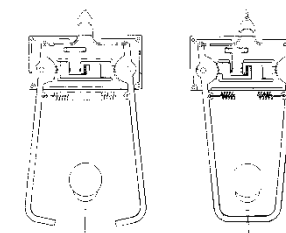
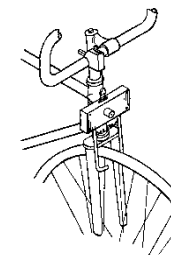
**US5133568A**

*U-Lock – Mounted to Handlebar*

## Damage to the Cycle

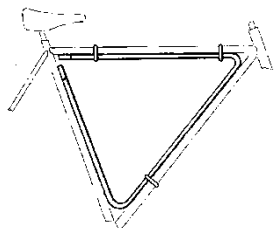
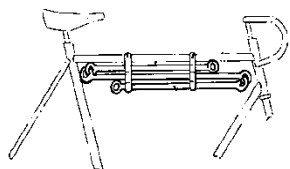
*“Colour of cycle frame gets damaged due to lock cable and housing. While riding, the lock constantly hammers the frame creating noise and also damages the frame.”*

Divyesh Panchal



**US4708004A**

*Ring Lock – Mounted and Operable from Head Tube*



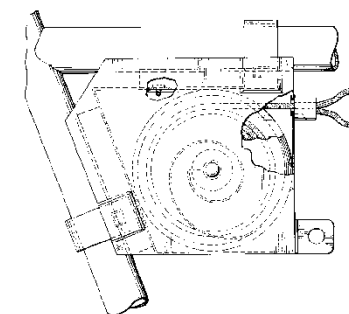
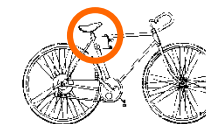
**US3908414A**

*Foldable Lock – Mounted to Top Tube / Main Frame Triangle*

## Lack of Mounting Element

*“Need additional lock mounting to secure the lock properly on the cycle while riding.”*

Dheeraj K



**US3981166A**

*Retractable Cable – Mounted to Top Tube-Seatpost Junction*

# Market Study

## Cycle Accessories

Money spent on cycle accessory

**69%**

upto ₹1000- ₹5000

**26%**

₹5000- ₹15000

Most Commonly Purchased Cycle Accessories



Bottle + Cage



Helmet



Light



Bell

# Market Study

## Cycle Accessories

Bottle + Cage

Helmet



**Metal Bottle Cage**  
*Decathlon*

₹  
200



**Reinforced Plastic Cage**  
*Merida*



**FRP Plastic Cage**  
*Leyzene*

₹ ₹



**Seat Mount Cage**  
*Skekane*

₹ ₹ ₹  
4,500



**300 Child Helmet**  
*Decathlon*

₹  
700



**500 Mountain Helmet**  
*Decathlon*



**Unisex Helmet**  
*Batfox*

₹ ₹



**Bluetooth Smart Helmet**  
*SENA X*

₹ ₹ ₹  
18,000

# Market Study

## Cycle Accessories

Light

Bell



Rear and Front Light  
*Decathlon*



Intelligent Rear Light  
*Decathlon*



Cateye Front Light  
*Volt 400*



Smart Solar Light  
*Garmin*

₹

300

₹ ₹

₹ ₹ ₹

13,000



Easy Bell  
*Decathlon*



Black Bell  
*Spurcycle*



Compass Bell  
*MTB*



Eletric Horn  
*Rockbros*

₹

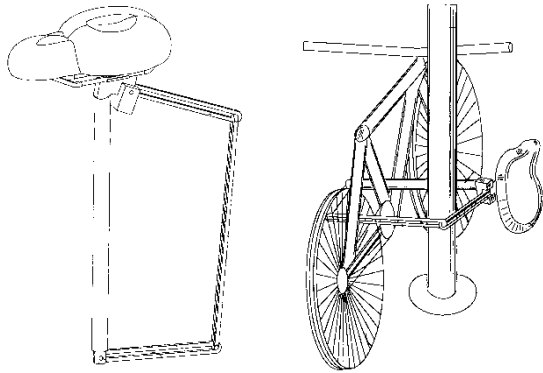
200

₹ ₹

₹ ₹ ₹

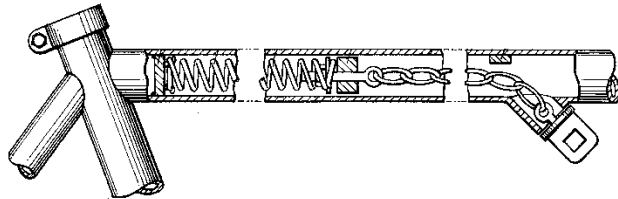
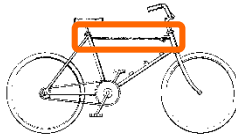
500





**US5678435A**

*Foldable Lock integrated with the Seat*



**US3774421A**

*Chain Lock integrated into the Top Tube*

## Cycle Integrated - Frame

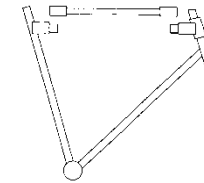
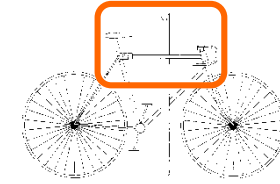
*“Why is it an accessory? Has to come with cycle by default!”*

Prashant

*“Cycles are sold without accessories. There is a package with helmet, lock, bottle cage, stand, mudguards, etc. from ₹2,500 onwards.”*

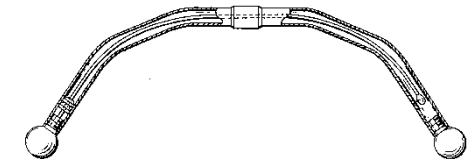
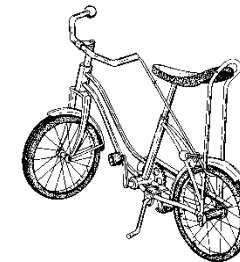
Salesman, Decathlon Amanora

*Insight : Cycle Locks can be integrated with cycle and/or accessories for targeting new users of Utilitarian/Recreational user groups.*



**US5558349A**

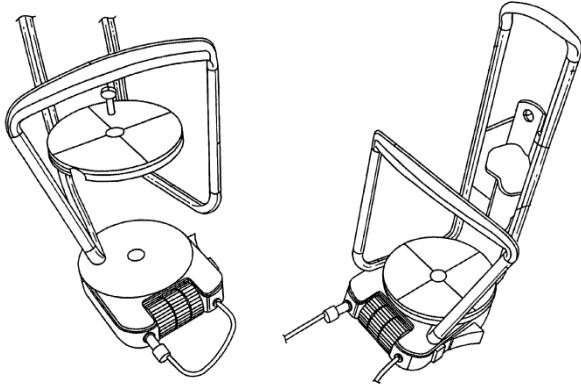
*Foldable Lock integrated with Cycle Frame*



**US3774421A**

*Cable Lock integrated into Handlebar*





**US6637244B2**

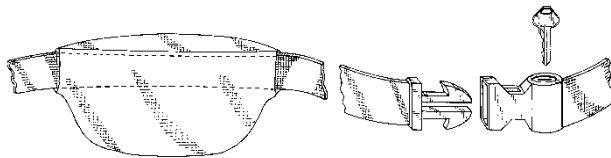
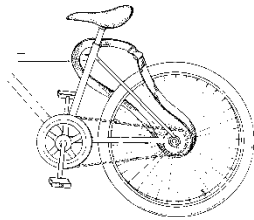
*Retractable Cable Lock integrated with Bottle Cage*

## Cycle Integrated - Accessory

*“People using cycles for sports and training remove accessories to make the bike lightweight - mudguards are installed only in monsoons and are removed otherwise.”*

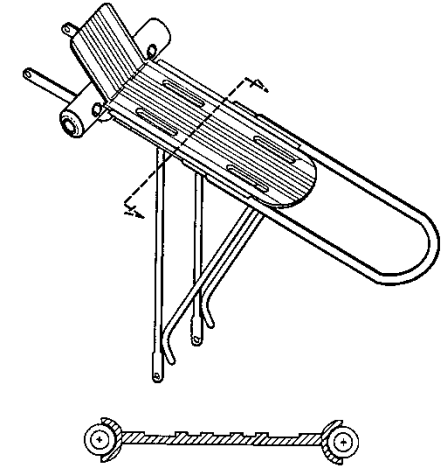
Salesman, Giant Starkenn, Chinchwad

*Insight : Professionals do not prefer integrating cycle lock with frame/accessory.*



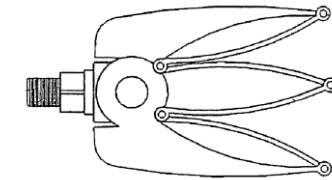
**US5873505A**

*Strap Lock integrated with a Waist Pack*



**US5251796A**

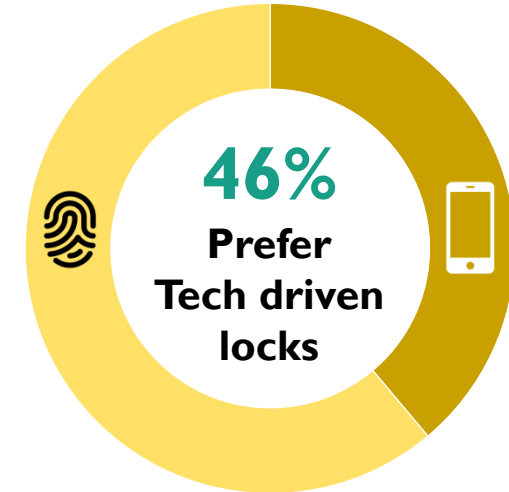
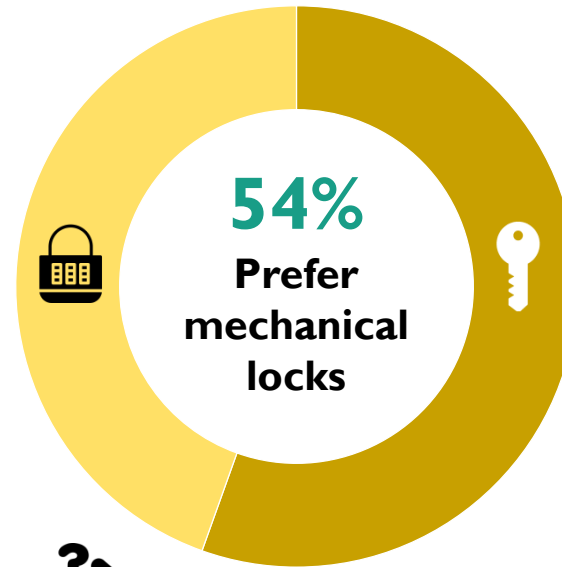
*U-Lock integrated with Storage Rack*



**US20070277569A1**

*Foldable Lock integrated with Pedal*

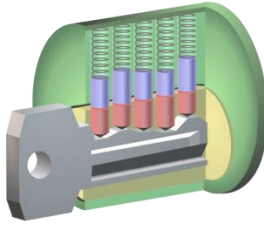
# Locking Mechanism



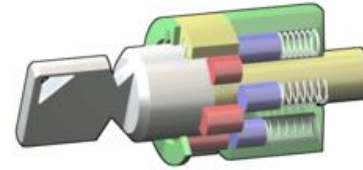
**48%** have forgotten their key or number code

# Locking Mechanism

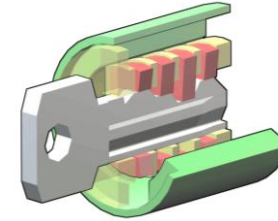
Key



**Pin Tumbler**



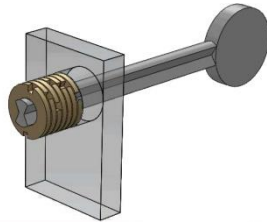
**Tubular Pin  
Tumbler**



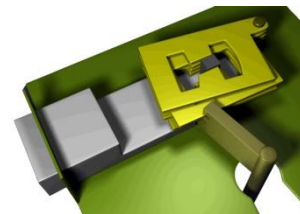
**Wafer Tumbler**



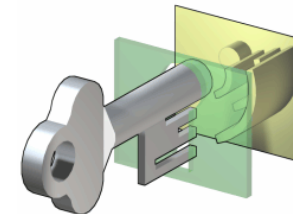
**Magnetic Coded**



**Disc Tumbler**



**Lever Tumbler**



**Warded**



## Preference to Mechanical

*“Keep it simple but tough. No need for smart tech because it fails often and is expensive to integrate.”*

Sudeb

*“People have fear of digital and smart locks. People want familiarity and devices that feel mechanical.”*

Michal Simon

University College of Arts, Crafts and Design,  
Stockholm

## Visibility Issue

*“I park my cycle under the stairs so it’s quite dark . My cycle and lock are both black , so visibility is an issue.”*

Mihika

## Key Placement & Insertion

*“While locking and unlocking, I have to adjust the position of key. Key gets jammed and key is inserted in reverse. It also takes time to find key.”*

Apurba Mondal

# Locking Mechanism

## Combination



Rotary Dial Combination



Sequence Combination



Directional Combination

## Forgetting Code

*“If a cycle key is lost you can make another key. If a lock combination is forgotten, it can be retrieved for combination of 3 but those with 4 to 5 are generally disposed. I have 40-50 locks which are useless because of this.”*

Salesman, Track and Trail, Chinchwad

*Insight : In combination locks, there should be a secure way of retrieving the number code.*

# Locking Mechanism

## Tech-Driven

---



### Hotel Lock

*-Deluns Hotel Lock-*

Unlocks when in contact with  
chip on the card



### Voice Activated Lock

*-Yale Smart Lock-*

Siri to open the deadbolt



### Unique Pin Lock

*-Samsung Smart Lock-*

Generates 2 digit pin which one receives on their  
phone along with a personalized password



### Multi-functional Lock

*-Sphinx Smart Lock-*

Various users can use mechanical or  
digital methods to open

# Locking Mechanism

Tech-Driven



## Mode Locking

*-Laser Lock-*

Mode-locking is a technique in optics by which a laser can be made to produce pulses of light of extremely short duration



## Car Door Lock

*-Radio Transmitter Lock-*

Keyless remotes contain a short-range radio transmitter, and must be within a certain range, usually 5–20 meters, of the **car** to **work**.



## Be Digitally Activated

*“The lock should be connected to a mobile app because we forget our password. will be more suitable for this generation.”*

Unmesh Kalhapure

## User as the Key

*“Why can’t my cycle unlock once I place my hand on the handgrip?”*

Amarnath

# Opportunity Area

## Direction A



Developing a *parallel product* to compete with the *traditional mechanical* locks in the ₹500 - ₹1000 price segment, catering to the requirements of the growing *utilitarian* user group in India.

# Opportunity Area

## Direction B



Developing a *rigid/semi-rigid* lock with a necessary *mounting device* to target the gap in the market for *stronger alternatives* in the ₹1000 - ₹2000 price segment, catering to the various user groups in India.

# Opportunity Area

## Direction C



*Developing a **smart lock** to be integrated with the cycle, to address the lack of the same in the Indian market, and to cater to the growing **PBS systems** and the **tech-savvy commuters** in India.*

# Opportunity Area

## Direction D



*Developing an **indoor cycle mounting** lock system to cater to the recreational and professional user groups in India with **high-end cycles** as well as for display in **cycle retail shops**.*

# Image Board

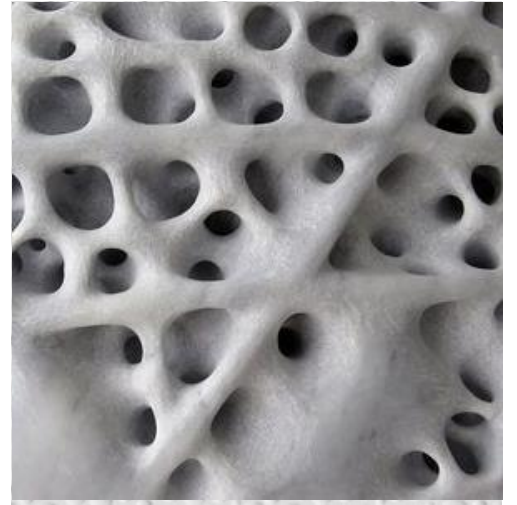
Secure





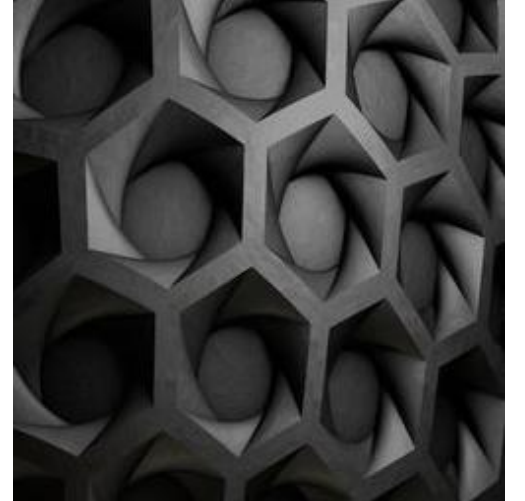
# Image Board

Lightweight



# Image Board

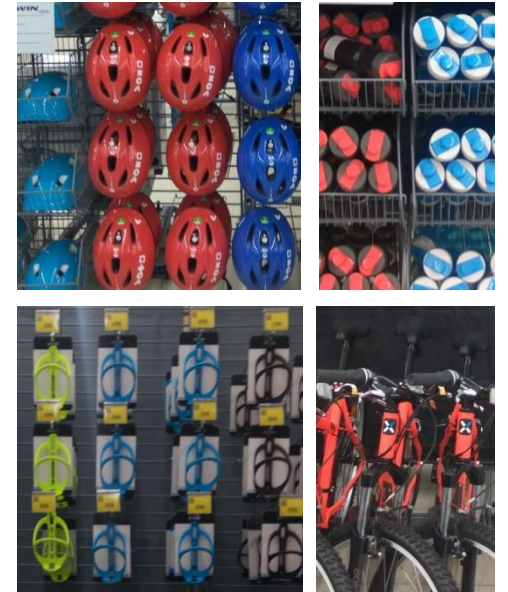
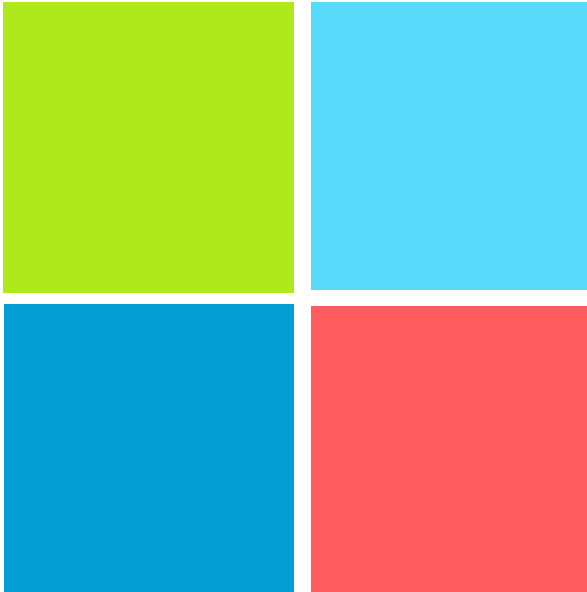
Durable



# Colour Palette

B'TWIN by Decathlon

*Fluorescent/Neon Colours + Grayscale  
Palette*



## Visual Deterrent

*“Something that is visually more prominent – not only for identification in a group but also to serve as a deterrent to thieves.”*

Imad Rais

## Visual Homogeneity

*“Locks should be hidden or kind of invisible and not obvious.”*

Parag S

# The Pitch

*Godrej Locking Solutions and Systems*  
Vikhroli, Mumbai

- Need for a comprehensive cycle lock
- Smart locks as future of locking systems
- Establishing new marketing and retail channels
  - Two wheelers to widen scope
- Outdoor Brainstorming session for business opportunities

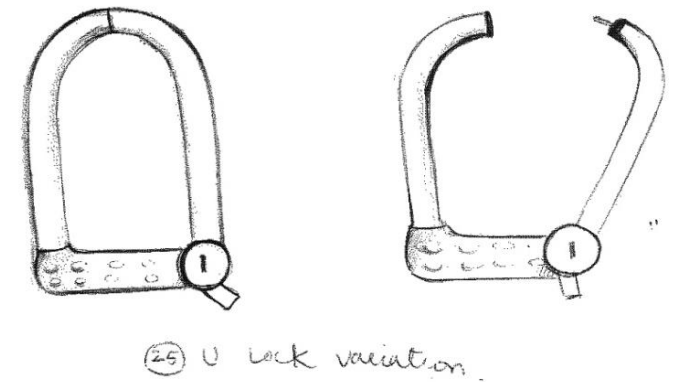
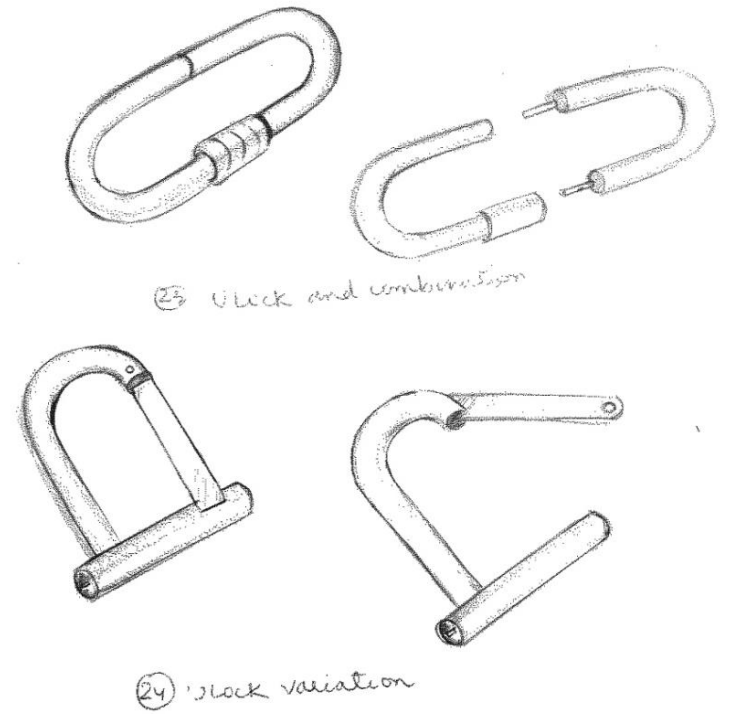
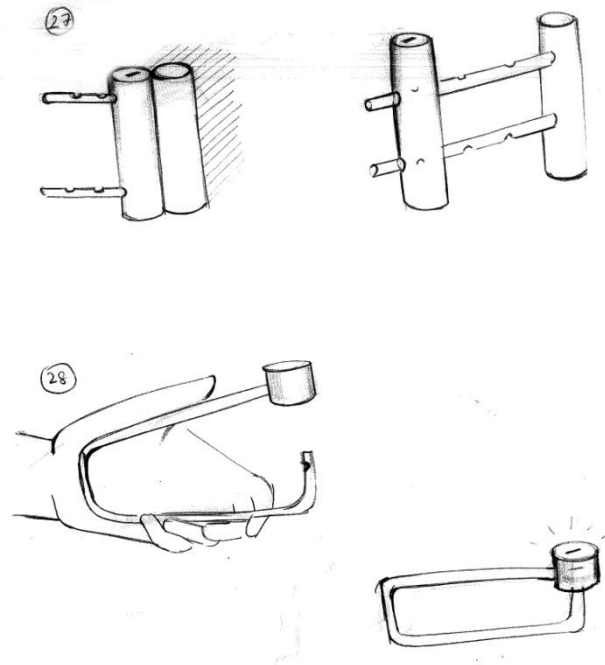


# Ideation

Anushree Banerjee

# Ideation

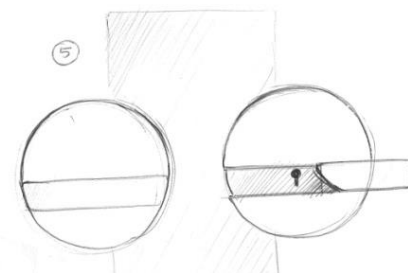
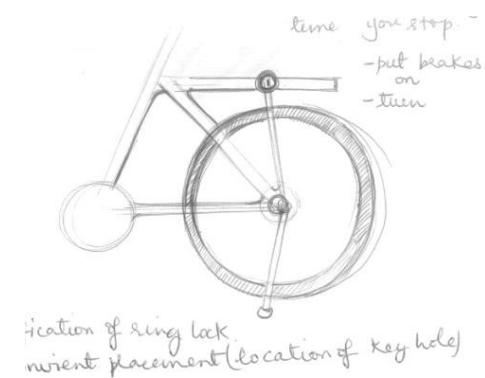
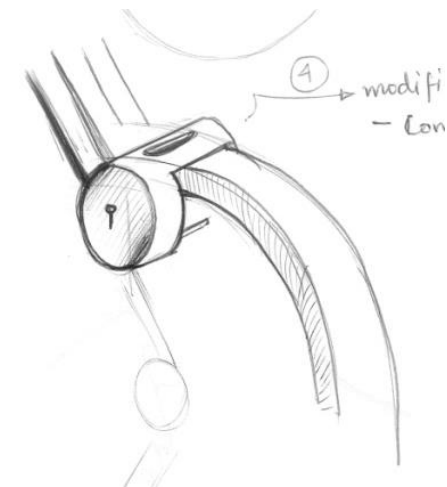
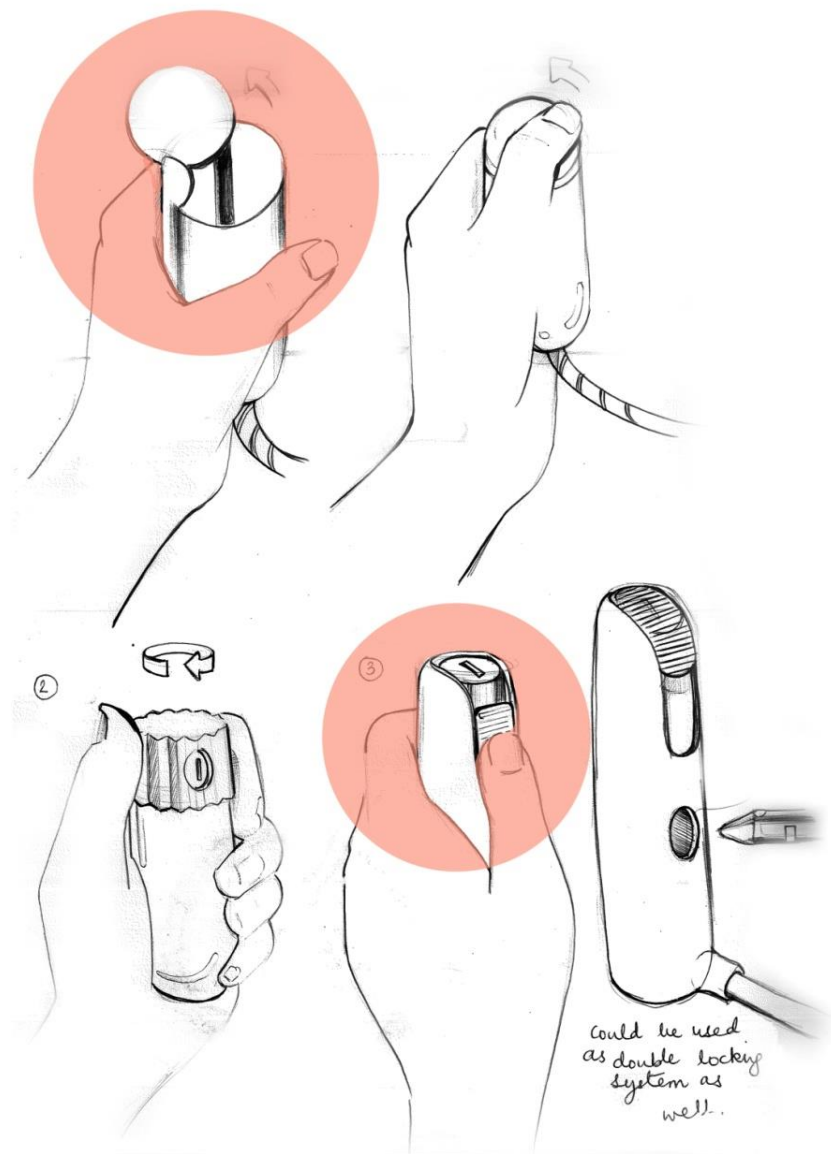
## U Lock Variation





# Ideation

## Hidden keyhole

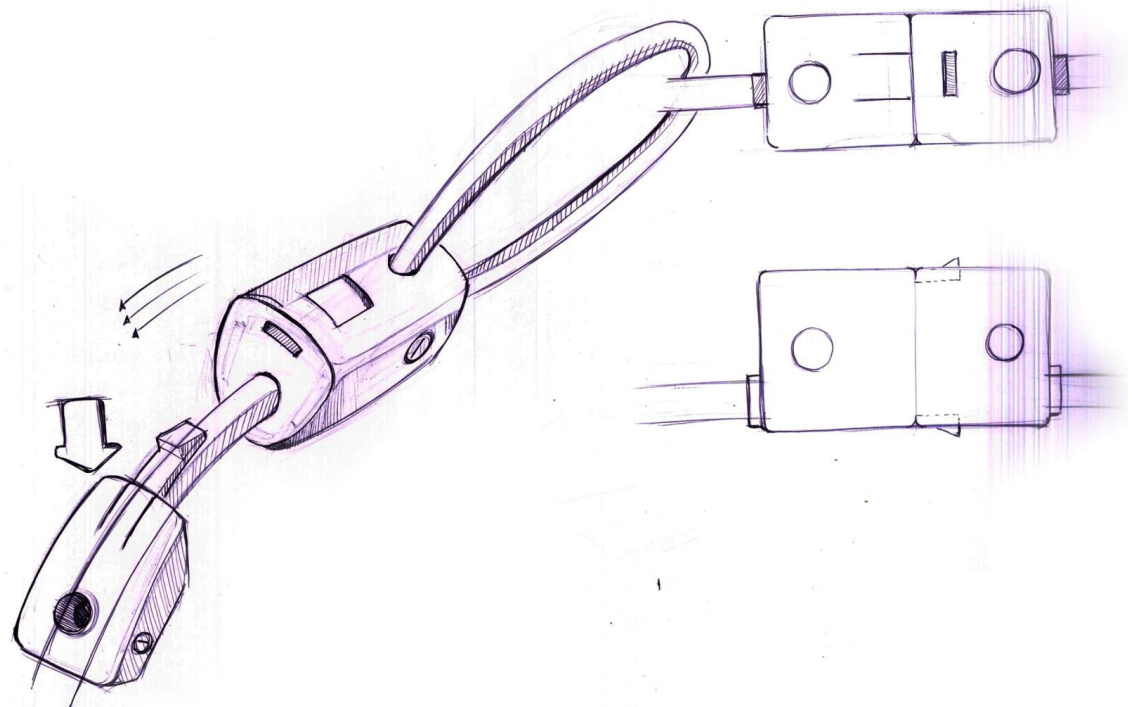
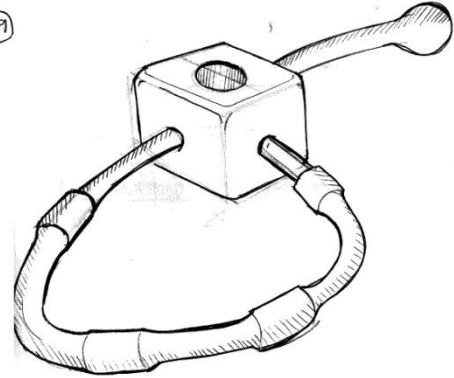


# Ideation

## Moving Casing

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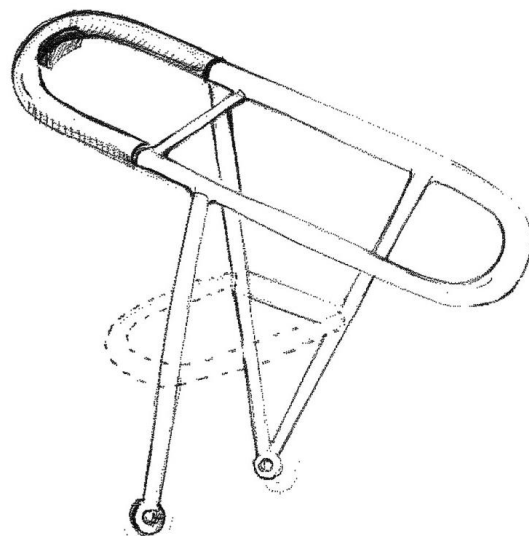
29



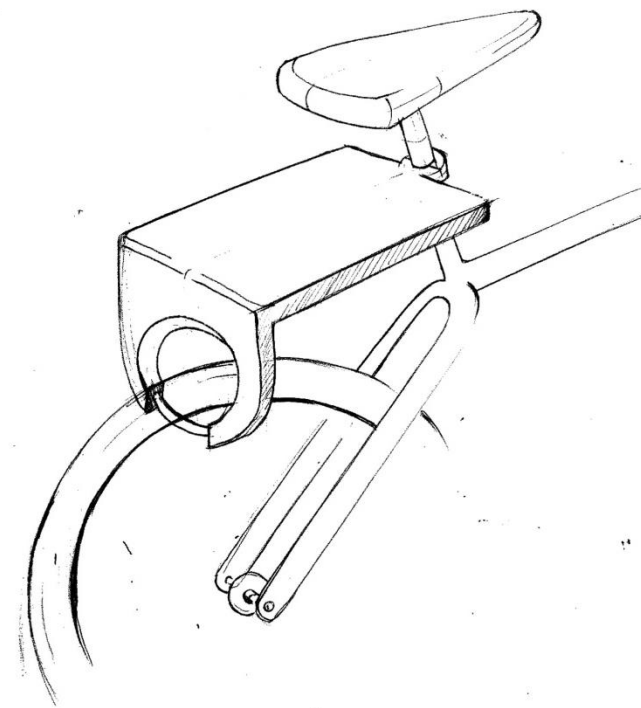
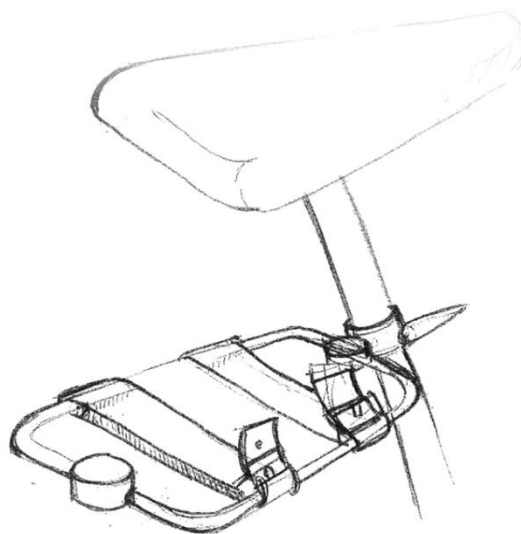
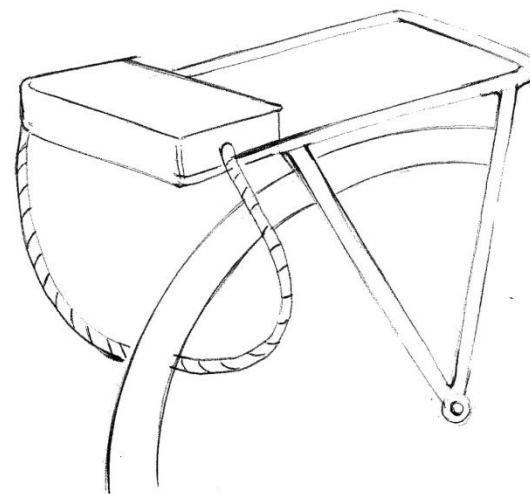
# Ideation

Part of an accessory

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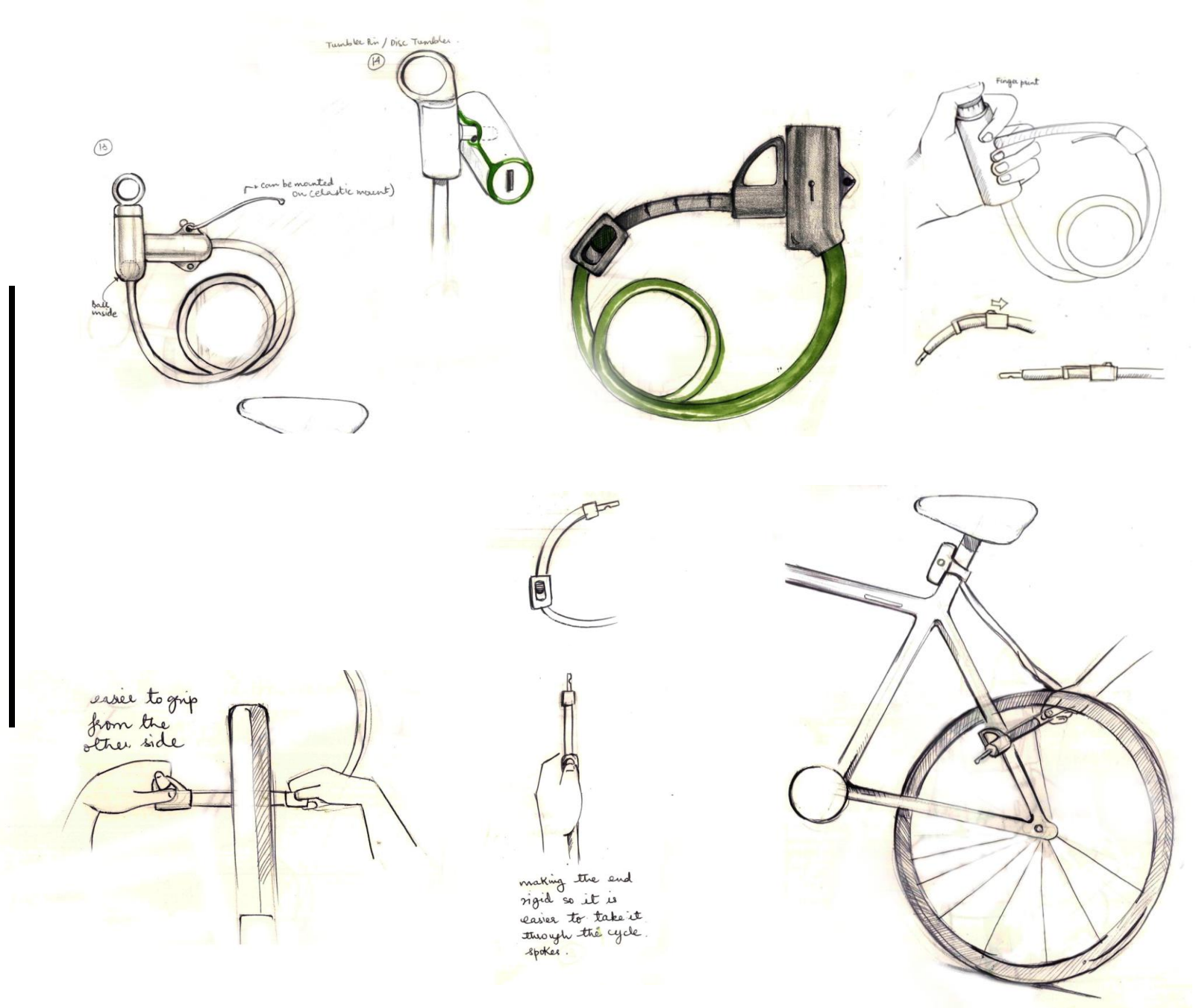


*Attached to the carrier*



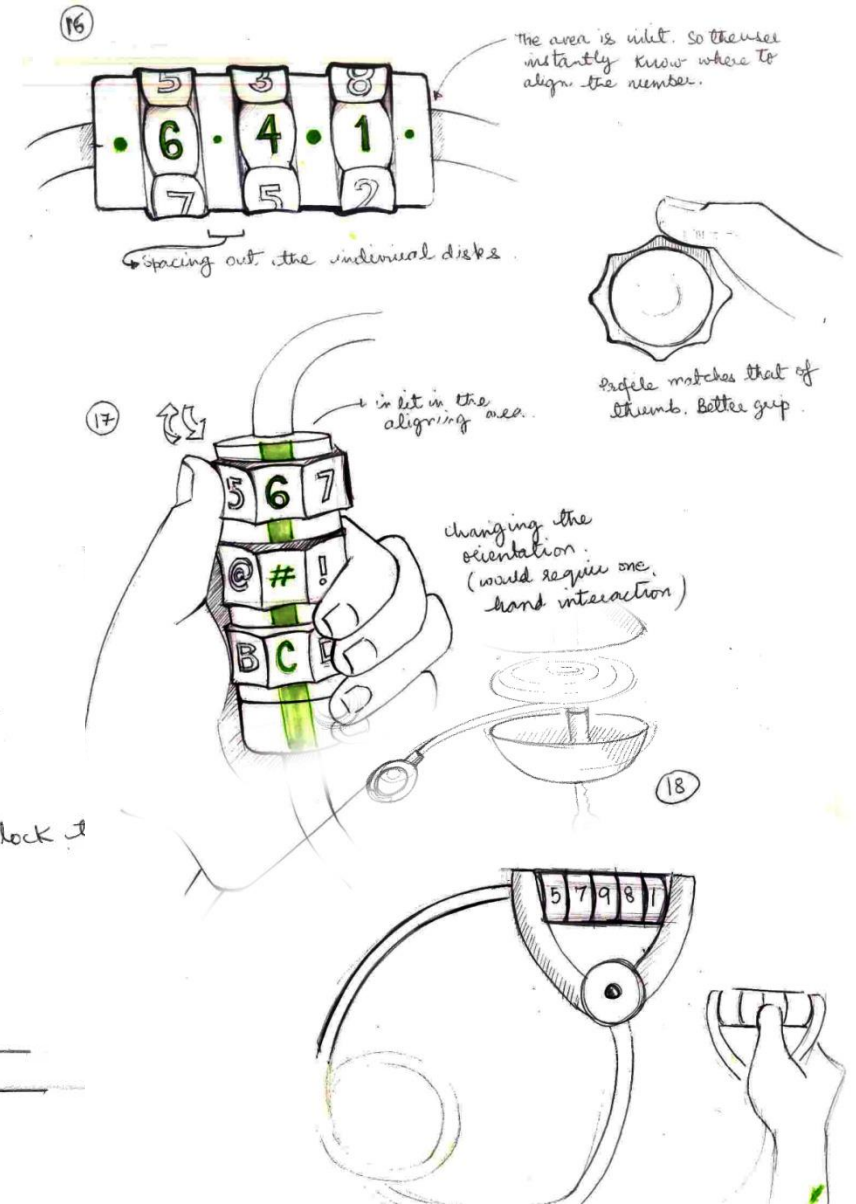
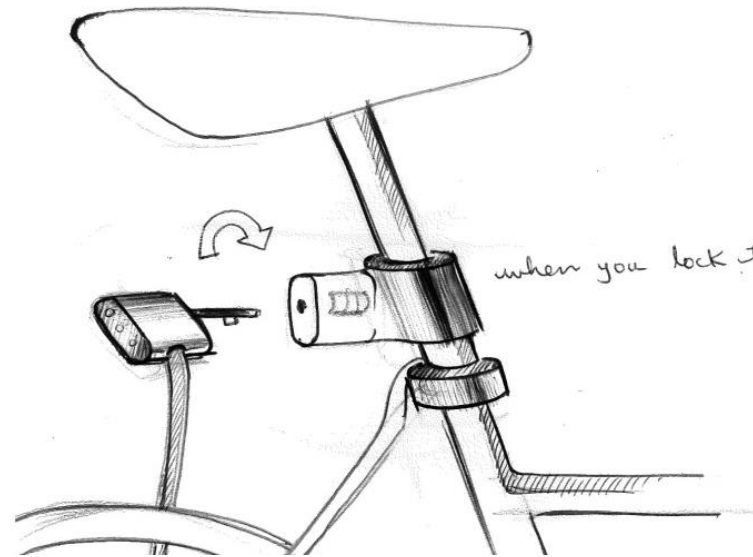
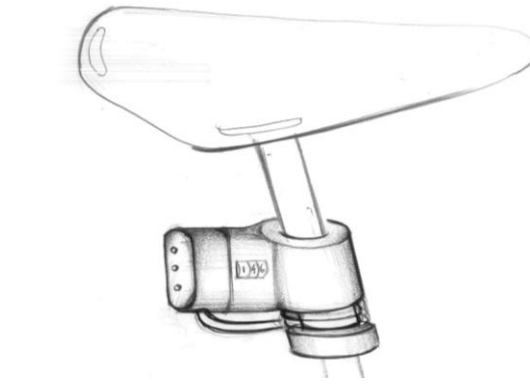
# Ideation

Part of an accessory



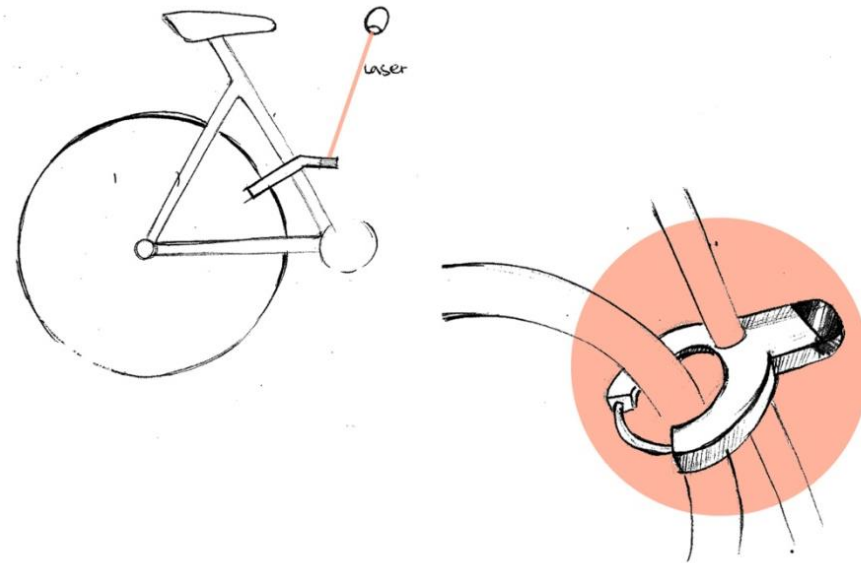
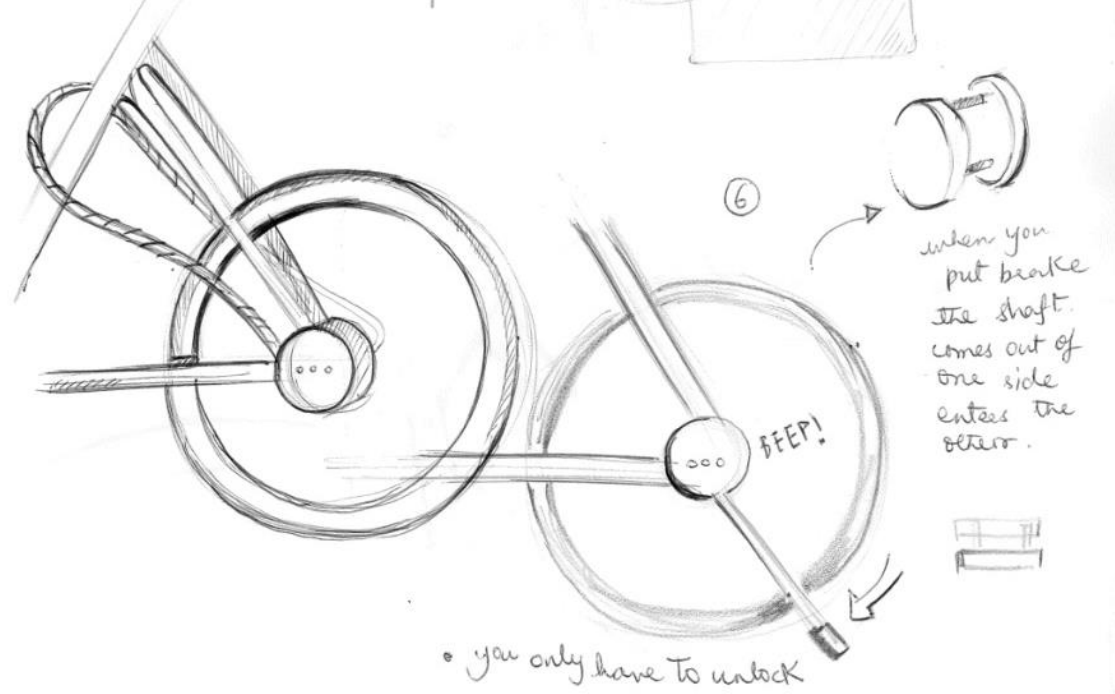
# Ideation

## Variation of Combination Lock



# Ideation

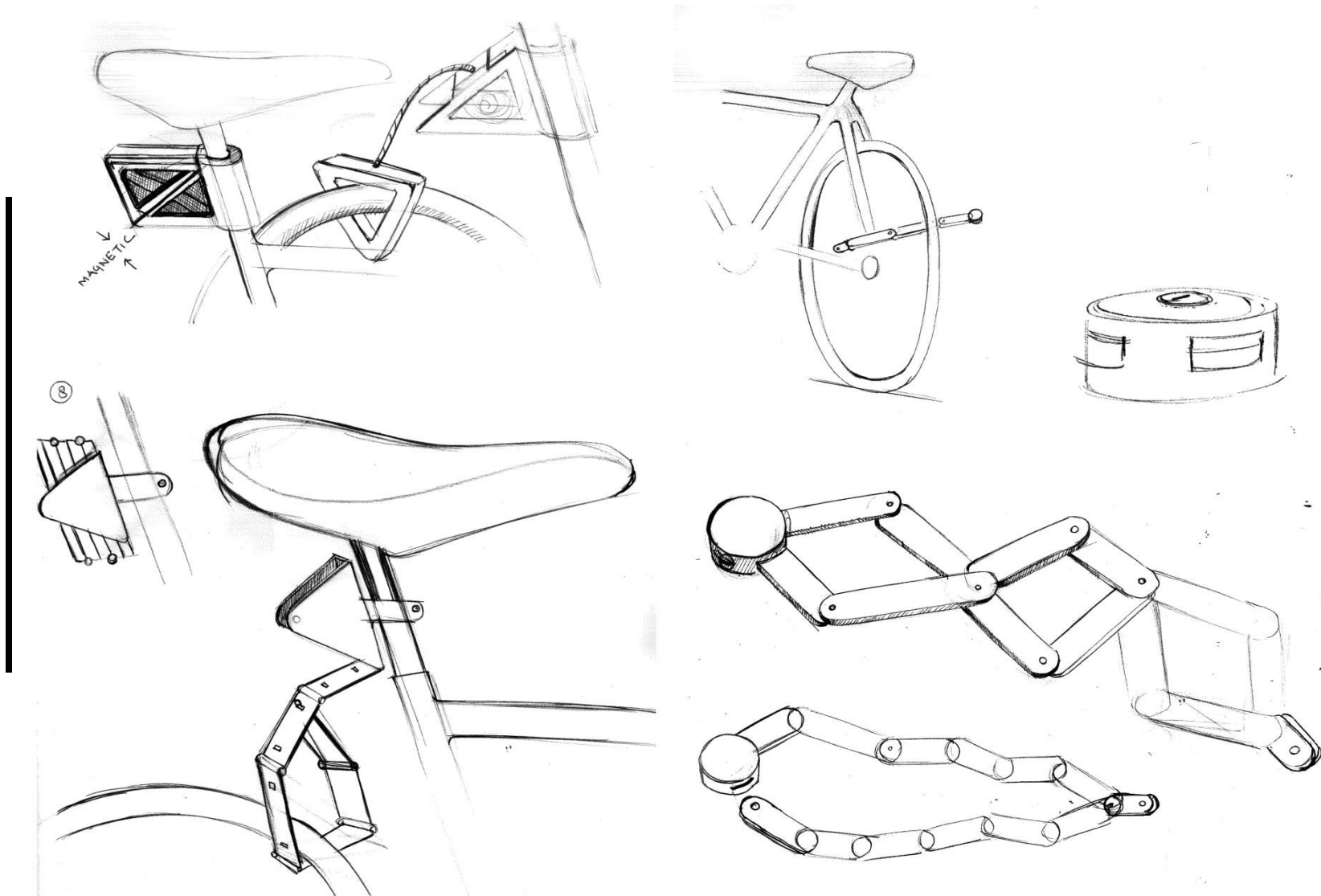
## Smart Lock





# Ideation

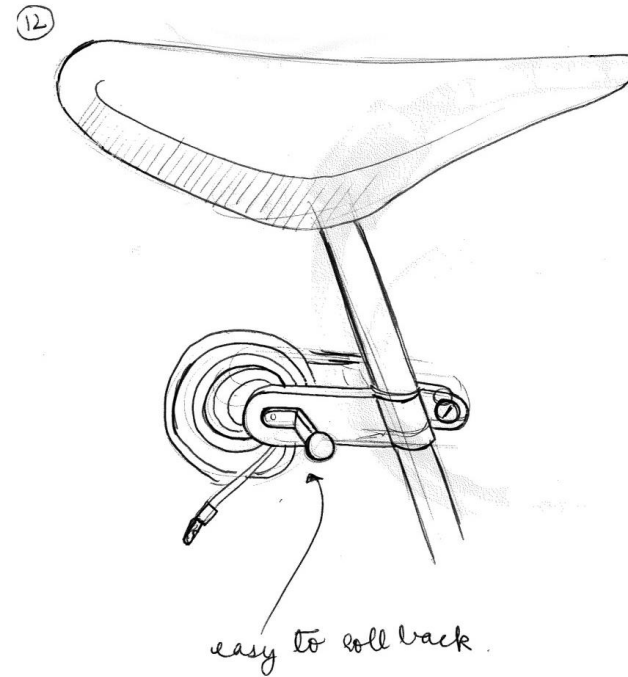
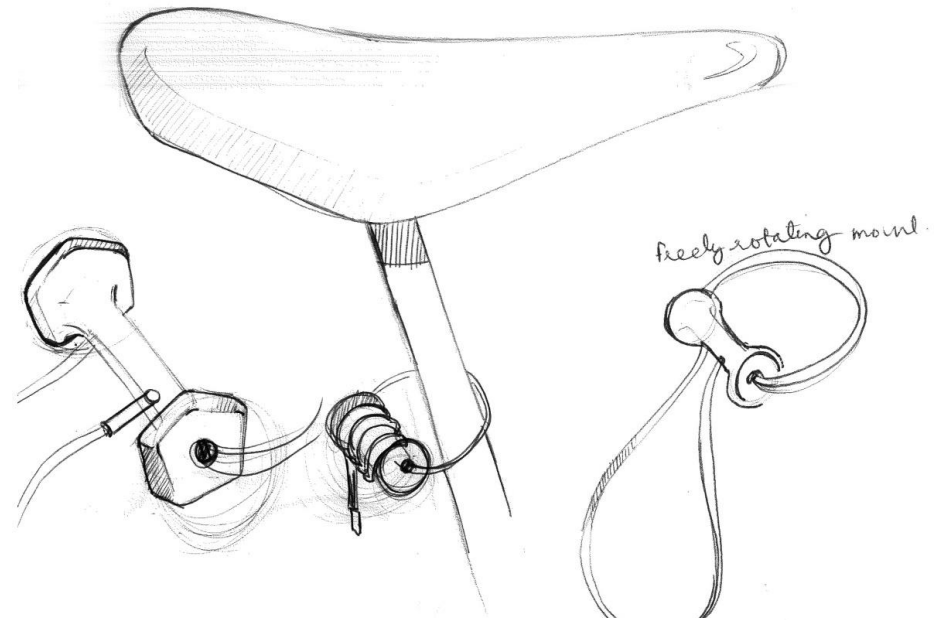
## Semi-Flexible Locks





# Ideation

## Smart Lock

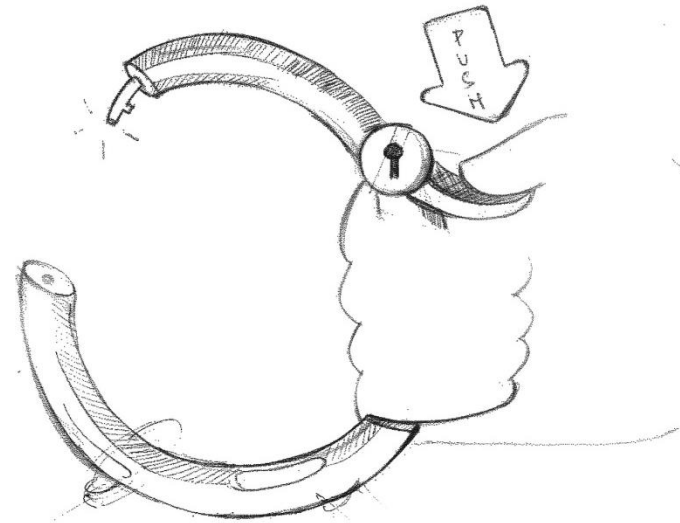
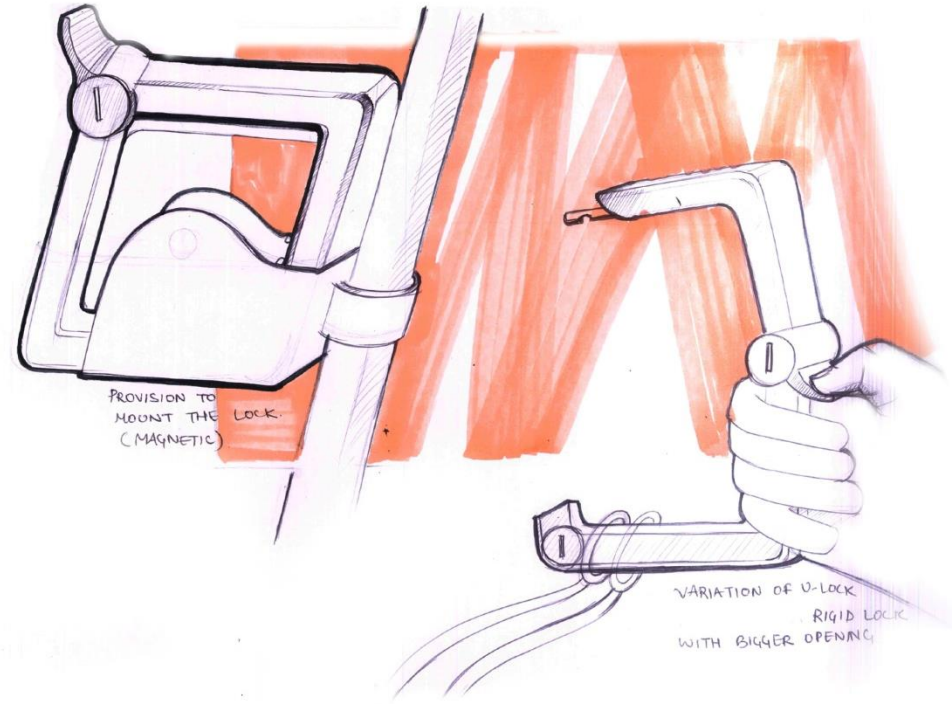




# Ideation

## SQUARE LOCK -VARIATION OF U LOCK

Rigid Lock  
Providing One hand  
operation  
More area of Opening  
Magnetic mounting  
accessory



# Ideation

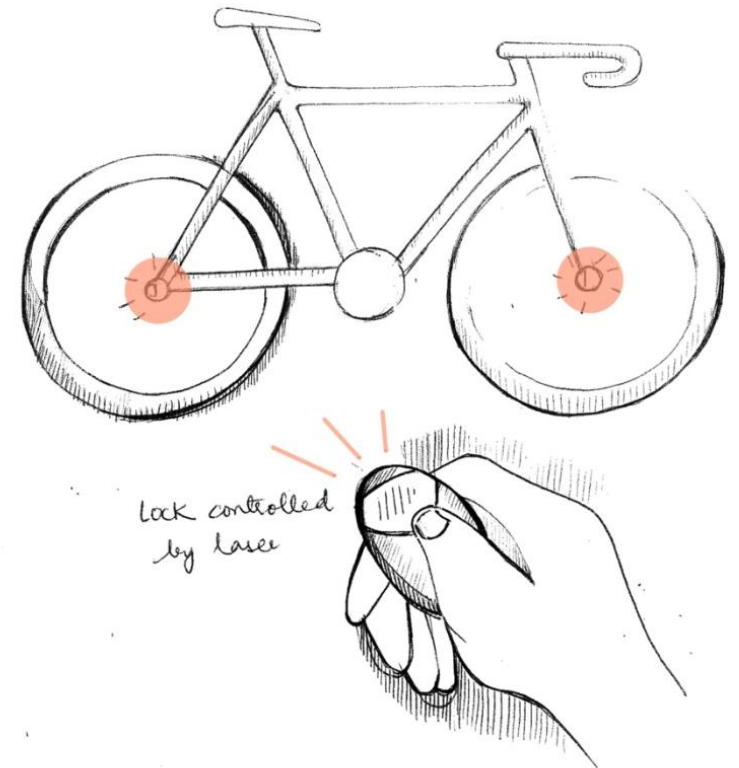
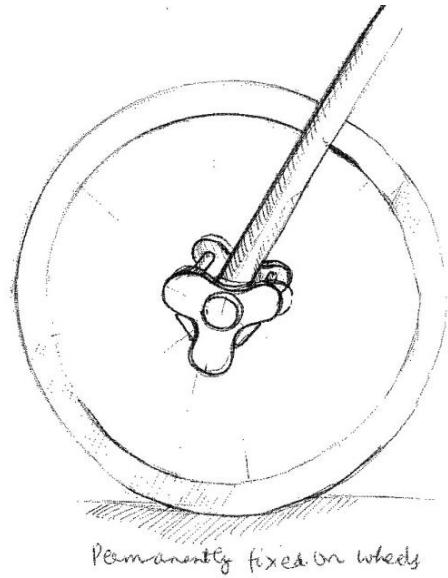
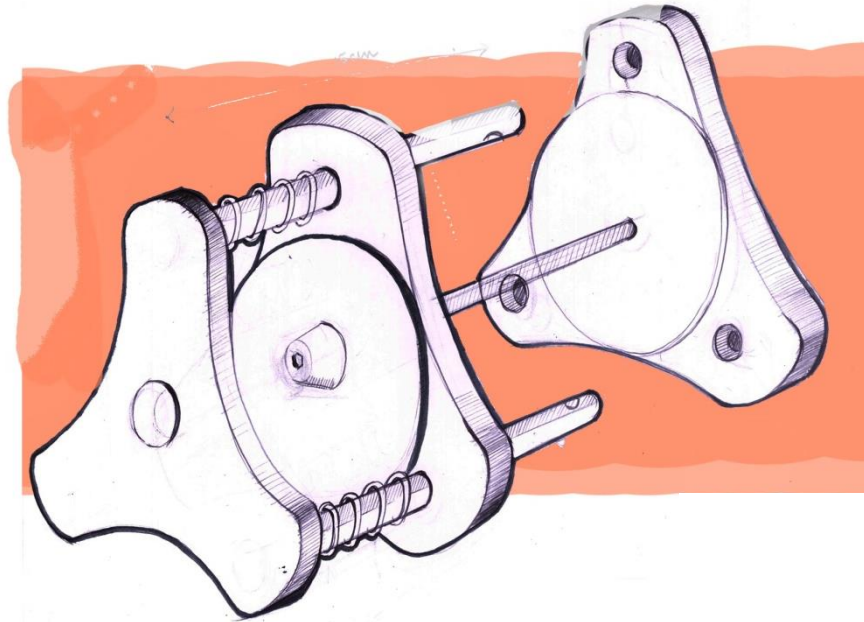
**Hub Lock**

Rigid Lock

Permanently placed

Laser/Radio Wave Controlled

Remote Access



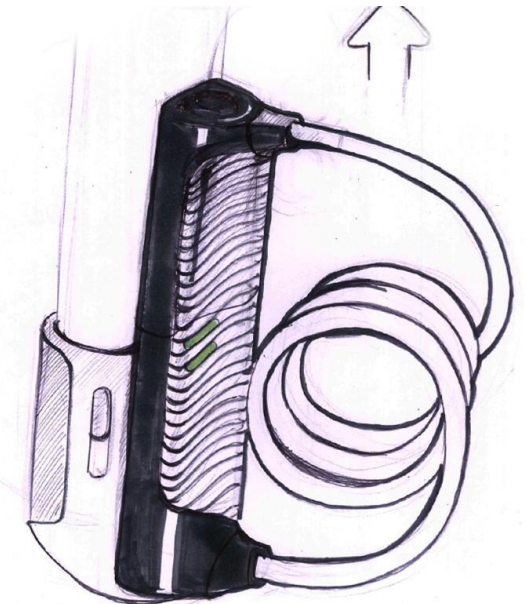
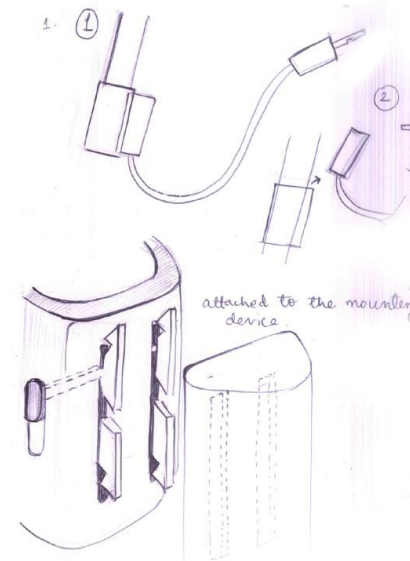
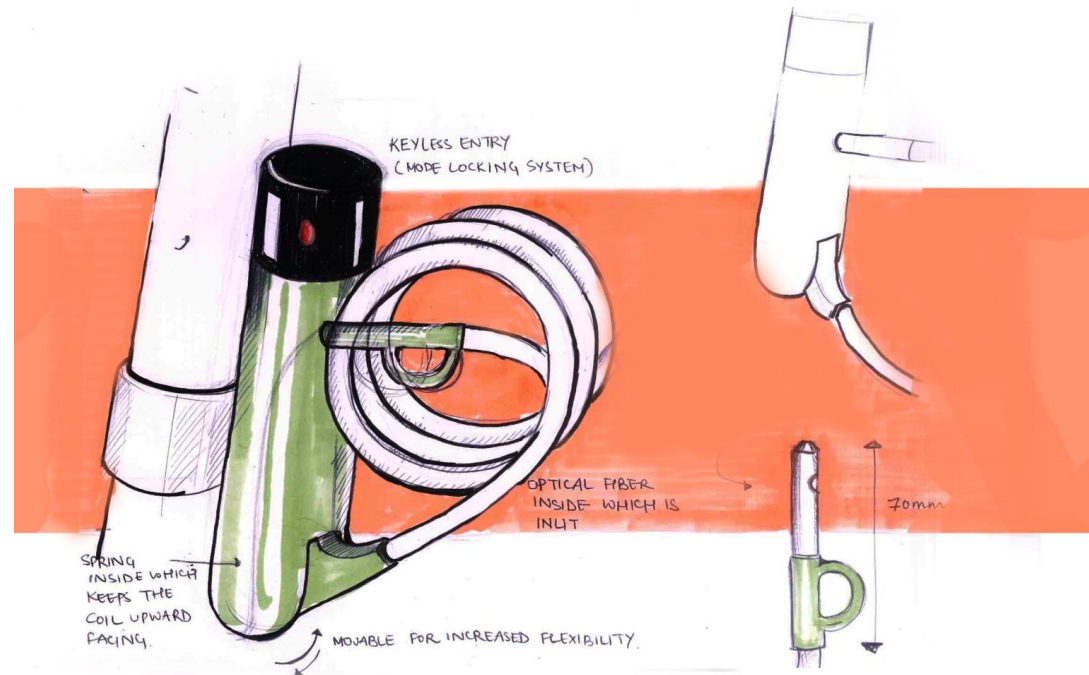
# Ideation

## Easy Access Smart Lock

Lock opened by by  
radio/laser wave

Easy Access Mounting  
device which

Allows the quick removal of  
the lock

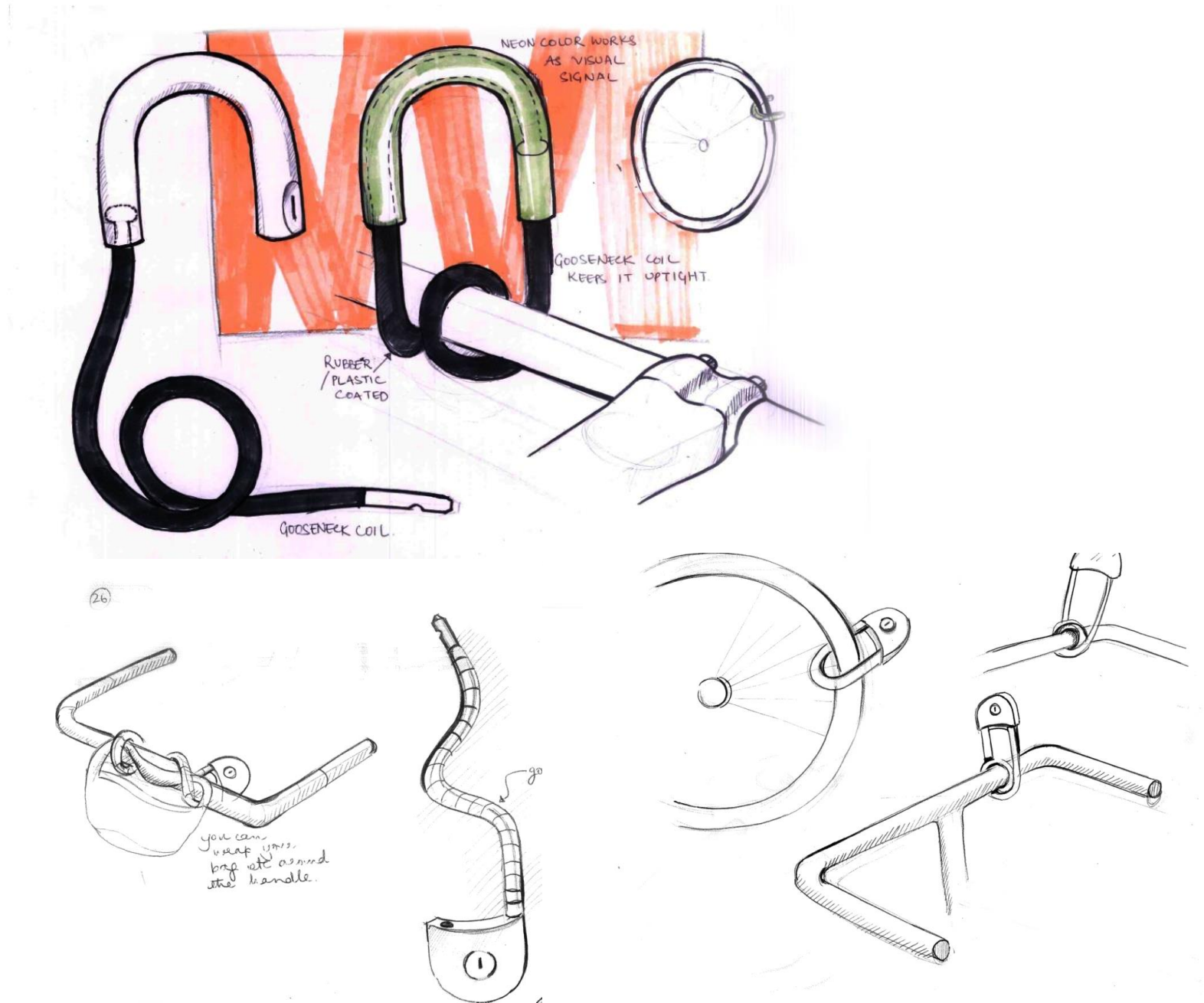




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## Gooseneck lock

Half of the lock has a gooseneck cable which has various advantages from easy mounting on the cycle to flexible operation.

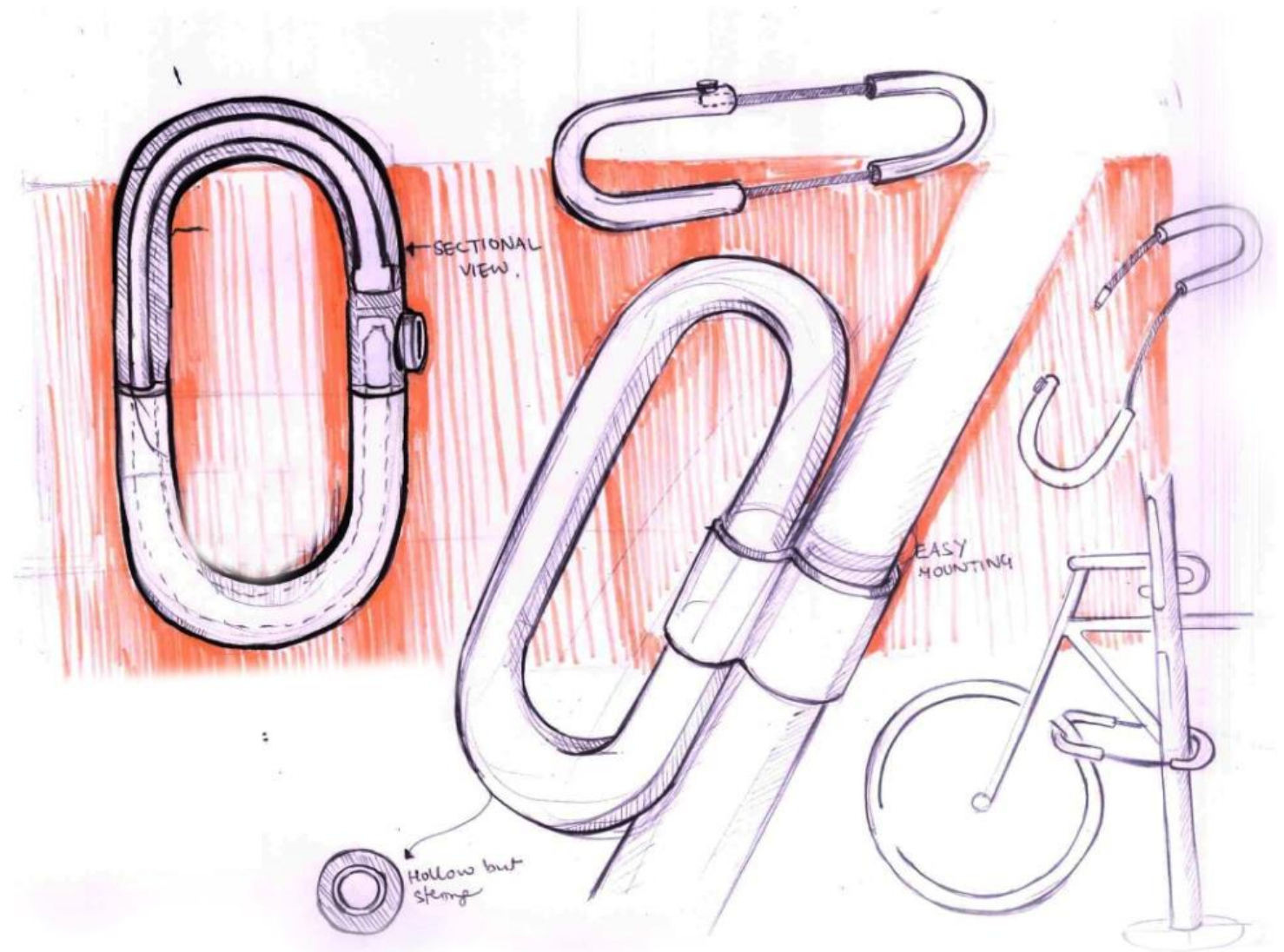


# Ideation

## Compact Double U

The Double U shaped lock has a rigid outer structure and a nestled flexible cable inside.

Makes it easier to store.



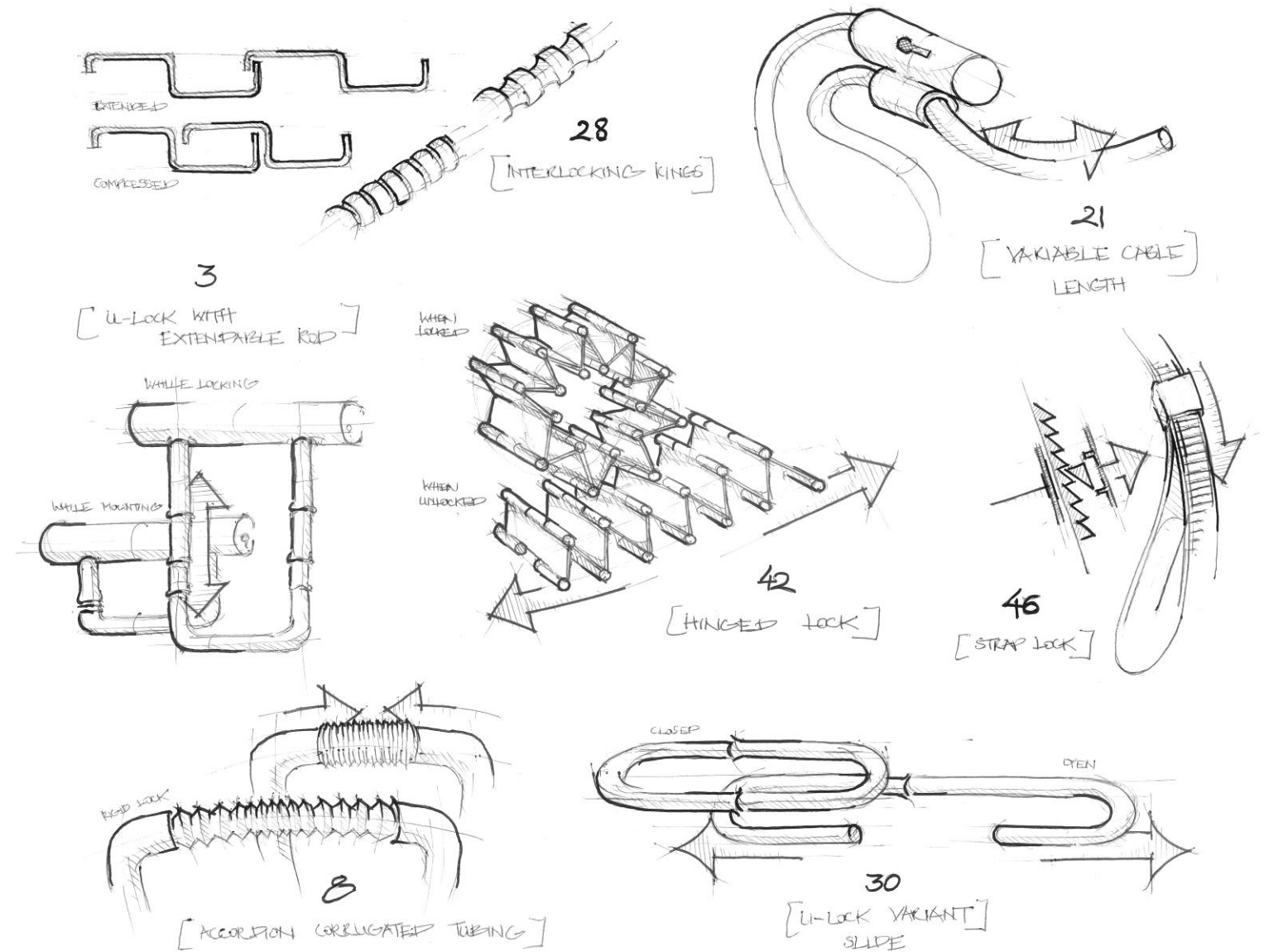


# Ideation

Vinod Louis Joseph Swamy

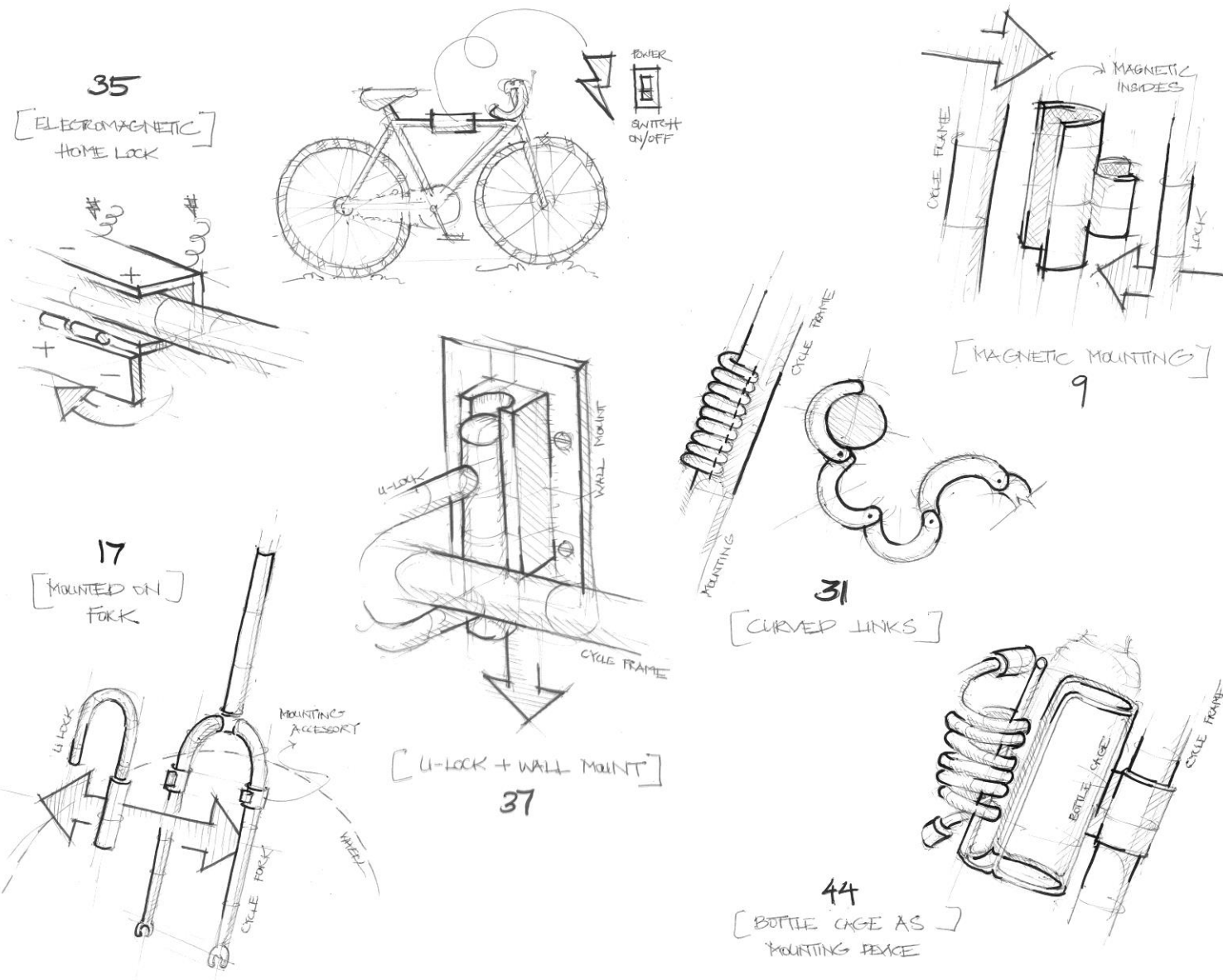
# Ideation

## Length Adjustment



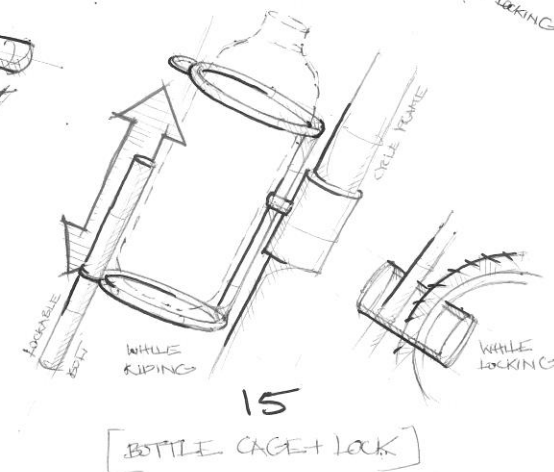
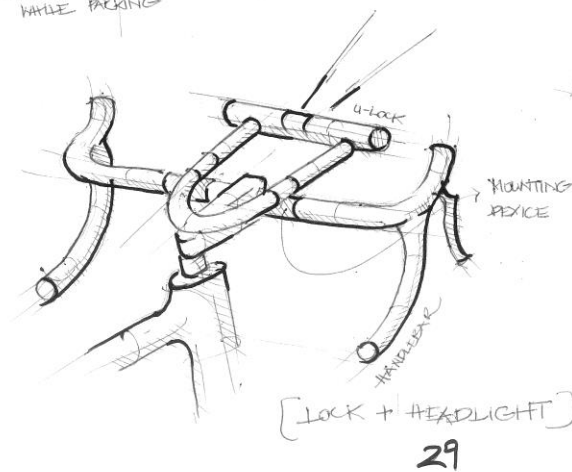
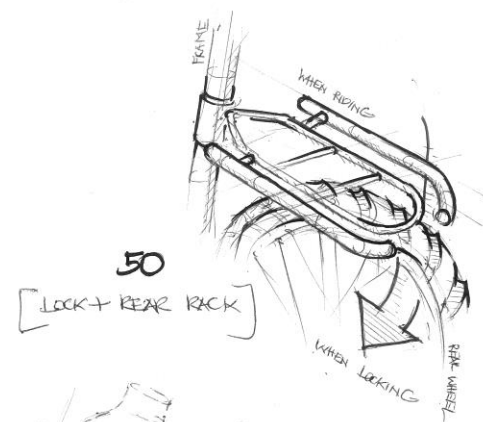
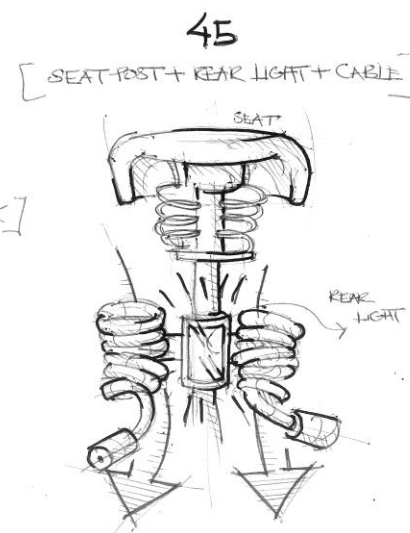
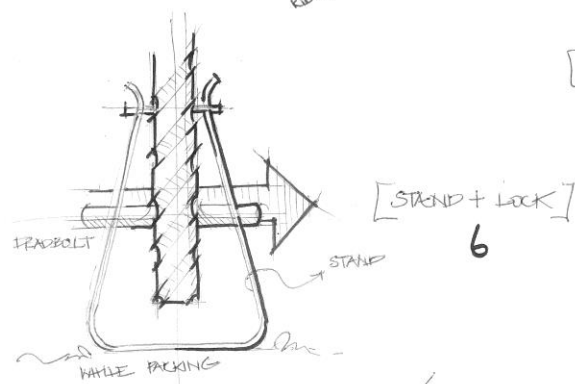
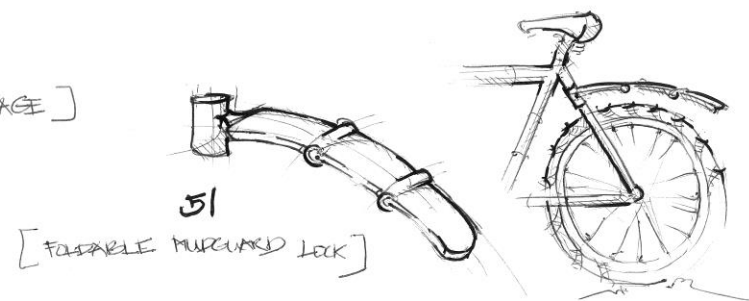
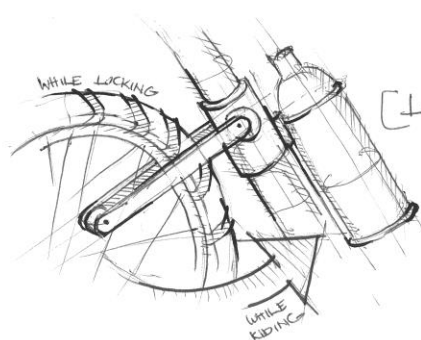
# Ideation

## Mounting Variation



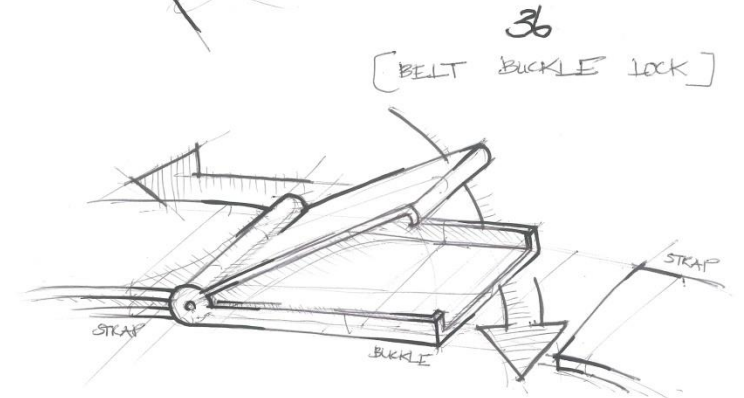
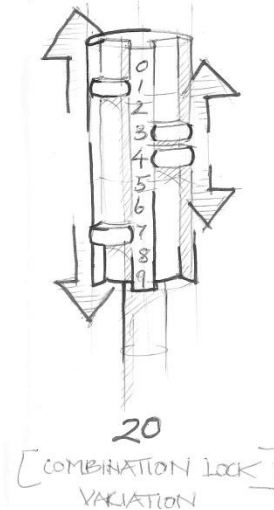
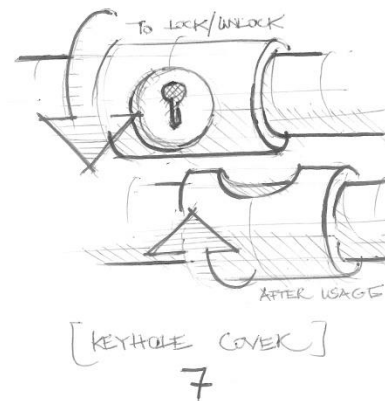
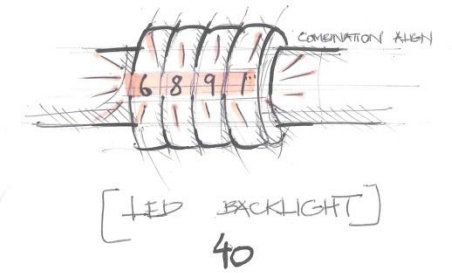
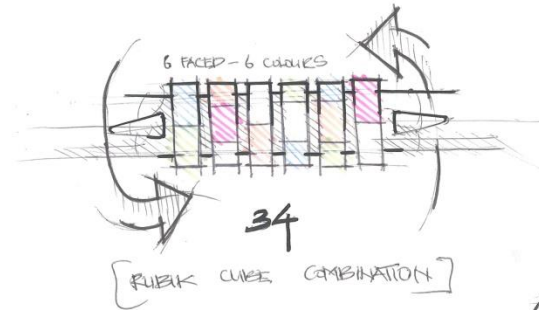
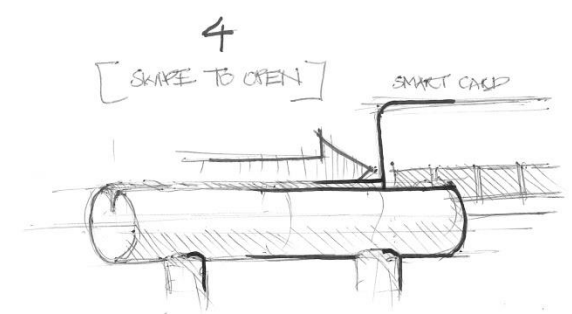
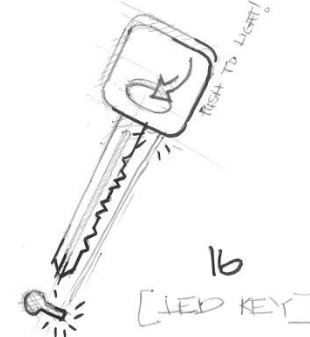
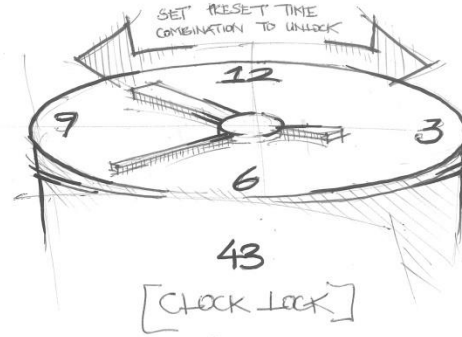
# Ideation

## Cycle Integration



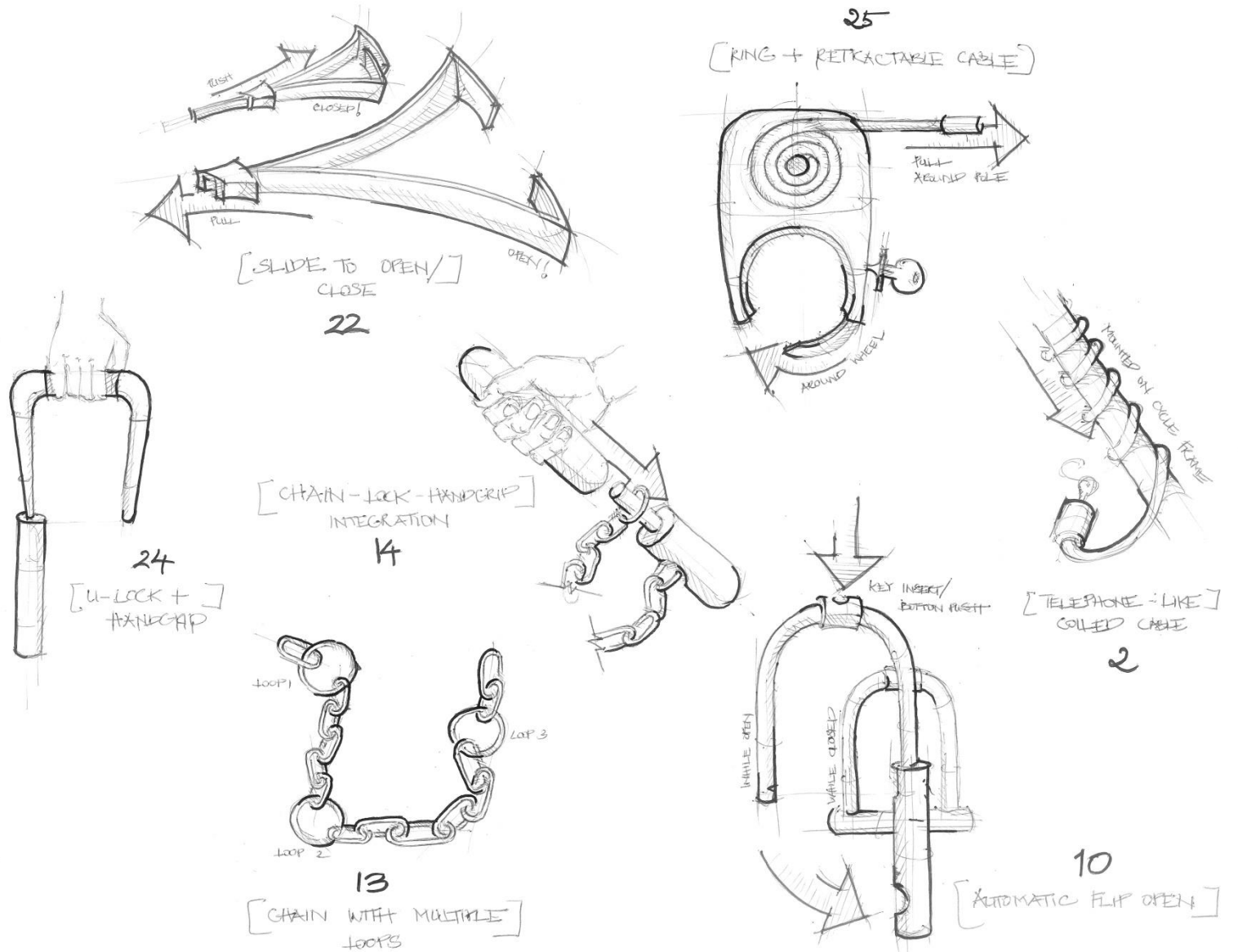
# Ideation

## Locking/Unlocking Variation



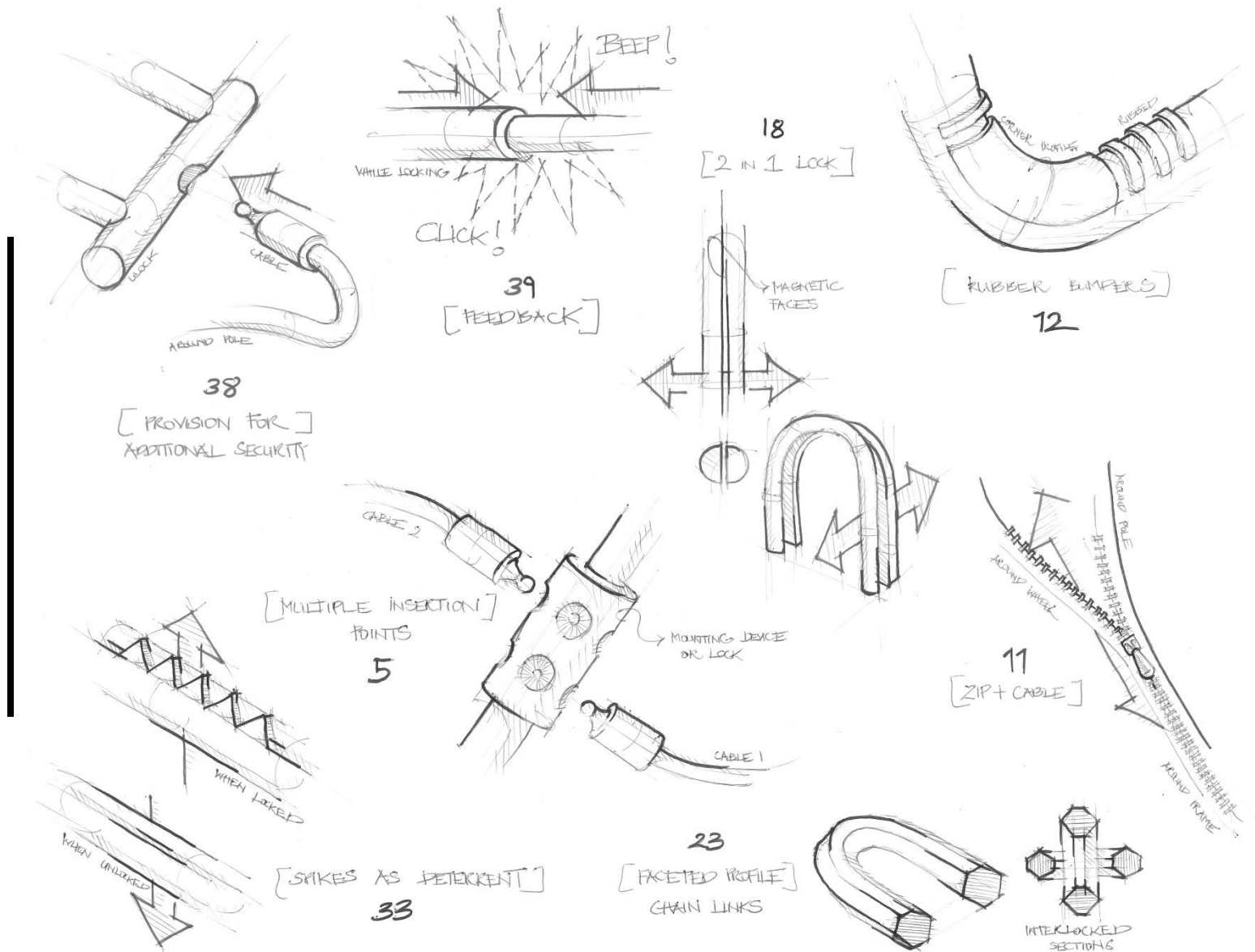
# Ideation

## Ease of Operation



# Ideation

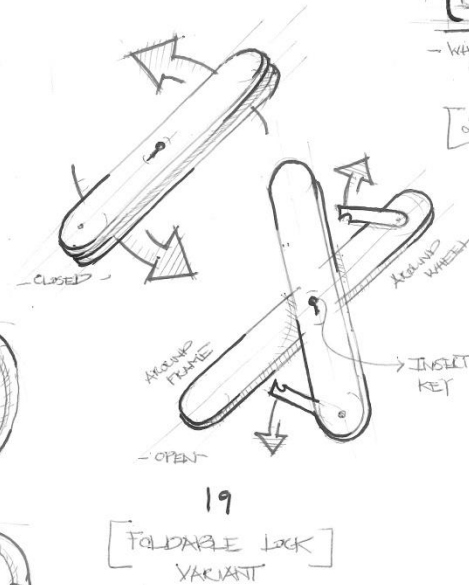
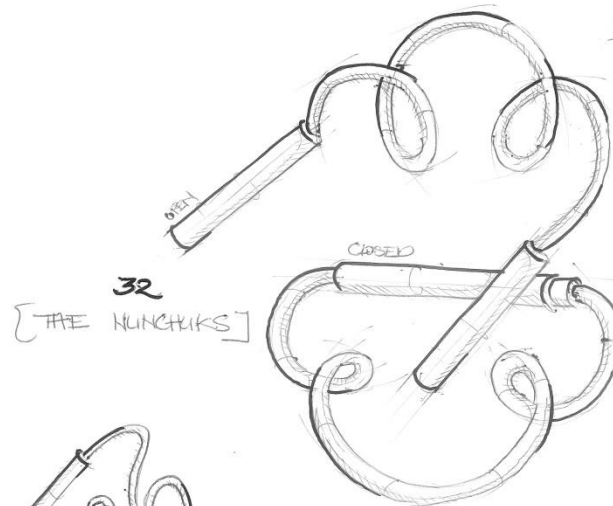
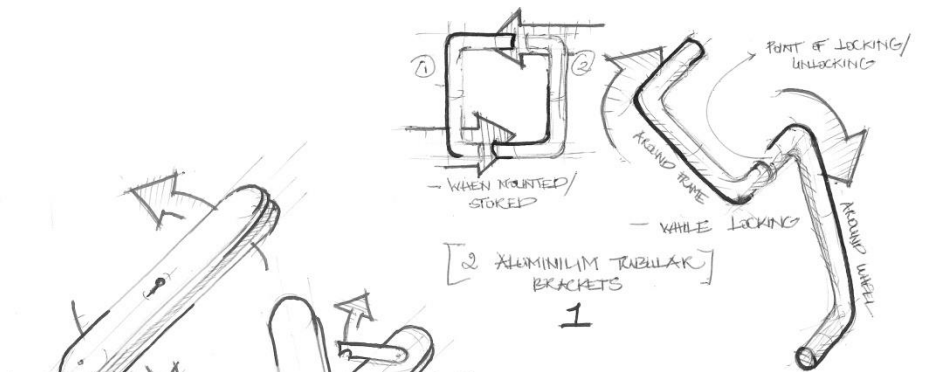
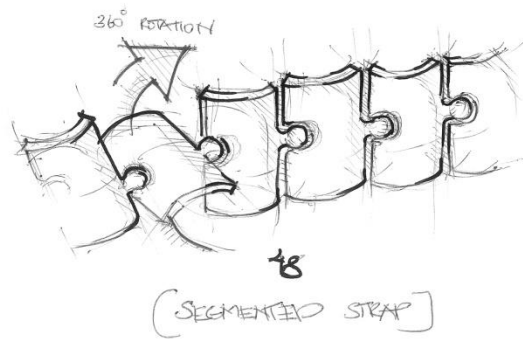
## Additional Security





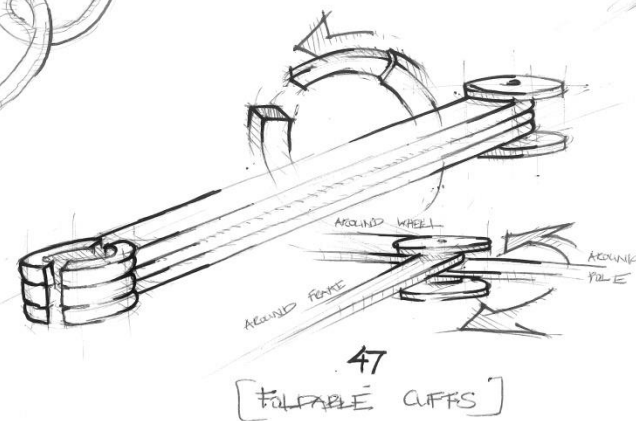
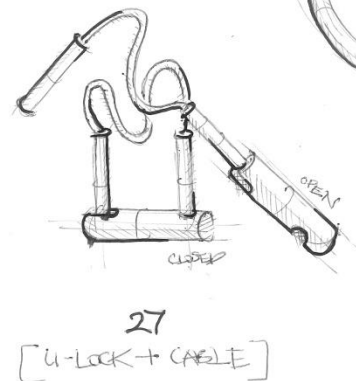
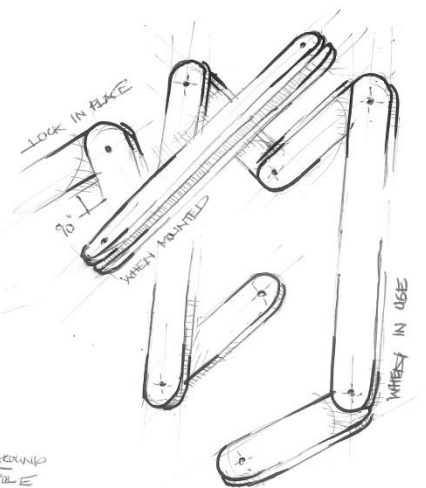
# Ideation

## Rigid Lock Variation

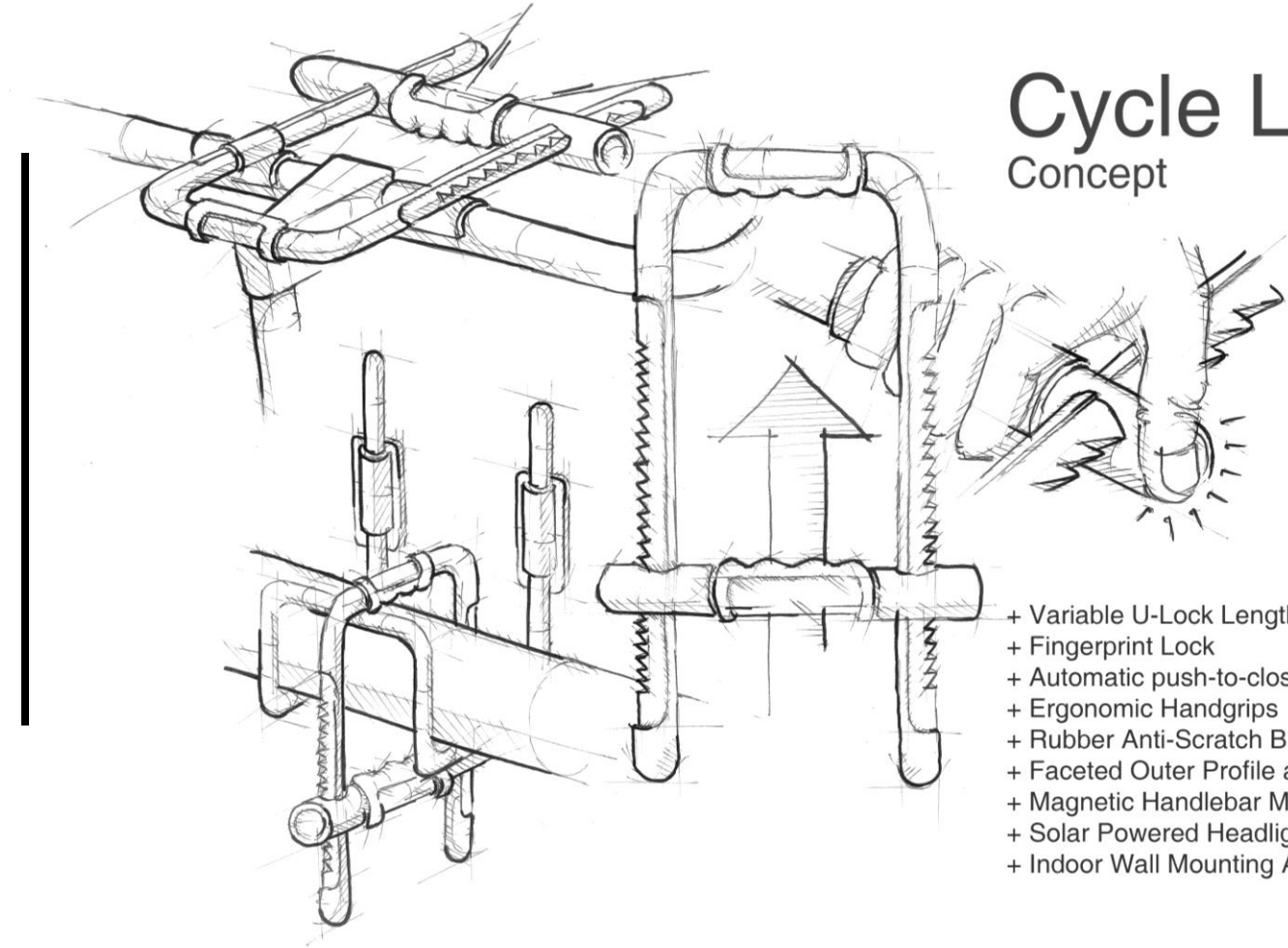


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[FOLDABLE LOCK] VARIANT



# Concept



## Cycle Lock Concept

- + Variable U-Lock Length
- + Fingerprint Lock
- + Automatic push-to-close Lock
- + Ergonomic Handgrips
- + Rubber Anti-Scratch Bumpers
- + Faceted Outer Profile as Visual Deterrent
- + Magnetic Handlebar Mounting Accessory
- + Solar Powered Headlight
- + Indoor Wall Mounting Accessory

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# Thank You

