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9/10/19

The Team Norms

- Communicate
- be present
- work hard
- Participate

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Austin Jacobs

DATE

9/10/19

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John

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9/10/19

PROPRIETARY INFORMATION

9/11/19

Question Everything

Question Everything

What material comes in phone charger? O

How different are materials? O

What brand? C → why is this best brand to go to?

What color? C → what reason is this the best color?

How is it made? O

Where is it made? C →

How long does it last? C → what makes it last for a longer period of time.

How many rotations? C → explain

How durable? O

How to stop turtlebacks? O

Austin Jacob

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Austin Jacob

DATE 9/11/19

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PROPRIETARY INFORMATION

9/12/19

Brain Storming

1 How to improve on the amount of time it lasts, before it "turtlebacks", breaks, or just stops working.

2 How to make it easier to carry

3

3

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9/12/19

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PROPRIETARY INFORMATION

KWR Charts

- What do we know
- Peoples chargers break down anyway
 - They are known for not lasting

What do we need to figure out

- How to make them last
- How to stop them from turtle necking

What resources do we need to use

- Rubber
- Honestly just an iPhone charger from apple because I don't think we will be making any

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9/11/19

Supporting Articles

<https://mobileaccessories.ventev.com/learn/how-usb-cables-work/>
Ventev, Team. "How USB Cables Work." Ventev, 16 Nov. 2017.
mobileaccessories.ventev.com/learn/how-usb-cables-work/.

<https://arxiv.org/pdf/1509.00940.pdf>
Lu, X., Wang, P., Niyato, D., Kim, D. I., & Han, Z. (2015). Wireless charging technologies: Fundamentals, standards, and network applications. *IEEE Communications Surveys & Tutorials*, 18(2), 1413-1452.

<https://researchrepository.uct.ac.za/bitstream/10197/3388/2/JournalPaperPreprint.pdf>
Richardson, P., Flynn, D., & Keane, A. (2011). Optimal charging of electric vehicles in low-voltage distribution systems. *IEEE Transactions on Power Systems*, 27(1), 268-279.

<https://www.chargerharbor.com/what-makes-a-great-charging-cable/>
Usman, Usman. "What Makes a Great Charging Cable?" - Charger Harbor. Power Bank, Wall & Car Charger Reviews, 24 Jan. 2017.
www.chargerharbor.com/what-makes-a-great-charging-cable/.

<http://www.velvetwire.com/cables-charging-time>
"Cables-Charging-Time - Velvetwire: Creating a Smarter Energy Future." Velvetwire.
www.velvetwire.com/cables-charging-time.

- ① has very good visuals & a lot of the information I don't understand
- ② A PDF of the make up of a charger
- ③ This one talks about everything on an electrical level
- ④ This one has a lot of good information
- ⑤

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PROPRIETARY INFORMATION

Problem Statement

The iPhone charger wears down and breaks at the end making it unable to use after a while. 93% of the population in the US have iPhone chargers and all of them use this charger when it breaks people will spend upwards 30 dollars to get it fixed every 6 months.

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patents

<https://patents.google.com/patent/US9054478B2/en>

Golko, A. J., Kamei, I., Jones, W. Z., & Thompson, P. J. (2015). U.S. Patent No. 9,054,478. Washington, DC: U.S. Patent and Trademark Office.

An improved method is employed to produce a plug connector having a defined breaking strength. The plug connector is receivable in a receptacle connector disposed in an electronic device. The plug connector has an inner enclosure bonded to a tab of the connector. The bonds are designed to break at a torque that is less than the breaking strength of the tab of the connector and/or the receptacle connector. The designed breaking strength protects the receptacle connector and/or the electronic device from damage when a force is applied to the plug connector.

—Pros: A lot of good information
—Cons: very long

<https://patents.google.com/patent/US9340341B2/en>

Farrell, Edwin B. "Cord management organizer." U.S. Patent No. 9,340,341. 17 May 2016.

A cord management organizer for use with an electrical cord having a plug end and a length of insulated wire. The organizer includes an elongate body extending from a first end to a second end, a plug retention opening proximate the second end, and an enlarged body portion adjacent the first end. The enlarged body portion has a thickness greater than a corresponding thickness of the body at a central region that is located intermediate the plug retention opening and enlarged body portion. The enlarged body portion includes a passageway having a central axis that extends in an elongate direction towards the central region of the body

—Pros

—cons

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<https://patents.google.com/patent/US20180351289A1/en>

Zaytoun, George. "Device for protection of electronic device charging cord." U.S. Patent Application No. 15/992,802.

The presently disclosed subject matter relates to protectors that safeguard the charging cords of a wide variety of electronic devices, preventing the cords from becoming damaged during use. The protector cooperates with the electronic device charger, keeping the charging cord safely bent at a soft angle to prevent fraying, breaking, and the like.

Conventional charging cords include a first end that plugs into an outlet, providing a power source, and a second end that plugs into or connects with the electronic device, thereby charging the device. The protector enables the cord to be maintained at an angle suitable to prevent or minimize damage, thereby extending the life of the charger.

austin

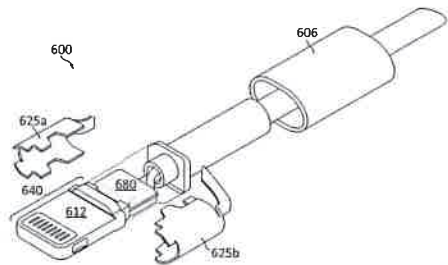
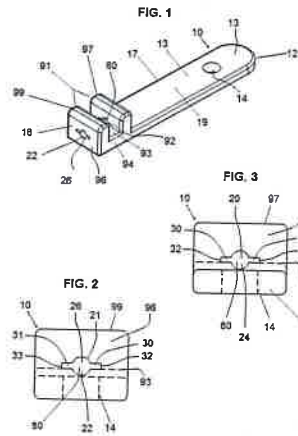


FIG. 6

austin Jacobs



austin Jacobs

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10/2/19

PROPRIETARY INFORMATION

wait

Goal Setting

Week 1 Group Finding And Research

Week 2 Research, Patents, Pictures

Week 3 Starting design Specifications

- Legal issues: We cannot ~~copy~~ copy apple or Samsung's design

- Safty: Make sure doesn't spark, there are no shorts, all wires and electrical components are contained and not exposed (except actual charger)

- Service life: Plan for the average charger to last a year

- Operating environment: Where ever you charge your phone.

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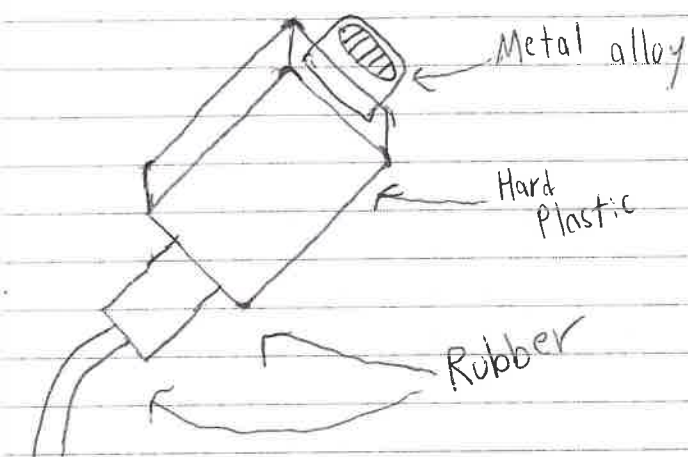
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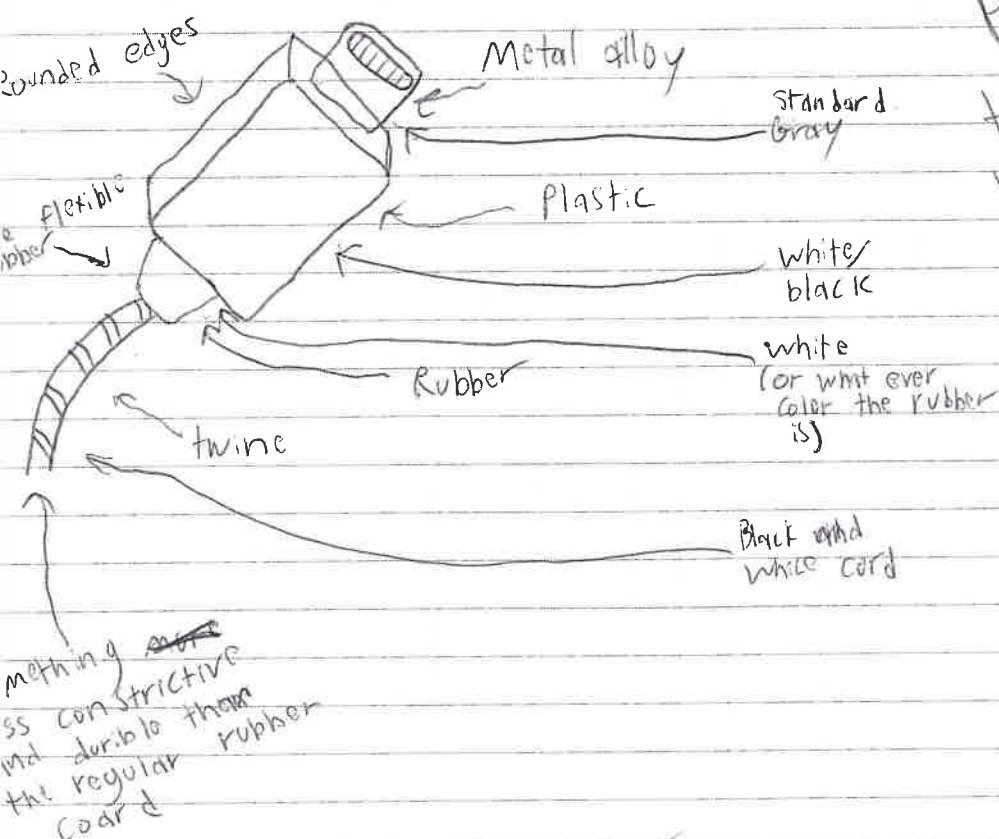
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10/3/19

PROPRIETARY INFORMATION

Original Apple Product

Task: To take the original charger and make it to a longer lasting more durable charger while keeping aesthetics

Team Charger Design

Possibly a case to stop the bending that leads to the charging breaking.

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10/22

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10/17/10

PROPRIETARY INFORMATION

Interviews

~~Taleon~~ Taleon: How many iPhones chargers have you had since you had an iPhone? "12 times"
When was your first time getting a charger? "5th grade"
Any thing different you wish about the charger? "Better quality"

Ben:

Bella/Hallie: How many phone chargers in your life?

H- "A couple but I lose them"

B- "ugh like 40 no 20"

When was your first time getting a phone?

H- "Freshman Year"

B- "5th grade"

Any thing different you wish about the charger?

H- "That"

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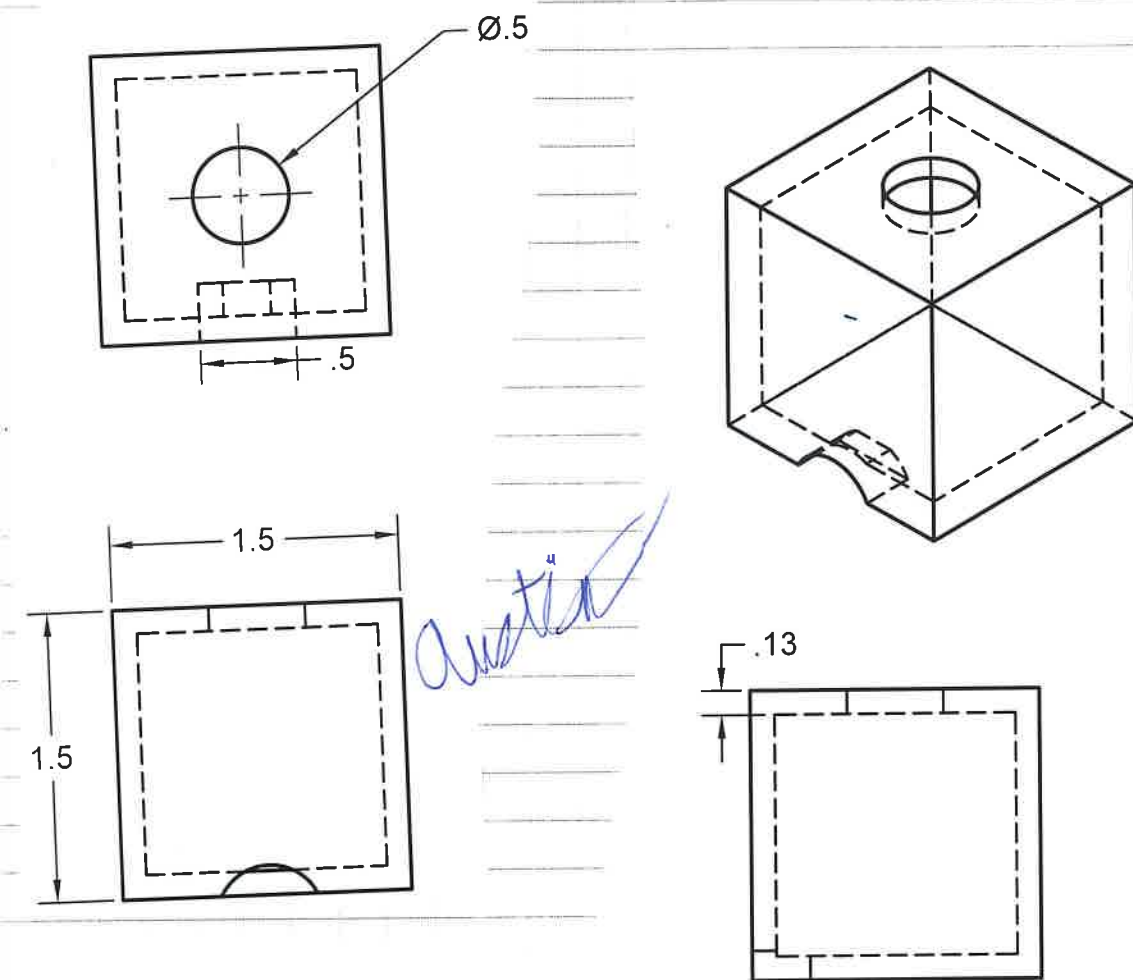
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10/22

DATE

10/18/10

PROPRIETARY INFORMATION



PROJECT

CAD Files

TITLE

Charger

APPROVED

CHECKED

SIZE

A

CODE

DWG NO

REV

VN Derrick Scurlock 11/6/2019

SCALE 1:1

WEIGHT

SHEET 1/1

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11/18/2019

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Design Brief Continued

Most important to least important

1. fm
2. product life
3. Customer Needs
4. Safety + legal
5. service life
6. Performance
7. aesthetics
8. material
9. Target cost
10. Ergo
12. operating
13. Global

Performance - design/product that can last for long amount of and still remain intact (perfectly Different Mat)

Time Available for process

Qualified Representatives:

Enduser

Different Material Options

- rubber
- stainless
- thermoplastic

- Why don't Apple developers improve change designer
- durability

Possible Materials - something hard:

- Maybe flexible
- Plastic = hard + cheap
- Rubber = Might be too flexible
- Glass maybe

Needs:

- Need something to pry es charger from bracing

- Something
- Easy to find

Size + Weight:

- Very small
- Make an inch or less
- weighs a couple grams

- light so

Product Size

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Austin Tack

DATE

11/19/2018

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PROPRIETARY INFORMATION

Survey Response

- We need to round off all the edges
- We need to make it look more aesthetic
- need to change the demensions
- people were for the idea

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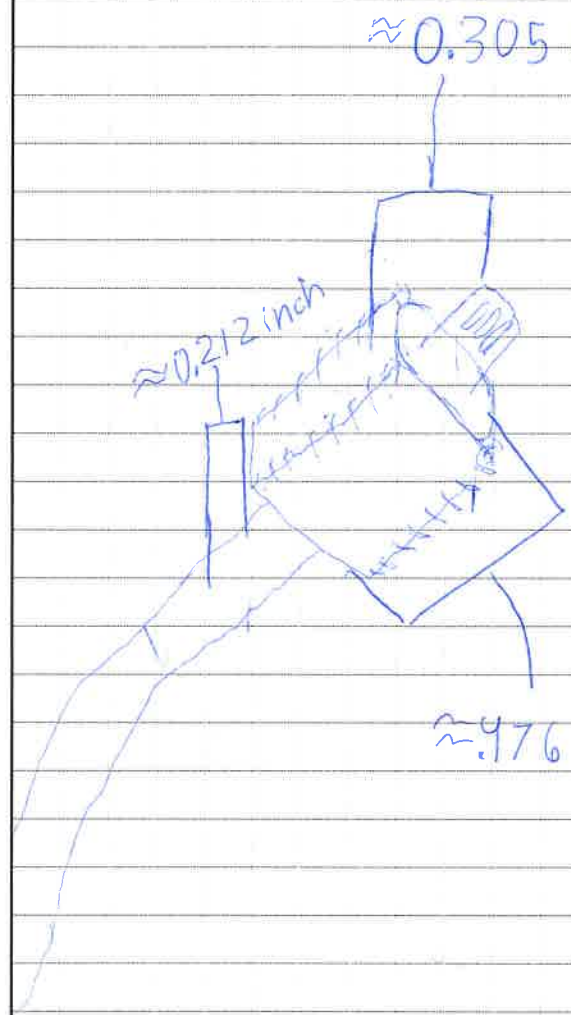
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Jasper

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12/3/19

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PROPRIETARY INFORMATION

New Prototye with better dimision



Demisions for Prototype Z

- Adjustments ~~Target~~
 - Look nicer
 - Make it more slim fit
 - New design
 - Be able to hold a phone up

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PROPRIETARY INFORMATION

Testing Procedure

Testing Method

- ~~Weather~~
We all use it our selves
Give it to a teacher and get their feedback
Give it to a parent and get their feedback
- Ask if it is pleasing to look at (aesthetic)
Ask if they would actually use it themselves
- Testing Date: December 23rd / 19th of 2017
- Location: School / house
- Purpose: The goal was to determine if our product would actually be used in everyday life, To go back and see if we met our design brief standards. Lastly To get feed back on the product design
- Initial Conditions: Someone who I haven't talked to about this before. Product completed
- Materials: Cord / Their Phone / (our) cube
- Pass or Fail: IF they would use it
If they like its aesthetics
- Safety: Its user friendly smoothed around the edges
- Data: Test's will answer and or give good feed back towards the purpose above
- Data Collection: We will have the quotes listed

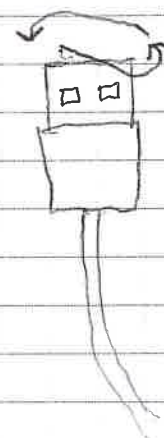
Jackson, Austin, Derrick

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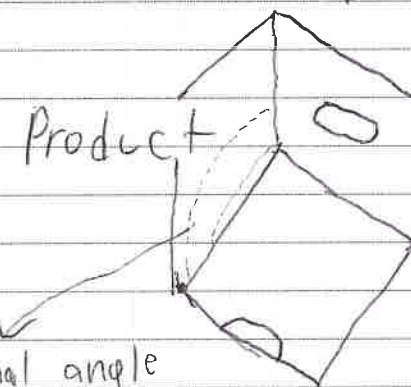
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Testing Procedure 'Including #'s Austin

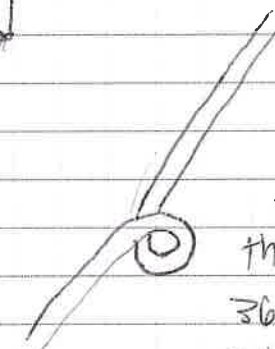
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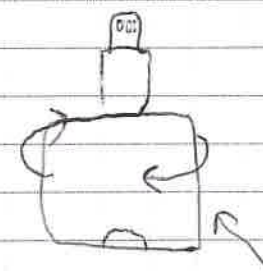
- After twisting the cord ~~180~~ 180° the internal wiring breaks. (3 full rotations)
- After twisting the cord 360° the entire wire will break off. (11 full rotations)



Internal angle
78°



After looping the charger at 360° the internal wiring gets damaged



If applying pressure to this bend then it won't return back to a straight state

The cube could only move 1° degrees in each direction because it is form fitted

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Test #2

Test Date: 11/6/2020 - 11/17/2020
10:30 PM - 5:00 AM

Location: Derrick's House

Purpose: The purpose of my test was to see the durability and performance of the product

Data

Dropped from 1m = not broken

Dropped from 2m = not broken

Dropped from 3m = Scratched, not broken

Plugged phone in with product in position → on charger
left over night (for 6 hours + 80 min) removed and under
in morning at 5:00 am
Initial conditions: phone part

Material: product, cord, phone

Pass or Fail: undecided

— tilted phone @ 15 angle from horizontal
worked correctly and served purpose

Procedure: ① product on cord

② inserted charger into phone port w/ product
in position

③ placed with phone standing on top of
product

④ stays for 6 hours + 30 min (overnight)

⑤ takes phone off charger and takes off
charger

⑥ 5:00

Safety: nothing was too close that could
start fire or flammable

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11/17/20

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