MAJOR PROJECT

Steam Iron Generator

morphy richards
smart ideas for your home

morphy richards

Re-attachable Soleplate


morphy richards
Direct Drive
LG
Sensor Dry

Brand Personality

Morphy Richards was established as a public company in 1947. It was one of the first and big home appliances company in the United Kingdom. Today the company is the largest company by small appliances per household. The brand is still well recognised in the same operational fields as kitchen and home appliances. The company is currently pushing new challenges towards innovation, facing customers' needs and also finding new methods of retail distribution.

Values

Customer loyalty
Market broad-mindedness
Innovative approach
Quality production

Img.21 1950s Morphy-:Richards iron

Img.22 Accents Complete Kitchen Set

Img.23 Kettle and Toaster Set

How Morphy Richrds remains relevent?

Products Ethics

Quality prioritising, leading to strengthening the already constructed relations

Exceptional market analysation, working towards finding the "mass satisfaction" spot.

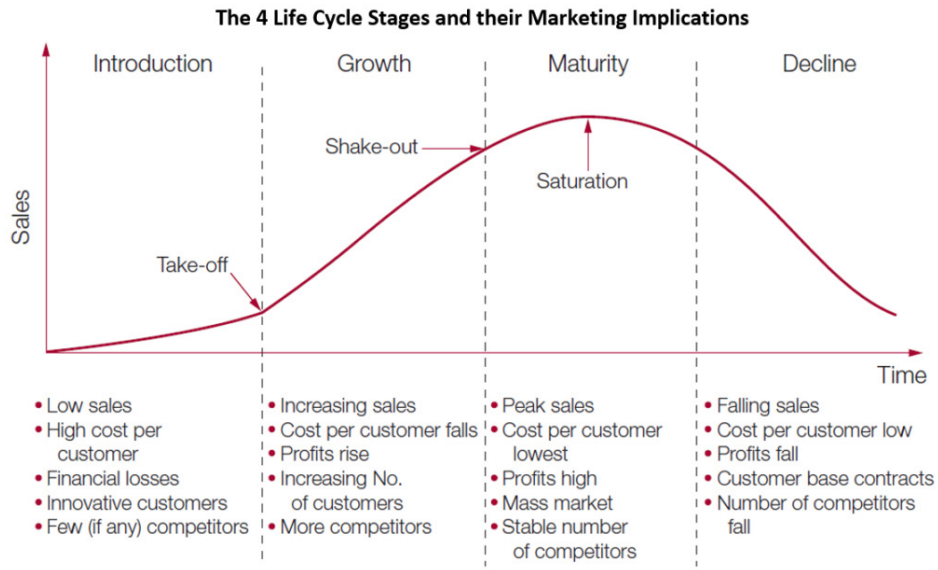
Maintain consistent support, which therefore preserves the customer/company connection

Creating user relationships with the product and the company

Offering Future contribution via enclosed service system

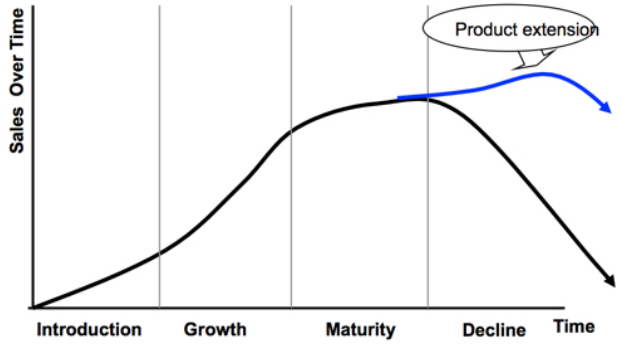
Creating trust wordy customers, making them more likely to stick with the already known for them brand.

Opening new fields for global customization



Graph 1. 4 Stages of the Product Life cycle

Source: https://marketing-insider.eu/characteristics-of-the-product-life-cycle-stages/



Graph 2. Extention of the Prodict Life cycle

Source:https://www.tutor2u.net/business/reference/product-life-cycle

Morphy Richards Design Language

Img. 24-27

Img. 28 DeLonghi Caldeira

Img. 29 Philips Care Elite Silents

Img.30 TEFAL Fasteo SV6040

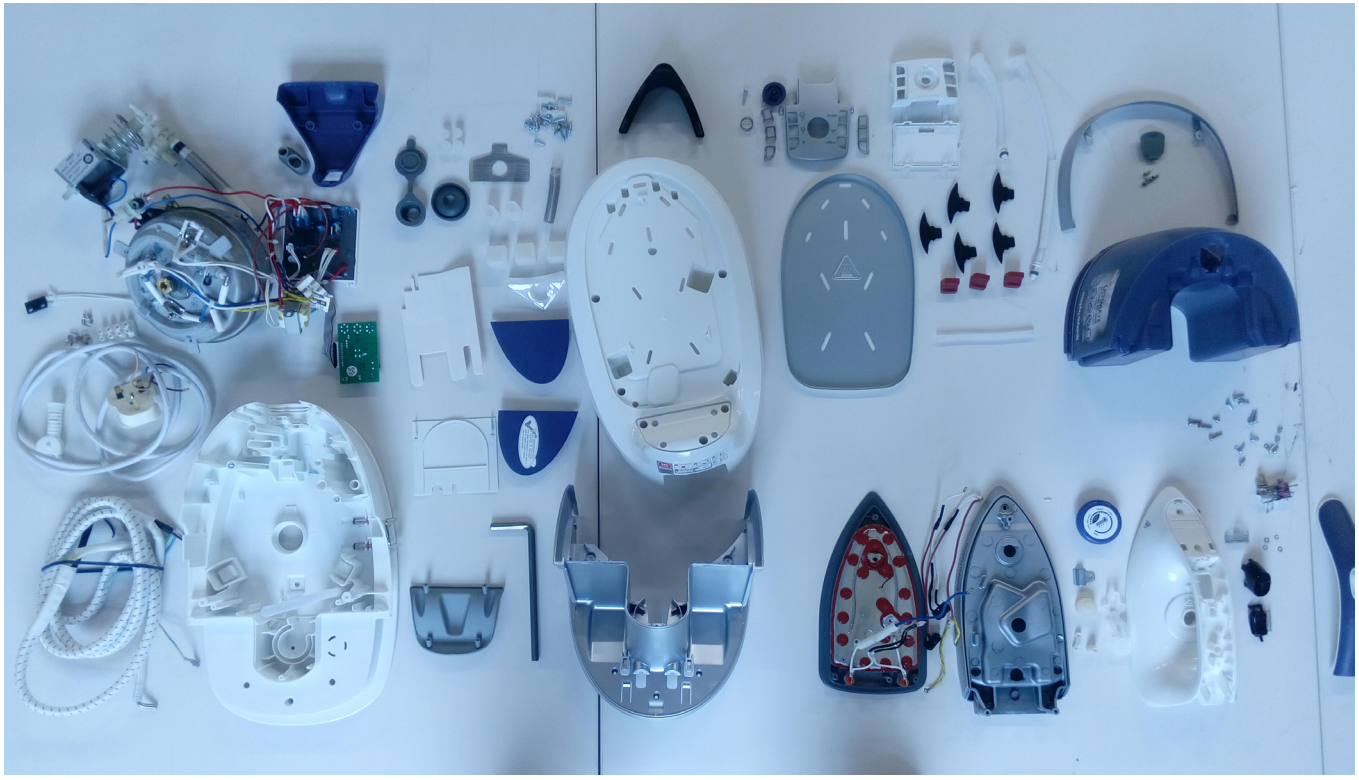
What Is a Steam Generator Iron?

Steam Irons have normally two main components: a base unit which houses a boiler and a water tank and a top unit which essentially looks like a traditional iron. The two components are connected with a cable which transfers the pressured water and steam from the base component into the iron.
Steam generator irons produce much greater steam volume than a traditional iron. This is due to the separate base they have that contains a compact boiler which heats up the water and shoots it out of the iron head as a steam.
The Steam Iron Generators can reduce the ironing time significantly compared to the traditional irons. Furthermore, the ironing requires way fewer effort thanks to the 6 bars of pressurised steam generated by the boiler.

Reverse Engineering

The Steam Iron Generator we took apart during the reverse engineering studio day was the Power Steam Elite Generator Iron by Morphy Richards.
From user's perspective: In a theoretical scenario, if a problem occurs with the product and the user is willing to localise the problem himself the first thing he would need is a well-equipped toolbox. 3 tyepes of diffrent srewdrivers were needed to open this product due to range of srews and bolts imbeded in the product. In addition to that, In order electronic components to be reached, the outer plastic components must be broken or bend to an extent where they would not be able to recover in their original shape.

Img.31-33 Reverse Engeneering Studio Day



Materials range

Plastics

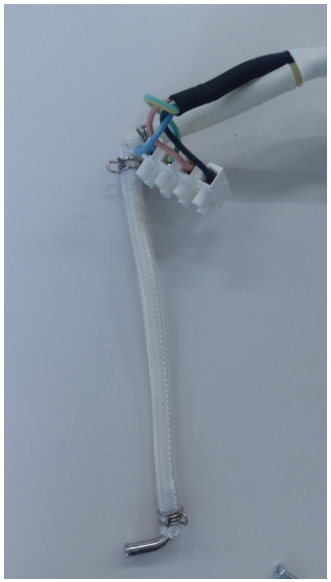
All the external and some internal components of the iron and the base components were made out of plastic

Silicon

Silicon sealing was applied all over the top of the soleplate, providing pressure isolation

Copper

All electrical cables in the iron consisted copper wiring.



Img.34-37 Reverse Engeneering Studio

Steel/iron

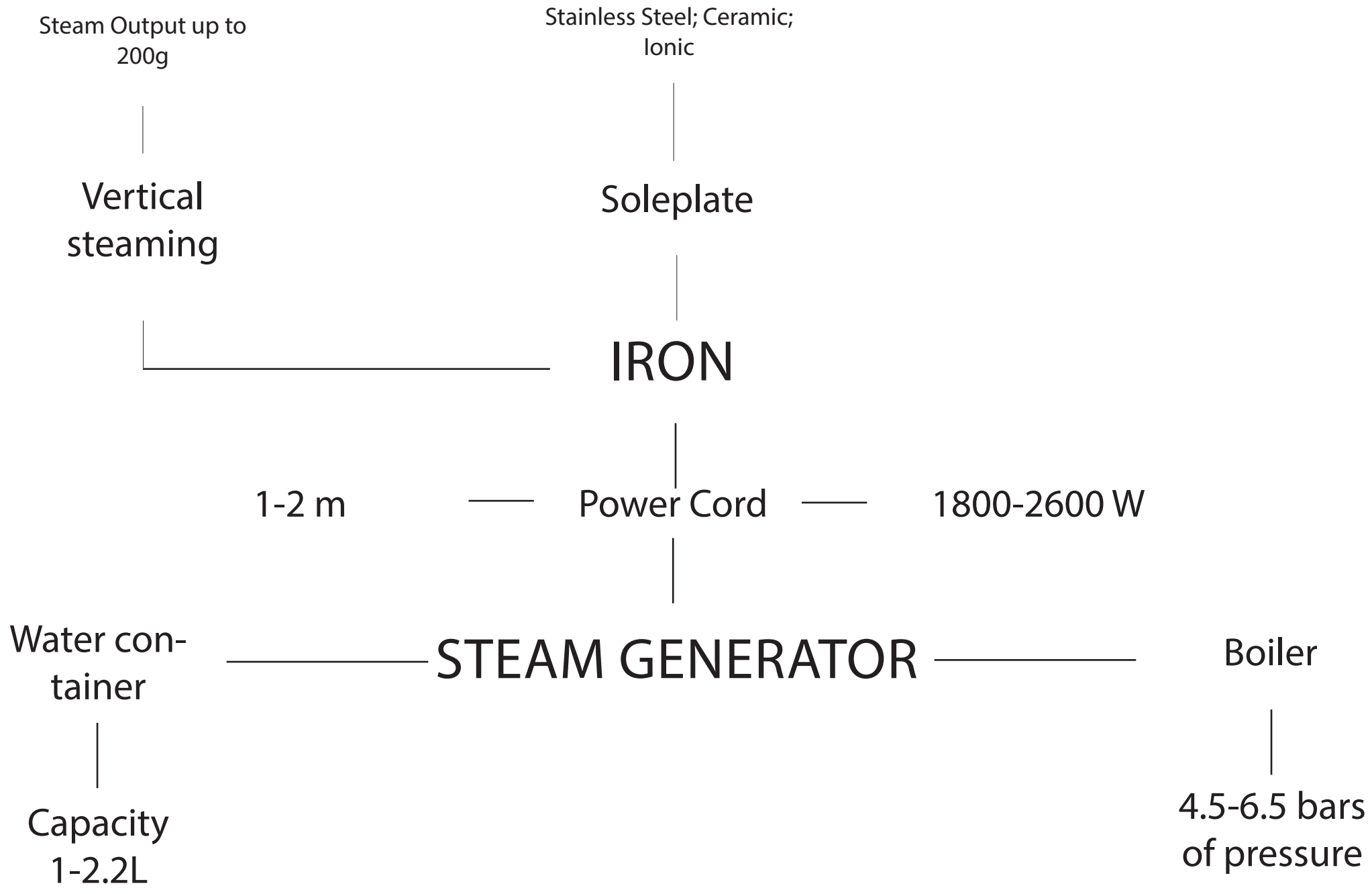
Although it has a ceramic coating applied, the soleplate was an iron casted component.

PCB board

A small PCB board was integrated inside the bottom compartment connected to the heating system

Rubber

Small rubber bit parts prevent the heated soleplate to have a contact with the plastic surface of the iron's "bed" located on the top of the bottom component.


Steam Output up to 200g
Stainless Steel; Ceramic; Ionic
Vertical steaming
Soleplate
IRON
1-2 m
Power Cord
1800-2600 W
Water con-tainer
STEAM GENERATOR
Boiler
Capacity 1-2.2L
4.5-6.5 bars of pressure

Client Meeting

The first and the second meeting with the person from the Morphy Richards design team were incredibly beneficial for the path I took in this project. Being able to receive first-hand observation pointed my thinking in a direction of dealing with the real obstacles. That saved me weeks of customer experience research later on.

The second meeting took time in the middle of April and at that time I had almost entirely completed my CAD model. I used my 3D model to help myself communicate with the client more productively and efficiently.

I mentioned my initial idea of leaving handy access to the electronics of the back of the iron so if a problem occurs, the customer could easily access the electrical components of the iron. That way it would not be necessary to use specialised equipment nor to break the plastics surrounding the components. The client quite liked the idea of the "easy access area", however, he noticed that the electrical components in the steam iron are one of the last things that can first fail. He suggested a better focus on the similar area which would address the brief even better. The problem that 90% of the time appears first during the first year of usage, he said, are mineral buildups on the soleplate pressure holes.

The Idea

Speaking to the person from Morphy Richards in small groups and having the chance to discuss my idea with the client provided me with a very useful feedback. The comments that he made for everyone's' concept opened another discussion about the first issue client might face when purchasing a new steam iron. He mentioned that the first issue that might occur with the iron would be the limestone building around the pressure holes on the soleplate itself.

That really got me thinking; how can I address that issue and combine it with my current design proposal?

I forced myself thinking in a direction of creating a replaceable soleplate, which would be easy to change. The technical goal I set was to make all mentioned above possible without the need of any professional equipment in order a customer to replace the old soleplate with a new one.

Before I could start with that task I needed to find answers to some questions:

How can a Customer safely remove highly heated surface with ease?
Do I need to consider the use of screws in order one to remove the base?

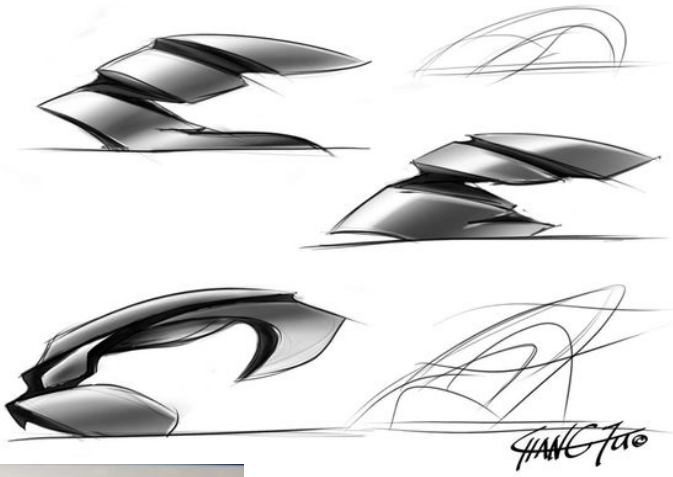
Visual Inspiration

Img.38 BORK i601 Steam Iron

Img.39 Archillect

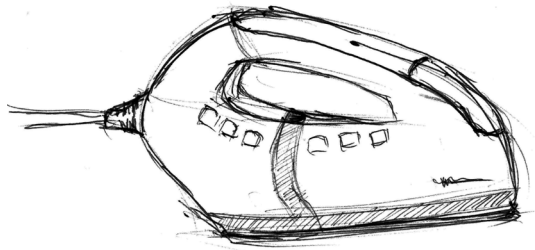
Img.40 Kabuto - coffee mak-

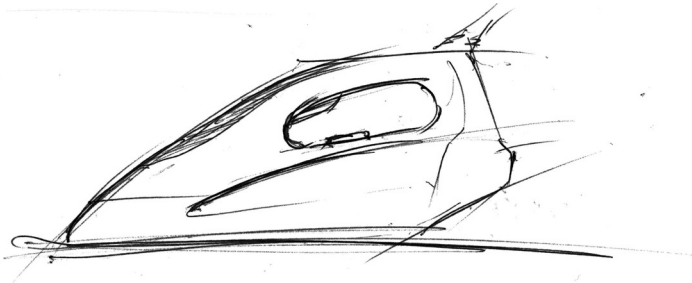
Img.41 Lamborghini Inerno

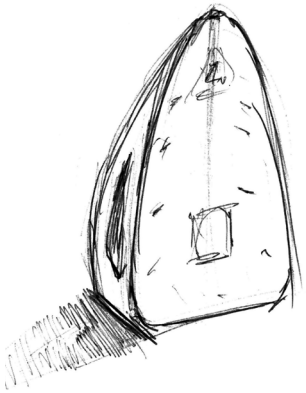


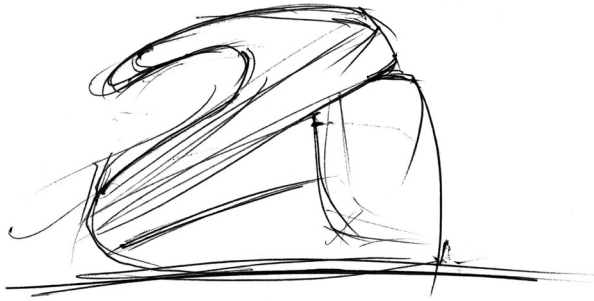
Img.42 Remington D7779 Air3D

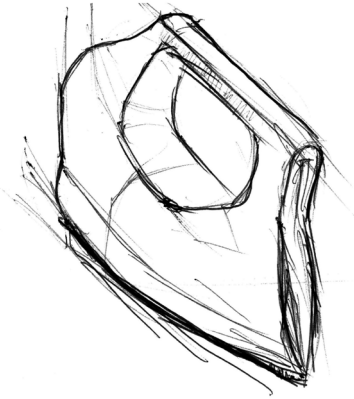
Initial Ideas and Sketches

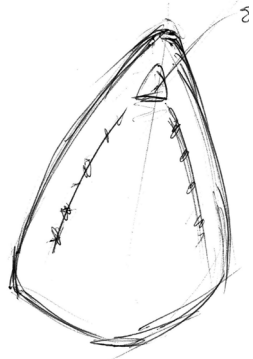


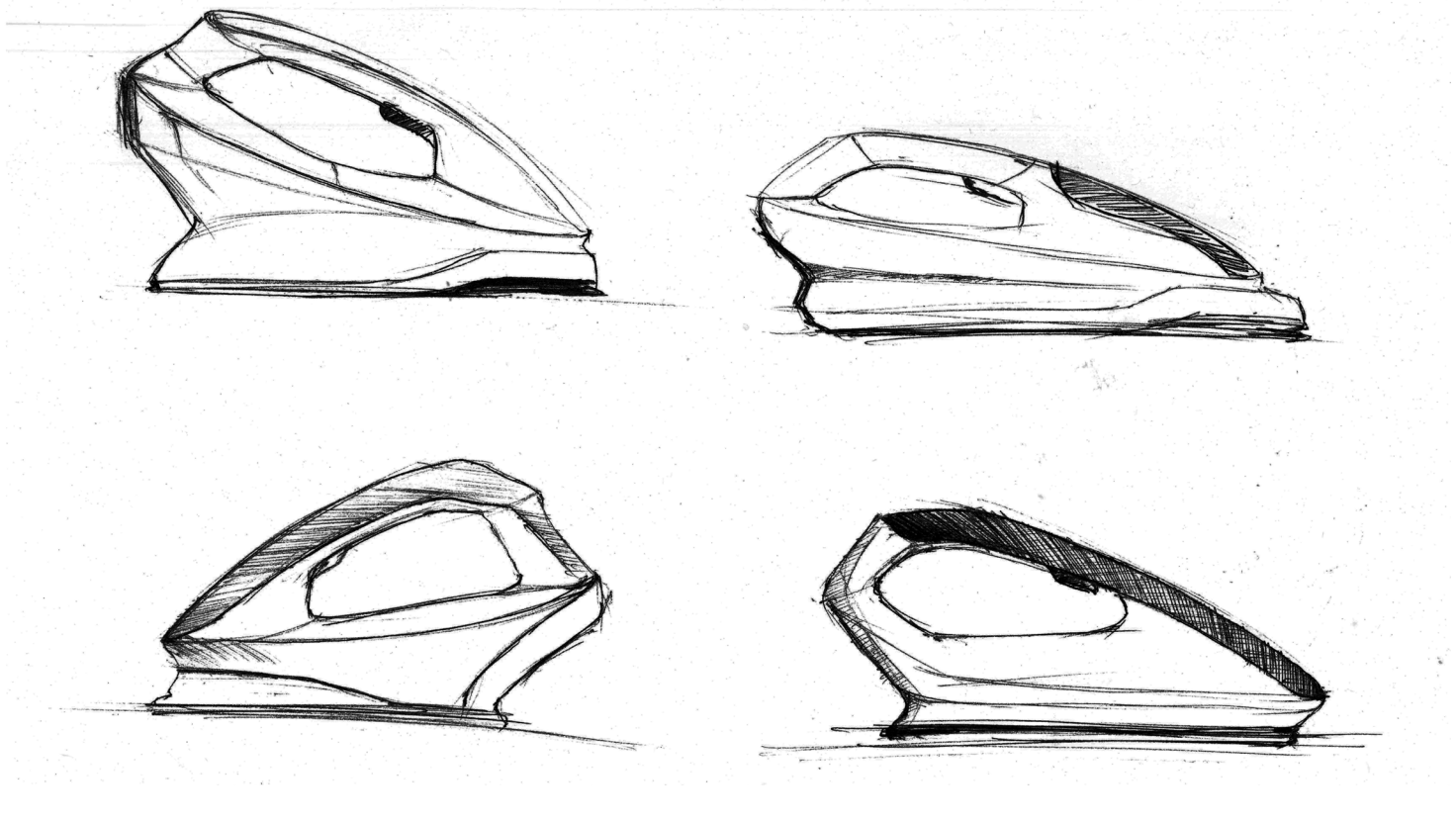


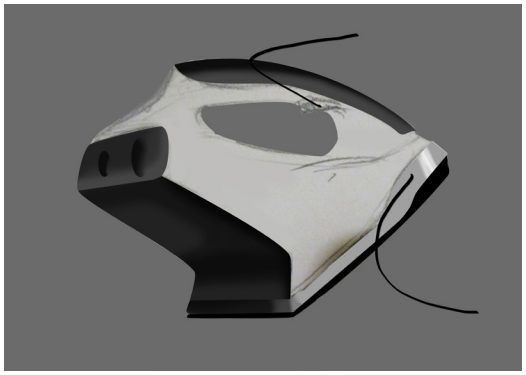


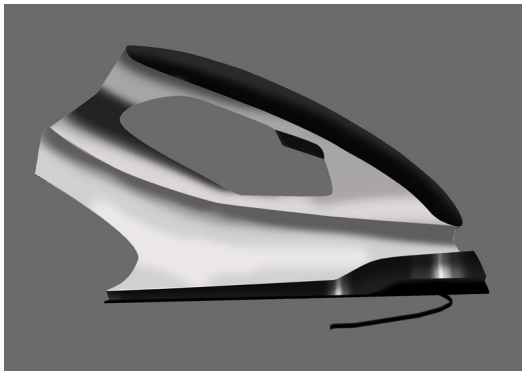




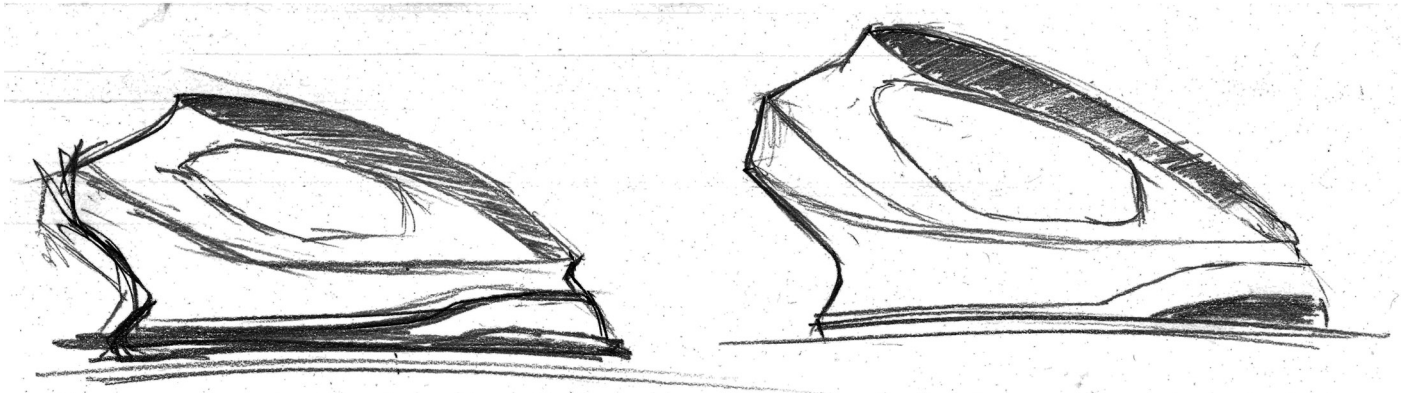




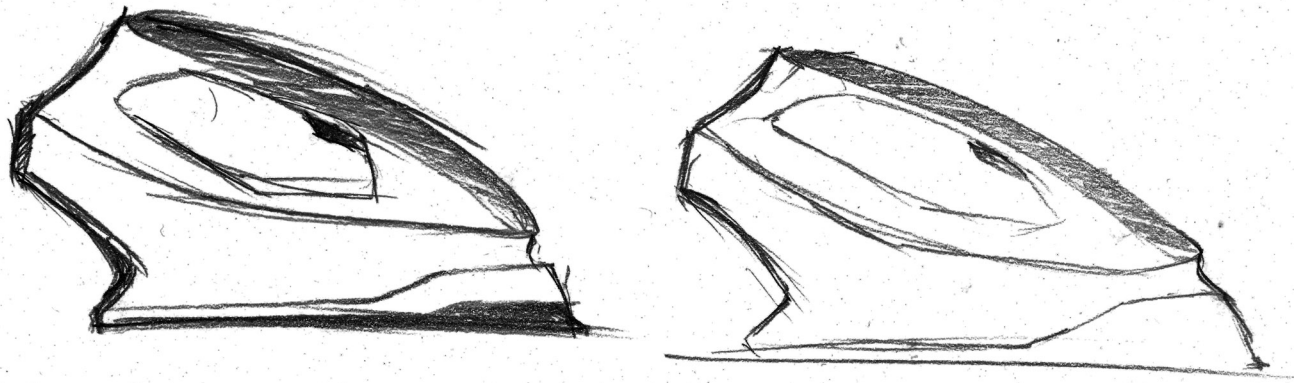




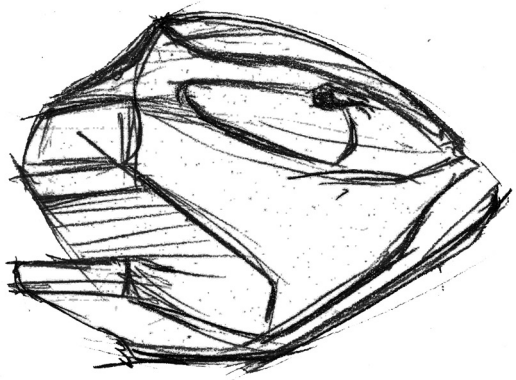
Distribution of the weight of the iron was also a prime focus in my design proposal.
I have spent some time experimenting with forms and trying to find the best way of distributing the weight so the iron can feel natural in human's hand.
By lifting the backside of the iron off the base I created a relatively equal distribution of the weight which will later resolve in better movement control and safer stationary position when the iron is positioned in a vertical/rest position. (This topic is also covered in "Physical Testing" page.)

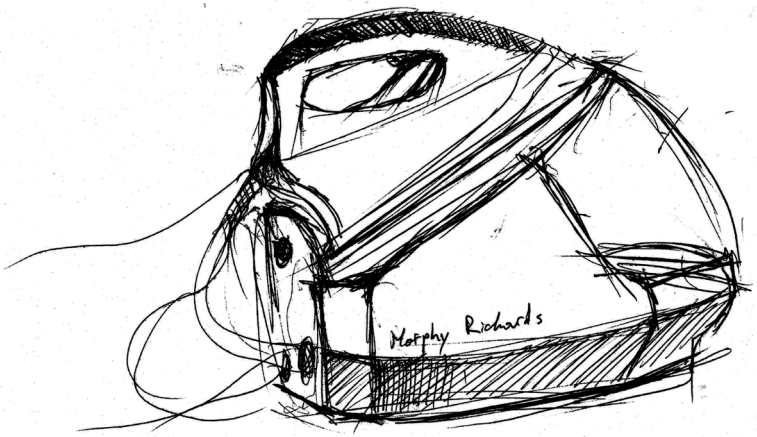


Once I had a clear idea of the general form I was going for in my design proposal. I started to explore the already created form while trying to improve the visual appearance to its best.



I did several pages of sketches of a similar design concept. That gave me a wide variety of options to go forward into the next stage of the process.





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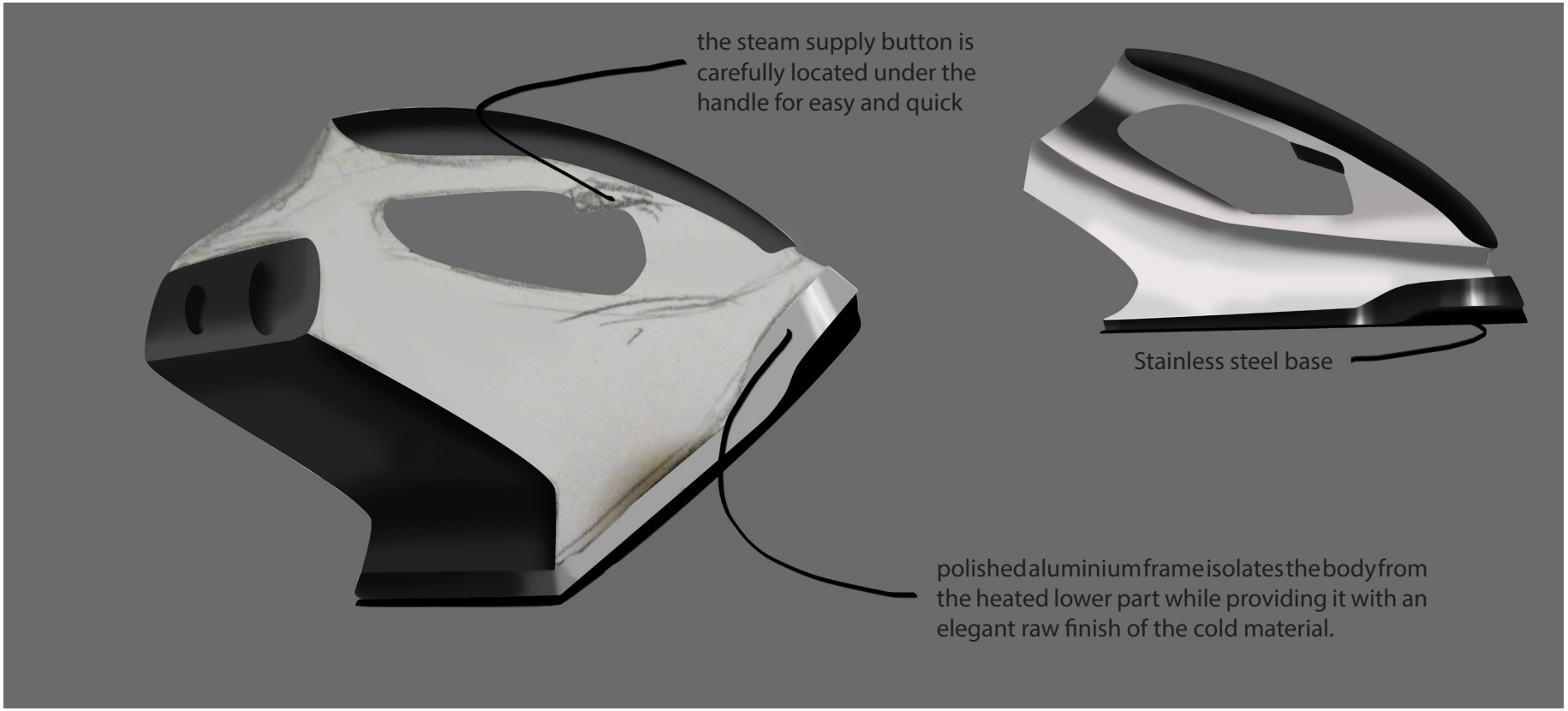
Steam Generator Iron

Benefits

-Exclusive Design
-Recyclable Materials such as (#5 Plastics and Aluminium)
-Organic and Aesthetically Appealing Shape
-Equally distributed weight, finding perfect centre of the masses
-Ease of use with one major switch



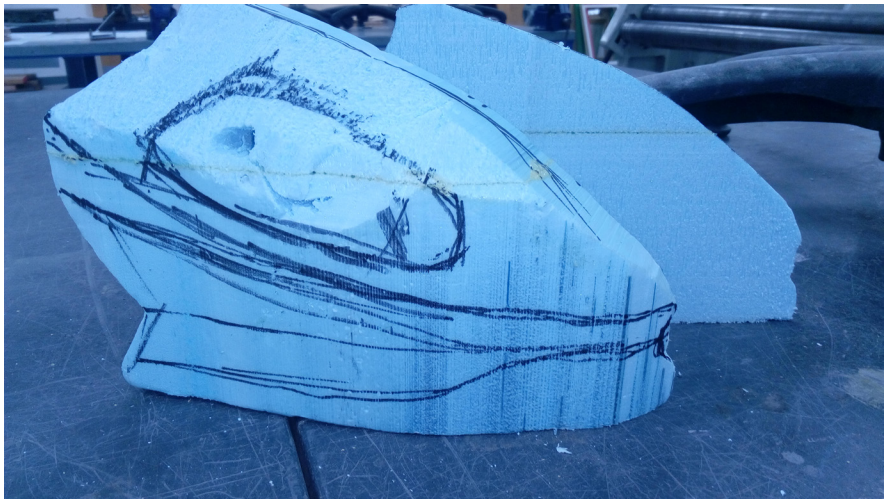
Physical Testing

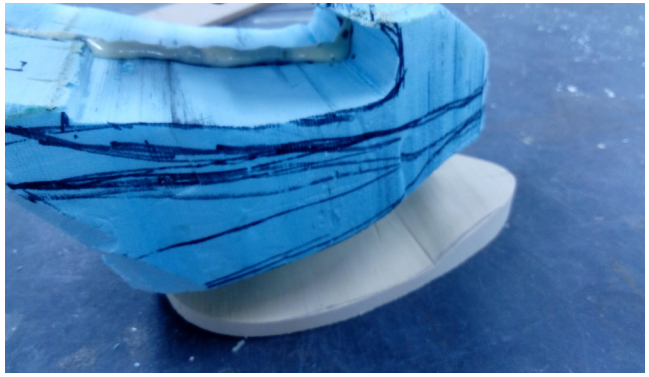
Img.43-46 Physical testing

Expressing the features well through modeling materials was almost impossible, mainly because my focus on this project is connected with choice material and mechanical matter. However, I decided to do a quick foam/wood model and examine how the soleplate component would go with the main body.

Another thing I manage to test with the physical model was the weight distribution of the product and the overall comfort of use. As the handle has a downward 27-degree angle, the forward motion felt quite natural and smooth.

In addition, the slightly shorter length of the iron I planned (26cm) compare to an average iron (29-32) made the iron look sufficiently more compact.





Most common soleplate problems

Mineral buildups

Arguably, limestone and mineral buildup are the most common issues with steam irons which can dramatically decrease the lifespan of the product. The reason why minerals are starting to build is because, first, the water may contain a high percentage of natural minerals and second, the liquid inside the boiler is vaporised and shot trough narow canals and holes, which respectively leads to limestone building on the inner surface.

Img.47 Limescale buildings

Iron sticking to the fabric

This issue is often caused due to low maintenance habits of the soleplate surface. There are several types (material wise) of soleplates, they all have different performing and resistant qualities, however taking care of the soleplate is a "must step" in maintaining the product. Using distilled water is one way to fight unwanted sticking to the fabric.

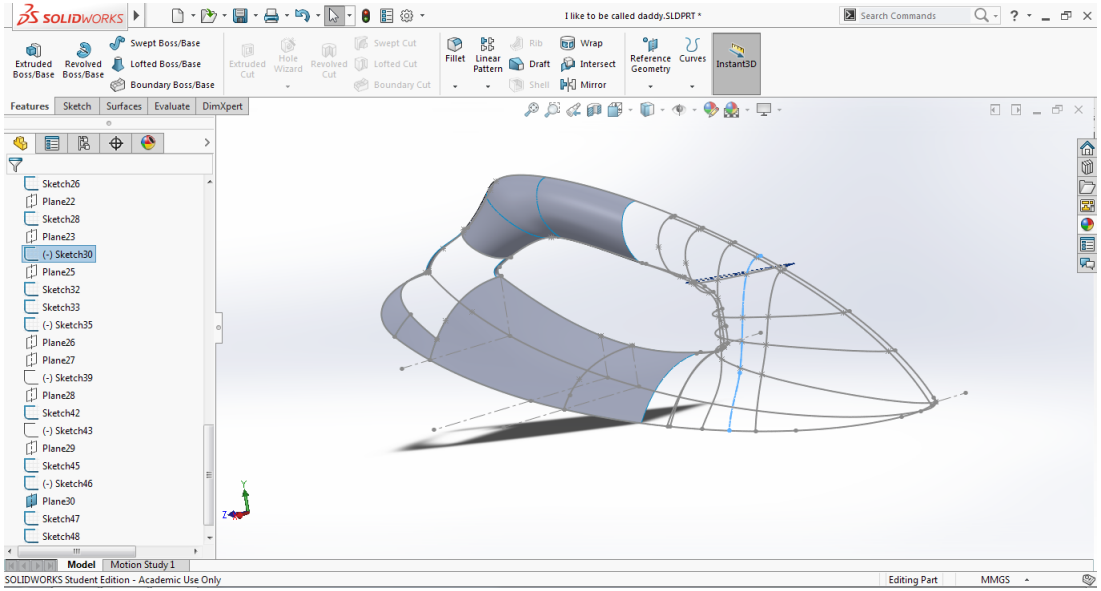
Img.48 Soleplate maintenance

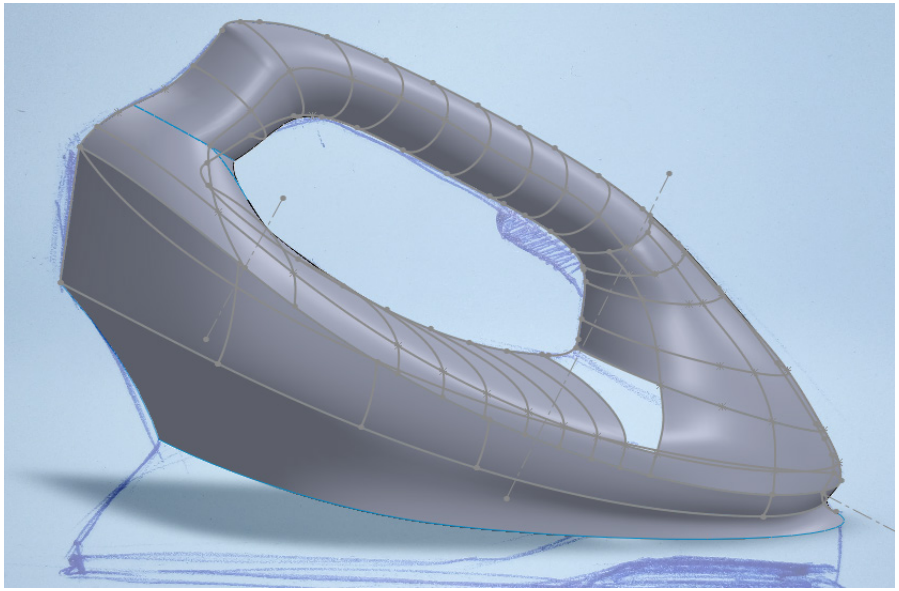
source: https://www.mrright.in/ideas/appliances/small-appliances/iron/common-steam-iron-problems-solutions/

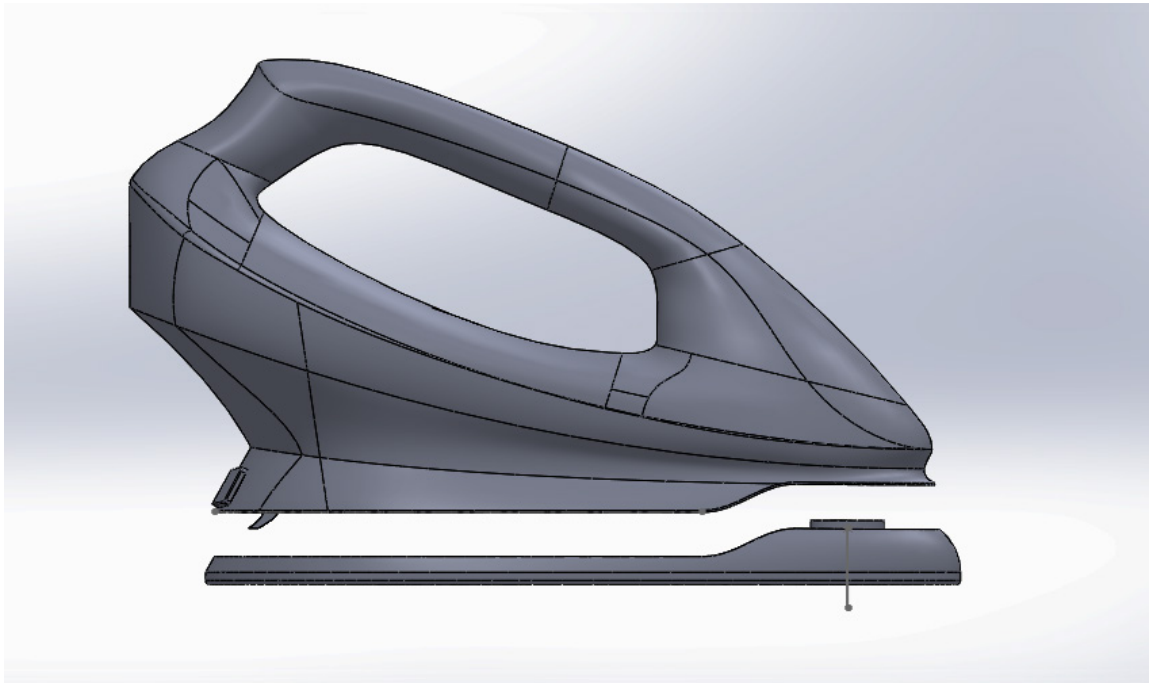
CAD Approach

Due to the complexity of the product, quick CAD build was essential for me in order to visualise how all the components fit/interact together. Furthermore, the early start on Solidworks really helped me realise where I can take an action of changing the planned form in my sketches and where that would be impossible. Although, high amount of details was not required for this project, yet I used some advanced surfacing modeling to make the details of the iron stand out.

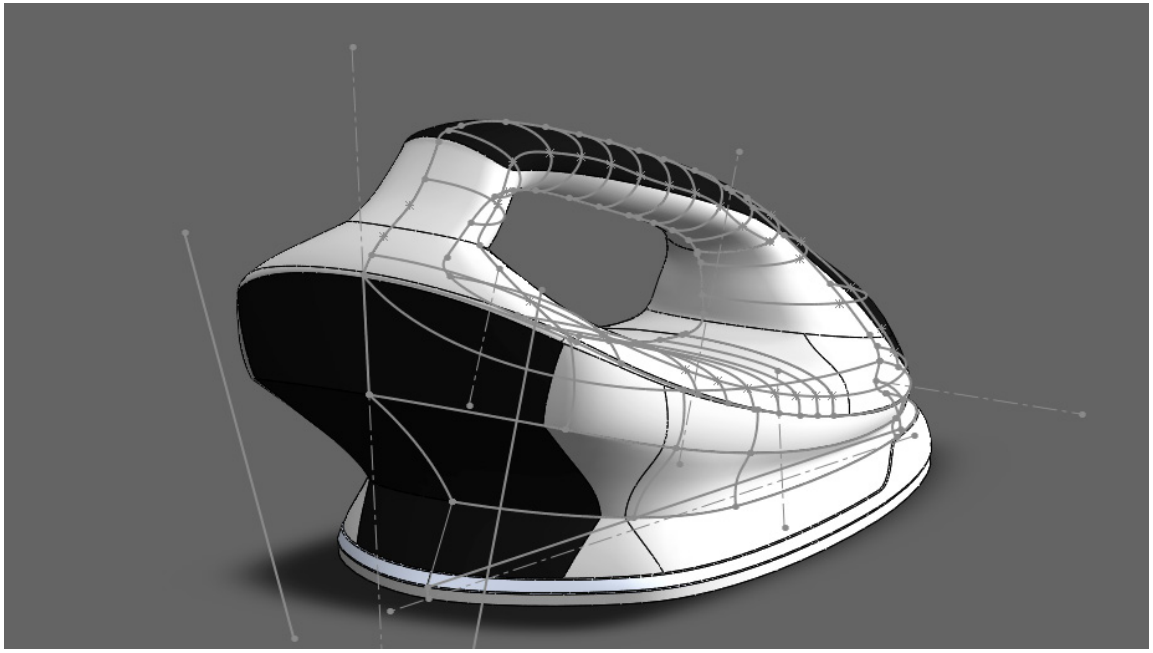
Img.49,50 CAD Development







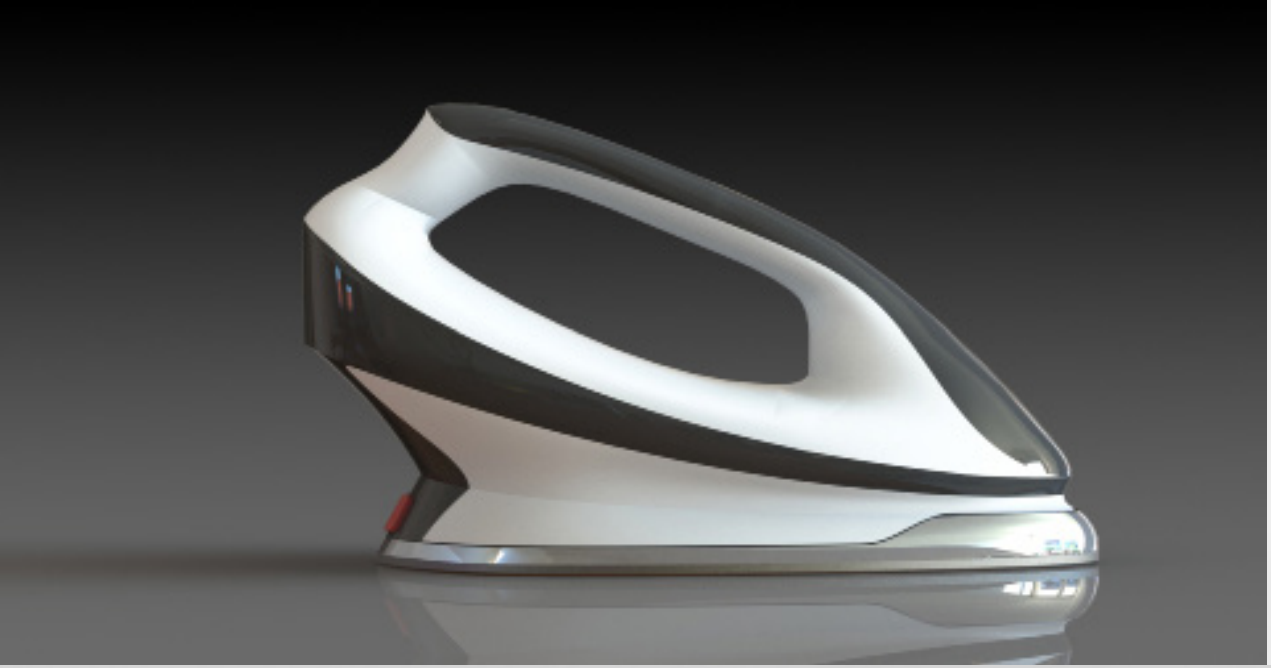
After I completed the general form of the iron,
I did some hypothetical planning of the water pipe and the pressure holes on the soleplate, based on the Morphy Richards design's pressure irons.



The metal hooks located on the bottom surface of the main body snap into the soleplate with a spring lock mechanism (explained on page ...). The soleplate can be simply released from the hooks with the button on the back of the iron.

Img.51,52 CAD Development


supply chords

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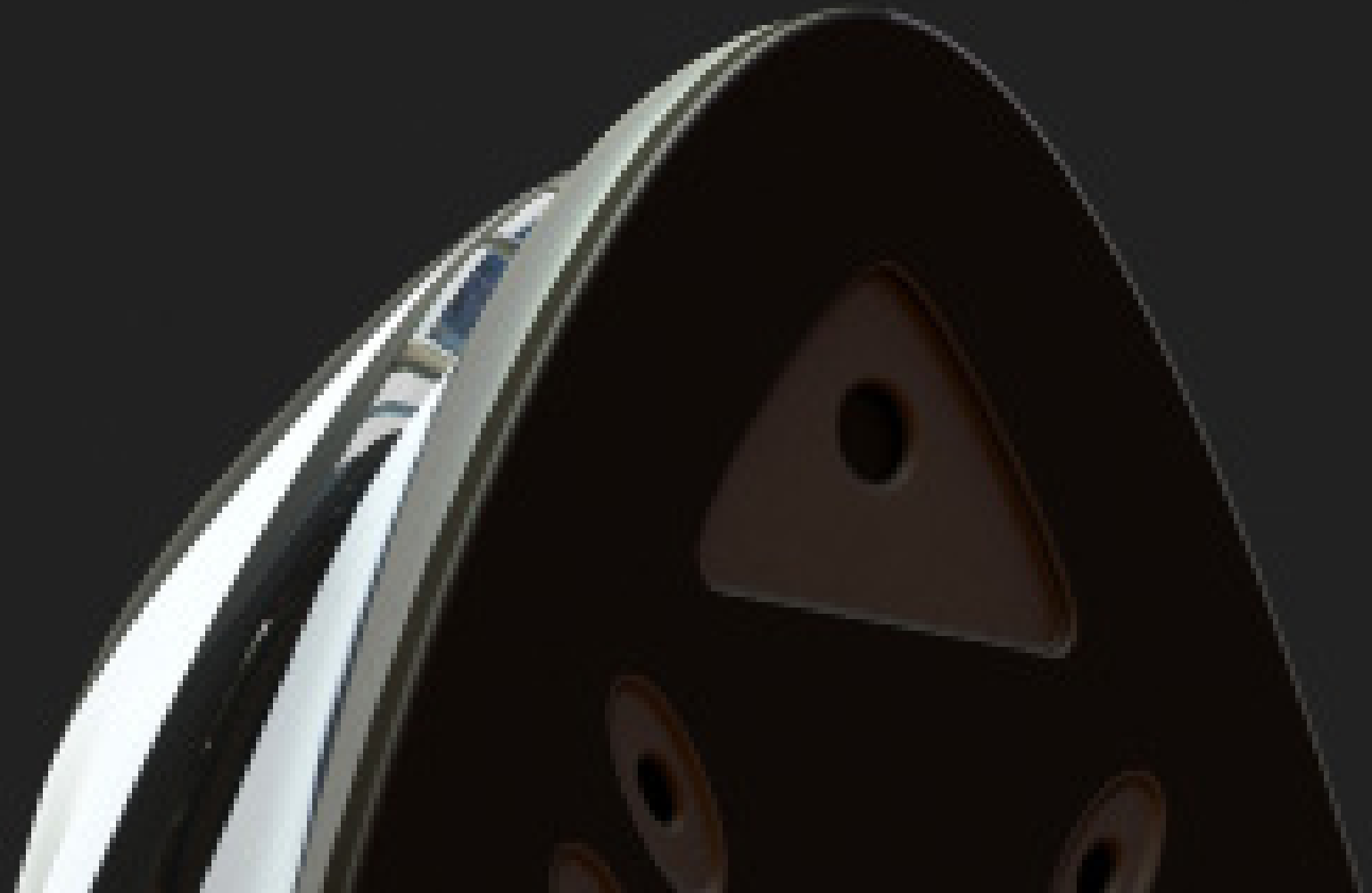
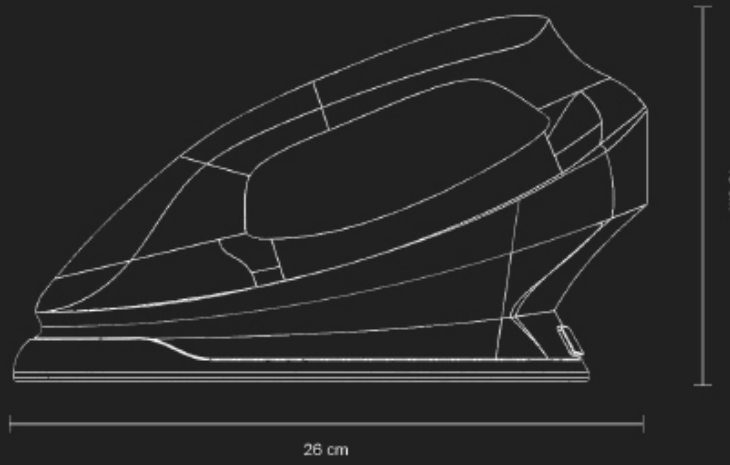
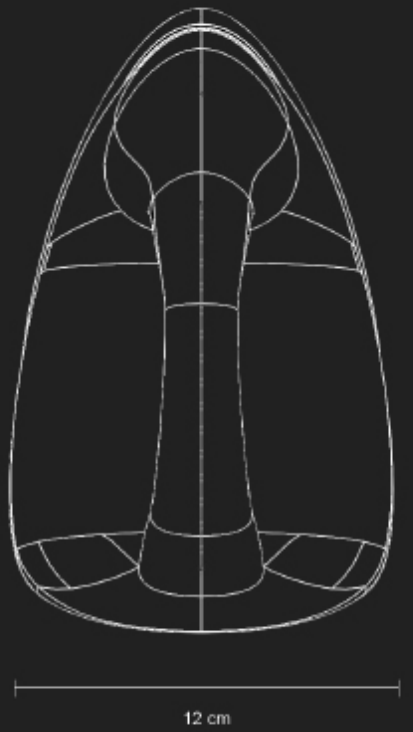



15 cm
26 cm


12 cm

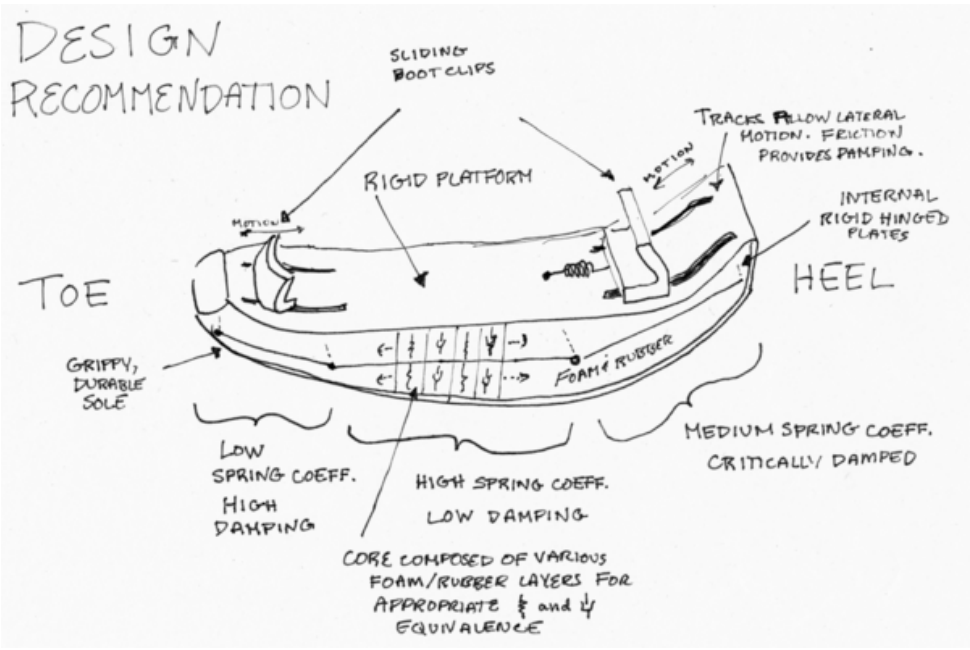
The locking mechanism

During a discussion with Mr. Evans over the viability of the mechanism I was using in my model at that time, he mentioned how the ski boots lock system works. Simply with just a vertical pressure applied on the ski boot, the mechanism locks the boot over the ski. Then the boot can be easily released from the ski by performing reverse motion on the release lever.

I managed to find several technical drawings of the ski boots and in-depth explanation of how the mechanism works once it is put in action. The only obstacle I found before I could consider applying this system in the design was the two different motions required in my design and the ski design.
Therefore, I had to make a small improvement in the original design of the mechanism. I added an additional angle of 30 degrees to the soleplate surface. I did that adjustment exactly where the hooks would meet the soleplate pockets. (see the next page)

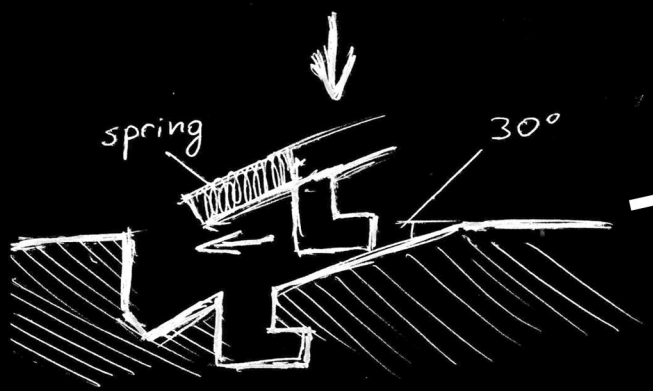
Img.53 Ski Boots

Img.54 Ski boot walking attachment redesign

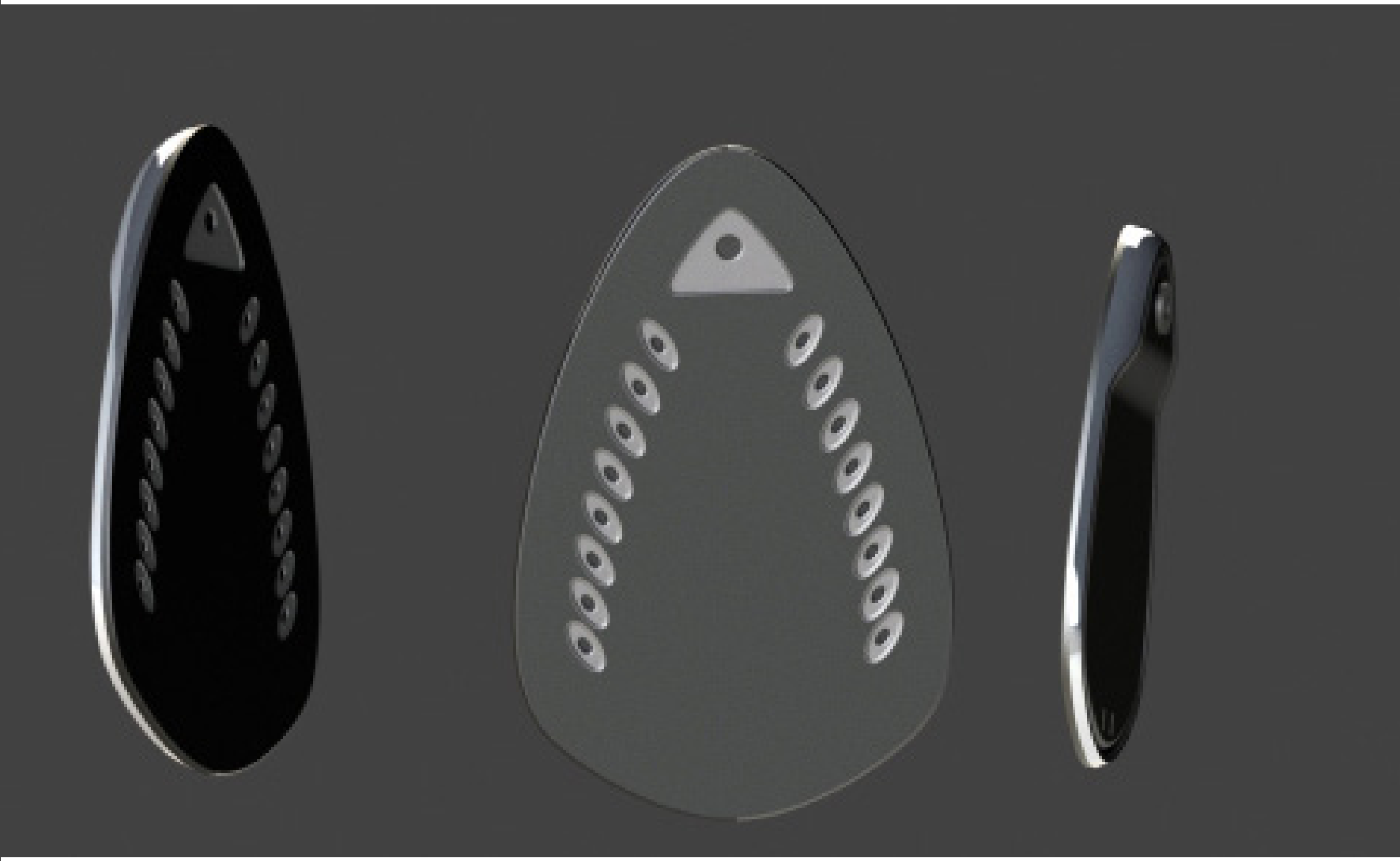


How to replace the old soleplate?

Attaching the new soleplate is quite simple. The only thing that needs to make sure is that the front of the soleplate fits around the front of the iron. Then one must push down the iron until the mechanism locks in place. To release the soleplate, the red button must be pushed down in order to release the metal hooks from the soleplate's holders.



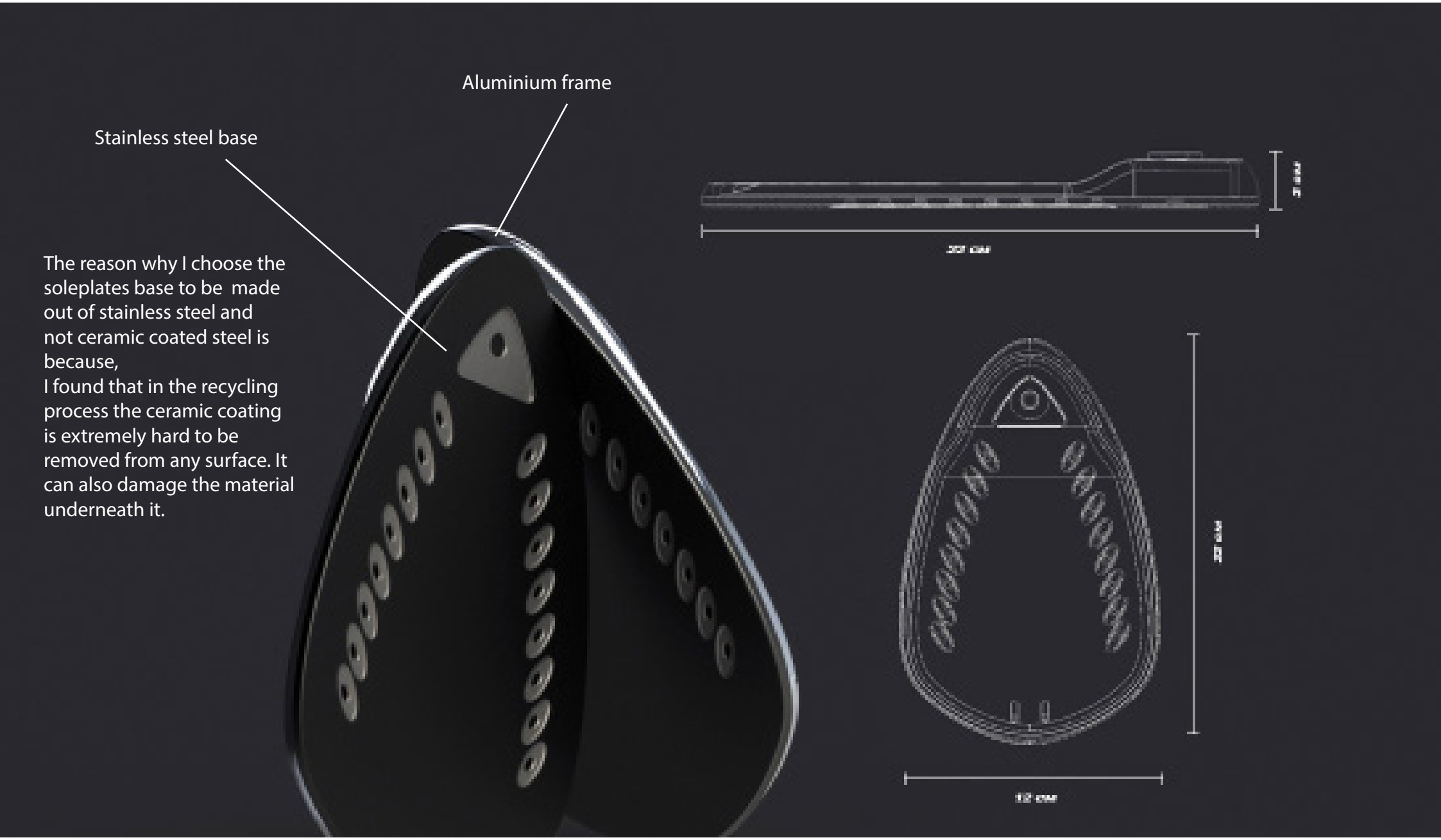
When the hooks are pushed against the cavities of the soleplate they will slide downwards due to the 30-degree angle while tightening up the spring until they reach the end of the hole. Then the spring will be released pushing the hooks inside the cavity. And the system locks by itself.



Aluminium frame

Stainless steel base

The reason why I choose the soleplates base to be made out of stainless steel and not ceramic coated steel is because,
I found that in the recycling process the ceramic coating is extremely hard to be removed from any surface. It can also damage the material underneath it.

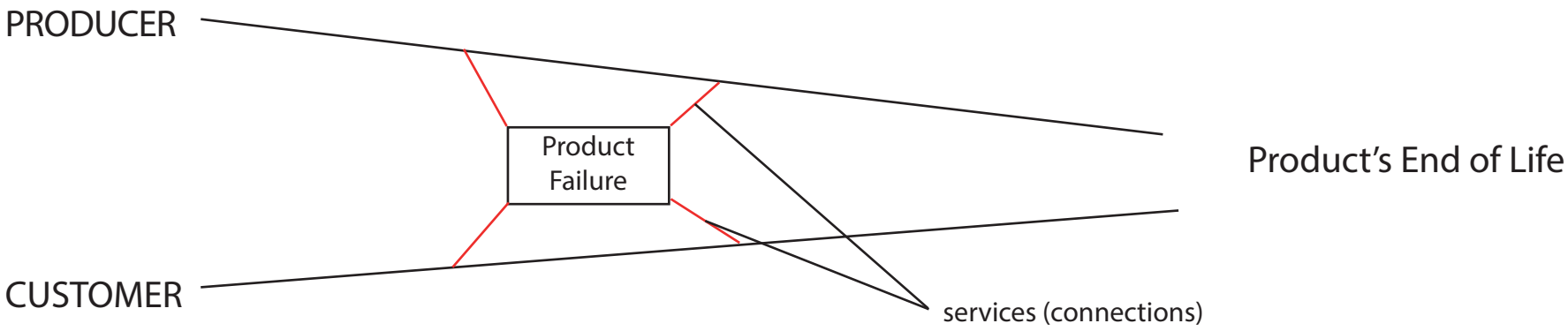


Adressing the circular economy

Attempting to adopt a whole new approach to production, manufacturing, and servicing of a product or feature is eminently tough and goal, especially when everything that is covered is theoretical.

Selling a product is just the beginning of that relaionship!

1. Building a relation
If such an issue has to be addressed, a long-lasting relation with the product, the client and the producer has to be insured in the making process. Addressing an issue which is expected to be positively resolved in the future must go hand in hand with a last longing bond with the company and the product.
2.Quality of the product
Certainty, the best way to satisfy a customer and leaving a good impression of your company is the key to a further business relation with that same person. But besides, well designed and high-quality products, a specific thought has to be put towards the case of that product failing and what the customer can do if that happens.
3. Company services (taking care if the existing ones)
As I mentioned above selling a product is just a beginning of a bond with the client. So in order to keep that relation healthy while ultimately aiming to reach the end of economy's cycle (which is the primary goal), services must be always prioritised. Services will play the role of connectin with the customer until the end of the product's life.



Problems and Solutions throughout the process

Problem

In this case of returning an old part to the producer, a small obstacle can occur regarding the collection of the old part from the customer, which can be tackled in a few ways.
The decision of returning the old soleplate can be made only by the customer himself. Since he is the legal owner of the old part. Therefore, the decision of returning the old soleplate is absolutely up to him/her.

Solution 1

Price reduction and discounts on the new soleplate can be one way to make sure that the customer will consider the opportunity to receive a discounted price of the value of the new soleplate.

Solution 2

Well presented leaflet explaining the importance of the circular economy and how the customer can get directly involved in the process could be another way of resolving this problem.

How the new soleplate affects the circular economy?