

Pooki

by Tina Dinh

BODY STORMING

Body Storming is a great activity to understand how your targeted user group would interact with a product that you are designing. As this product was for children, I made a mock-up of an arbitrary shape and gave it to a toddler to observe how she would interact with a toy. Taking note of how she held the toy, the size of the toy in relation to her body, and how she reacted to the slight weight in the toy.

This provided a great opportunity to observe scope of play, and any affordances that were made with the toy. The following photographs demonstrates the different ways in which she played with the toy.





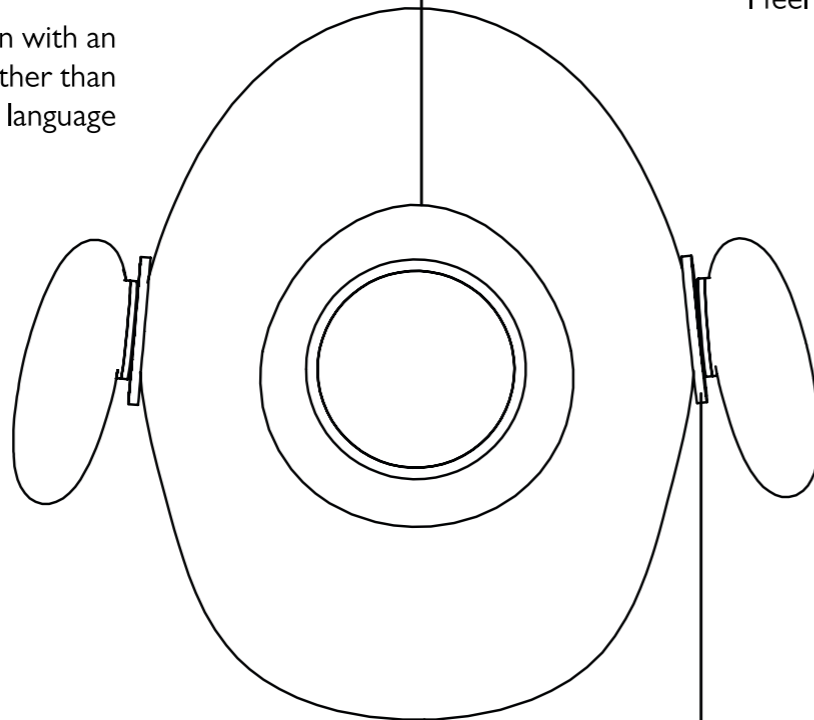
The following photographs demonstrates the different ways in which she played with the toy.

CONCEPT INNOVATION

COMMUNICATION

Learning to communicate is key for children to interact with their family and friends and to have their needs met. Many Autistic children experience delays and difficulty in being able to communicate.

My design provides Autistic children with an alternative way of communicating other than using verbal language



CALMING EFFECT

Studies suggest that Autistic children favoured weighted toys for they give them a sense of security. Weighted products helps promote a sense of calmness for Autistic children.

My design incorporates a small weight source in the toy (which adheres to the safety standards of being <10% of an average child's weight). This weight aims to lead the child to a senses of calmness whilst holding the toy.

AMBIGUOUS FORM

Studies suggest that Autistic children favoured 'deviant' toys, toys that normal children would generally not identify with or favour.

My design centres around an abstract form, leaving the rest to the child's own interpretation and imagination. I feel that by doing so, this doesn't restrict the experience for the child.

CUSTOMISATION

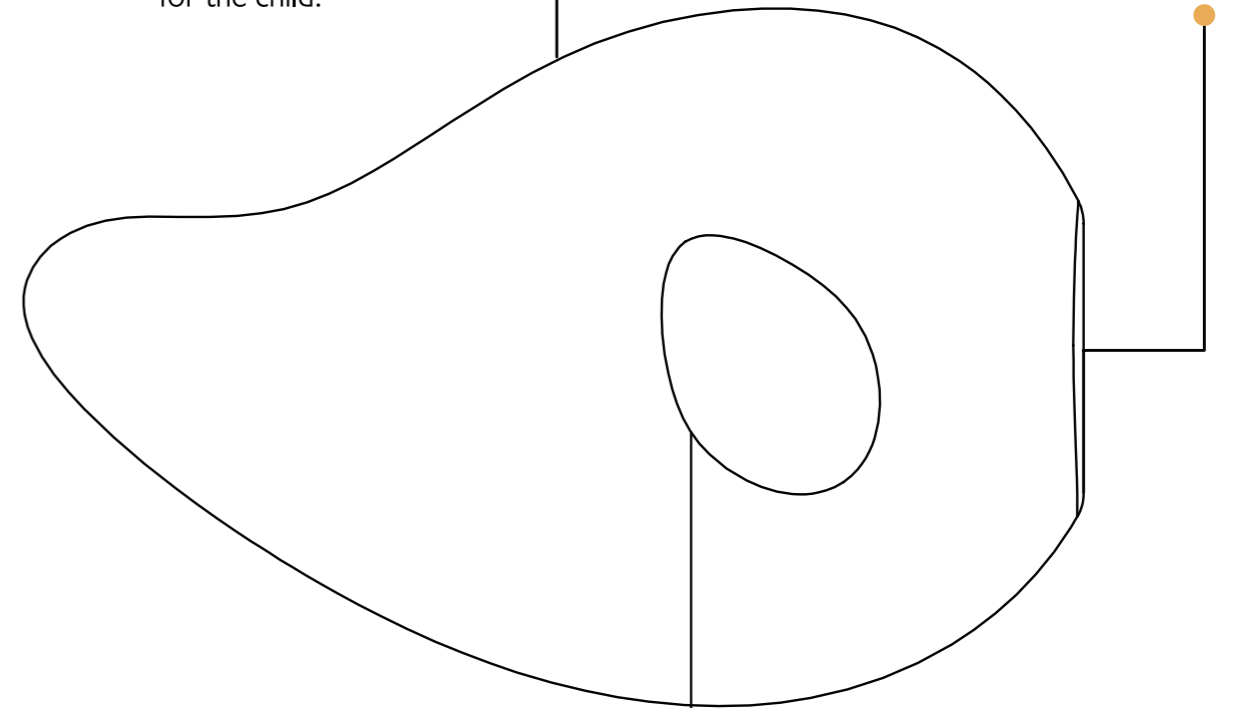
Each Autistic child is different, not one child is the same as the next. A toy that might work for one child might not necessarily work for another.

I wanted to provide the parents and the child with the power of customisation and personalisation. As studies suggest that there are some textures and colours that Autistic children shy away from, having the ability to change things/taking away elements that they don't like is a powerful feature.

UNDERSTANDING EMOTION

Emotion is a complex concept to grasp. Studies suggest that Autistic children are concrete thinkers, often having difficulty understanding abstract concepts.

My design provides Autistic children with an easier solution in learning emotion. Emotion is subjective to what the child identifies with, and what they understand, thus being able to draw how they feel will hopefully make it easier for them

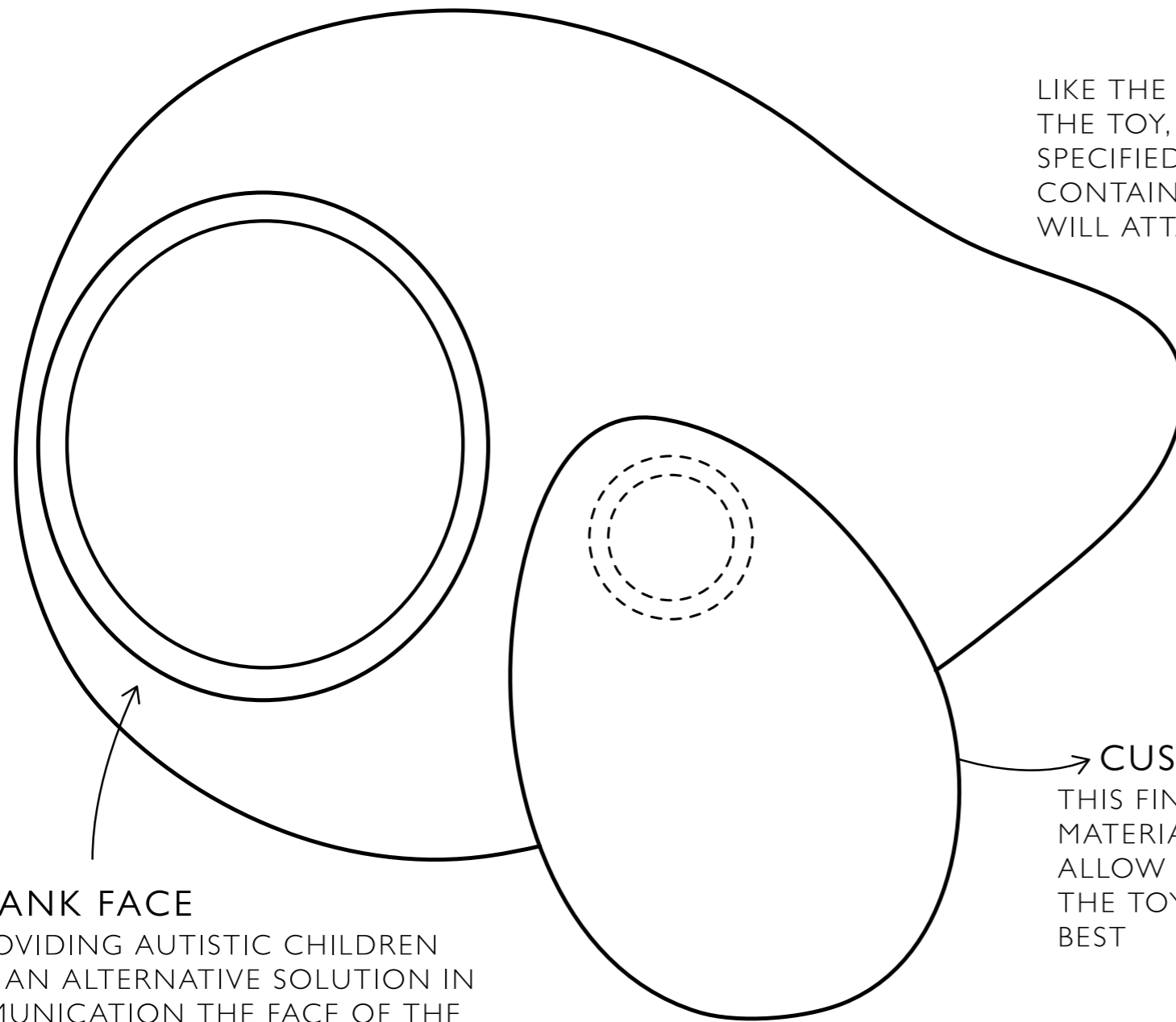


REMOVE WITH EASE

Changing fins to customise a toy will be seamless. The incorporation of magnets in the body and in the fins allows the child/parent to remove and/or replace limbs with ease.

All magnets are concealed, with no wiring or sharp edges interfering with play.

CONCEPT DIRECTION

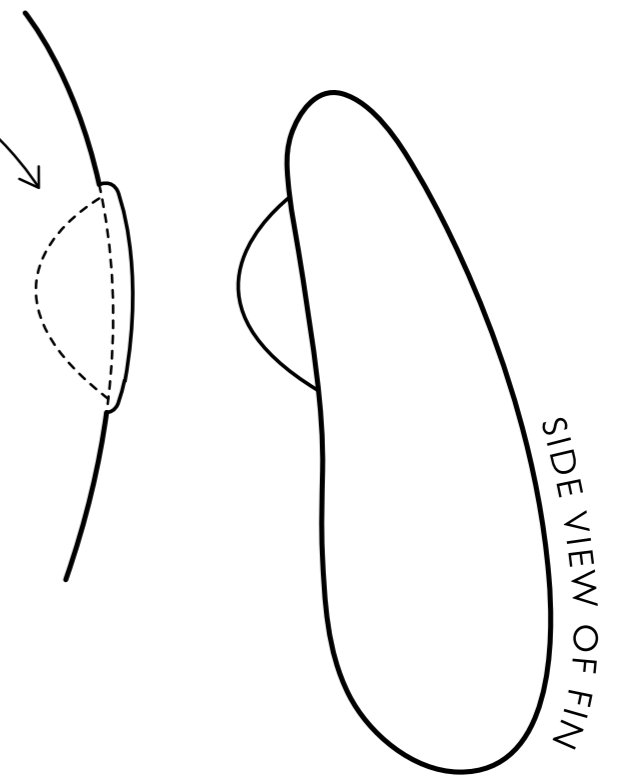


BLANK FACE

IN PROVIDING AUTISTIC CHILDREN WITH AN ALTERNATIVE SOLUTION IN COMMUNICATION THE FACE OF THE TOY WILL HAVE A DRAWABLE AREA TO ALLOW THE CHILD OR PARENT TO CUSTOMISE THE TOY

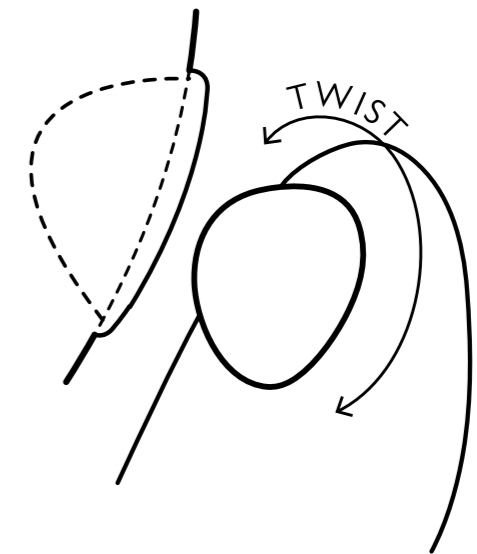
LIMB SOCKET

LIKE THE FINS, ON THE BODY OF THE TOY, THERE WILL BE TWO SPECIFIED SOCKETS THAT WILL CONTAIN A HIDDEN MAGNET THAT WILL ATTACH THE FIN TO THE BODY



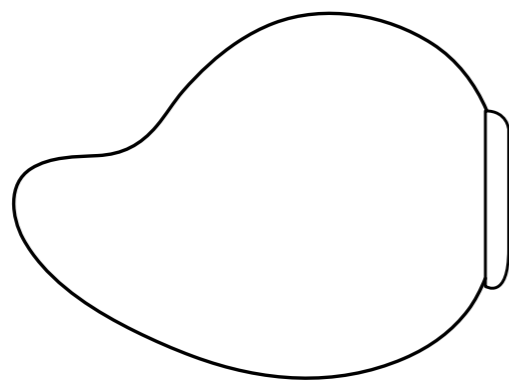
CUSTOMISEABLE FIN

THIS FIN COMES IN DIFFERENT MATERIALS AND TEXTURES TO ALLOW THE USER TO CUSTOMISE THE TOY TO WHAT THEY LIKE BEST

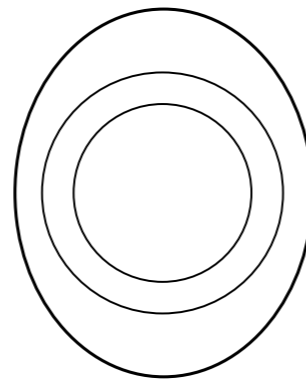


REMOVEABLE FIN

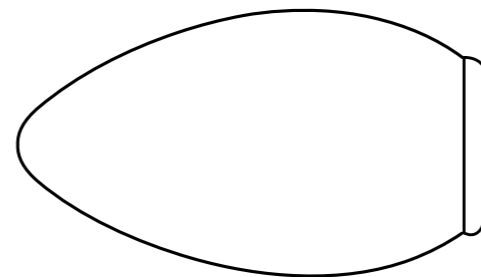
TO SECURELY ATTACH THE FIN TO THE BODY, EACH FIN HAS A DOME LIKE STRUCTURE ADHERED ON TO CONCEAL A MAGNET THAT WILL AUTOMATICALLY CLICK IN PLACE IN THE CORRESPONDING LOCATION ON THE BODY



SIDE



FRONT



TOP

MATERIAL RATIONALE

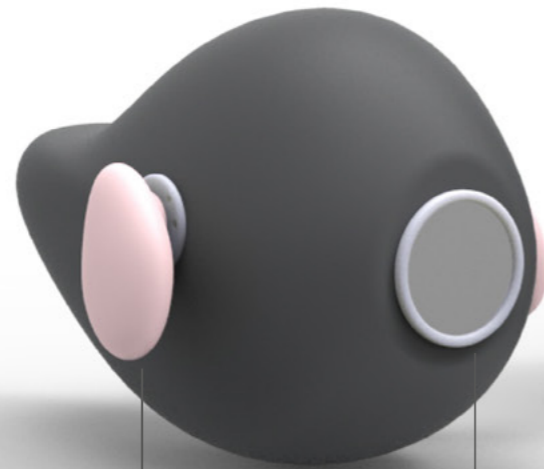
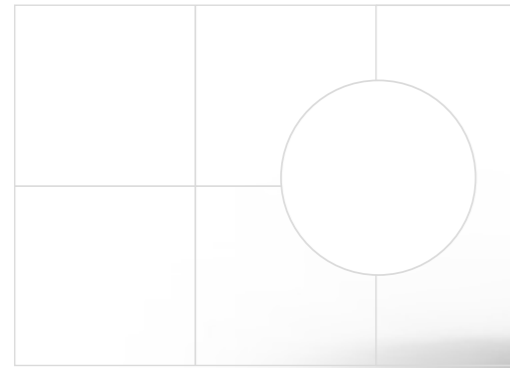
TOY STUFFING & WEIGHT POLYESTER STUFFING & ABS PELLETS

Polyester Stuffing was chosen based on its machine washable quality, enabling it to retain its shape with ease. ABS Pellets were chosen based on its high melting point, thus reassuring the user that the pellets will not dissolve over many washes.

TOY BODY FABRIC BLEND OF MERINO WOOL & BAMBOO

Colour & Finish: Slate Grey, Woven Fabric
Manufacturing Process: Machine Sewed, Hand Finished

Bamboo is specifically chosen for its antibacterial properties, thus discouraging formation of bacteria. Bamboo fiber is also incredibly soft, strong and durable. Paired up with a luxurious blend of merino wool, this combination is easy to wash and durable.



REMOVEABLE FIN SKIN SAFE SILICONE

Colour & Finish: Pantone Codes (9281, 9401, 9521, 9120 & 911), Smooth Silicone Finish
Manufacturing Process: Injection Moulded

Skin safe silicone (code number p20) is chosen for its food safe and skin safe properties as the name suggest. To achieve desired colour, appropriate amounts of non-toxic silicone pigments are mixed in.

Silicone is great as a material for the removeable fin for its soft yet semi-resistant texture and consistency.

FACE PLATE CASE ACRYLONITRILE BUTADIENE STYRENE (ABS)

Colour & Finish: White, Matte
Manufacturing Process: Injection Moulded

ABS is chosen for its strength and limited shrinkage. Please see 'fig. A' for an exploded view.

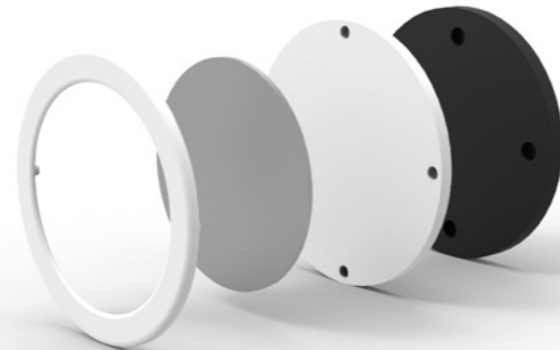


Fig. A

FACE PLATE ANODISED ALUMINIUM

Colour & Finish: Silver & Champagne Gold Anodised Aluminium
Manufacturing Process: Laser Cut, Anodised

The surface finish of the face plate is anodised for an easy to clean surface, which the user can simply rub off. Aluminium is also an unusual material to use for a toy, which appeals to its deviant nature. Please see 'fig. A' for an exploded view.

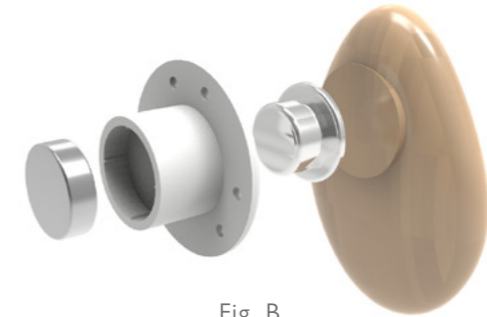


Fig. B

BODY JOINTS ACRYLONITRILE BUTADIENE STYRENE (ABS) & 20MM MAGNET

Colour & Finish: White, Matte
Manufacturing Process: Injection Moulded

ABS is chosen for its strength and limited shrinkage. Please see 'fig. B' for an exploded view.

The 20mm (in diameter) magnet has a 6kg pull. It is chosen in relation to the weight of the removeable fins and the materials that separate the fin and the magnet.

REMOVEABLE FIN JOINT STAINLESS STEEL

Colour & Finish: Stainless Steel, Lightly Brushed
Manufacturing Process: CNC Machined. Hand Finished

Stainless steel is chosen for its ferrous nature, in attraction to the magnet incased within the body of the toy.

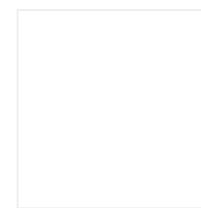
REMOVEABLE FIN VARIOUS WOOD TYPES

Colour & Finish: Wood Types (European Beech, Fiji Mahogany, Kauri & American Walnut)
Manufacturing Process: CNC Machined. Hand Finished

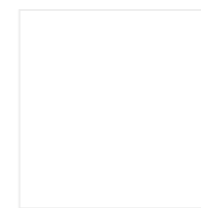
A selection of fine wood types are chosen based on grain, colour and finish. This in turn gives the removeable fin a nice weight and a firmer texture.



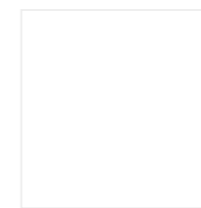
Euro. Beech



Fiji Mahog.



Kauri



US. Walnut

TOY STUFFING & WEIGHT
POLYESTER STUFFING & ABS PELLETS

Polyester Stuffing was chosen based on its machine washable quality, enabling it to retain its shape with ease. ABS Pellets were chosen based on its high melting point, thus reassuring the user that the pellets will not dissolve over many washes.



TOY BODY
FABRIC BLEND OF
MERINO WOOL & BAMBOO

Colour & Finish: Slate Grey, Woven Fabric
 Manufacturing Process: Machine Sewed, Hand Finished

Bamboo is specifically chosen for its antibacterial properties, thus discouraging formation of bacteria. Bamboo fiber is also incredibly soft, strong and durable. Paired up with a luxurious blend of merino wool, this combination is easy to wash and durable.



REMOVEABLE FIN
SKIN SAFE SILICONE

Colour & Finish: Pantone Codes (9281, 9401, 9521, 9120 & 911), Smooth Silicone Finish
 Manufacturing Process: Injection Moulded

Skin safe silicone (code number p20) is chosen for its food safe and skin safe properties as the name suggest. To achieve desired colour, appropriate amounts of non-toxic silicone pigments are mixed in.

Silicone is great as a material for the removeable fin for its soft yet semi-resistant texture and consistency.



FACE PLATE CASE
ACRYLONITRILE
BUTADIENE STYRENE (ABS)

Colour & Finish: White, Matte
 Manufacturing Process: Injection Moulded

ABS is chosen for its strength and limited shrinkage. Please see 'fig. A' for an exploded view.

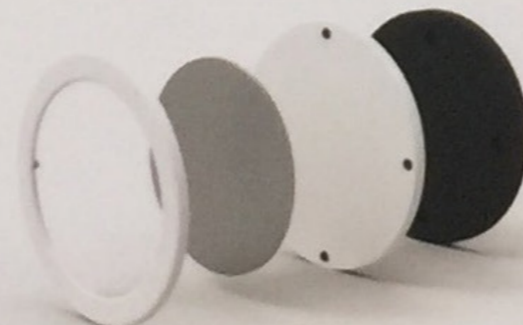


Fig. A

FACE PLATE
ANODISED ALUMINIUM

Colour & Finish: Silver & Champagne Gold Anodised Aluminium
 Manufacturing Process: Laser Cut, Anodised

The surface finish of the face plate is anodised for an easy to clean surface, which the user can simply rub off. Aluminium is also an unusual material to use for a toy, which appeals to its deviant nature. Please see 'fig. A' for an exploded view.

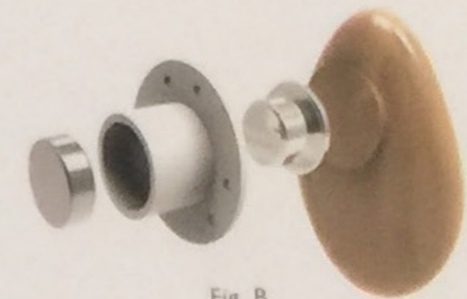


Fig. B

BODY JOINTS
ACRYLONITRILE BUTADIENE
STYRENE (ABS) & 20MM MAGNET

Colour & Finish: White, Matte
 Manufacturing Process: Injection Moulded

ABS is chosen for its strength and limited shrinkage. Please see 'fig. B' for an exploded view.

The 20mm (in diameter) magnet has a 6kg pull. It is chosen in relation to the weight of the removeable fins and the materials that separate the fin and the magnet.



REMOVEABLE FIN
VARIOUS WOOD TYPES

Colour & Finish: Wood Types (European Beech, Fiji Mahogany, Kauri & American Walnut)
 Manufacturing Process: CNC Machined, Hand Finished

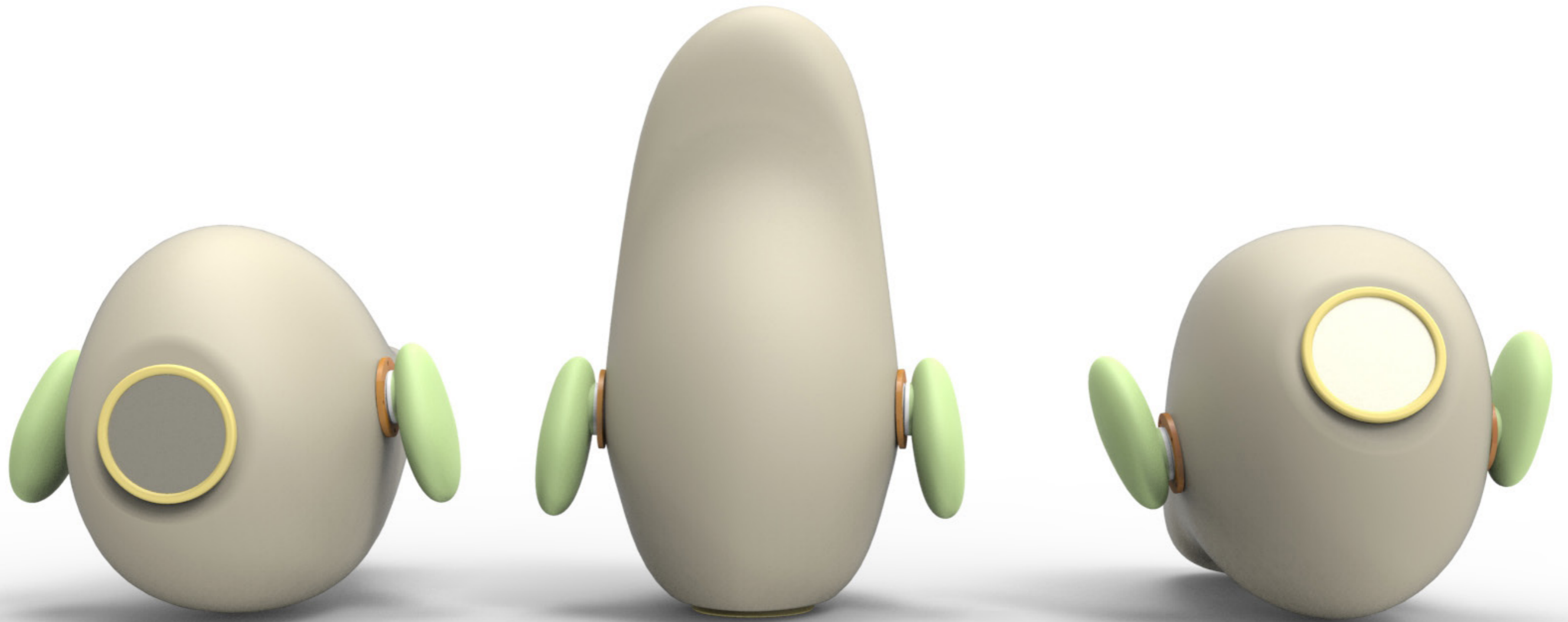
A selection of fine wood types are chosen based on grain, colour and finish. This in turn gives the removeable fin a nice weight and a firmer texture.

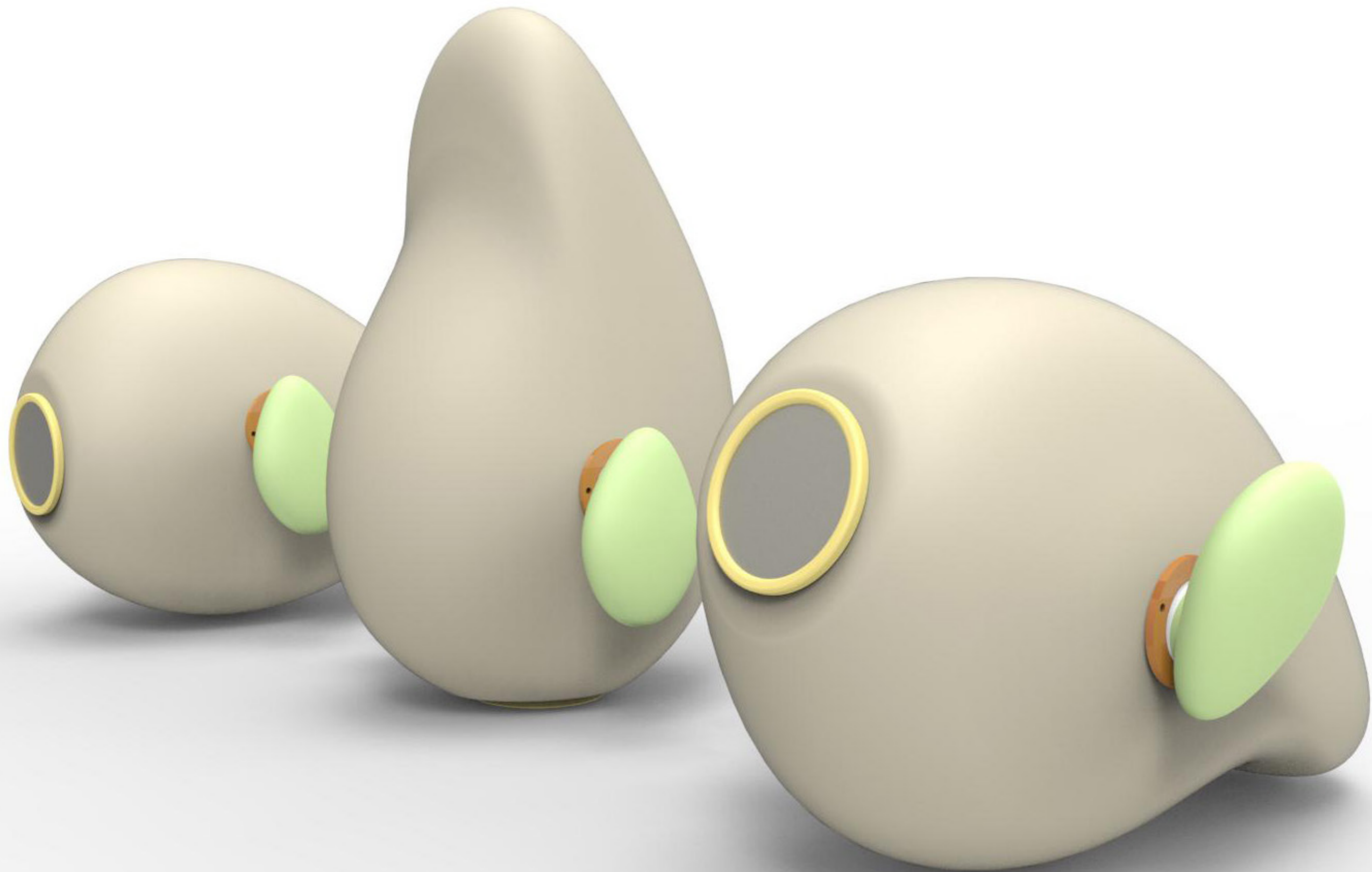


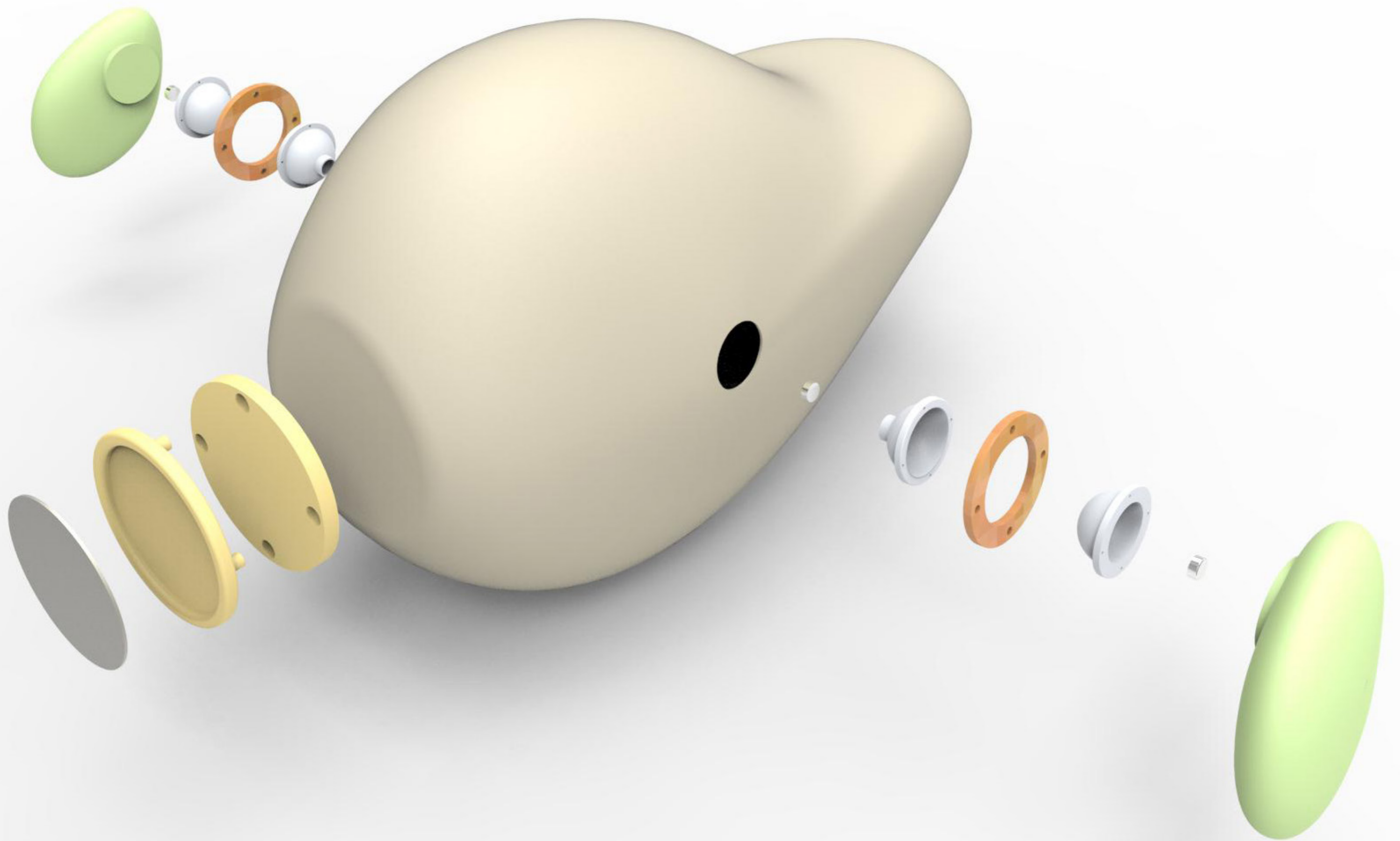
REMOVEABLE FIN JOINT
STAINLESS STEEL

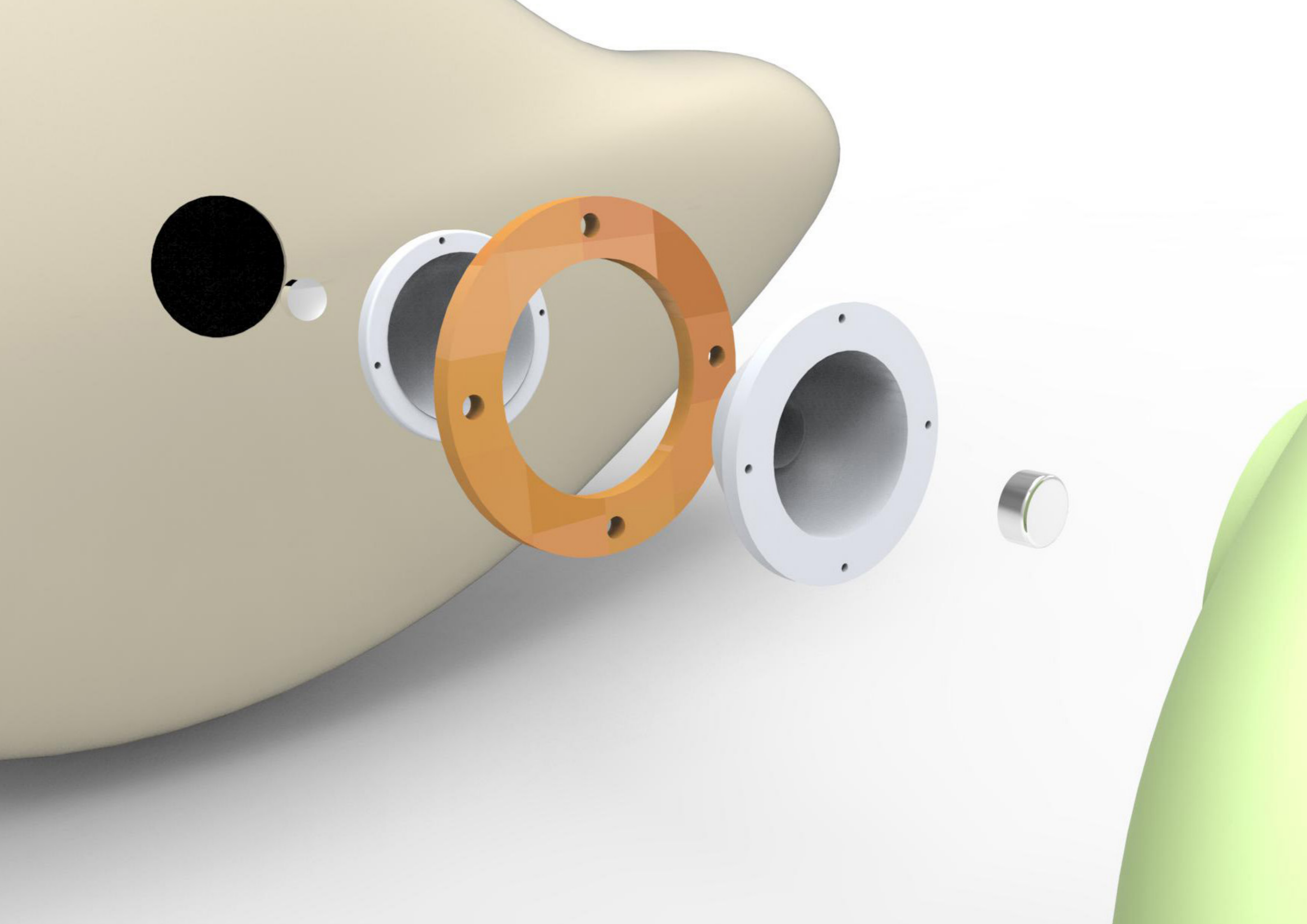
Colour & Finish: Stainless Steel, Lightly Brushed
 Manufacturing Process: CNC Machined, Hand Finished

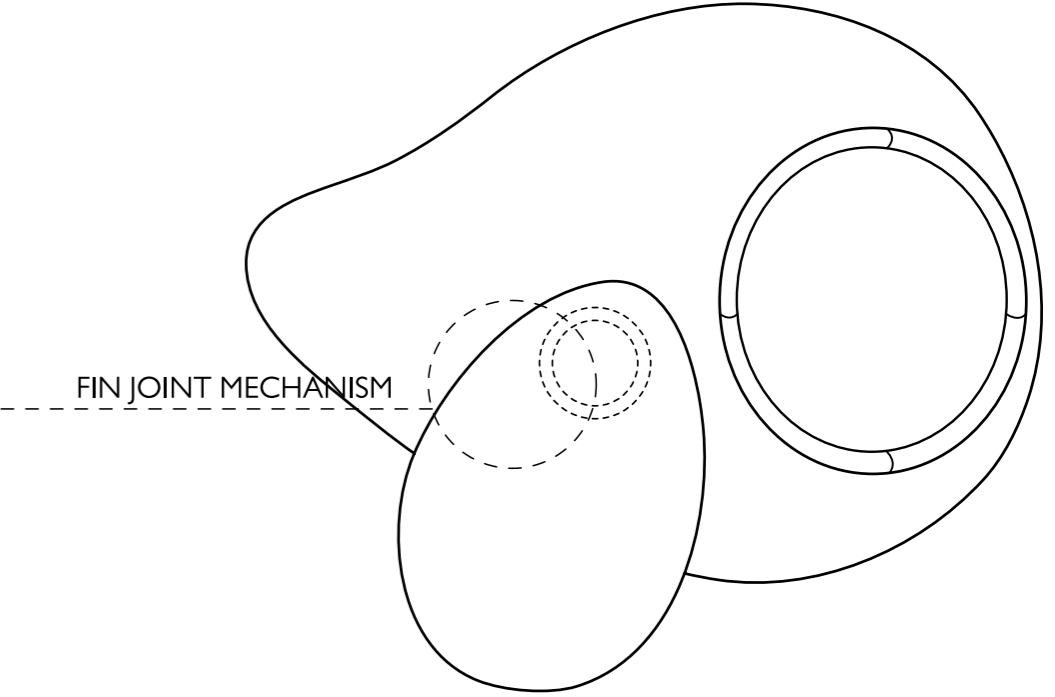
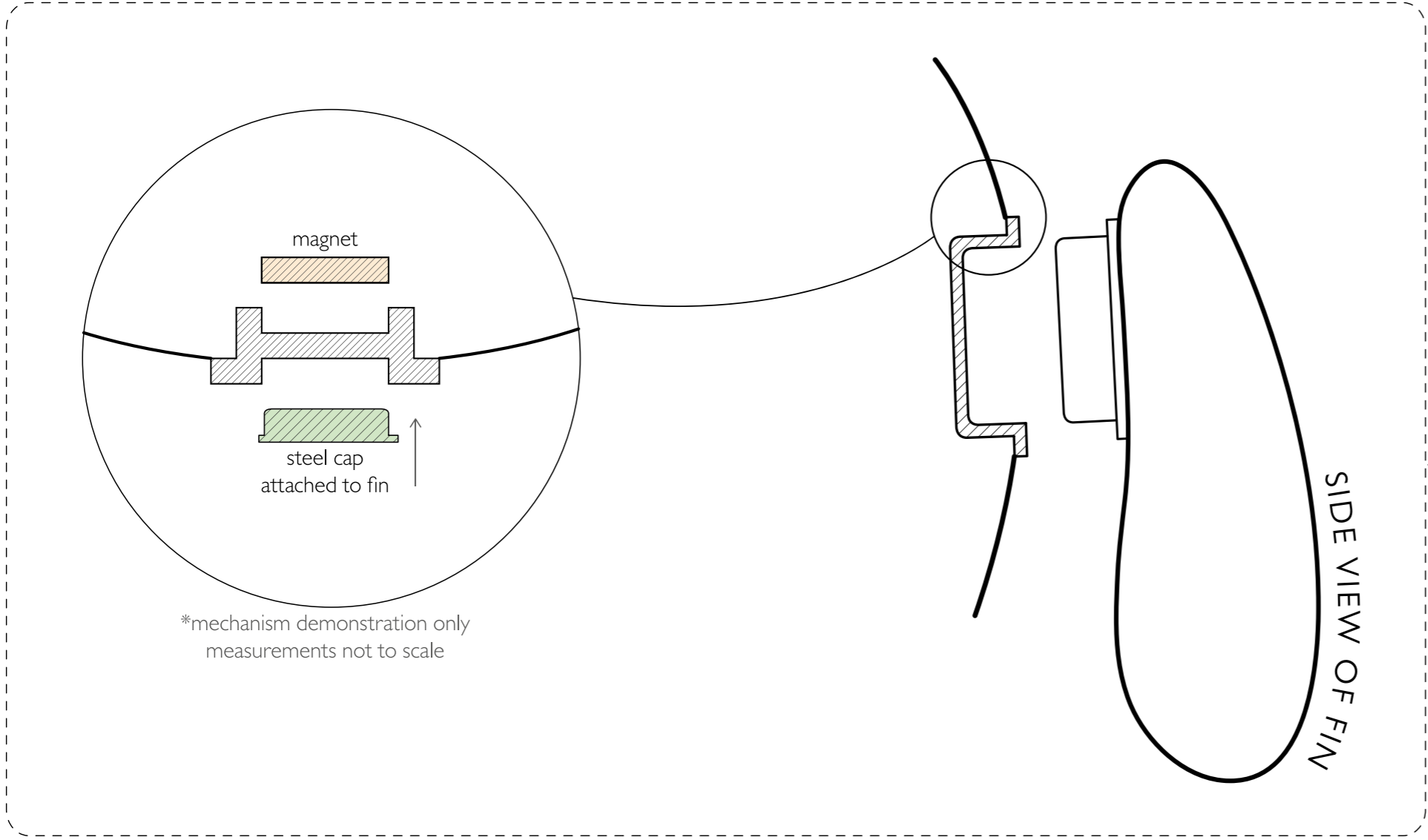
Stainless steel is chosen for its ferrous nature, in attraction to the magnet incased within the body of the toy.





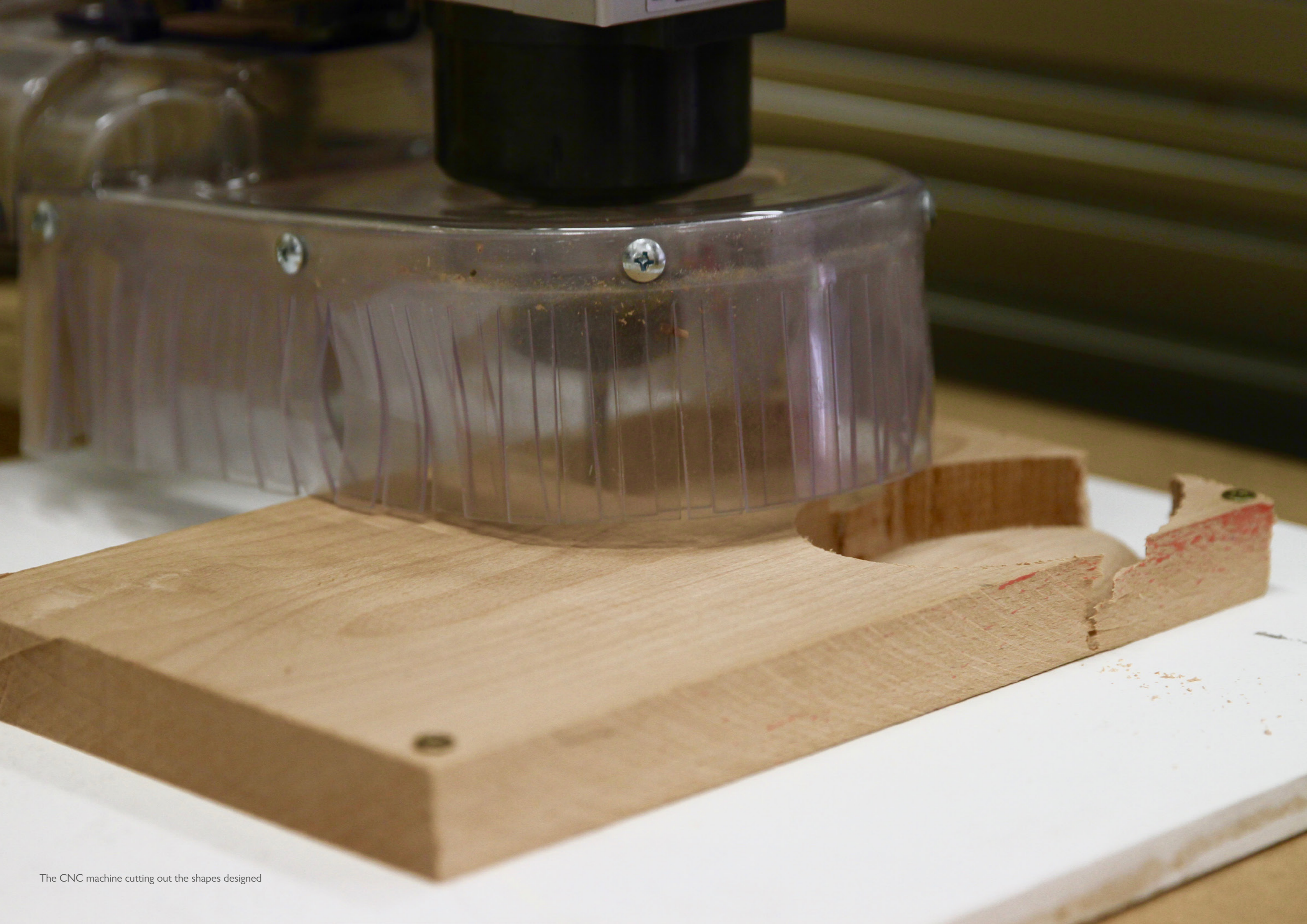








In order to get a better sense of scale, I continued to make mock-ups. This is a series of limbs I made to determine what form I wanted, and what was nicest to hold. I ended up favouring the fin on the far right hand side



The CNC machine cutting out the shapes designed

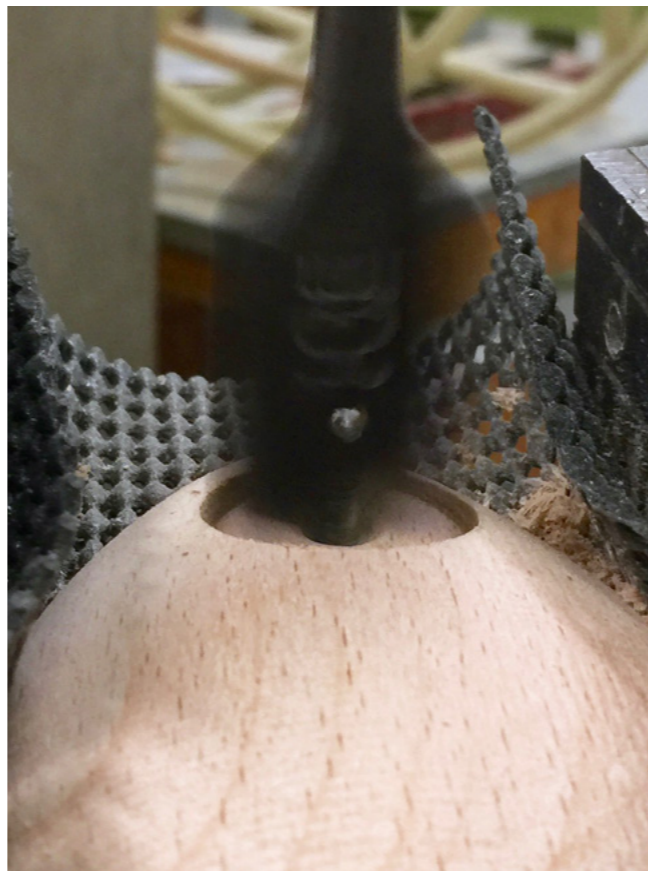


Fins cut and finished with the CNC

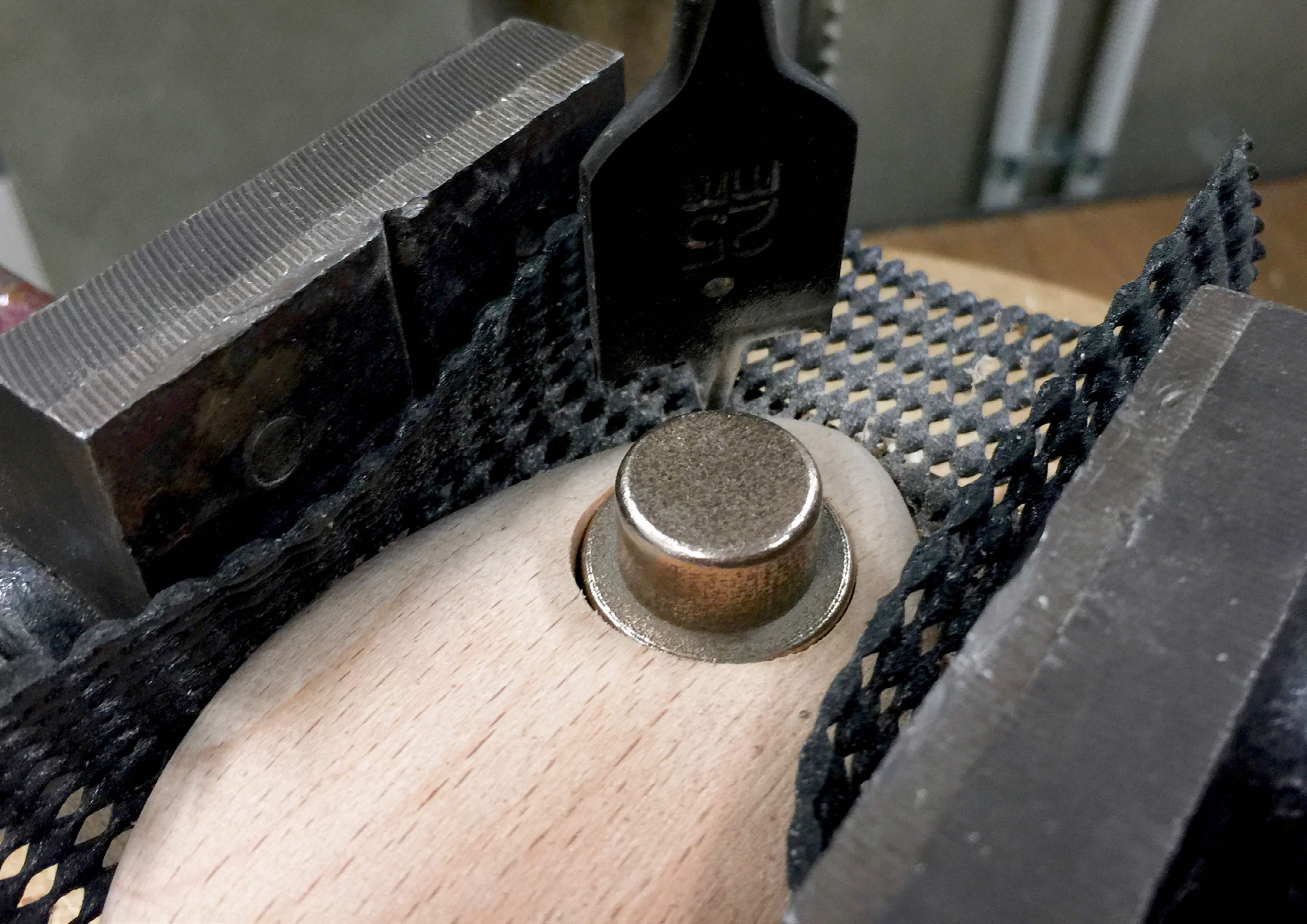
DRILLING A RECESS

In order to attach the metal fin joints onto a curved surface such as my fins, it was necessary to **drill a slight recess into the surface to provide a flat surface**. In order to protect the sides of my fin as I was drilling a hole, I **cushioned the sides with a soft foam liner**. This proved to be very useful as this **prevented any dings and marking**.

As this wood was harder than most types, I had to lower the drill into the wood at a slower pace than usual to avoid smoking and damaging the part. For this recess, I used a **25mm drill bit**. The results were fantastic, however as the surface was curved, I had to **drill deeper than what I needed** to then fill it up at a later stage to achieve a flushed surface finish.



Process of using a drill press to drill a recess into the fin



CASTING WITH SILICONE & COLOURS

Now that I had a new mould that I was more satisfied with, it was time to **add some pigments into the silicone**. It's important to note that with skin safe and food safe silicone, you must **be very careful in adding pigments as this can easily cause a chemical imbalance**. Thus, I was adding pigments by the drop, **very small amounts to achieve my colours**.

In regards to what kind of colours I was matching my fins with, I had **pre-selected a few muted tones from my colour and trim exercise**. Thus I was referencing my colours based on the colours I had chosen. In order to **understand what the ratios looked like** for mixing my colours, I did a quick colour test, **matching the mixed pigment against the actual true to life colour palette**. This proved to be extremely helpful as I was more conscious and informed when adding colours.

In order to ensure that there was **minimal spillage**, I chose to **use a syringe to fill my mould**. This ensured that I had full control when pouring into such a small sprue hole. Purely accidental, **as a result of pushing silicone into the mould, air was forcefully being pushed into the mould, creating slight air bubbles into the fin**. This in turn made the casted fin **a lot softer than it originally was**. This was very pleasing.



Process of adding pigment into silicone and injecting it into the pinksil mould



Pile of silicone casted and wooden fins



A child grasping onto a fin attached to the body

PATTERN DESIGN AND BODY CONSTRUCTION





Sewing Pooki's body using a sewing machine



Checking the stitches, ensuring that the sewing line is straight

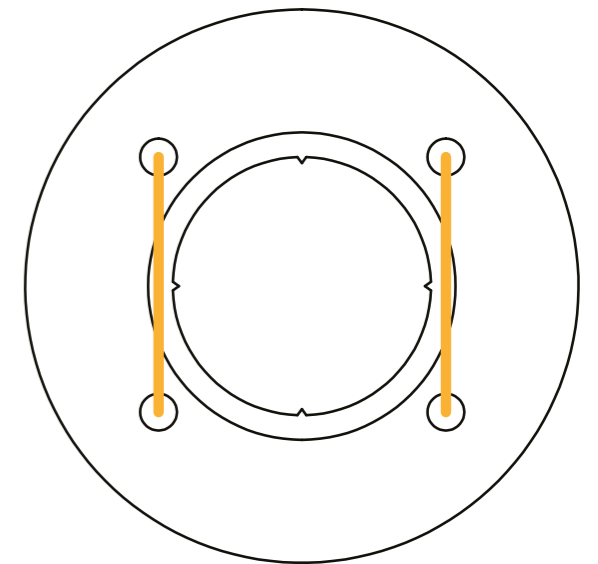
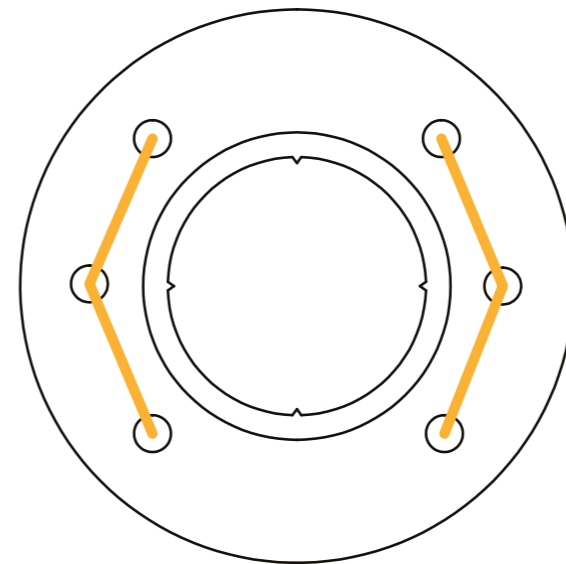
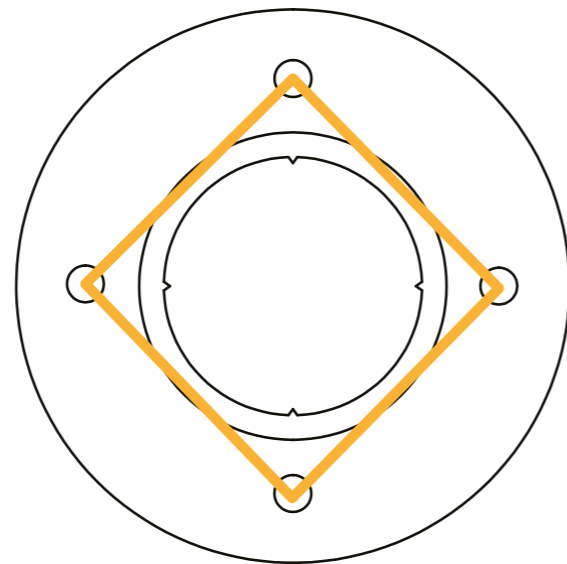
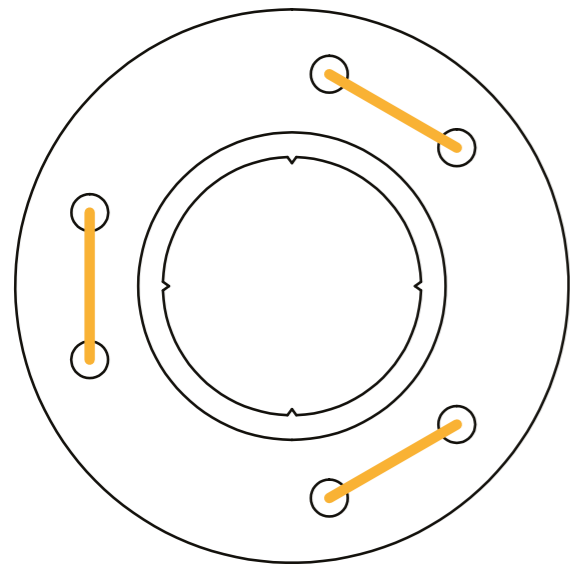
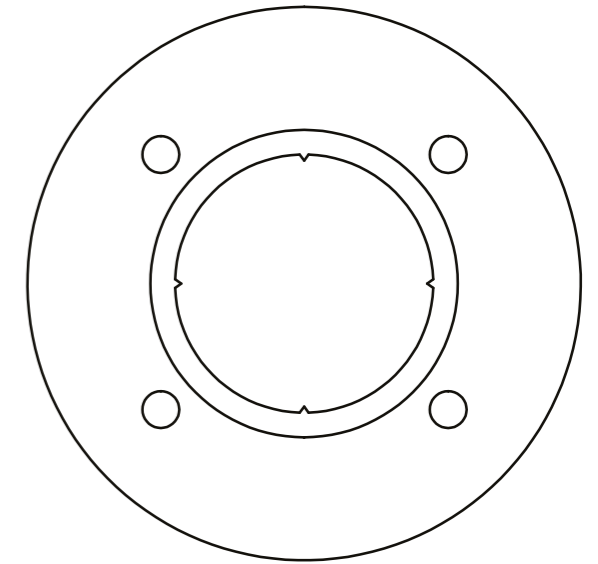
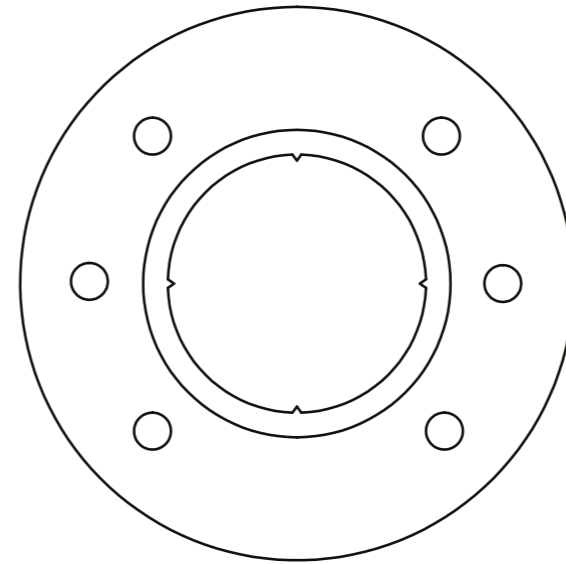
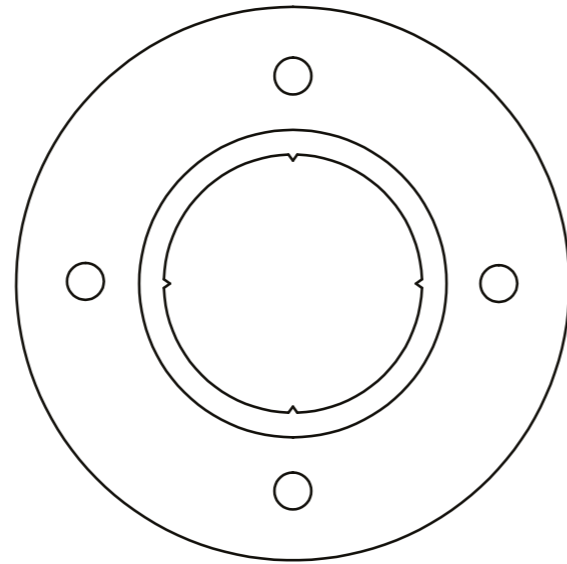
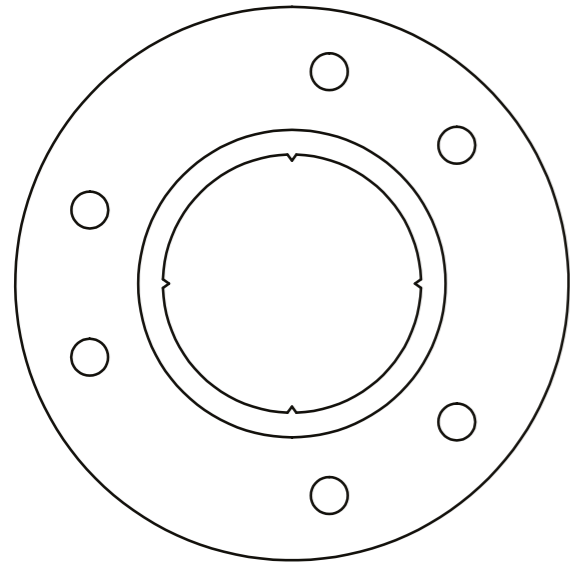
DETAILING

What makes this toy so special is the small details that brings it all together. At this point, the body was now sewn, and the fin sockets were now attached (see button jointing details on opposite page). To bring everything together, I took my supervisor Robbie's advice and paid a little bit more attention to the stitch lines.

By adding a detailing running stitch around the parametre of the fin socket, I found that it was almost like completing a circle. It established a nice border around it, which made it feel more defined.



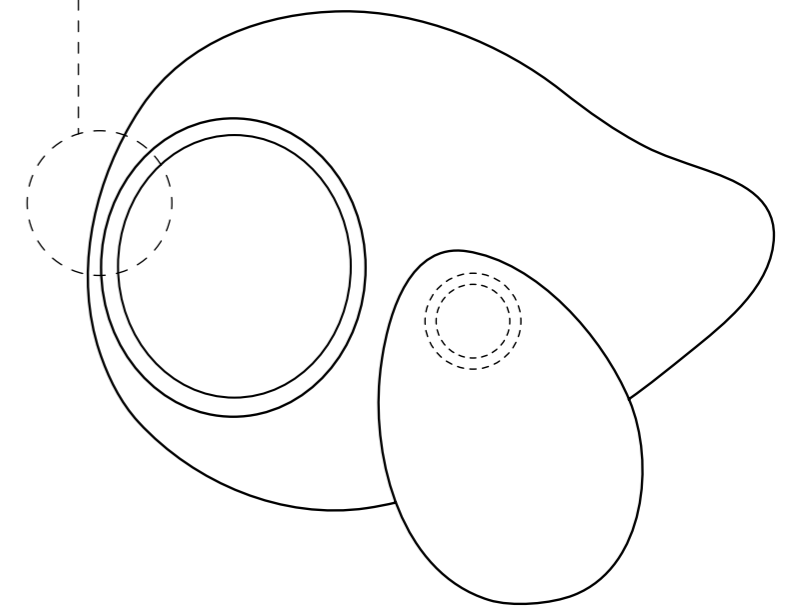
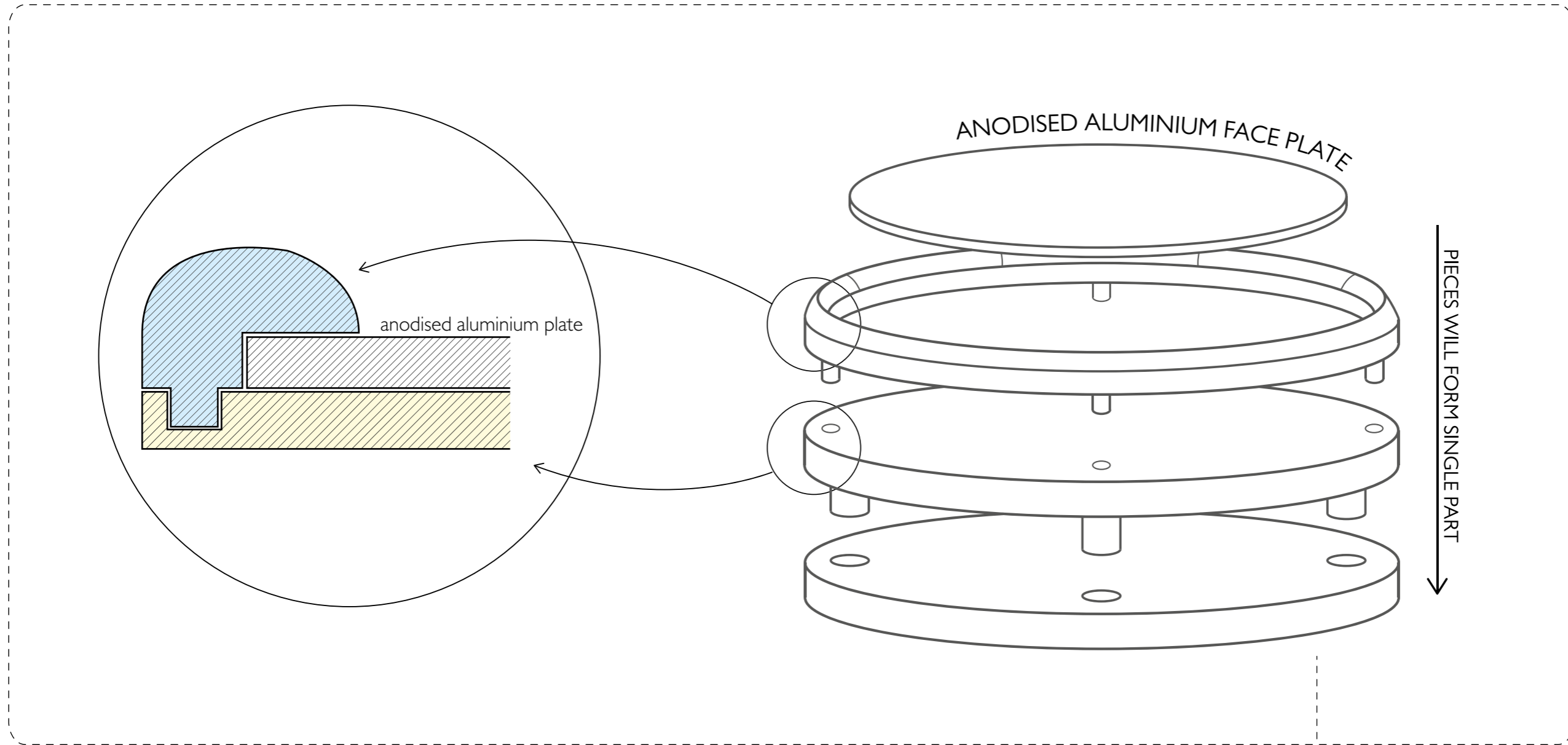
BUTTON JOINTING



The method of button jointing the fin sockets ensured that the magnet was securely kept within the body of the toy, but also allowed the sockets to be pulled a little closer to the body. There are many ways a thread can be stitched to give the most aesthetically pleasing stitch line.

Above, you can see I trailed a few different stitch styles. I chose to go with the far left hand side, as this, albeit a lot harder to do, did not interfere with the fin socket, and looked the nicest.

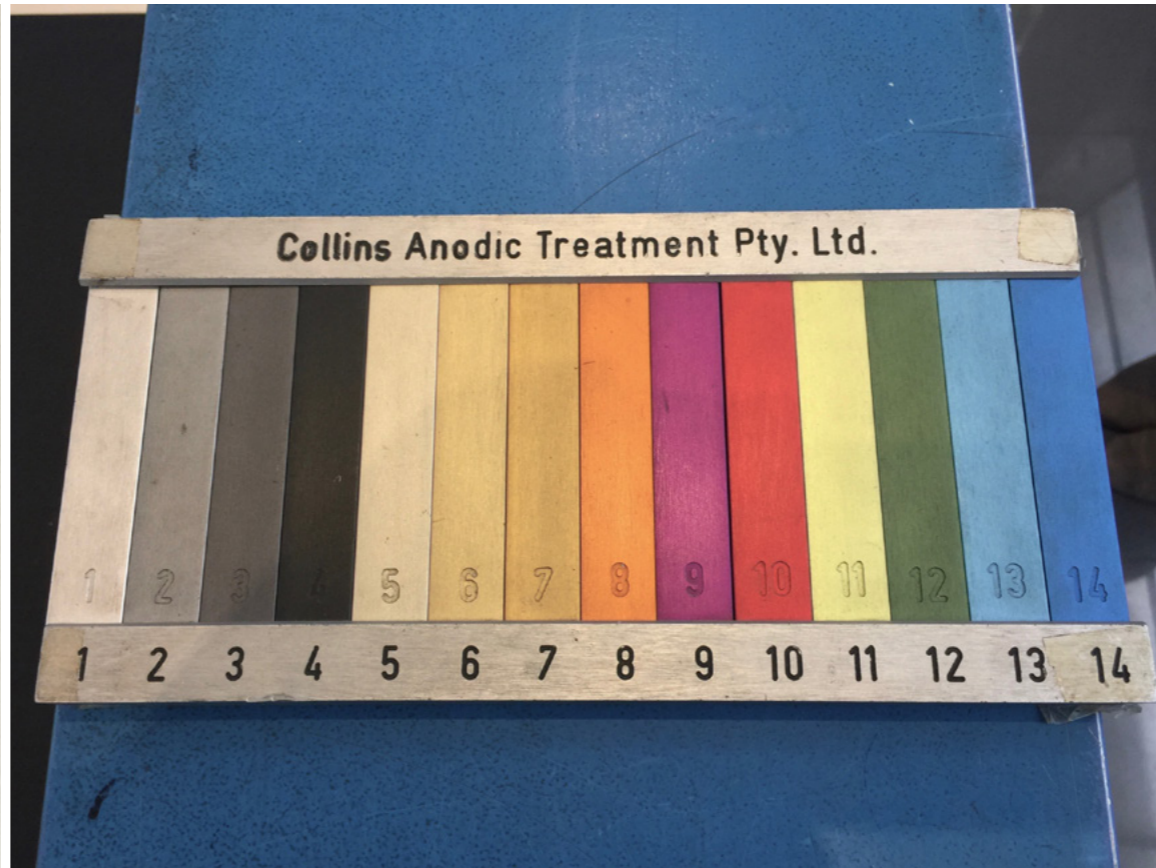
FACE PLATE MECHANISM



ALUMINIUM FACE PLATE

The face plate contains 4 different parts: An inner plate which sat inside the body of the toy, an outer plate to sit atop of that part to hold the inner part in place and to give the other parts something to grasp onto, the next was an anodised aluminium plate and the last being the outer plate, framing and containing the aluminium plate.

The first step of further developing this face plate was sourcing the aluminium circle. I contacted a laser cutter named A.G Holdings and ordered a few 70mm aluminium circles to be laser cut. Once I obtained the laser cut circles, I sent them to Collins Anodic to get them anodised. It was here that I was able to choose the colours I wanted to anodise the plates with. I chose a neutral silver and a champagne gold for variety.



Images from L to R
Aluminium circles cut via laser cutter
Collin's Anodic treatment samples
Anodised Aluminium circles

OUTER FACE PLATE

Once the anodised aluminium plate was complete, I was able to then test the remaining parts that would incase the plate. As demonstrated below, there was a lot of trial and error as like the fin joints, every 0.1 mm counted.



Images from L to R
3D print trial and errors
Fitting the anodised aluminium circles into the best fitting face plate

