

Hyperfold

Unfolding the future of reuse.

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Platinum A'Design award winner
Architect, developer of 3 product lines
Co-founder of PRAKTRIK and WallStack



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Co-founder of WallStack
MSc Entrepreneurship at ESADE
Ex-strategist at Saatchi&Saatchi

The bottle



- ✓ **Compact & Stable**
- ✓ **Durable & Sustainable**
- ✓ **Elegant & Versatile**

The technology

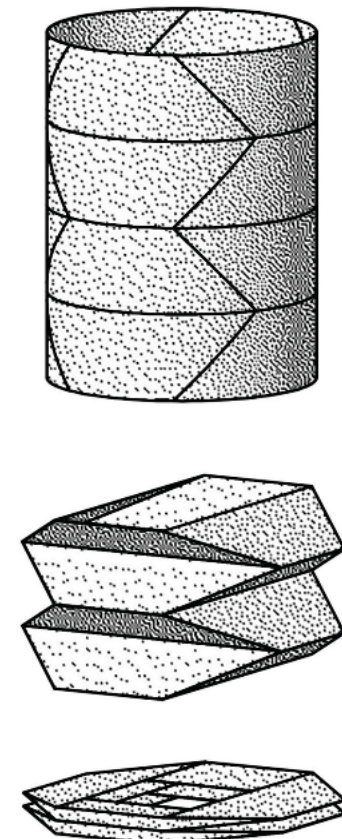
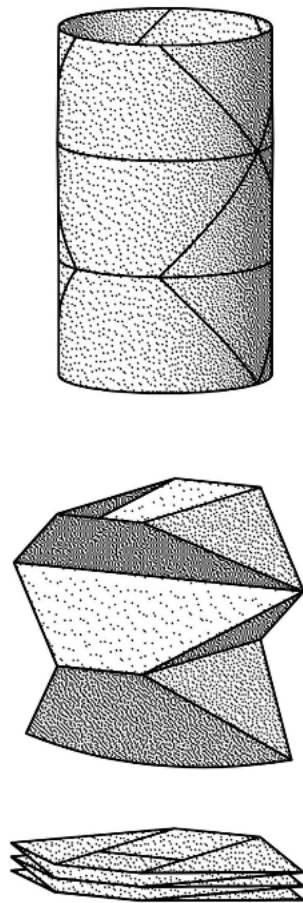
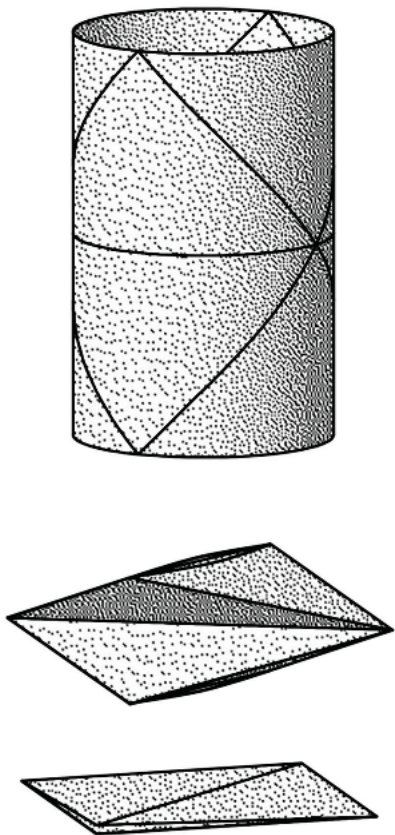
Hyperfold technology

Compact | Stable | Fun

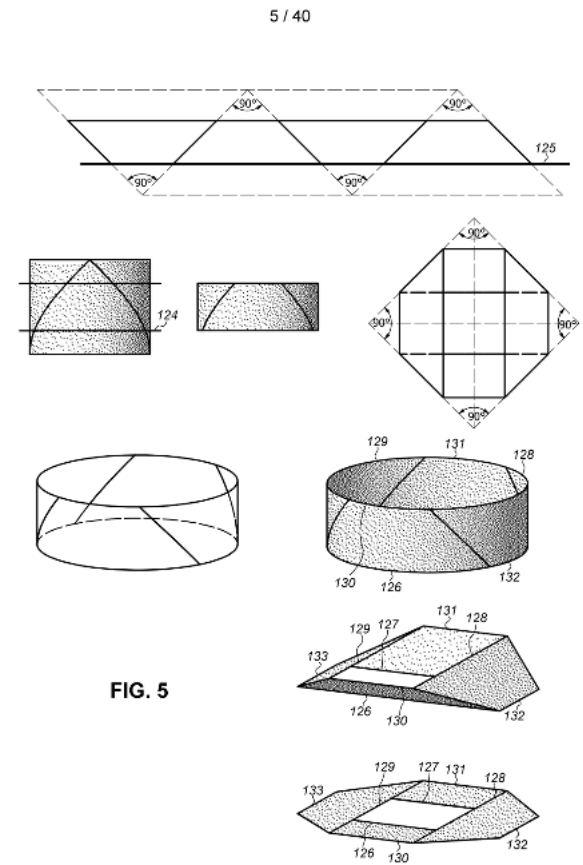
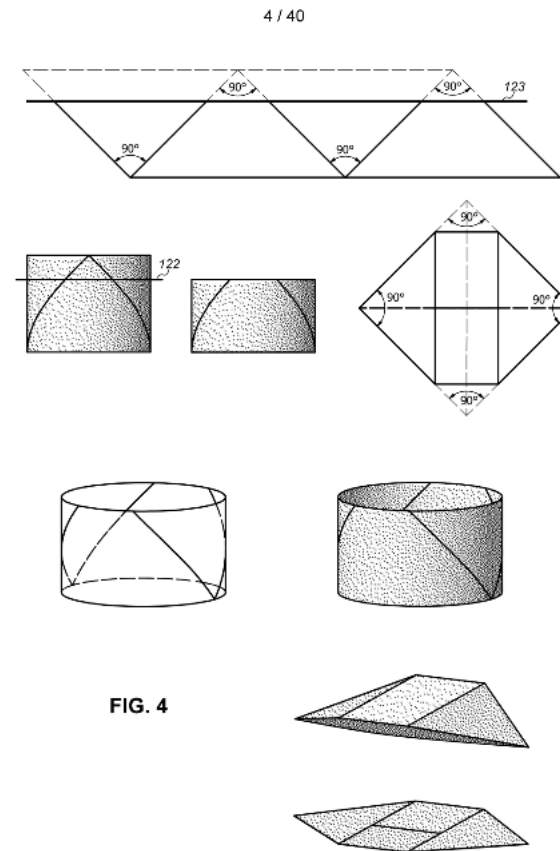
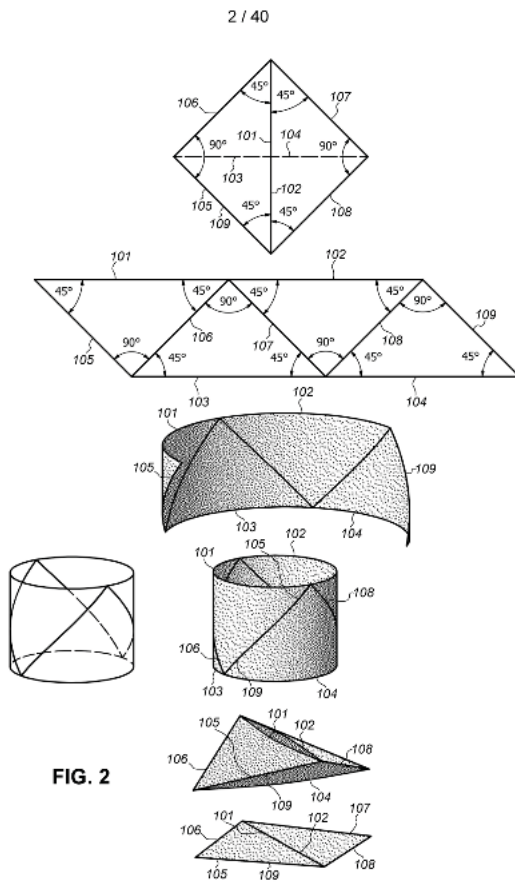


*Patent pending.

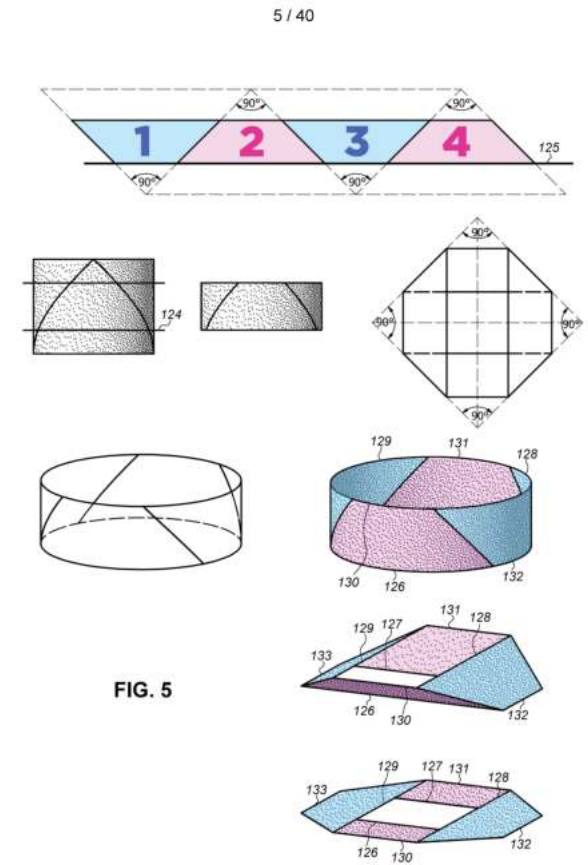
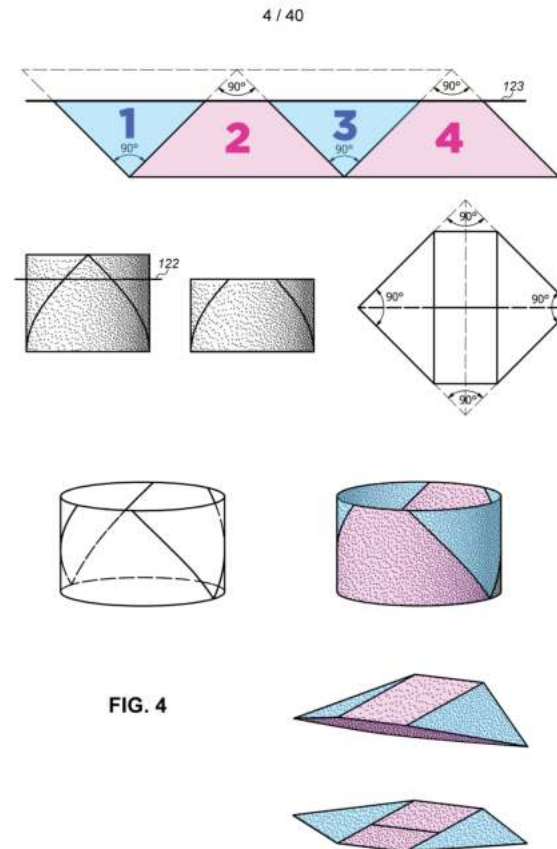
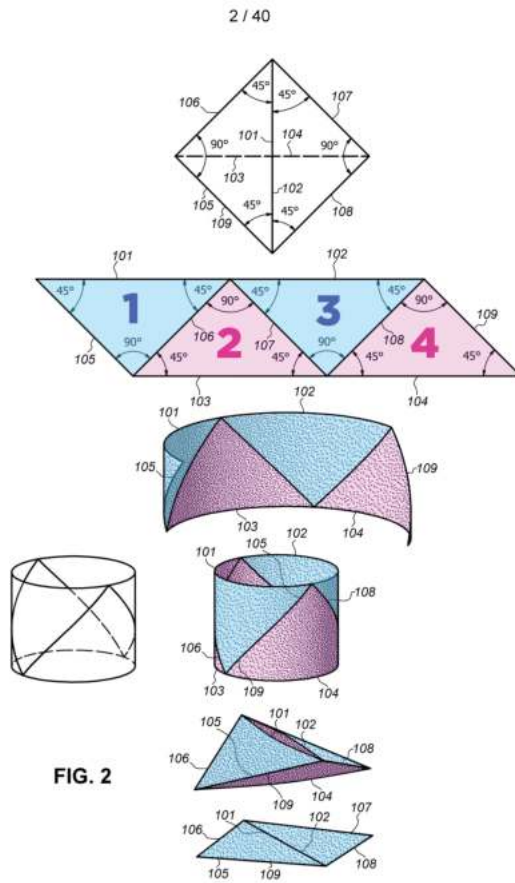
Main patterns



Principle - the 4 polygons

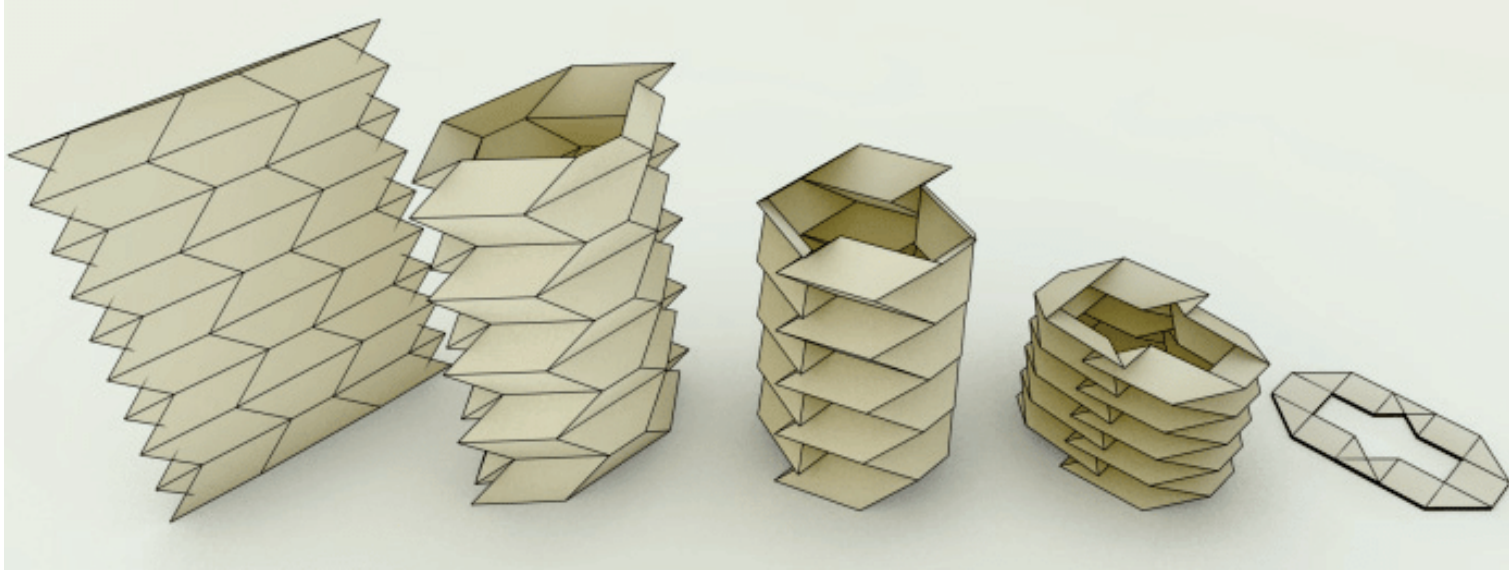


Principle - the 4 polygons





Flexigami / Foldable cylinders



1.

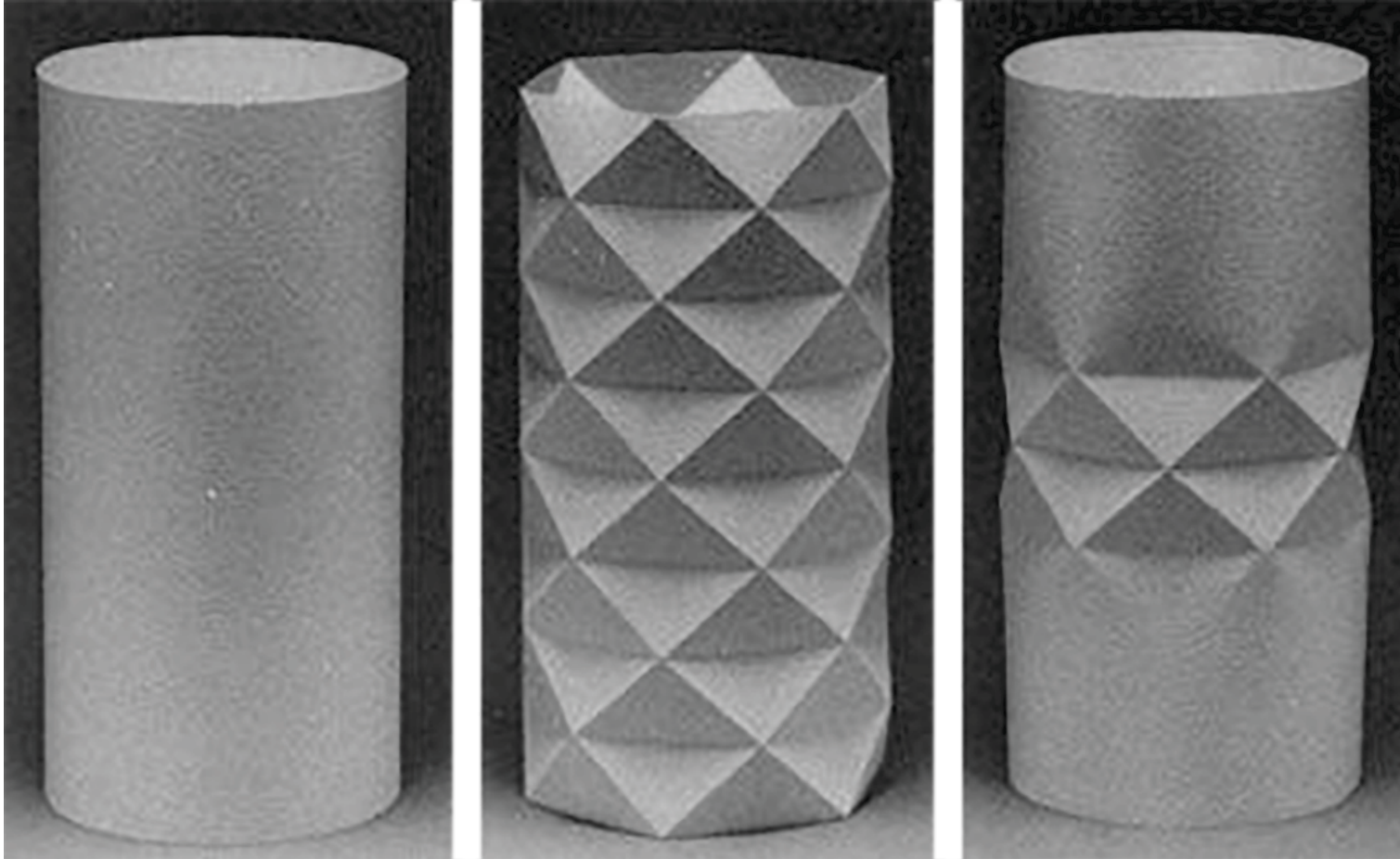


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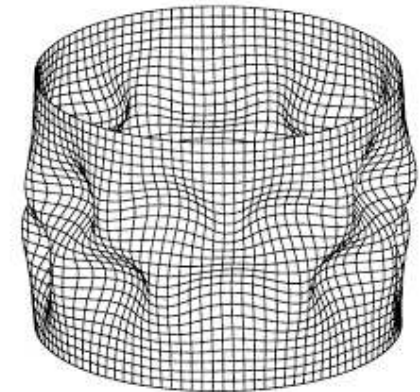
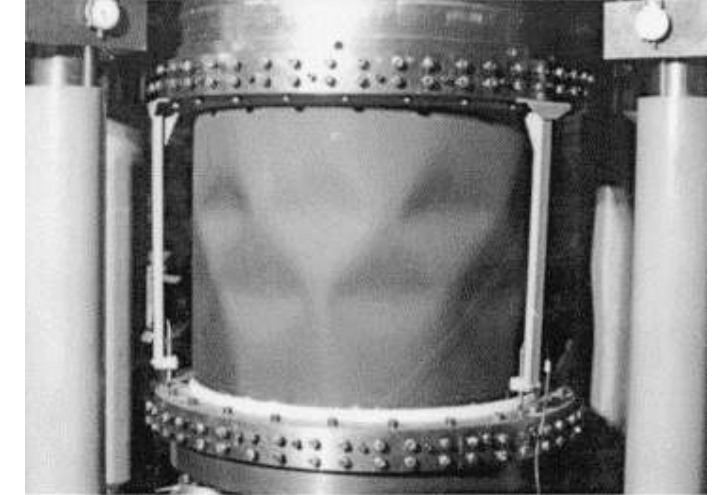


3.

Yoshimura pattern / Thin-shell buckling

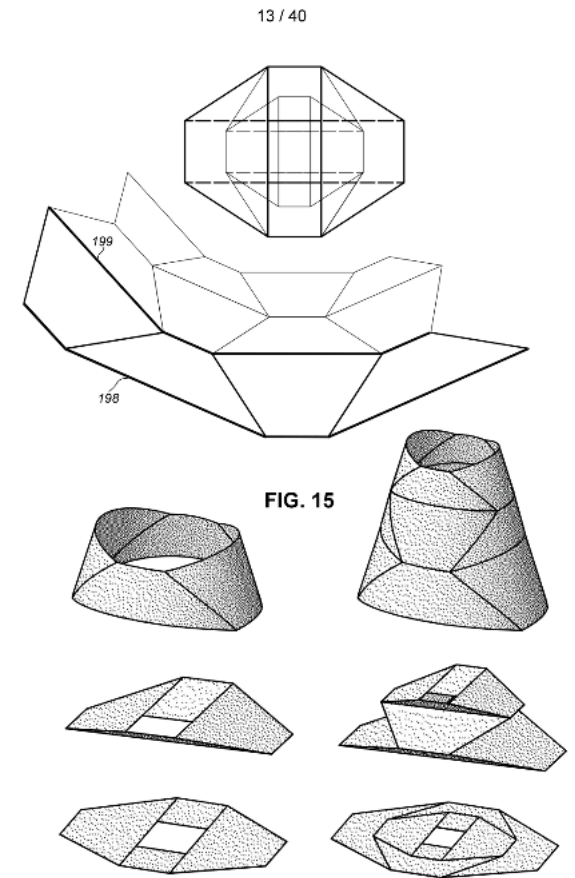
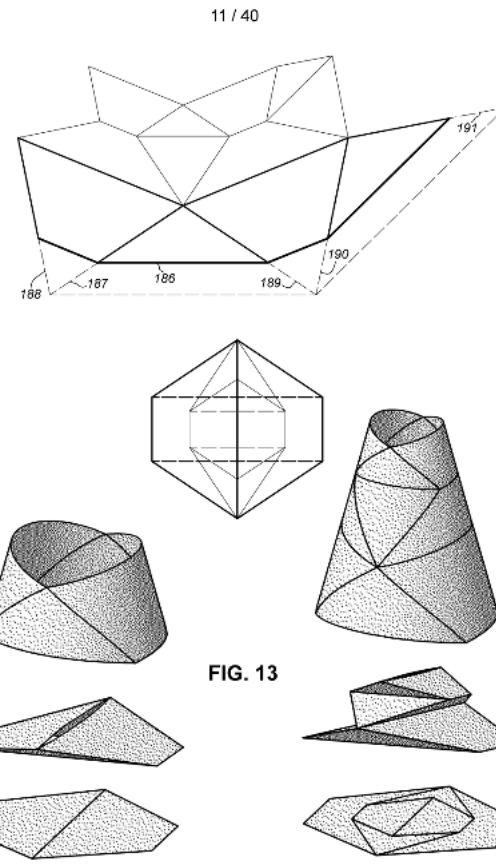
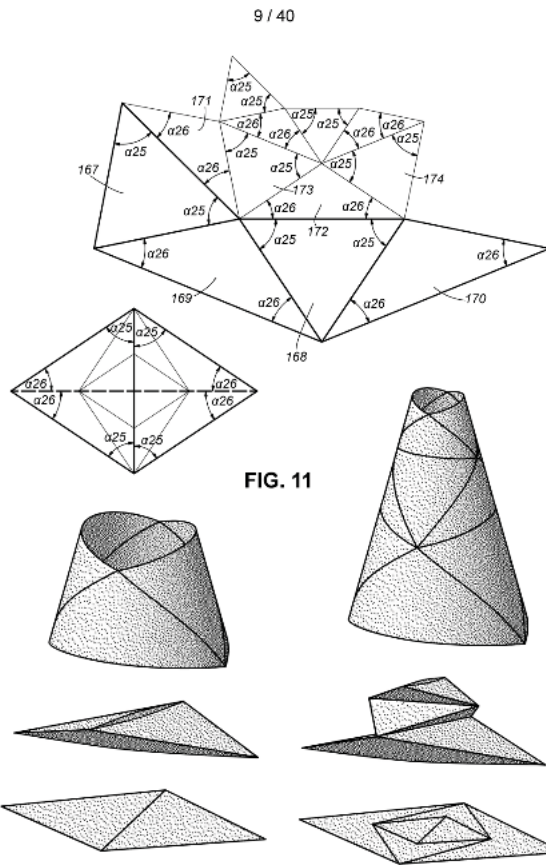


1.



2.

Conical patterns



Asymmetrical patterns

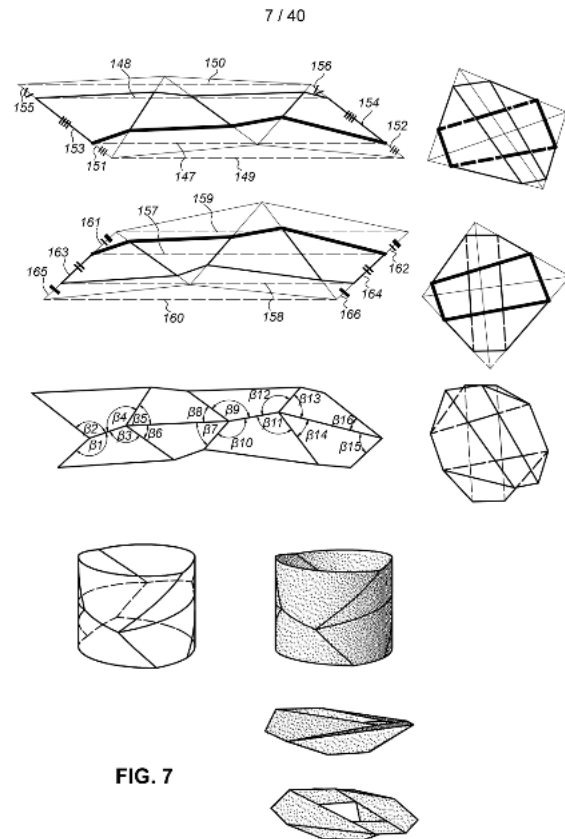


FIG. 7

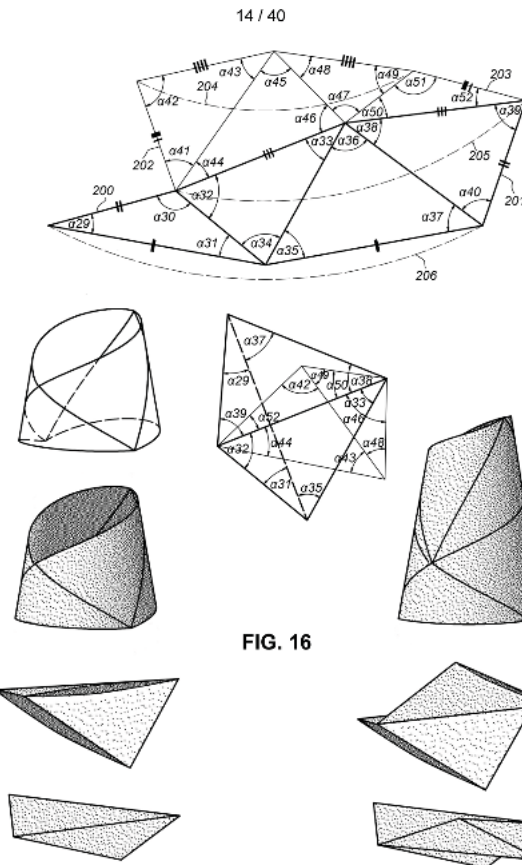


FIG. 16

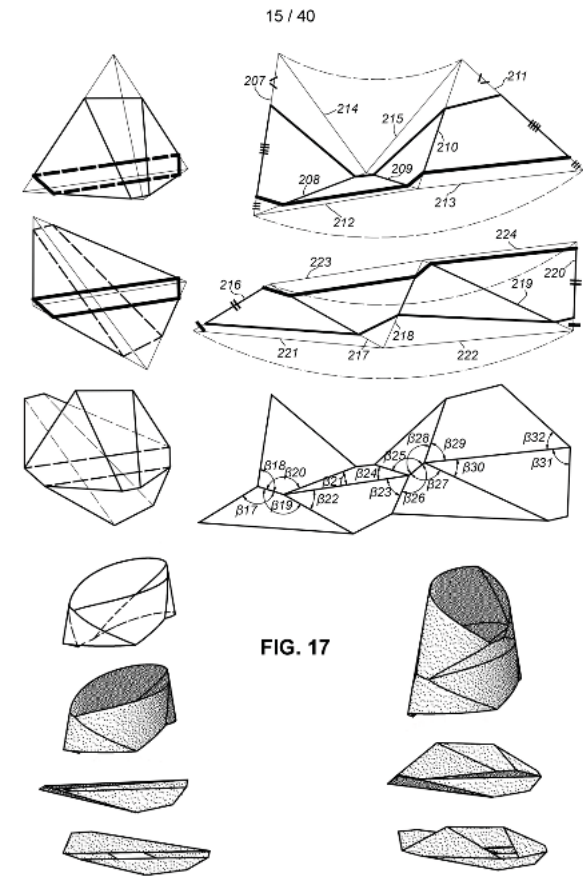
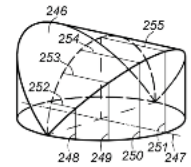


FIG. 17

Closing patterns



19 / 40

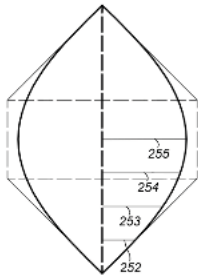
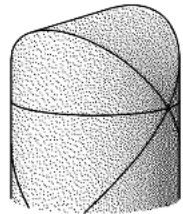
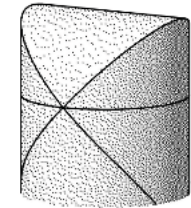
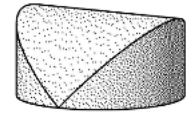


FIG. 23



25 / 40

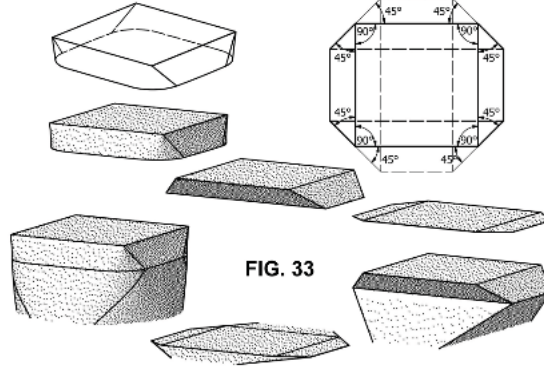


FIG. 33

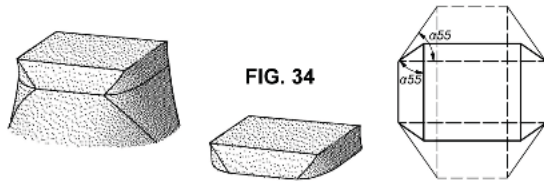


FIG. 34

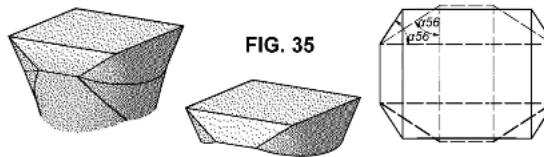


FIG. 35

28 / 40

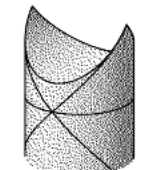
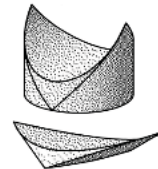
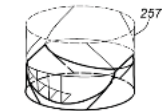
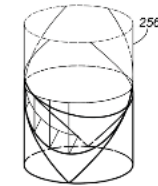
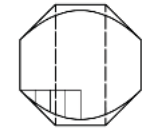
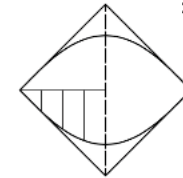
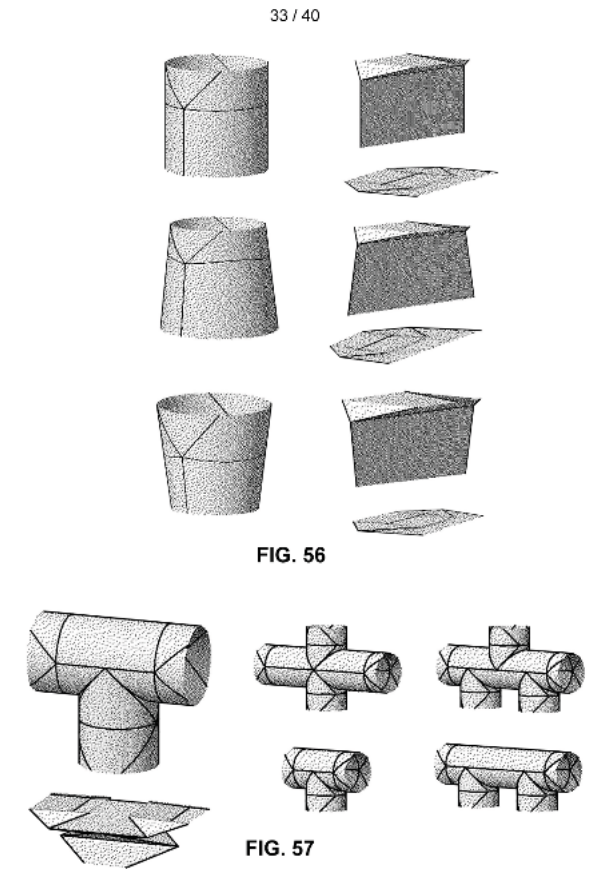
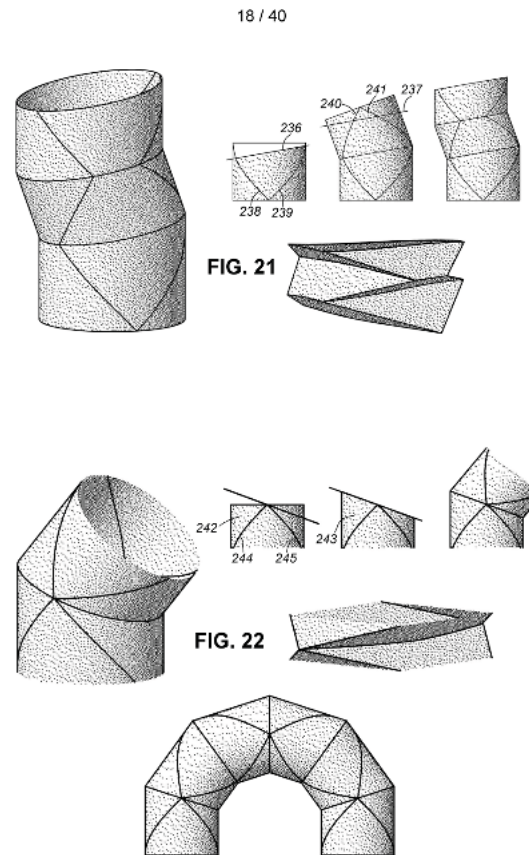
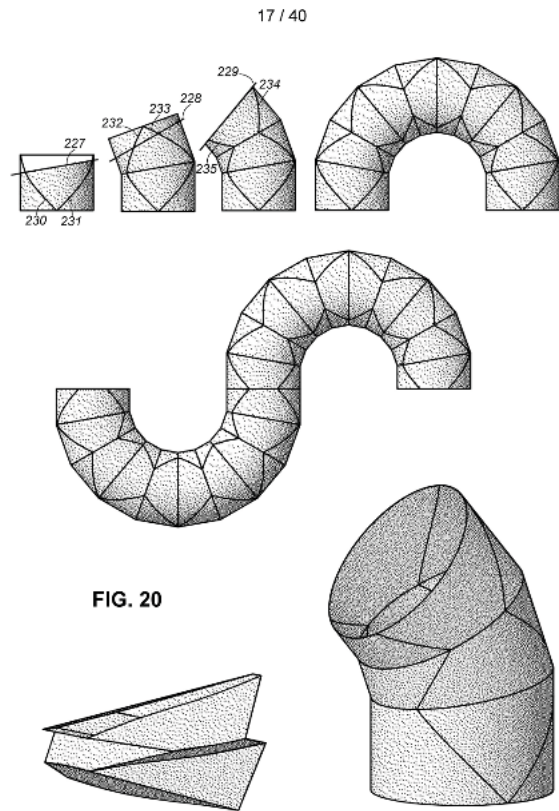


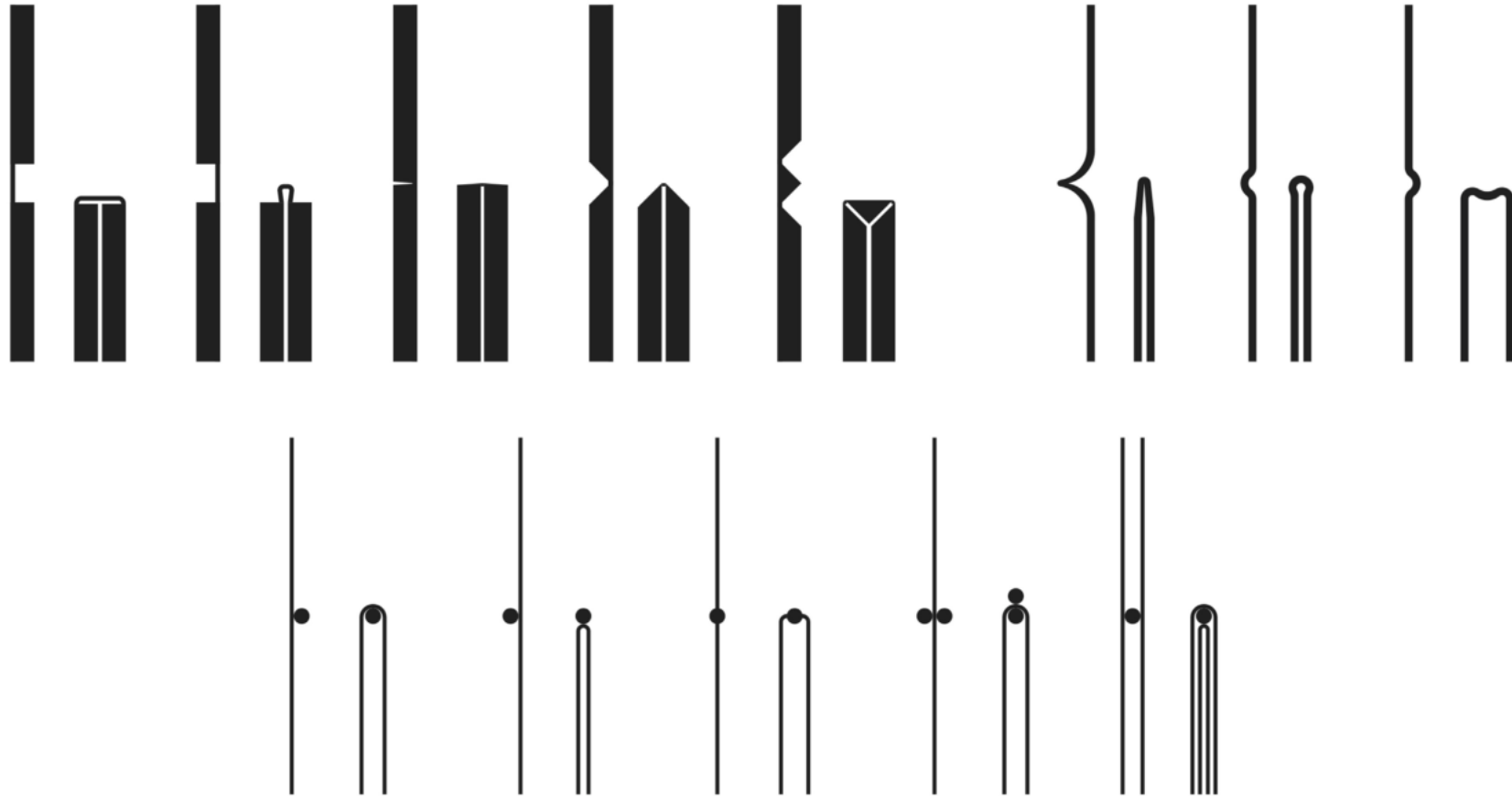
FIG. 42

FIG. 43

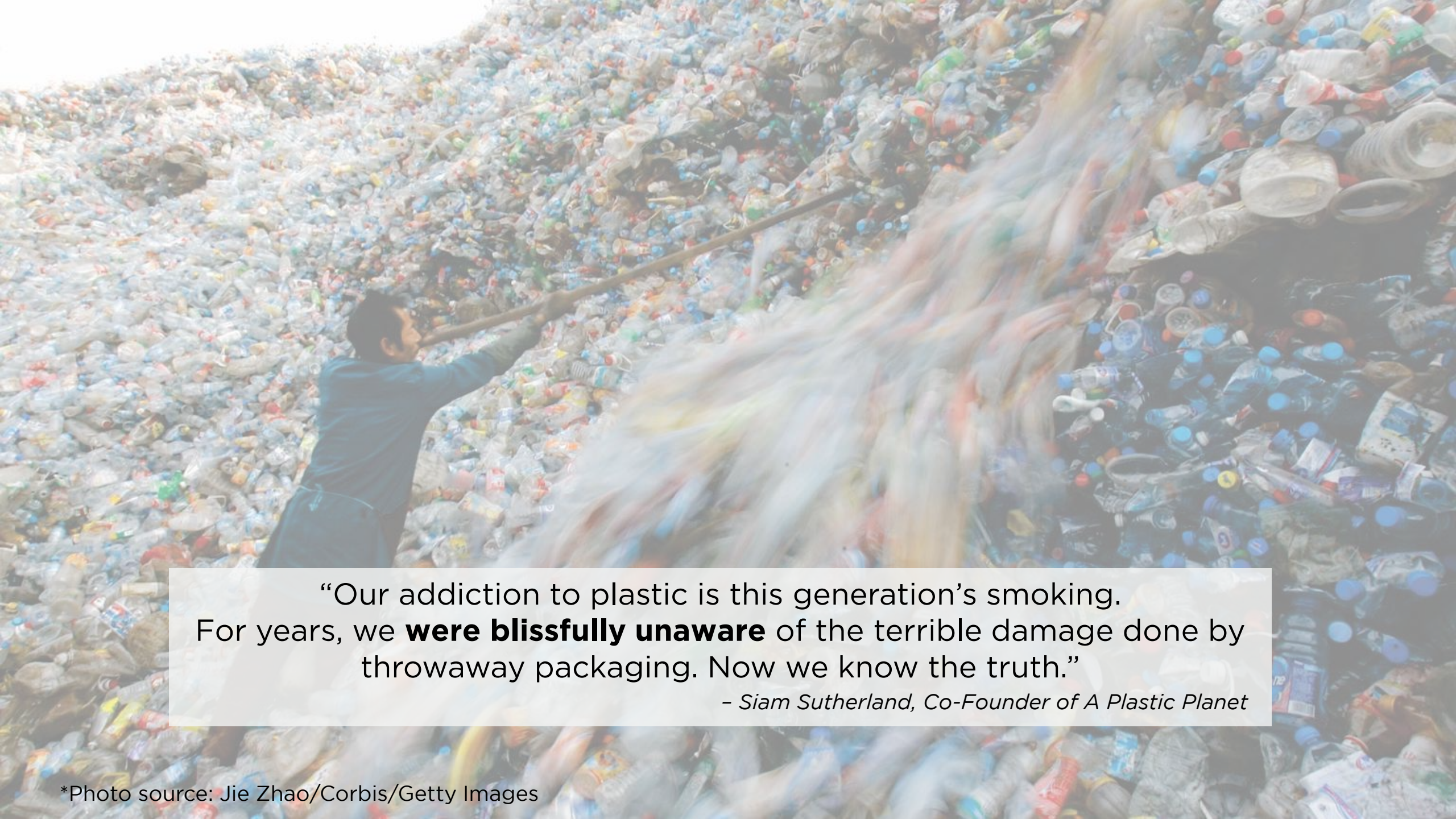
Modifications



Creases / Hinges



Applications



“Our addiction to plastic is this generation’s smoking. For years, we **were blissfully unaware** of the terrible damage done by throwaway packaging. Now we know the truth.”

– Siam Sutherland, Co-Founder of A Plastic Planet

Plastic pollution

Plastic binge
to double in the
next 20 years¹



More plastic than
fish in the oceans
by 2050²



Lack of convenient
reuse packaging
alternatives



1. Guardian: <https://bit.ly/2t0AH4W> 2. WEF: <https://bit.ly/2aLltbe>

The positive reuse revolution

Change of ownership paradigm

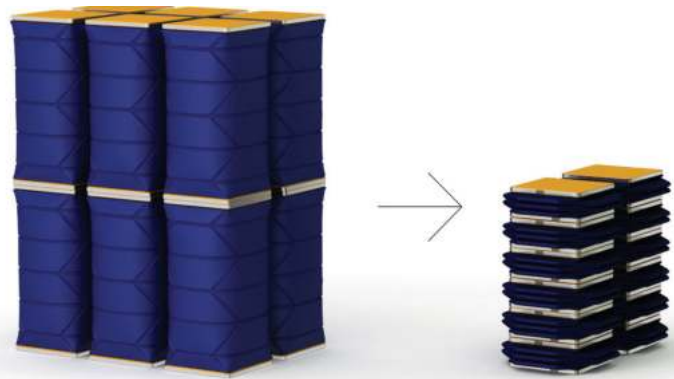


Emerging Reuse Models



Technology Applications

Developing more functional space-saving reusable packaging and products.



Supply chain containers



Reusable CPG packaging



Lifestyle reusable ware

Business roadmap



Stage 1
Hyperfold Bottle



Stage 2
Reusable Packaging

Single-use packaging

Developing packaging that offer new UX for disposal

- ✓ Encouraging people to recycle more
- ✓ Optimizing waste volume
- ✓ Optimizing transportation



Prototyping

Different directions



Print technology

FDM / FFF

Print technology

Why FDM?

- ✓ **Affordable**
- ✓ **Accessible**
- ✓ **Works with thermoplastics**

Equipment



Ultimaker 2+

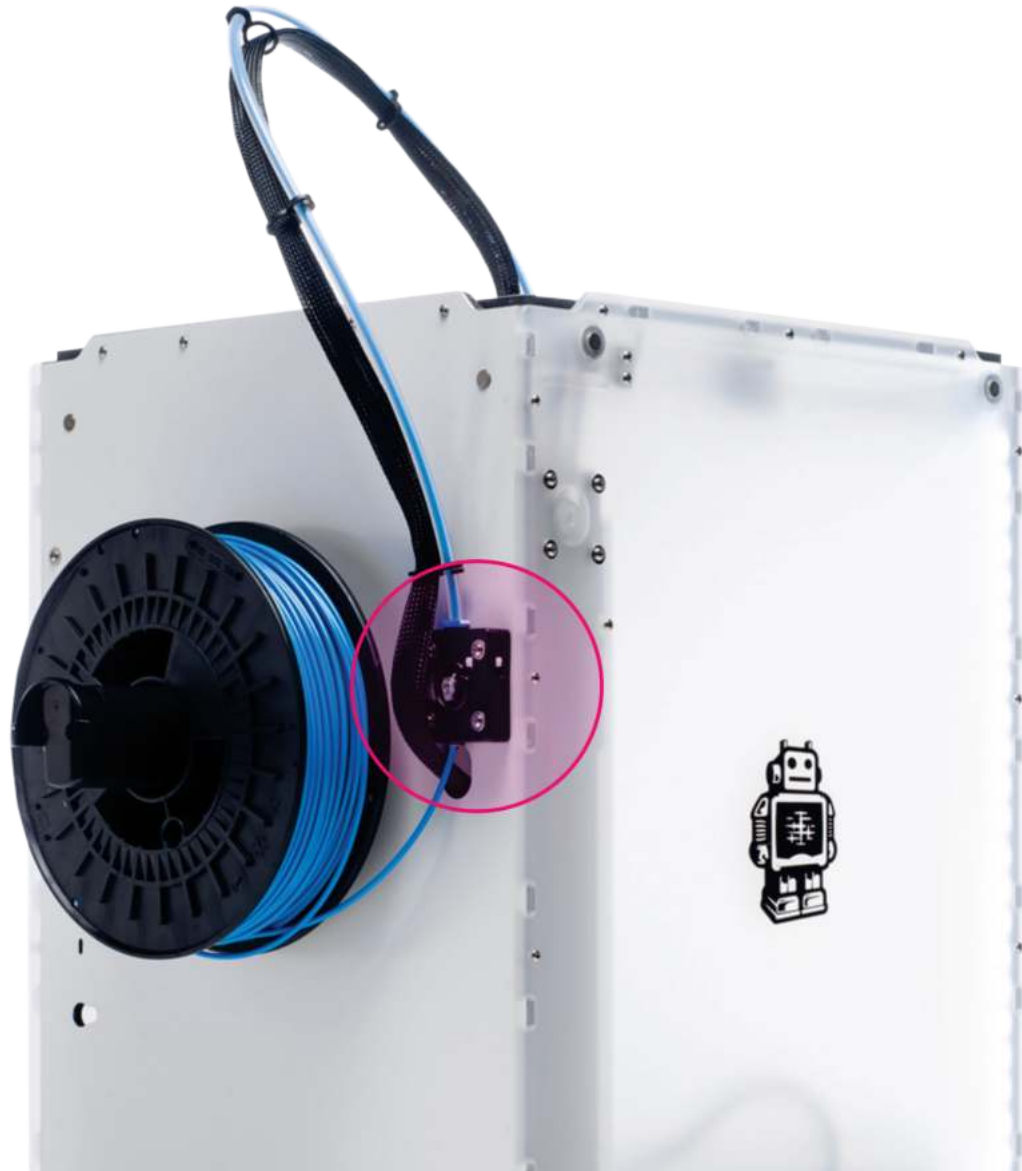


Ultimaker 3

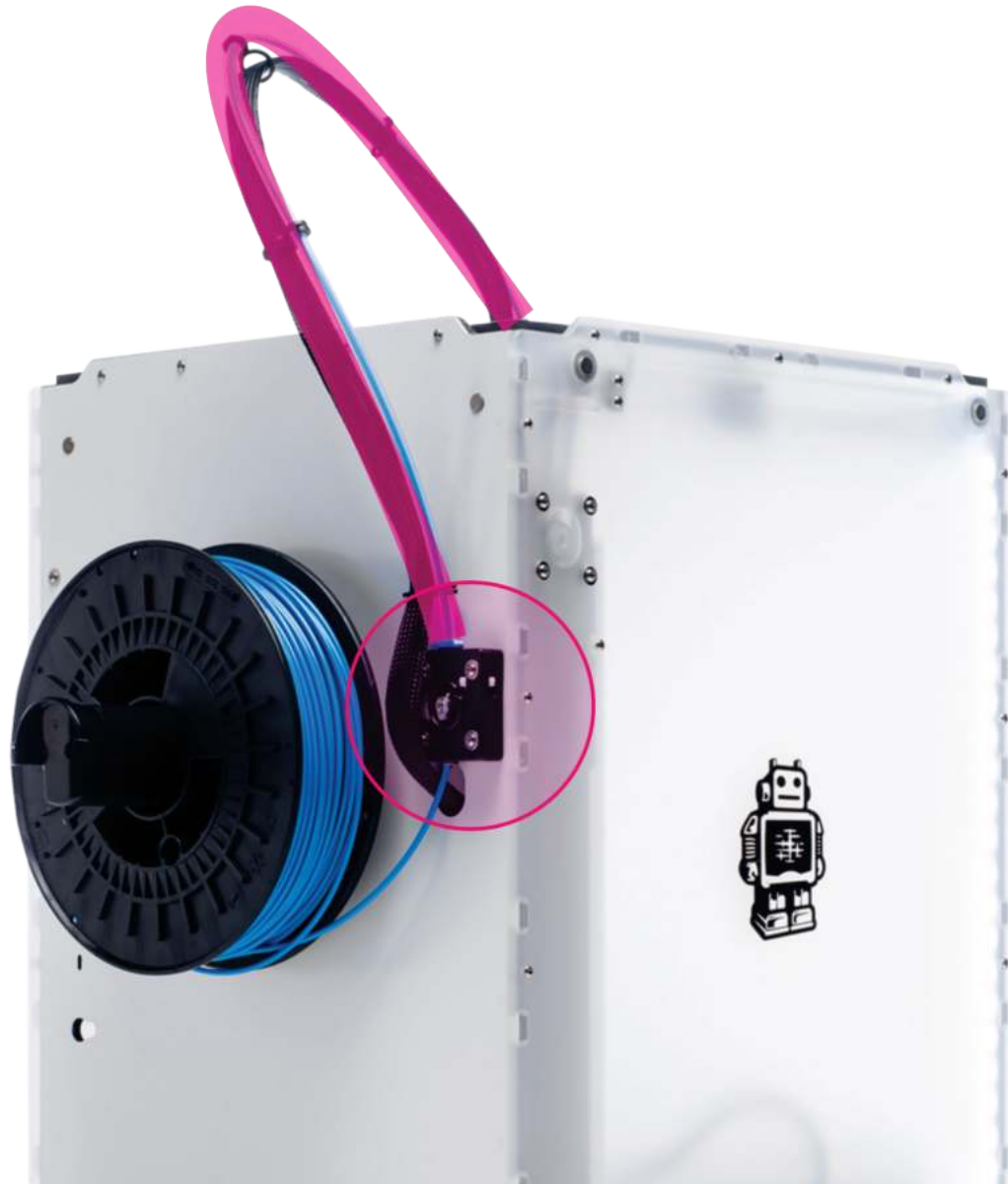
Bowden extruder



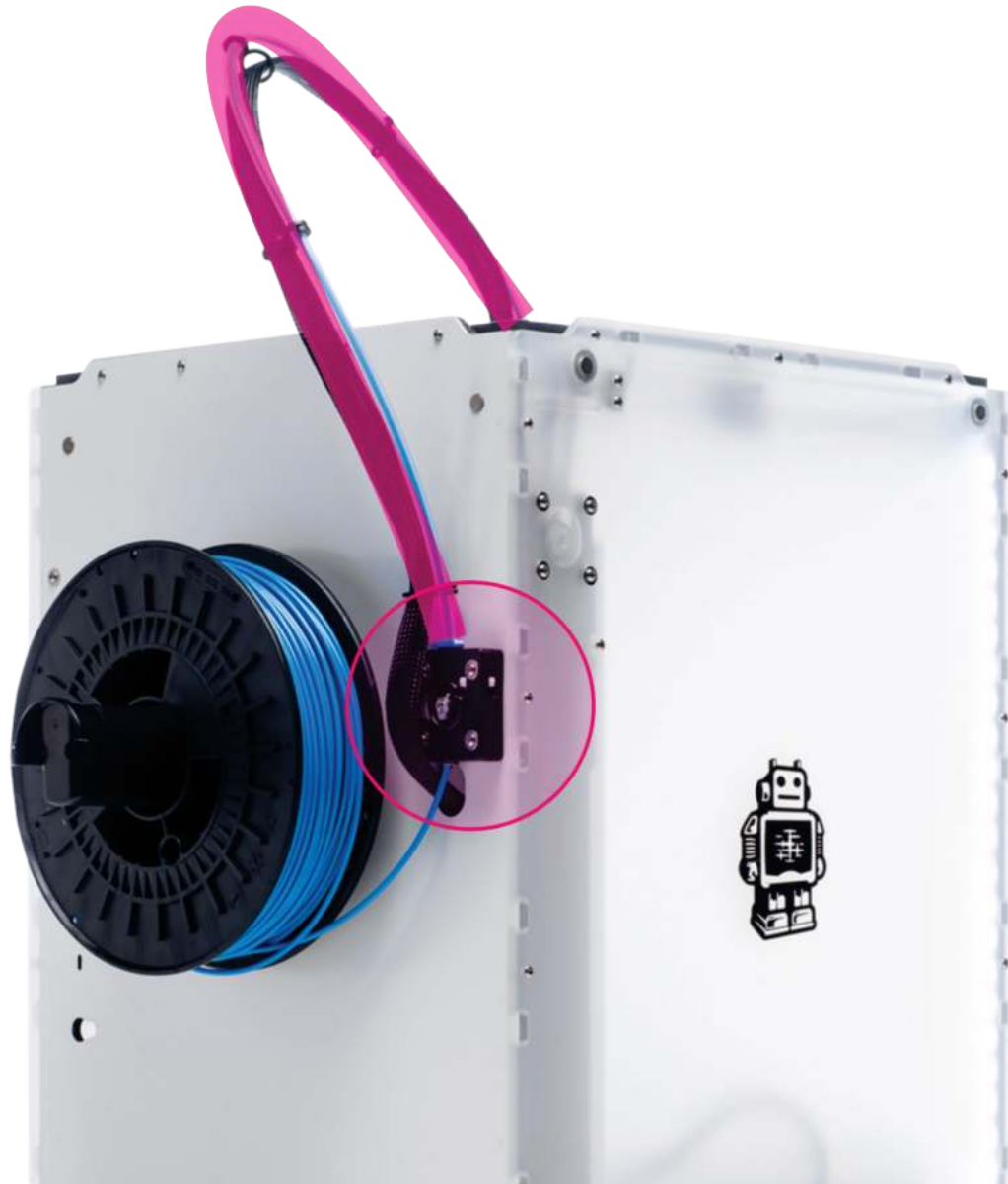
Bowden extruder - motor



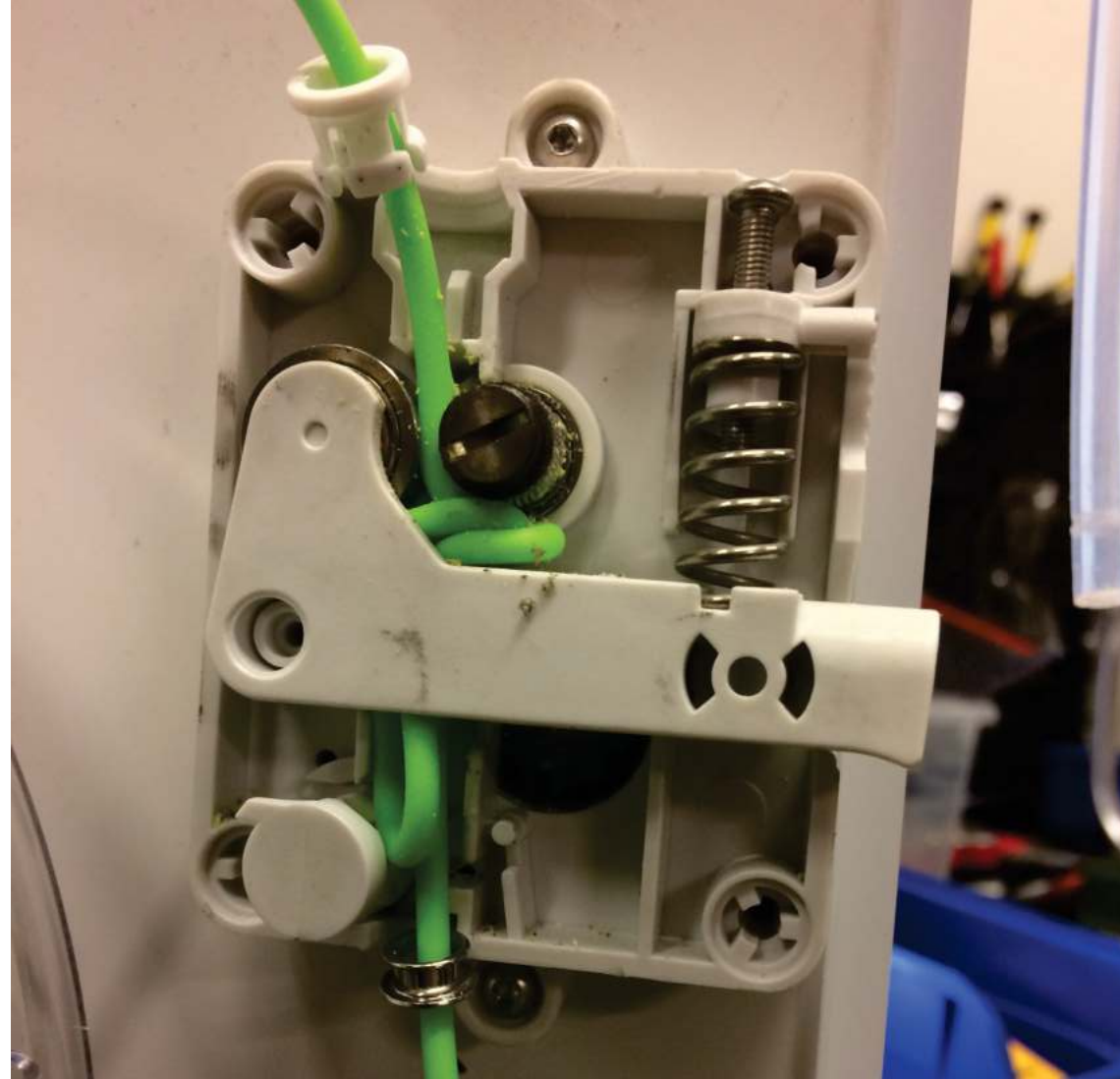
Bowden extruder - tube



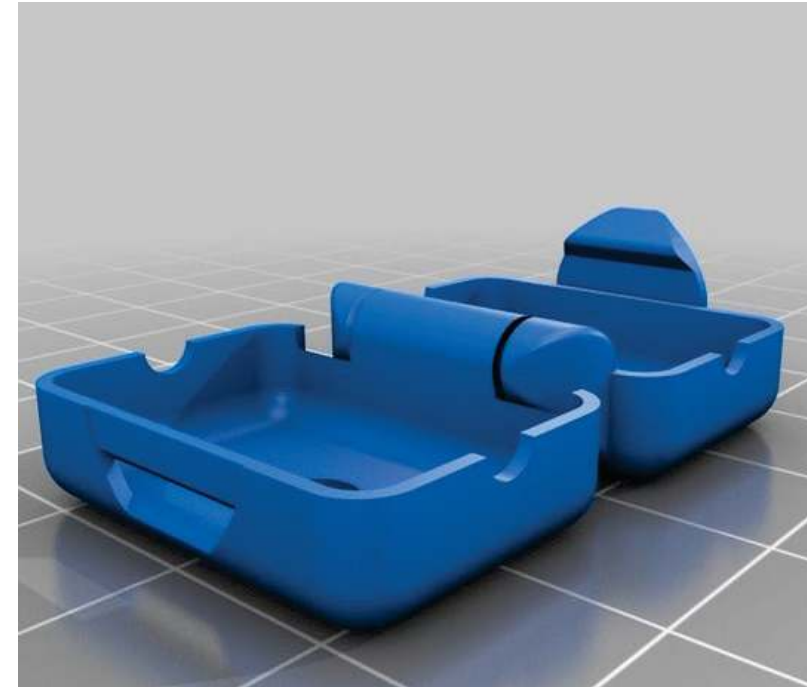
Bowden extruder - head



Challenges with flexible materials



Filament oiler



Tested materials

Ultimaker

PP TPU 95A



FlexFill 98A



PP



Innoflex 45



Python Flex



Filaflex 82A Filaflex 95A



Soft PLA-Flex

Materials - hardness

Ultimaker

PP

TPU 95A

fillamentum
addi(c)tive polymers

FlexFill 98A



smart materials 3D

PP

InnoFil 3D

Innoflex 45

FORM
FUTURA
3D PRINTING FILAMENTS

Python Flex



Filaflex 82A

Filaflex 95A

ORBI-TECH

Soft PLA-Flex

Hardness comparison

Shore A

60	65	70	75	80	85	90	95	100
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Shore D

22	25	29	33	39	46	58	70	85	100
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Filaflex 82A


Filaflex 95A

Ultimaker
TPU 95A


FlexFill 98A


Soft PLA-Flex


Pyton Flex

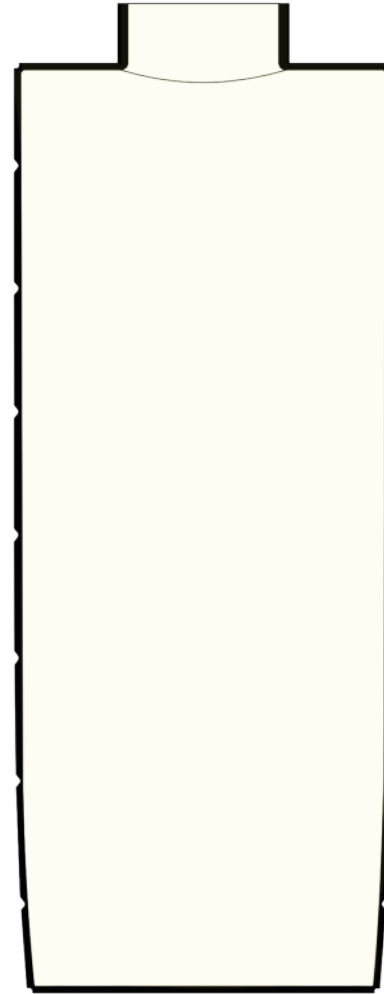
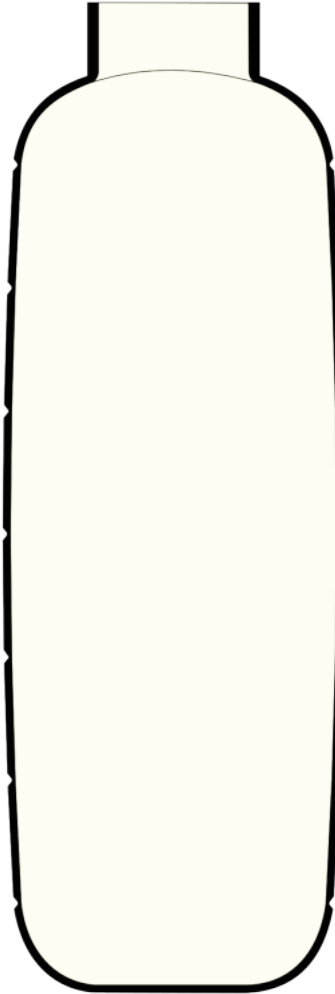
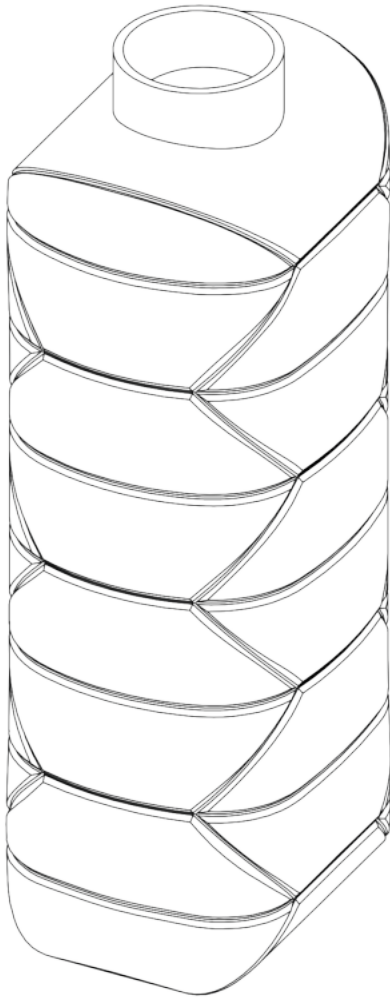

Innoflex 45


PP

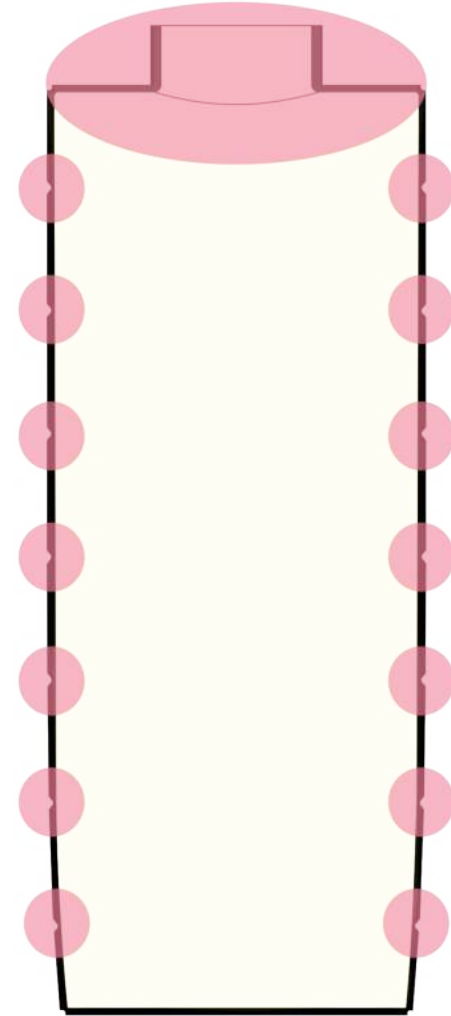
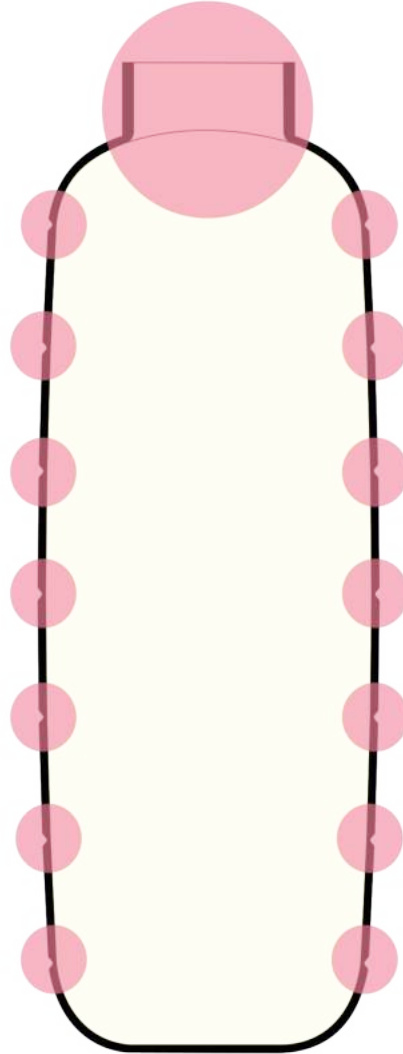
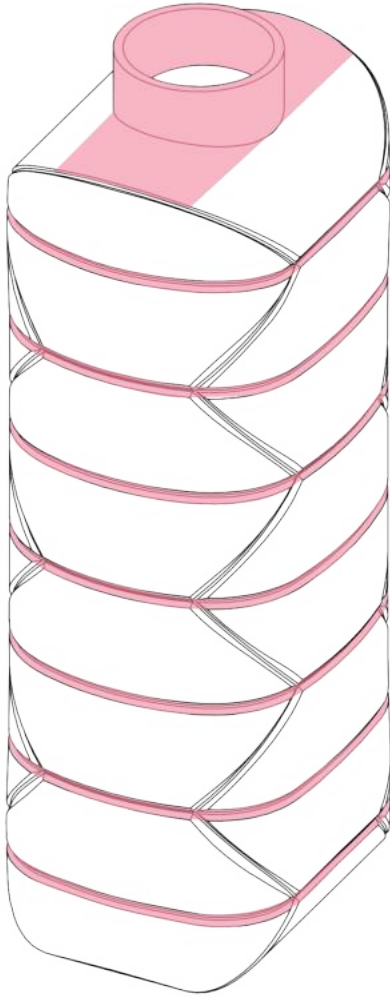
Ultimaker
PP

First bottle design

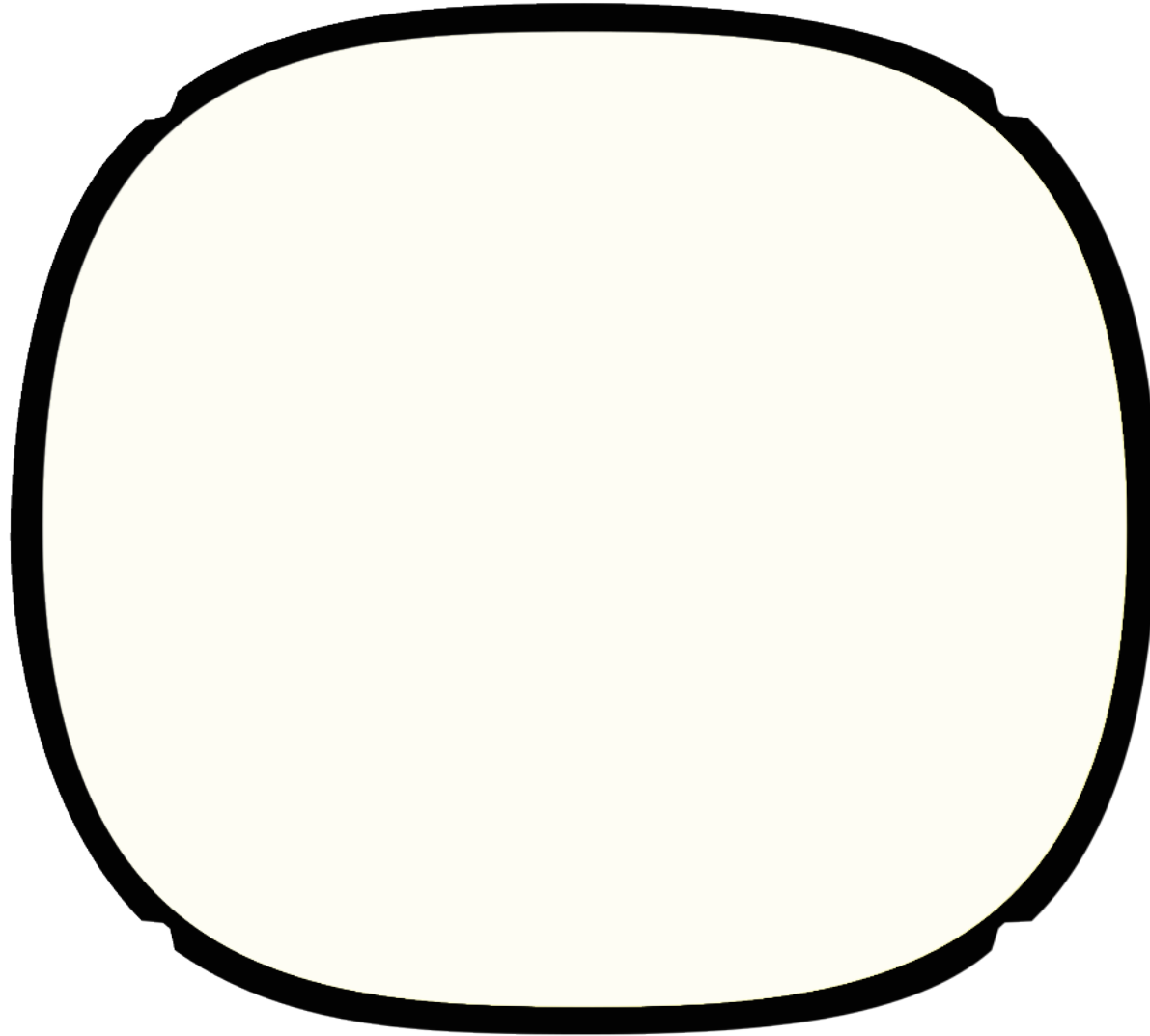
Challenges



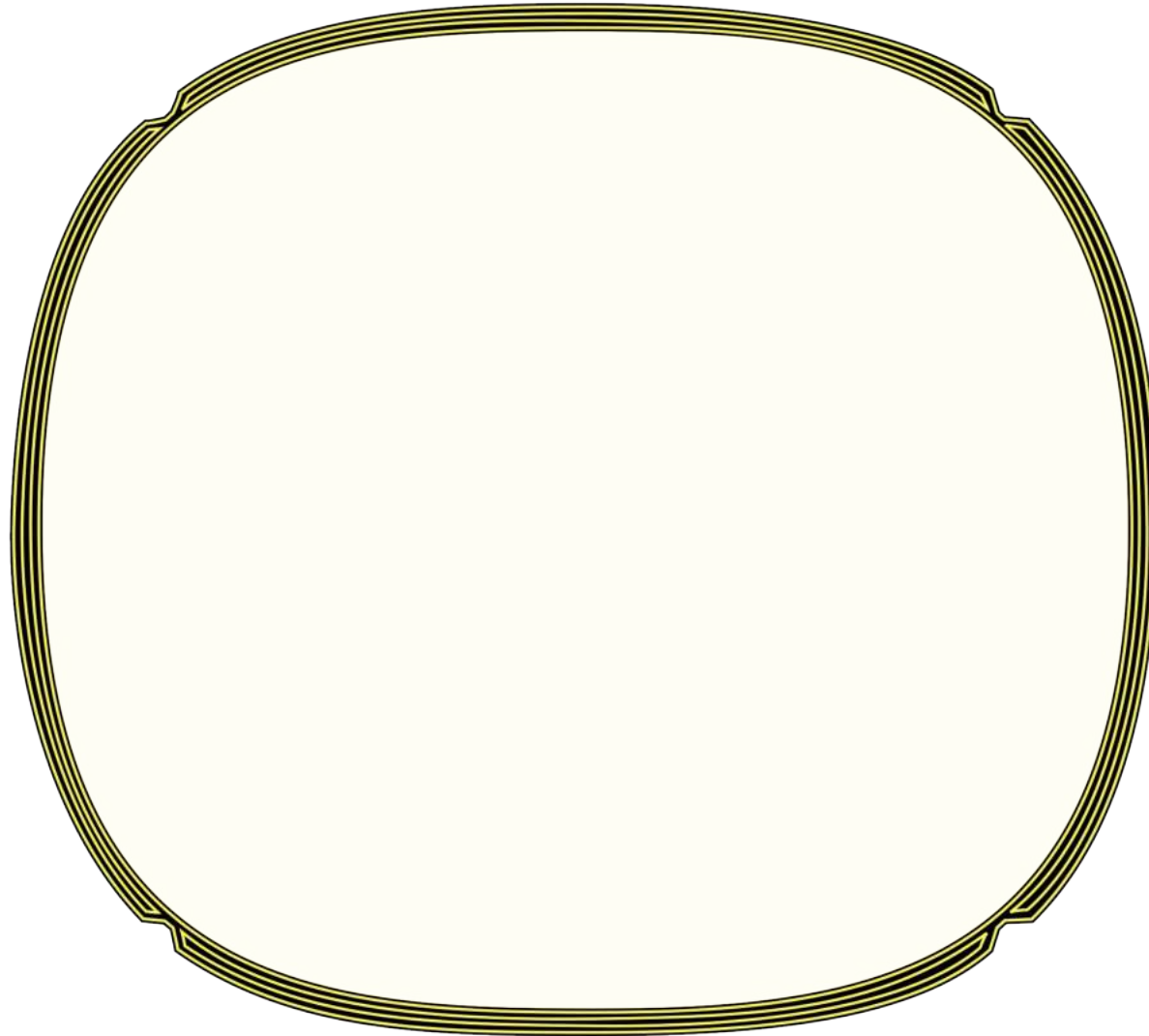
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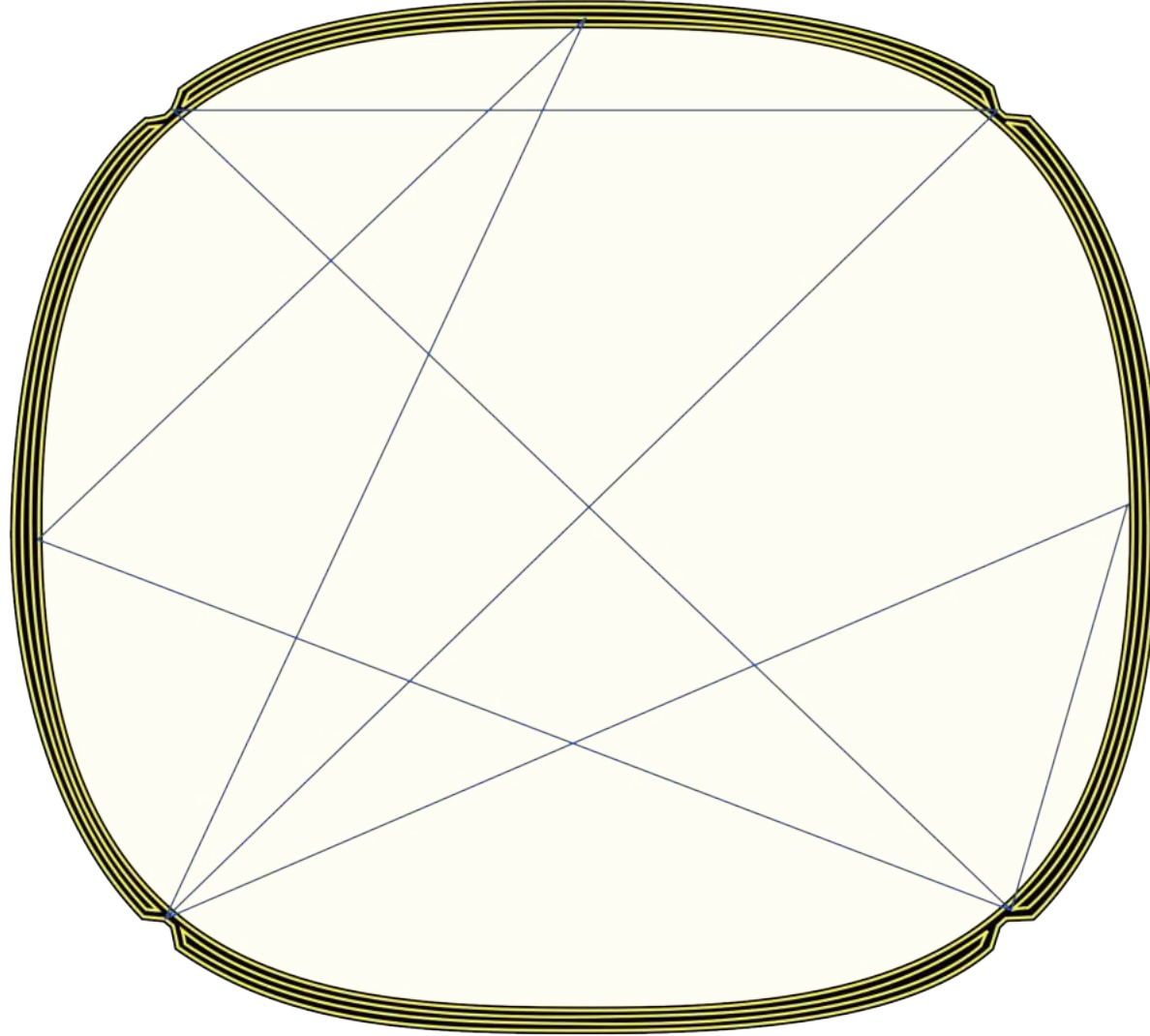
Travel & Retraction



Travel & Retraction



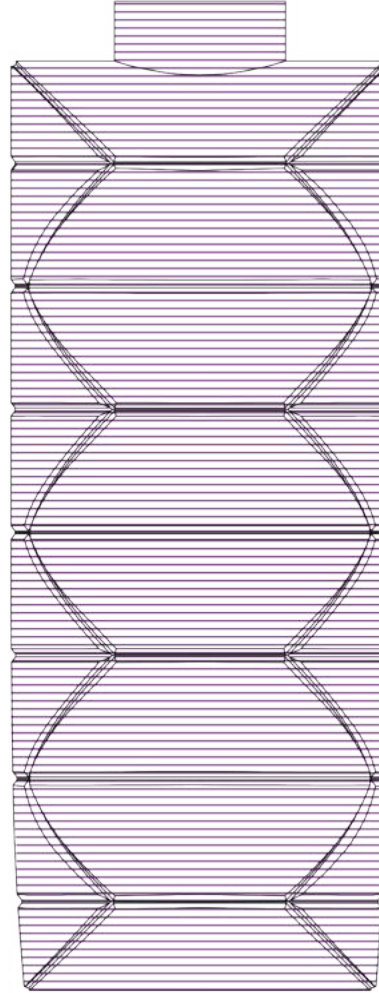
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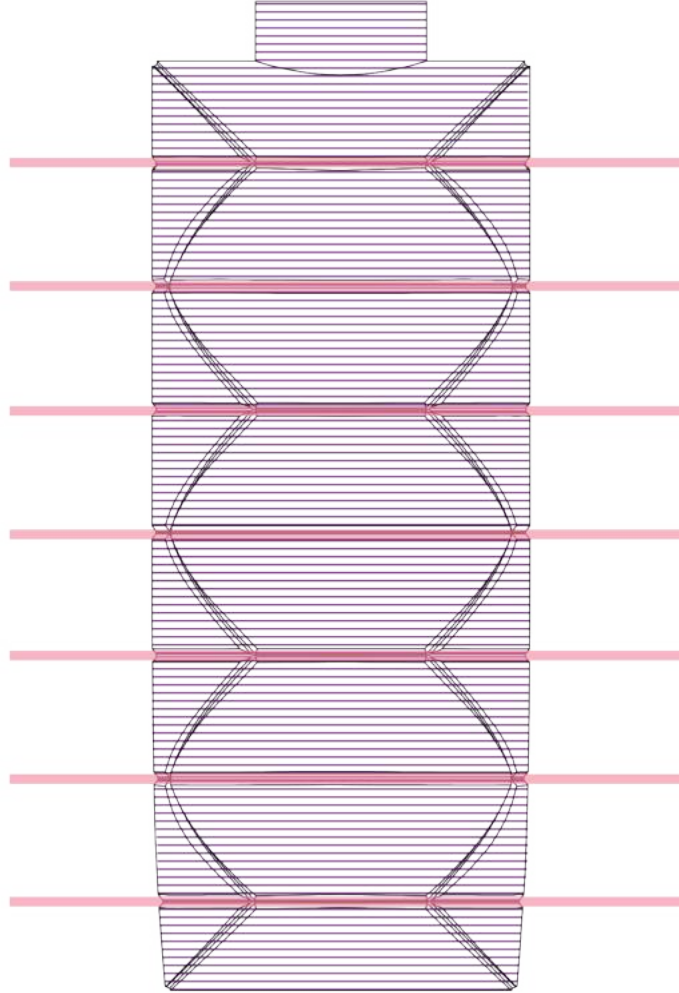
Travel & Retraction



Vertical print



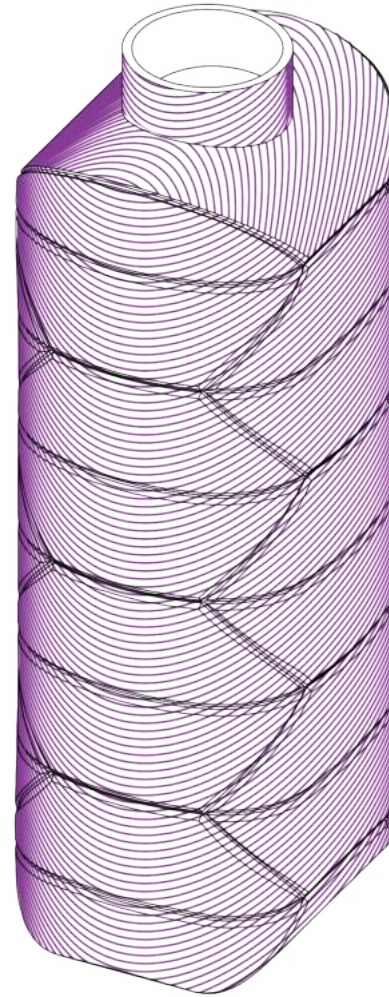
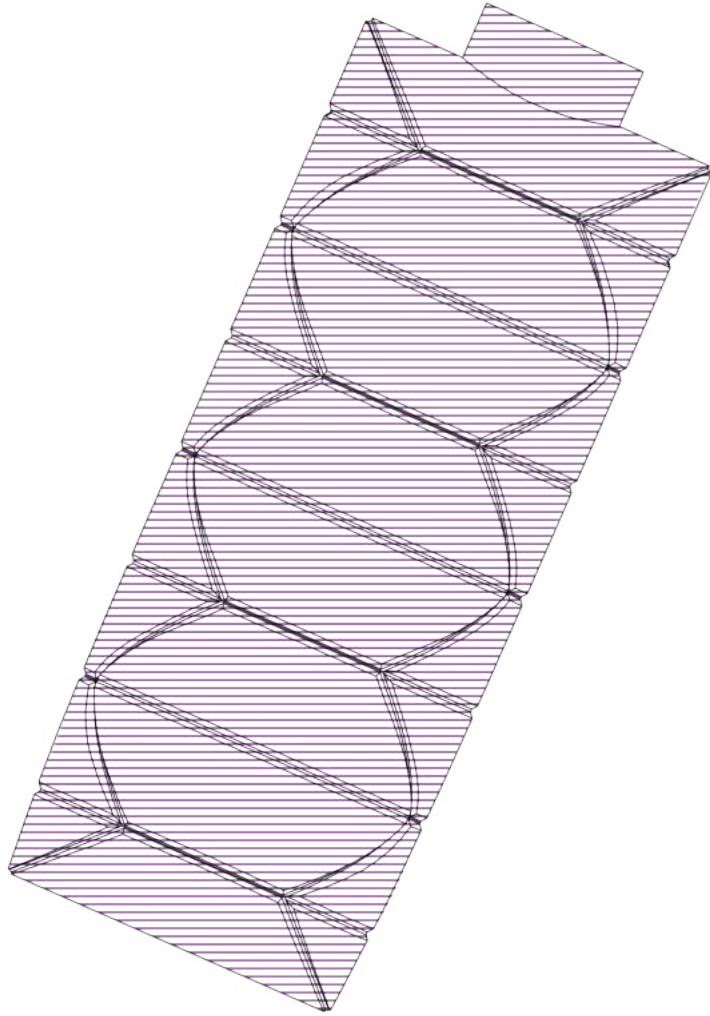
Vertical print



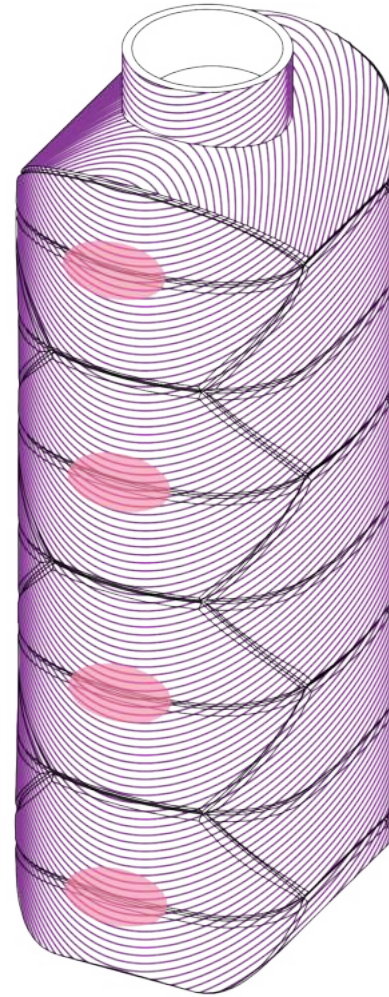
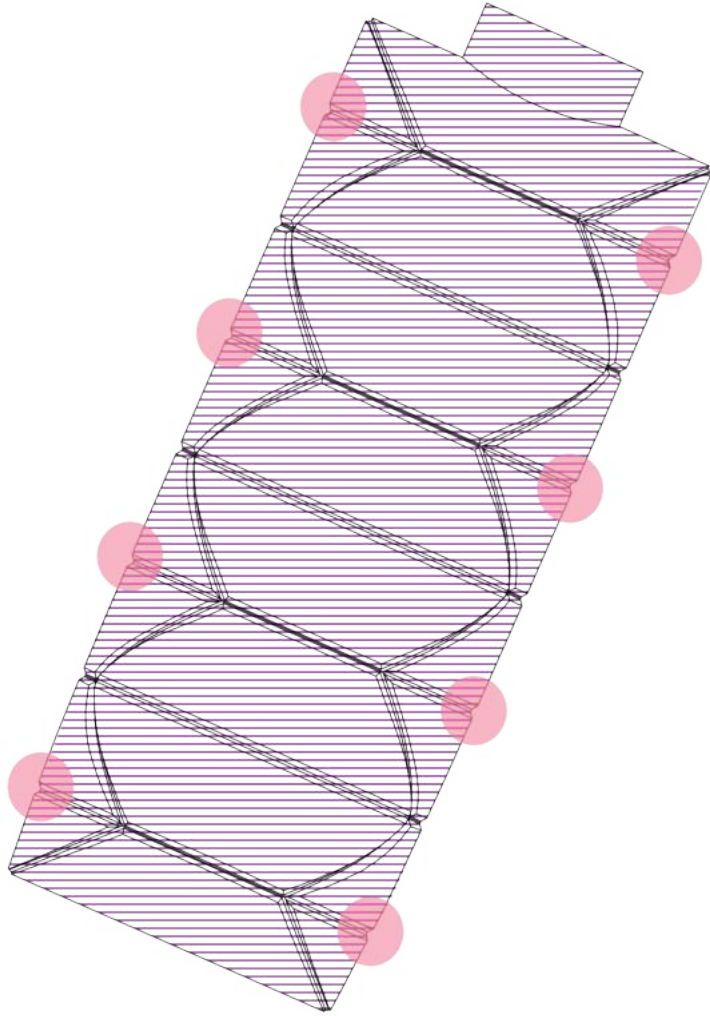
Poor bonding



Inclined print



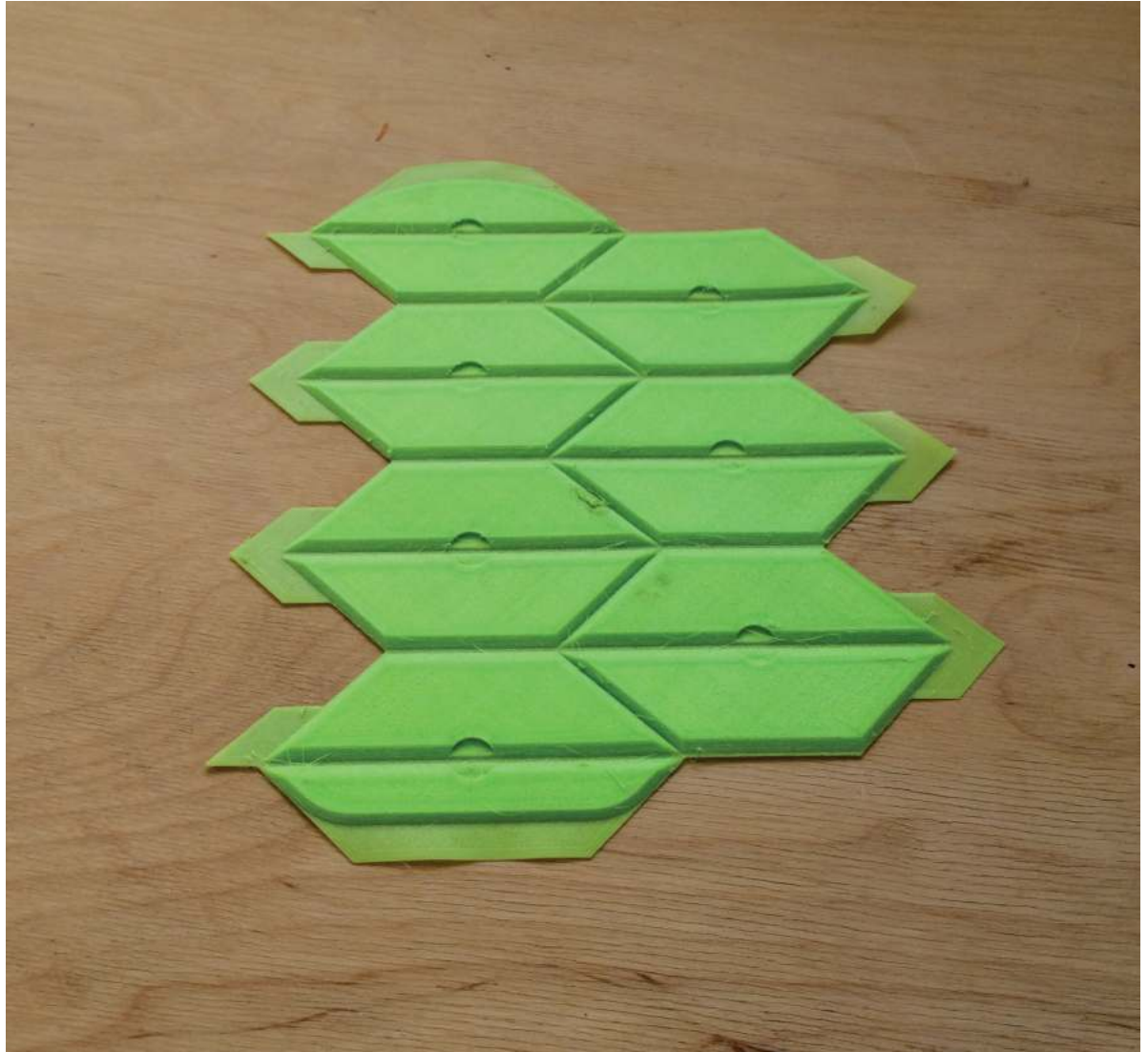
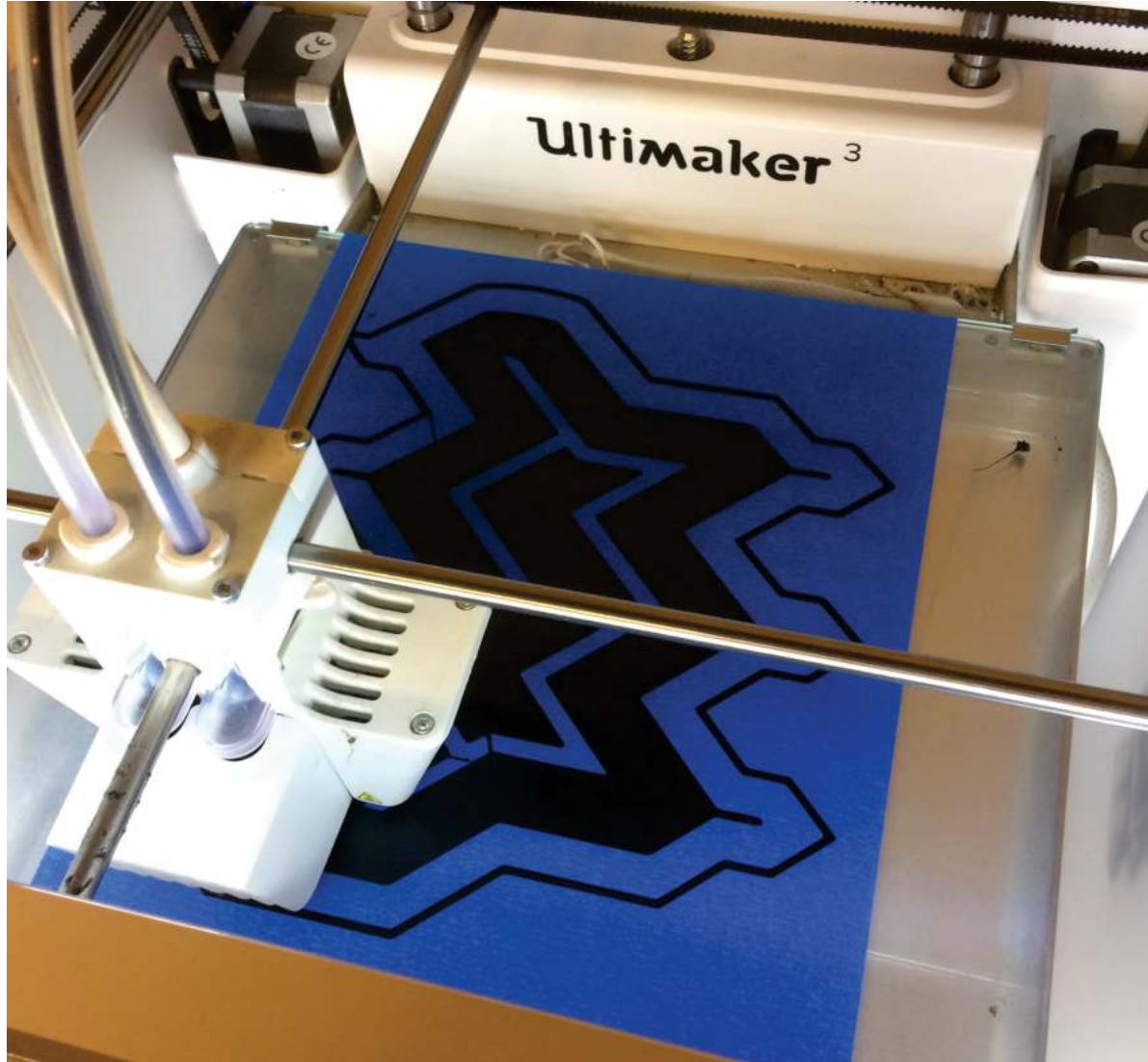
Inclined print



Semi folded print



Flat approach



Flat approach - assembly



First working prototype





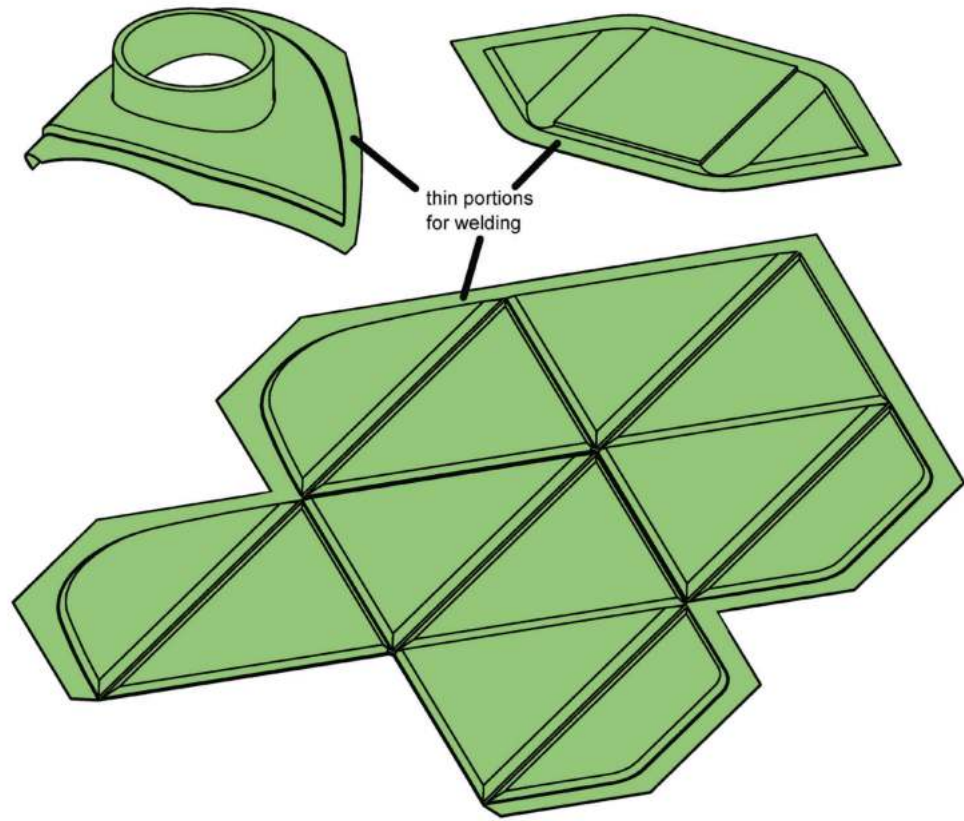
New bottle design

New design - triangles



- ✓ **Minimalist design**
- ✓ **Less creases / hinges**
- ✓ **Less movements during folding**
- ✓ **More compact**
- ✓ **Easier to produce**

New design - flat approach





New material

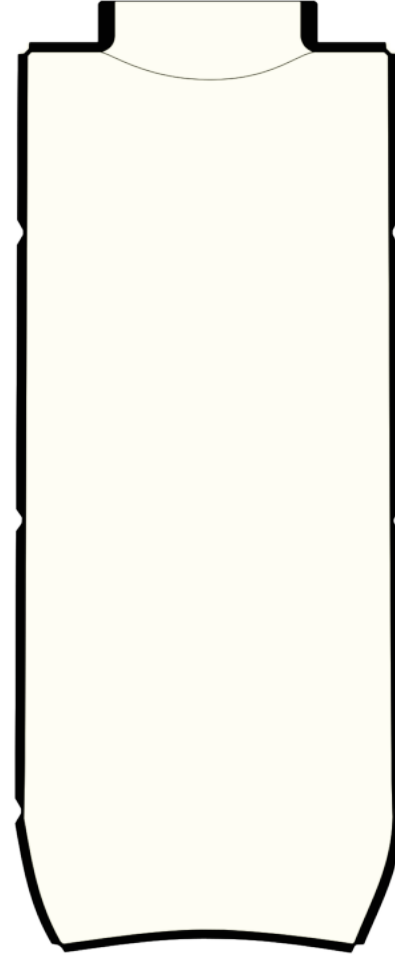
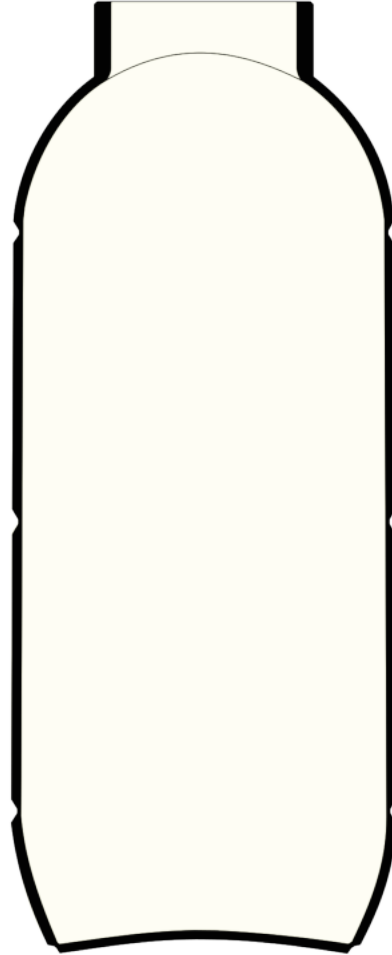
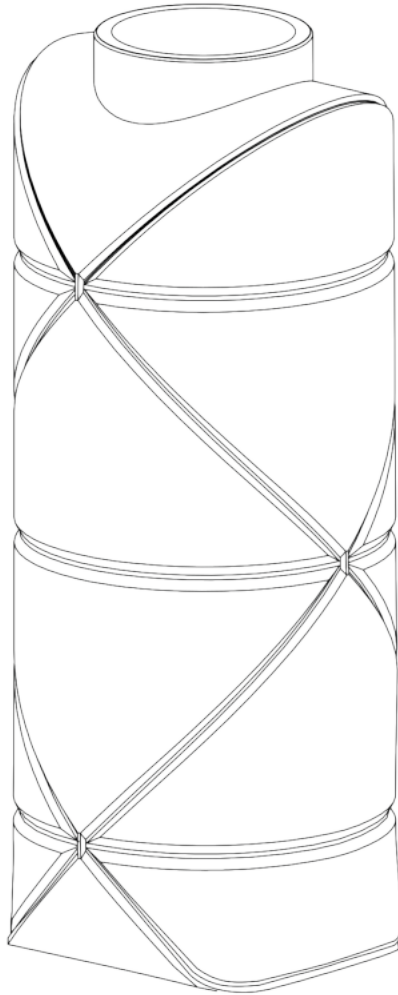


Innoflex 45

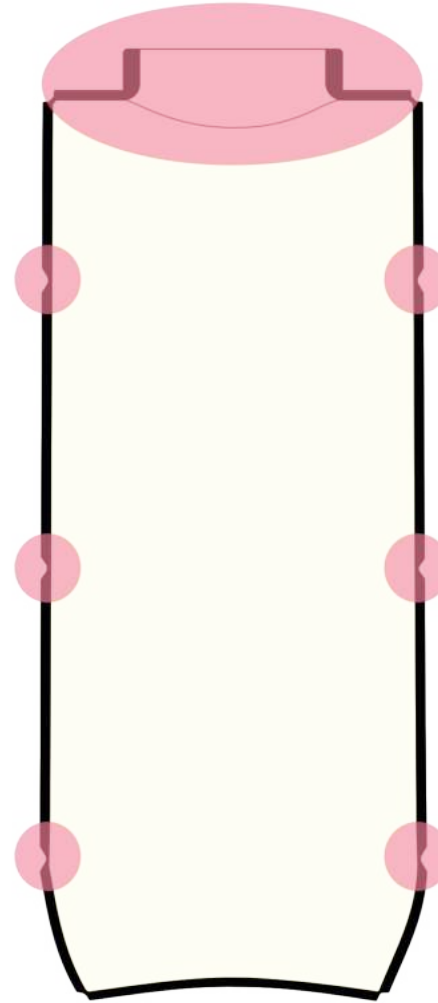
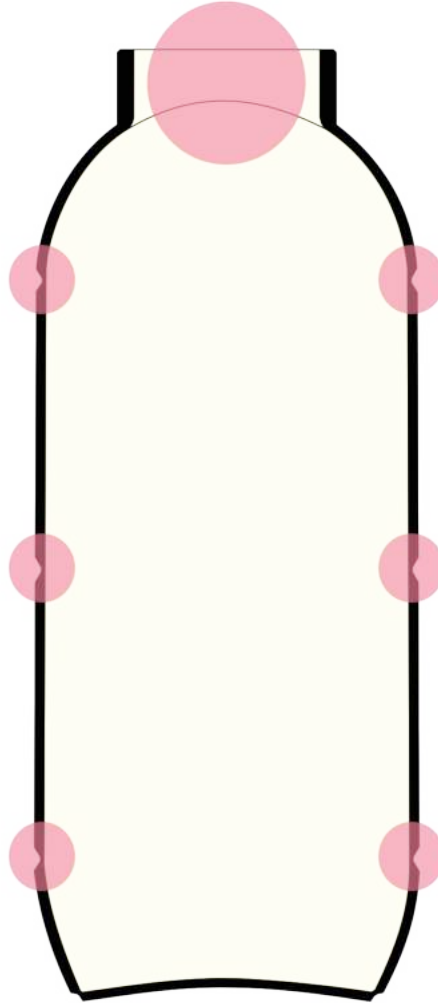
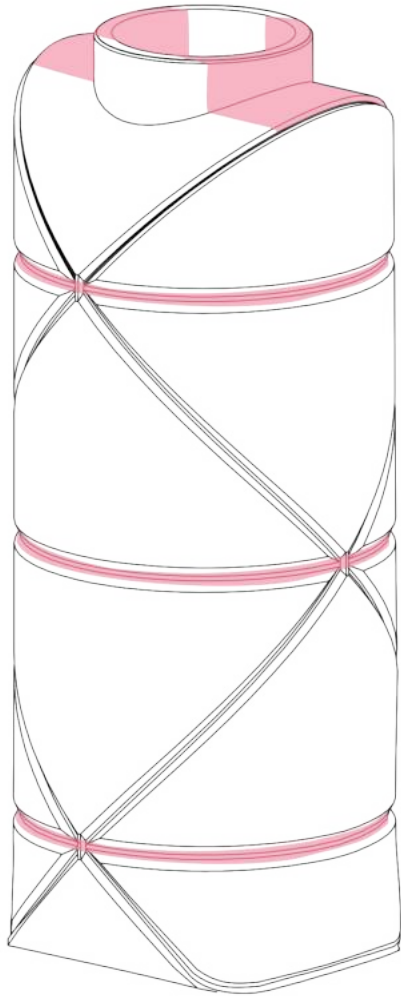


Arnitel ECO

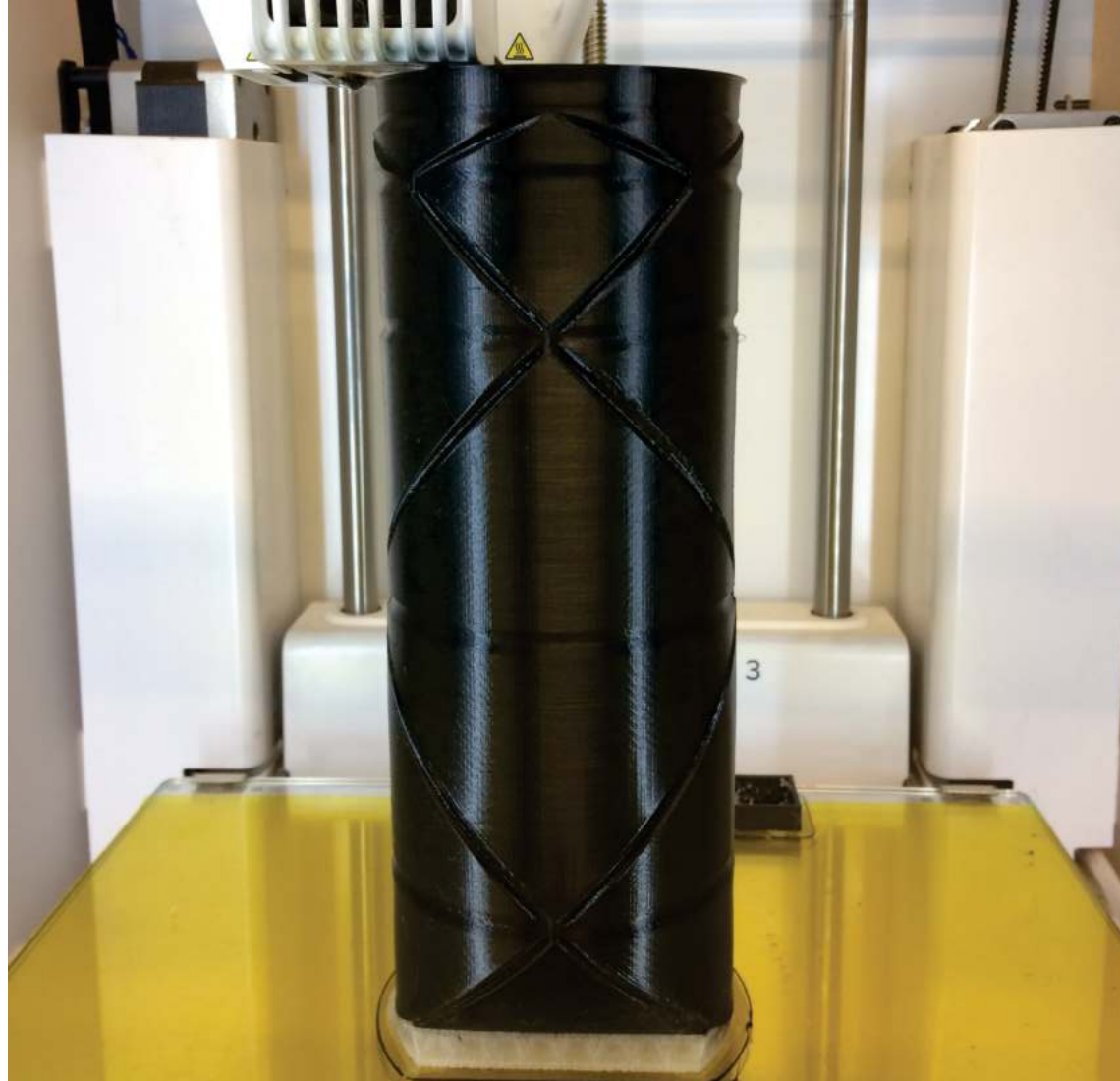
Challenges



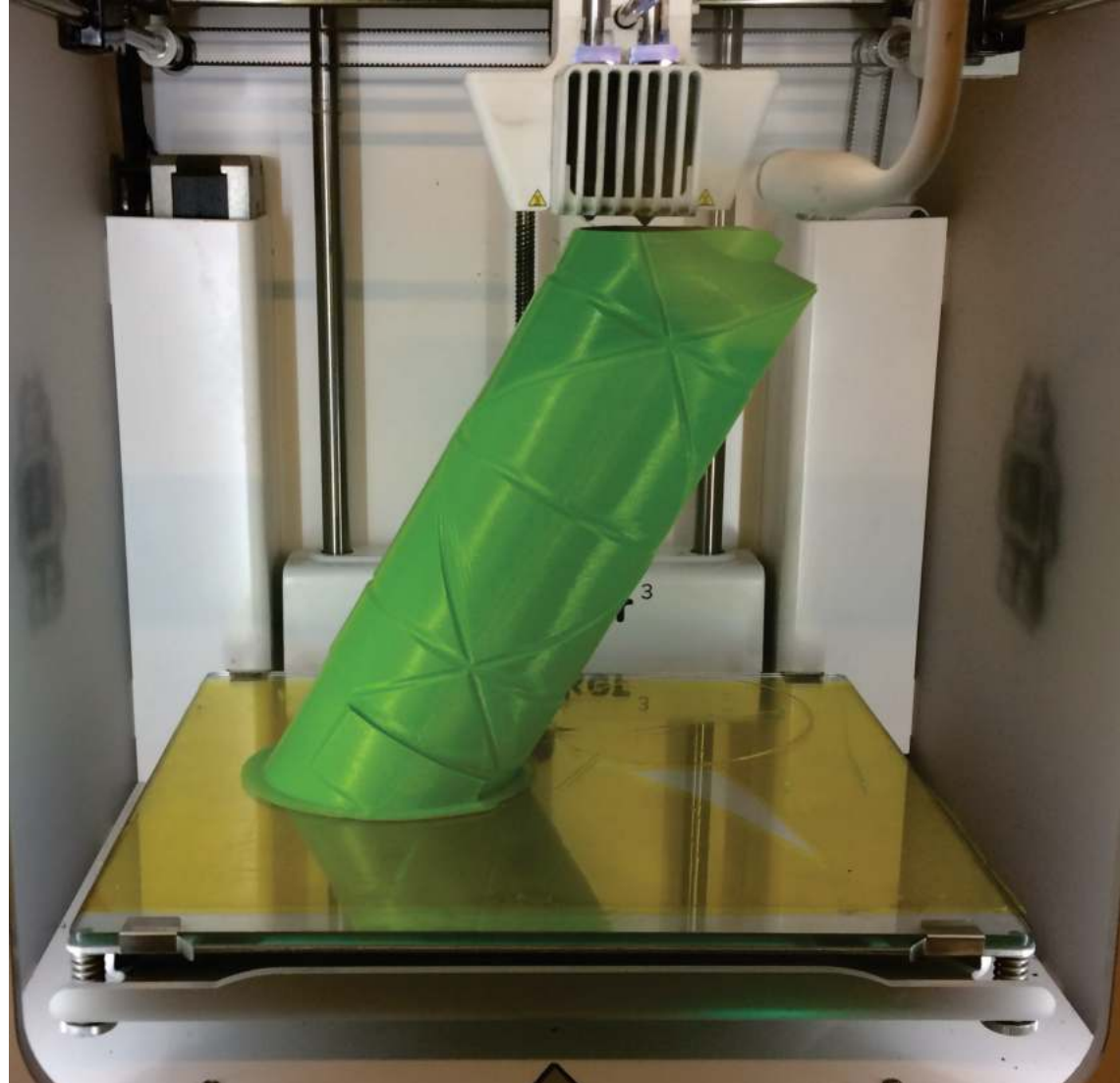
Challenges



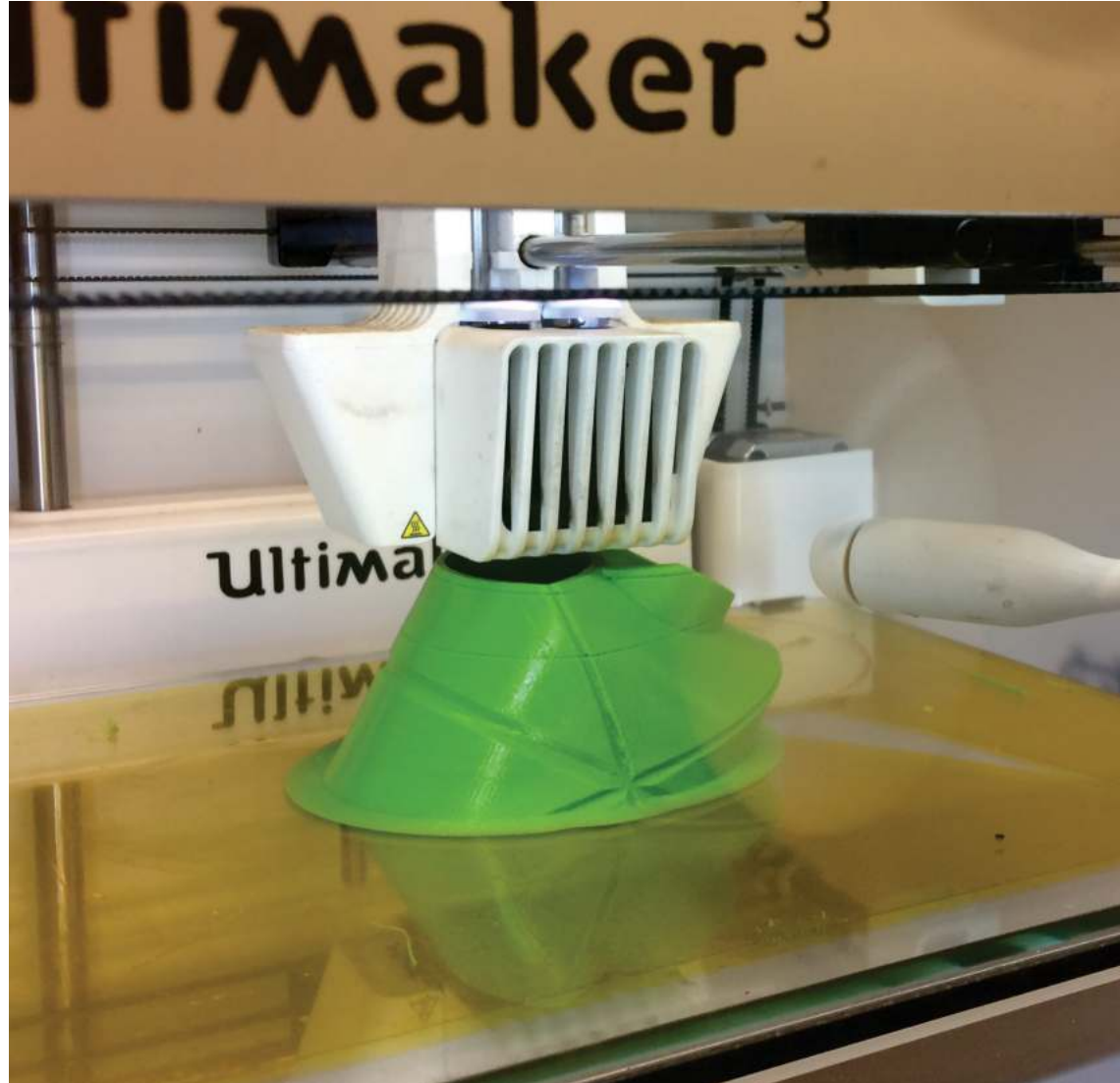
Vertical print



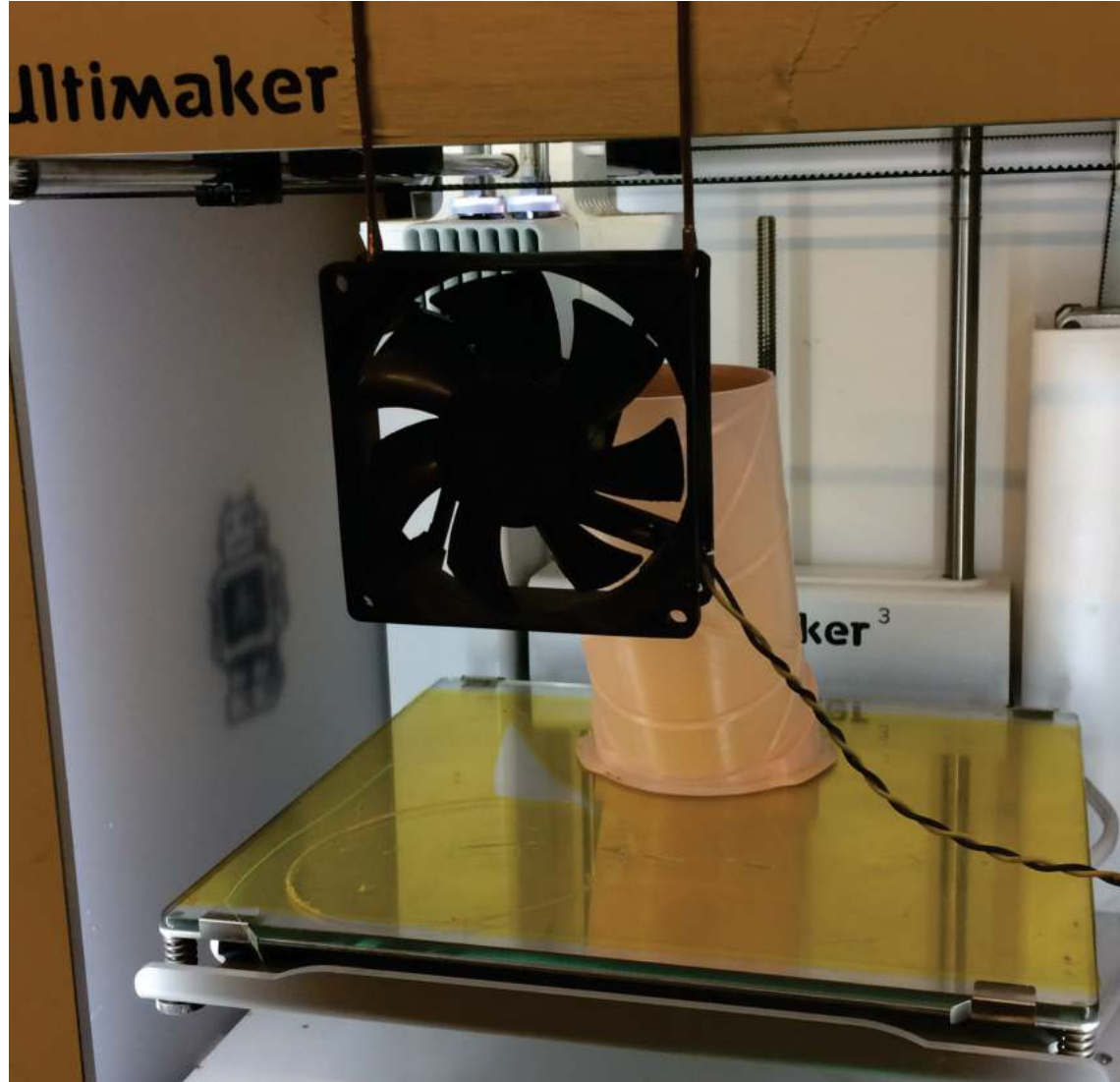
Inclined print



Cooling challenges



Additional cooling







bottle.hyper-fold.com

Thank you.

Petar Zaharinov
contact@hyper-fold.com

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