

Aim of the Project

This project aims to construct a 3D printer uniquely designed to utilise recycled plastic bottles as its filament source to create another form of recycling in order to contribute to the reduction of plastic waste and pollution.

Objectives

- Research 3D Printing technologies, with particular attention given to FFF approach. Research current projects utilising waste materials for 3D printing and review all potential equipment required for the rig.
- Design a table-top recycling plastic bottle rig to turn material into usable spools of filament. Complete design process must be adhered to including 3 design concepts which must include clear dimensional specification and associated material of construction. Identify required equipment and justification for inclusion.
- Build recycling bottle rig. Must be capable of being able to handle various diameter bottles and benchmark parts to be printed & analysed with resulting filament



Background

3D printing builds three-dimensional objects layer by layer, driven by computer models or tools like a 3D printing pen. Unlike subtractive methods, it minimizes material wastage. For instance, a 3D printed cylinder requires minimal material, as opposed to subtractive methods that involve cutting to size or using expensive molds. Invented in 1981 by Dr. Hideo Kodama, this technology has many applications in pharmaceuticals, construction, and machining.

Bottle Cutter

The parts used for the cutter was the following:

1. 1x Razor Blade
2. 2x Bolts
3. 2x Nuts
4. 4x Washers
5. 1x Metal Rod

The razor was placed between the washers and the nuts and bolts fastened the blade down in place. The metal rod was utilised in order to keep the bottle in an upright position so it would allow us to make the strips with ease.

Conclusion

Extensive research and rigorous testing showed that PET (Polyethylene Terephthalate) would be the best plastic to use for this as its readily available due to it being widely used in the production of water bottles. If this method of recycling was used largely it could make a real difference in the amount of plastic that is not disposed of properly.

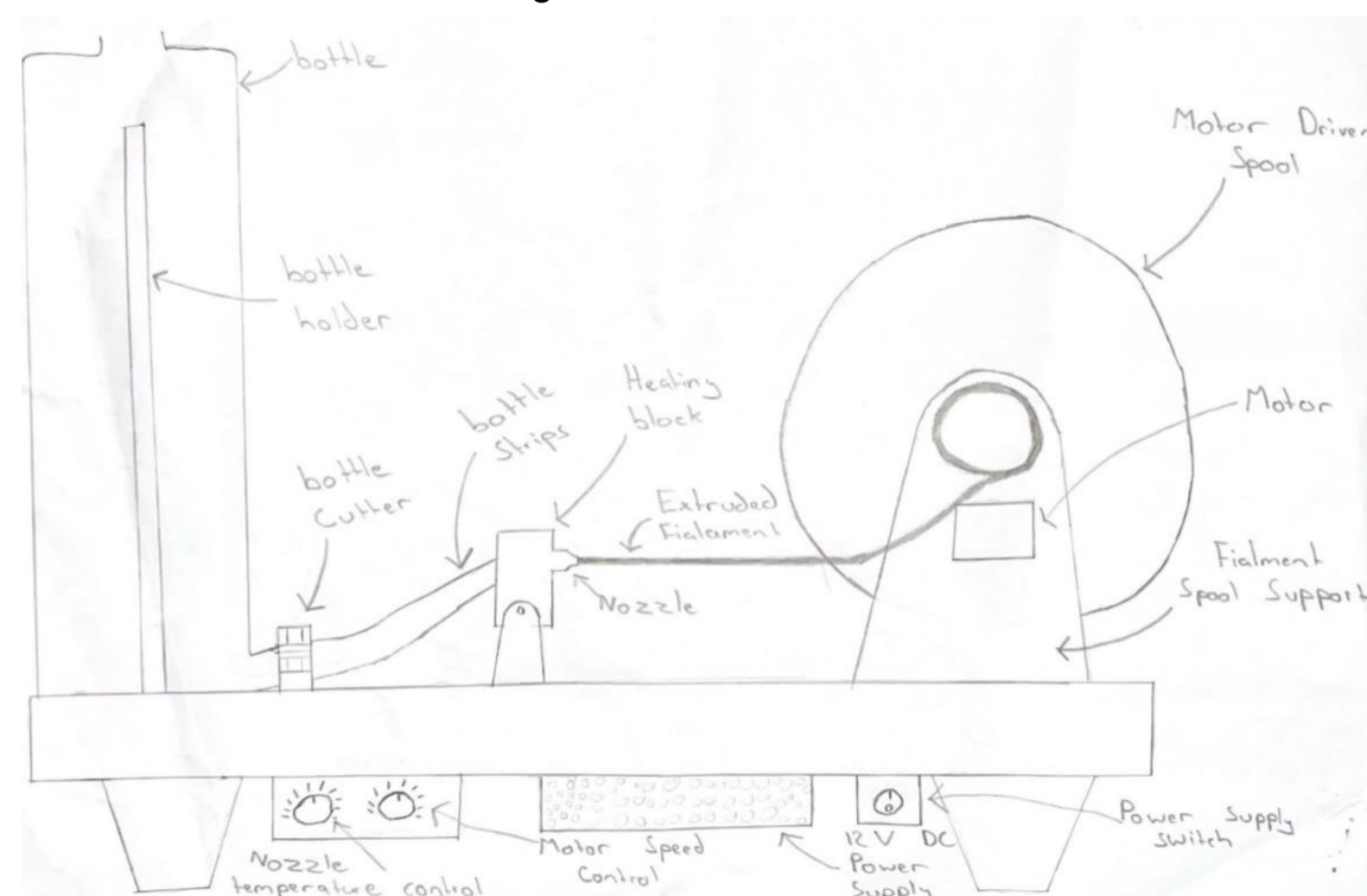
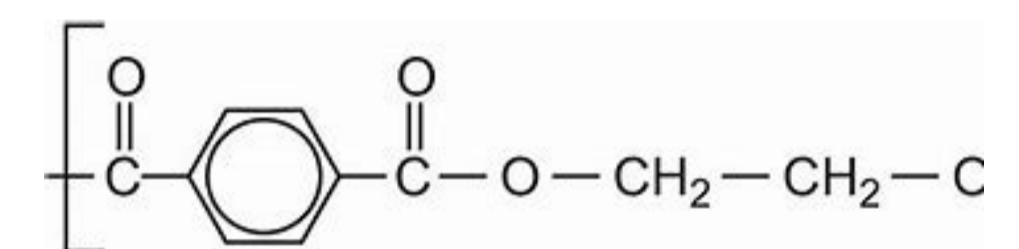


Figure 2: Final Sketch



polyethylene terephthalate (PET)



Figure 1: Bottle Cutter

Acknowledgements

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