Engineering:
Rubbish Bin Cleaning System

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Aim

To design and construct a rubbish bin cleaning system that will result in a rubbish bin that is clean, sanitary and odour free.

Choice of Problem

Rubbish bins have a habit of developing bad odours which are extremely unpleasant. I want to be able to prevent bins from producing bad and smelly odours frequently, by inventing a cleaning system that is quick, easy and cheap to use. Although more importantly, I want to create a system that would reduce germs/bacteria growth, therefore providing a safer environment for households.

How it Works

Step 1: Attach the filter/ disinfectant system onto the irrigation connector (make sure you attach the end furthest away from the filter). Push in and twist until you hear a click, this makes sure it is secure.

Step 2: Once the two pieces are connected together, open up the top hose connecter and pour approximately 25ml of disinfectant in to the filter chamber. **Make sure that the tap is at OFF position, this will stop the disinfectant from leaking out.**

Step 3: Twist the hose connector back onto the filter and attach this to a hose (water source).

Step 4: At first turn the water tap on so it allows a soft water flow to begin and open the tap on the system so that the water and disinfectant can both flow through the system to clean the bin. You can then turn the water flow to a higher but steady pressure to enhance cleaning quality.

Step 5: After approximately 45 seconds for smaller bins and 65 seconds for larger bins, turn off the water flow and detach the system from the water source.

Step 6: To drain the water, tilt the bin backwards allowing the dirty water to flow out of the drainage holes into the grass, drain or desired surface.

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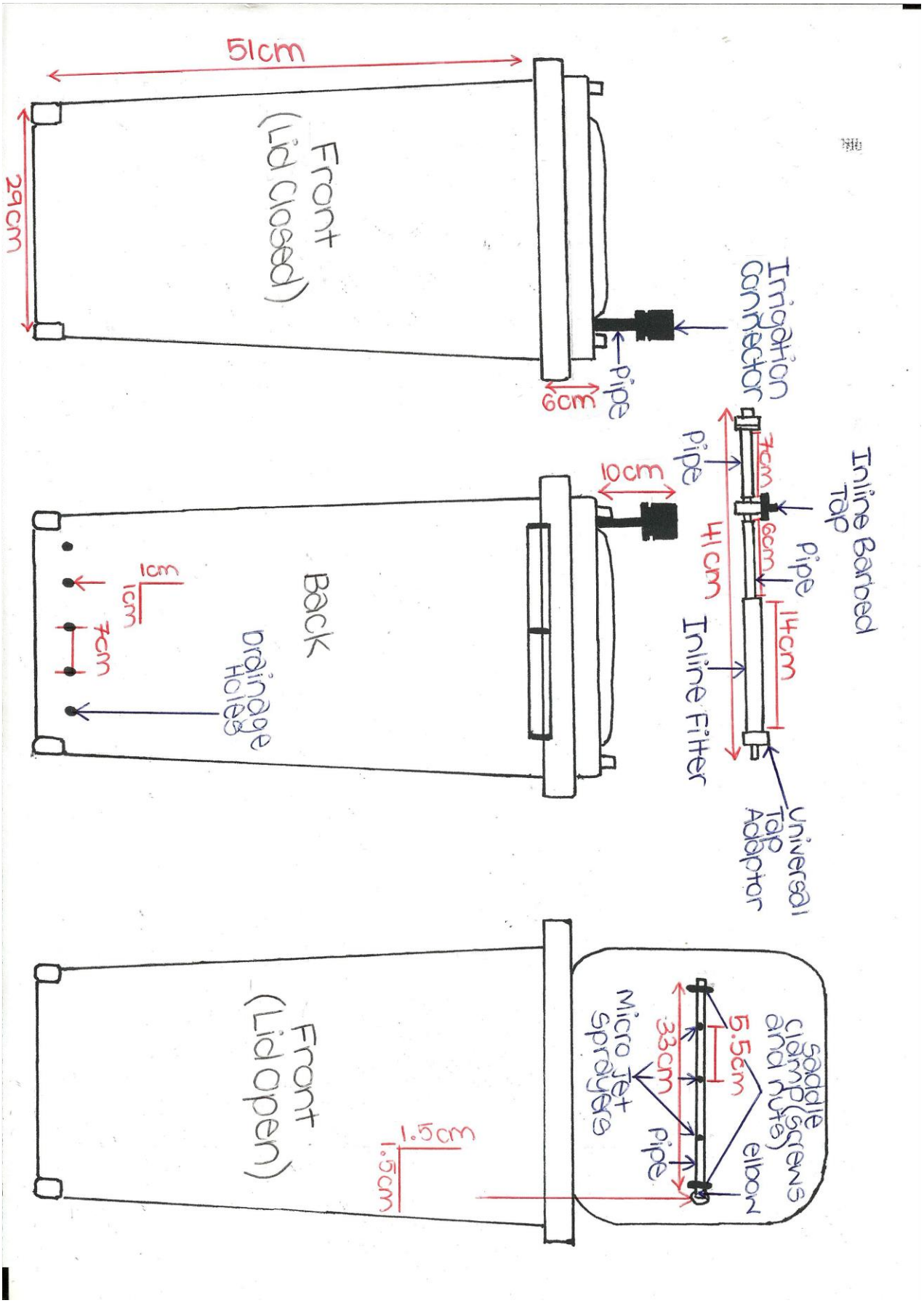
Working Drawing



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Risk Assessment

	Hazards	Risks	Precautions
Construction	Stanley Knife	Cutting yourself	Suitable knife safety techniques (keeps hands clear and put pressure onto flat surface)
	Punch/Spanner	Poking yourself	Place firm pressure into pipe on a flat surface (beware of fingers)
	Cordless Drill	Hearing Damage, Hair and clothing getting caught, eye irritation and cuts	Parental supervision required. -Wear noise cancelling earmuffs to protect ear drums -Tie hair back or cover with hair net to prevent hair getting caught -Do not wear loose clothing and secure loose items with an apron to prevent catches -Wear safety goggles to prevent offcuts from entering your eyes -Have complete and firm control over drill pushing down onto surface keeping hands and fingers clear
Operation	Young children operation	Children swallowing small materials	Parental supervision is required at all times. If materials become loose restrain children from system.

Explanation of limitations

- I needed to further consider an appropriate way to construct the filtration and disinfectant holding system by looking at the products available to me for purchase at Bunnings that were cost effective.
- It I noticed that after I had poured the disinfectant into the liquid chamber I could instantly hear it pouring through the micro jet sprayers in the bin lid, down into the bin. I decided to add an inline valve into the piping after the filter/ disinfectant holding chamber, adding value to the overall product
- My original idea was to drill multiple large 14mm holes at the rubbish bins base. This would have been a good idea but I thought about the hygiene issues related to doing this (e.g. leakages). I came to the conclusion that placing the drainage holes here would allow any garbage liquids to pour out of the holes in the base onto pavement (or where you keep your bin) potentially staining this surface and causing added odours. As this didn't seem like the most suitable idea, I generated the idea of placing these drainage holes at the bins back in a line close to the base. This then meant that any present liquids in the bin could not escape out of the bin between cleaning.

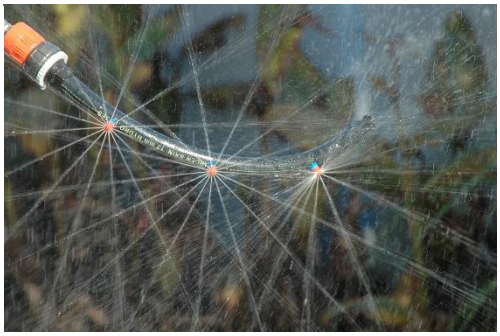
Suggestions for further improvements

- Creating a system that is properly manufactured and custom made for this purpose; eliminating the amount of parts joined by extra piping adding value, aesthetics and ease of general construction.
- Seeking advice from a professional in this field, assisting me in designing an improved System potentially allowing the filtration and disinfectant holding chamber flush in line in the top of the rubbish bin; preventing part breakage whilst in use and adding to aesthetics.

Sprayer Testing

Before construction I tested and evaluated the spray pattern of 2 sprinklers (MicroJetSprayers and MiniSprayers), investigating durability displayed by the sprinklers construction.

Pope MiniSprayers



Pope MicroJetSprayers

MicroJetSprayers were used due to their strong and functional spray pattern to different angles and their compact design.

Product Testing

To test that this invention worked successfully, I wanted to think of a creative way that resembled the Rubbish Bin Cleaning System in action.

To replace the odorous liquids that would be found in a bin (that this invention would need to clean) I splattered puréed baby food down all four of the bins walls as well as the bins base.

I then closed the bin and let the disinfectant and water flow through after I turned on the tap.

After approximately 40 seconds of the water being on, I turned off the tap and looked inside the bin. All of the baby food had been rinsed off all four walls and the base of the bin.

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Acknowledgements

Father

An acknowledgement goes to my Father (David Carey) for his help throughout the construction process. He gave me knowledge in construction and irrigation materials. He purchased the materials and tools needed for construction. He taught me how to use a cordless drill which then allowed me to drill holes independently under parental supervision. He supervised me in the overall construction.

Teacher

An acknowledgement goes to my school science teacher (Ms Pan) for her support and guidance.