

# Portfolio



## Top 5 Bugs In Daily Products:

- ▶ Shoes gets dirty riding motorcycle.
- ▶ Handwraps takes time to put on before boxing.
- ▶ Forgot cutlery to bring with my food to campus.
- ▶ Forget to water my lemon tree on busy days.
- ▶ Water getting into my phone while listening to a podcast in shower.



## Brainstorming Ideas From The Bugs:

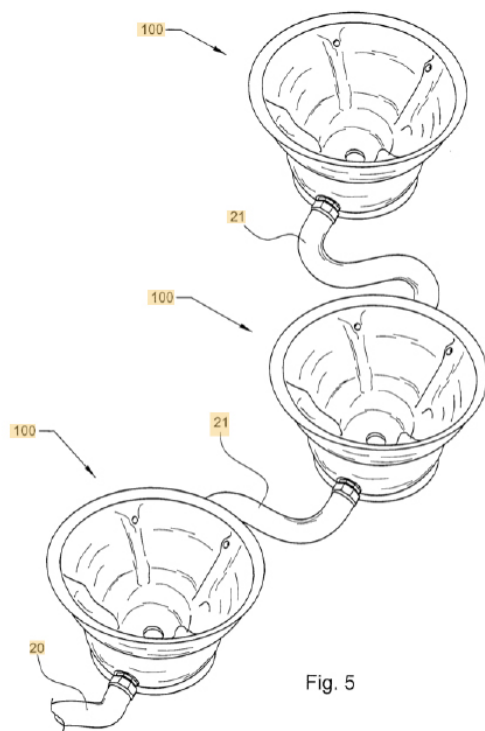
- ▶ Self-Watering planter.
  - Has a water tank that periodically lets water flow out.
- ▶ Motorcycle shoe protector.
- ▶ Edible Cutlery?.
  - Cutlery made out of food so you can eat it after, useful for students.
- ▶ Phone case/shelf to use your phone in shower.
- ▶ Boxing gloves that do not need to have hand wraps.



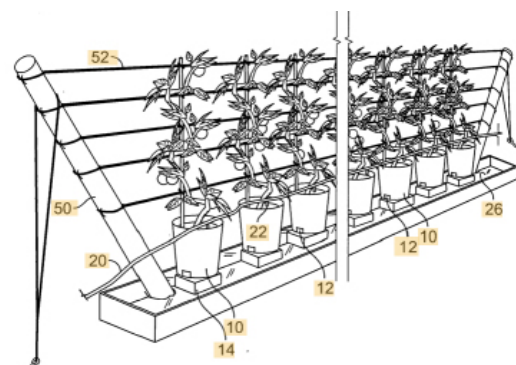
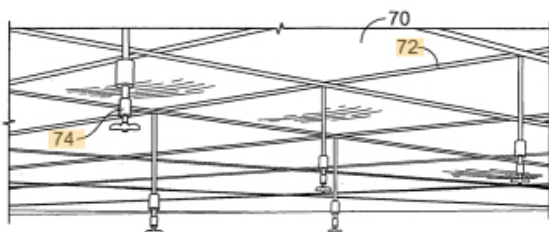
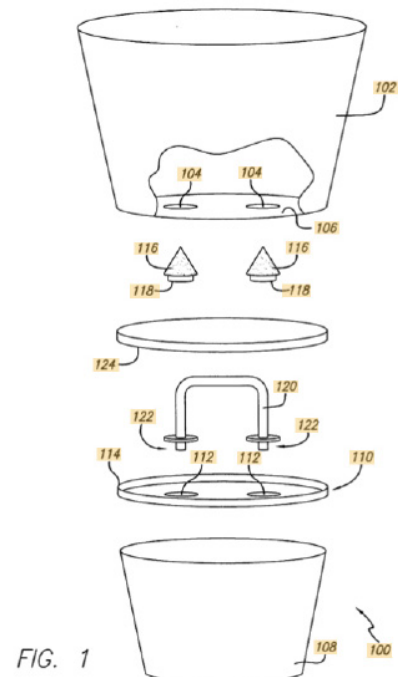
## My Team And I Chose Our Favorite 3 Ideas Products Collectively:

- ▶ Pill Bottle Cap Opener.
  - For disabled/ elderly people that have a difficult time opening prescription pill bottles.
- ▶ Self-Watering planter.
  - Has a water tank that periodically lets water flow out.
- ▶ Drinking Glass that will not fall over if bumped into.

## I Chose To Look For Patented Intellectual Property For The Idea That I Came Up With:



U.S. Patent Jun. 27, 2000 Sheet 1 of 11 6,079,156



There was no self watering planter with a timer that was patented other than industrial sprinkler that are used in big greenhouses. So I thought a home product with a timer would be a great idea.

## I interviewed my friends to find the best top 5 needs they would want in a home product self watering planter:

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- ▶ Water Capacity
- ▶ Aesthetic
- ▶ Easy Assembly
- ▶ Durable
- ▶ Lightweight

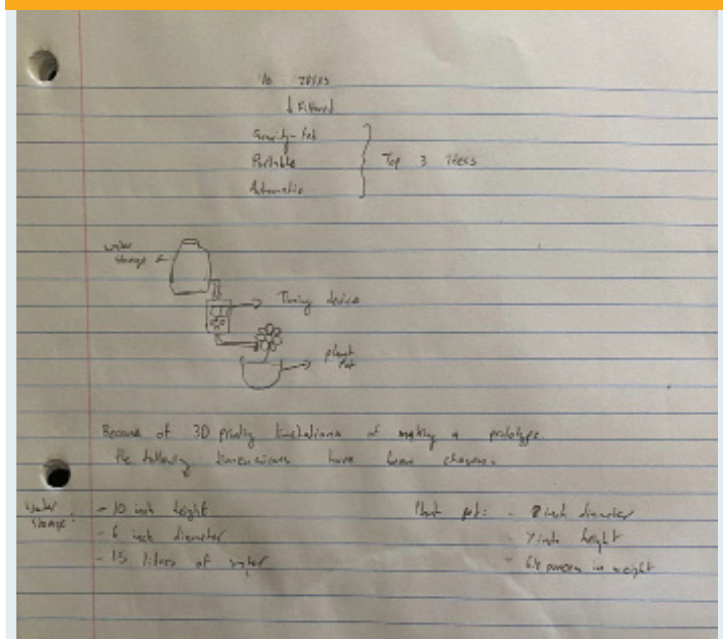
- 01. Automatic water level control:** This concept is most appealing to customers, while also being feasible and economically viable with the allocated budget and skill set of the team. It has a high probability of success.  
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- 02. Gravity-fed system:** This concept is also feasible and economically viable, and has the added benefit of using gravity to deliver water to the plants, making it a low-maintenance option.
- 03. Sensors:** While it has potential for precise watering, it may be less feasible due to the need to calibrate to different types of soil. It could still be a viable option if we integrate pre-made sensors into our design.
- 04. Portable design:** While a portable design could be convenient for customers, it may not be as economically viable due to the need for additional materials and design considerations.

05. **Solar-powered valve:** This concept could be appealing to customers as it eliminates the need to change batteries, but it may be less feasible as it would require a larger budget for the solar panel and may not provide as much value as some of the other concepts, while the skill set of the team may not be able to meet it without outside help.
06. **Customizable appearance:** While the ability to customize the appearance of the planter could be appealing to customers, it may not be as economically viable unless we upscale the production, and will not provide as much value in terms of plant care.
07. **Reservoir filtration:** While a filtration system could be useful for keeping the water clean and healthy for the plants, it may not be as economically viable as other options and is not needed in terms of plant care.
08. **Companion planting:** While companion planting can be turned into a cool idea/design, it does not bring any value in terms of plant care and can make the other ideas (like being portable) harder to achieve.

09. **Adjustable water flow:** While the ability to adjust water flow could be useful for some customers, it is not as important as the amount of water that gets supplied to the plant.

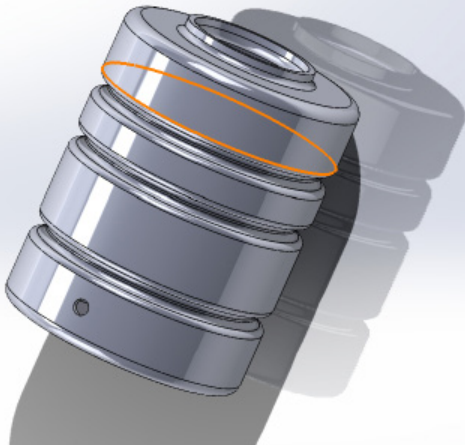
10. **Capillary action:** This concept involves using a cotton rope to draw water up into the soil, but it may not be as precise in watering and could potentially lead to overwatering or underwatering. It may also require the rope to be replaced every once in a while.

## Filtered Into:



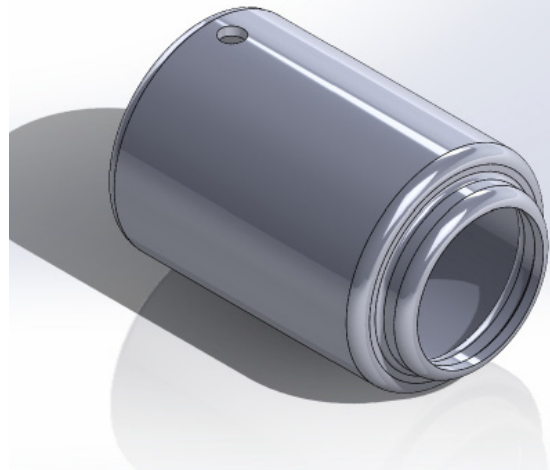


# Water Storage Designs:



## Design #1

- Holds 1.5 liters of water
- Aesthetically pleasing
- 10 inch height
- 6 inch diameter
- 5 days printing time on 3d printer



## Design #2

- Holds 1.5 liters of water
- Aesthetically simple
- 10 inch height
- 6 inch diameter
- 23 hours printing time on 3d printer



**We chose the second design due to 3D printing limitations.**

### **3D printed result:**

- Needs the hole to be drilled
- Needs the hole to be threaded

Timing device was bought from Ebay along with a faucet:watering planter:



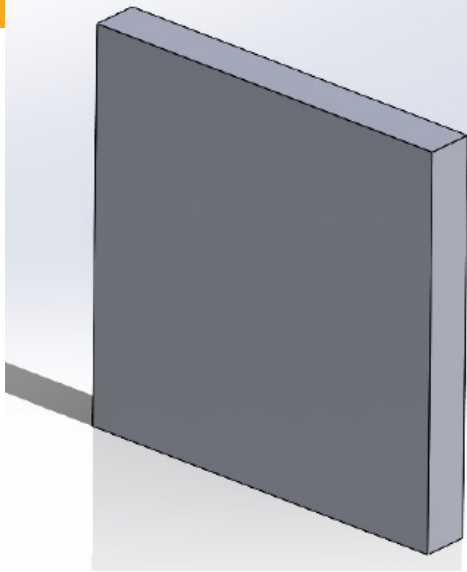
After Threading:



We bought a hose to connect to the device so that it is easier for the water to flow into the pot:



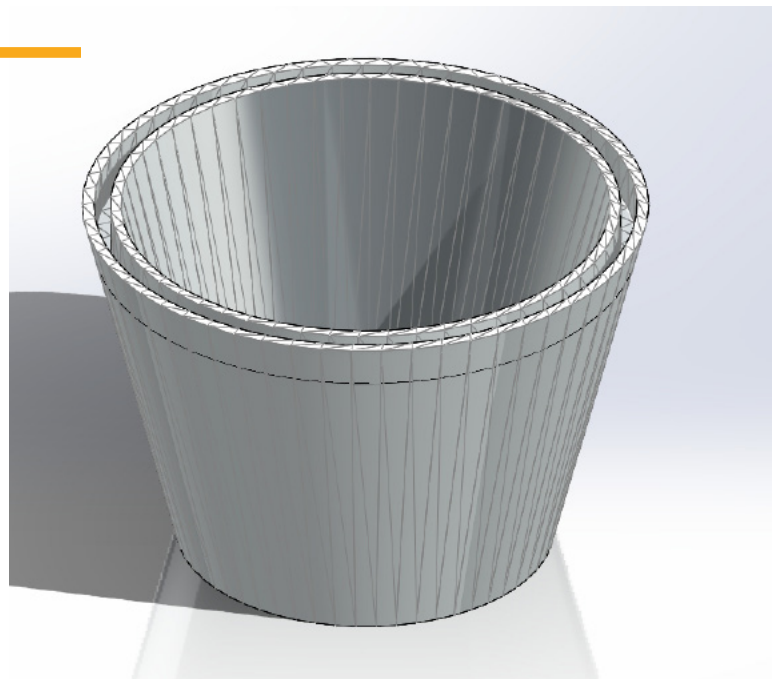
### 3D design



To hold the water storage higher than the plant pot we decided to 3D print a platform that gets stuck to the wall using an adhesive:

### 3D design

We were deciding between buying or 3D printing a pot, so that the printers are available for students who need to use them but I designed a pot:



- 8 inch diameter
- 6 inch height



# Design Specifications

- **Platform**

- ▶ This supports the water storage system to be held above the plant. It is to be stuck on the wall using double sided 3M tape.
- ▶ It is 6.5 x 6.5 x 2 in. The dimensions chosen are the perfect dimensions for the water storage to be held up in a stable position.

- **Water Storage**

- ▶ Holds 1.5 liters, this was chosen as it was the average water needed for the average household plant.
- ▶ It has been treated with epoxy resin to make it more water resistant and durable.

- **NPT Faucet**

- ▶ This allows the customer to switch the system on and off without having to play around with the timer device. This makes it easier for the customers who are not tech-savvy although the device is easy to use.

- **Timer Device**

- ▶ It has 3 settings. How long do you want it to let water flow through, from 30 seconds to 10 minutes? How often do you want it to let water flow through, from every hour to every 48 hours? At what time do you want it to start its first cycle?
- ▶ It has an option for choosing to manually let water flow through.
- ▶ User Friendly.

- **Hose Outlet**

- ▶ This allows the customer to change the direction of the water flowing out of the device, that way it gives it more flexibility on where to hang the system around the plant.
- ▶ This also makes sure that the water flows out perfectly into the pot, and not spill

# Lessons Learned:

- Keeping track of your design process, testing results, and iterations can be helpful in refining your product over time. Take photos, write notes, and create a record of your progress, so you can refer back to it as needed. It is something I should've done from the beginning but I did not.
- While 3D printing offers a wide range of possibilities in terms of shapes and designs, it still has some limitations. For instance, ensuring water resistance can be challenging. Additionally, the time required for 3D printing can be a significant factor to consider. In my experience, I found it challenging to work with 3D printing due to time constraints, as there were limitations on the duration of use for the printers at Jacobs Hall.
- The materials you choose for your 3D-printed planter will affect its strength, durability, and water resistance. And not having the options to choose a different type of material in Jacobs limits the possibilities for a prototype.
- It's not uncommon for unexpected challenges to arise, even when you've taken steps to prepare for potential issues. Therefore, it's always a good idea to be proactive and anticipate any problems that could arise. However, it's also important to stay flexible and adaptable, as you may encounter unforeseen difficulties that require quick thinking and swift action. In summary, preparing for potential issues while remaining open to unexpected challenges can help you stay better equipped to handle any situation that may arise.
- Sometimes it's better to modify existing products rather than creating everything from scratch, particularly in terms of time, effort, and resources. Often, it may be more practical to purchase something readily available in the market and adjust it to fit your needs, rather than designing and creating it entirely on your own. For instance, in our case, it was easier to purchase a pre-made pot rather than making one from scratch, especially if the focus of our project was not on the pot itself.
- Make sure the planter is stable: A self-watering planter that's wobbly or unstable can be a hazard, especially if you're growing a larger plant. Ensure that the planter has a stable base and won't tip over easily, even when the water reservoir is full.
- Factor in assembly and disassembly: If you plan to sell or distribute your self-watering planter, it's essential to consider how easy it is to assemble and disassemble. Ensure that all parts fit together smoothly and that there are clear instructions on how to put everything together. Which is why we chose to use a faucet, so that the user does not have to keep changing the device

# Thank You