Assembly of 3D Printing Recycled Material Rig

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Aim of the Project

The Aim of the project is to design and build A rig that would be able to convert plastic bottles made from PET into useable filament for 3D Printing. This rig will attempt help reduce the amount of plastic waste there is in the world.

Background

As 3D printing is becoming more popular in industry and in people's homes the increase for filament has also gone up in demand. This rig is being aimed for people that have 3D printers at home as to be able to use the rig you will need PET bottles that are no longer being used. These bottles will then have to be cleaned and prepared before they can be used. The bottles cannot have any labels or any adhesive on the bottle. Then any indents made to the bottle will have to be smoothened that a continuous strip of PET can be created.

These strips will then be feed through the rig and will produce PET filament at a diameter of 2.8mm so that it will be able to work for the Ultimakers in the college. But this can be changed to suit any size by changing the nozzle that is being used.

Design

There are 2 main parts to this design for the rig.

1. How the PET bottles will be turned into Strips.
2. How the filament will be collected to be used in a Ulti maker.

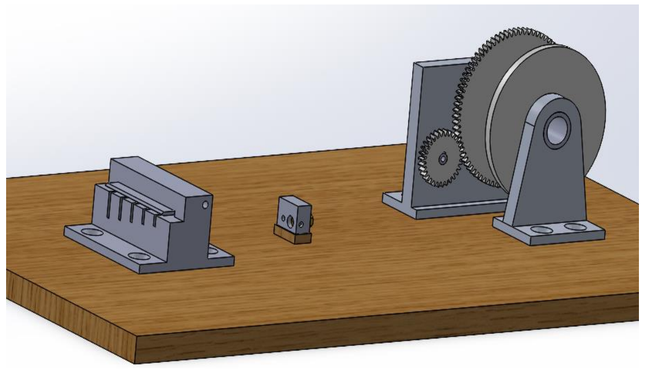

Figure 1: SolidWorks assembly of the rig

To be able to make PET strips the bottle will be placed on top of a razor blade so that it would cut the strips at the required height. This razor blade will be placed in a housing which will keep the razor blade secured and will not lift the blade will cutting the strips. The next part of the design will see the strips enter the heating block. The heating block will melt down the PET and as it is being pulled through the nozzle it will become filament at a diameter of 2.8mm. Then the final part to finish this rig is the collection of the spool. To do this I am using a motor which will be connected to a gear which will drive the spool and will rotate the spool so that it can collect the filament so that it can be used for 3D printing.

Build

The main part of the building of the rig is in the wiring of all the electrical components. To be able to get the components to work I had to use a soldering iron to combine all the wires and other components to make it work

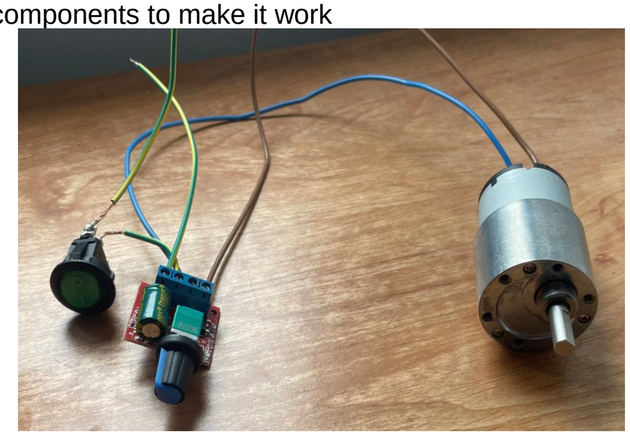

Photo of: Wiring of the motor

The first component that needed to be put together was the motor. The motor will have an on and off switch so that when the spool is finished collecting all the filament you can stop the motor so that the filament can be taken off. The motor is also connected to a dial that will change the speed so that you will be able to increase or decrease the speed of the motor if needed.

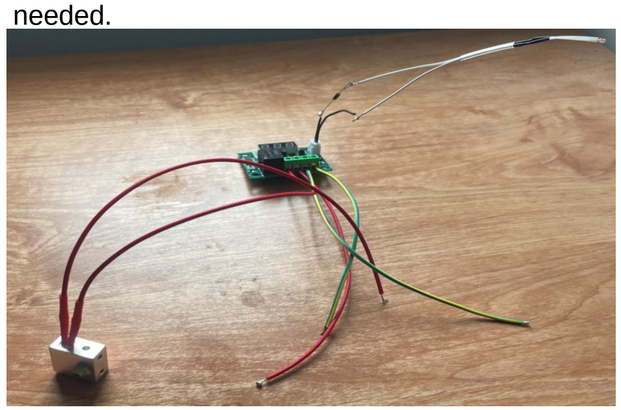

Photo of: Wiring of the heating Block

The next component that is required for the rig is the heating of the heat block. With this you will be able to adjust the temperature of the heating block so that it will be able to melt the PET as it is passing through the block.

Photo of: 12V Power Supply

Both of these components will then be connected to a 12V power supply which will give the components the power they need to make the rig work properly.

Conclusion/Recommendation

This is the design that was created and the work that was done to get the rig working Future work that can be done is to the rig is to make it semi-automated so that you can speed up the process of make filament. Also test the PET to see if heating the plastic has any effect on the properties of the material.

Acknowledgements

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