Individual Lab Report 8

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Team G-Bobs the Builders

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Individual Progress:

Since the last checkpoint, I spent the majority of my efforts finishing the designing and manufacturing process for the part orientater and part flipper subassemblies. I made a CAD model for the slide that orientates that part after an individual part has been isolated and the part flipper that flips the part if the camera determines that the part needs to be flipped. You can see the part flipper in Figure 1. I also fabricated both of these designs. I used the laser cutter to make both of these profiles out of acrylic. I used the milling machine to mill out an inch diameter pocket for the electromagnet. I used an end mill for this process and I had to mill far enough in so that I did not break through the acrylic but far enough through so that the electromagnet was effective enough to hold the part in place as the part was flipped. I also used the drill press and lathe to fabricate numerous pieces for our design. I used the countersink drill to create indents in the acrylic for the countersink bolt heads to fit in. Lastly, I played a major part in installing the subassembly. You can see the complete subassembly for the part orientater system in Figure 2.

Challenges/Issues:

A major issue that we faced this week was with the magnet losing its magnetic power after being turned on for too long. This was problematic because we had planned on using the electromagnet to stop the individual parts as they came down the slide. While this worked for the first minute or so, it did not work afterwards because the electromagnet lost too much of its strength. In order to remedy this issue we decided to make a mechanical stopper attached to a servo on the slide that stopped the part as it came down the slide. If the camera detects that there is a part in its range of view then the electromagnet turns on and the stopper moves out of the way.

Another issue occurred when we were working with our part orientator subassembly. We were not getting the consistent results that we had hoped for with the acrylic block attached to the servo design. The plan was that if a part came in at the wrong orientation then the part would hit the edge of the block, the block would rotate 45 degrees to orientate the part, and then rotate back. While this worked some of the time we were still having issues with parts getting stuck. So, we came up with a new design that involved a gear attached to a DC motor that was constantly spinning. If the part came in at the wrong orientation the gear continuously knocked the part back up until it came in at the right orientation.

Cross-Referencing:

This past week I collaborated with Mike in creating a design for the part orientater and the part flipper. We also went into the machine shop to manufacture the various parts used for our subassembly. Mike did the majority of the design and fabrication work for the part hopper that isolated individual parts to be processed in the next stages of our system.

While Mike and I did the majority of the work to assemble the part orientater, part flipper, and part hopper, Guillermo and Eric worked to operate the motor controls using their computers. Eric and Guillermo also worked on calibrating the motor controls for the flux extruder so that they could extrude a precise amount of flux each time. Eric also worked to update the website.

Figures:

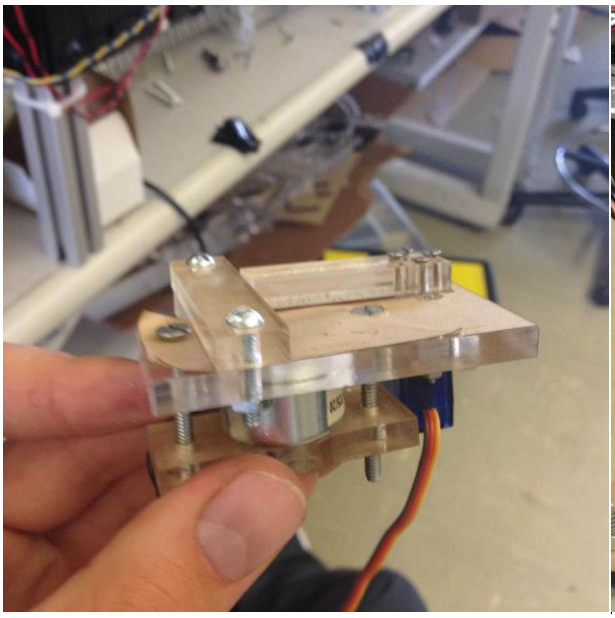

Figure 1: Part Flipper

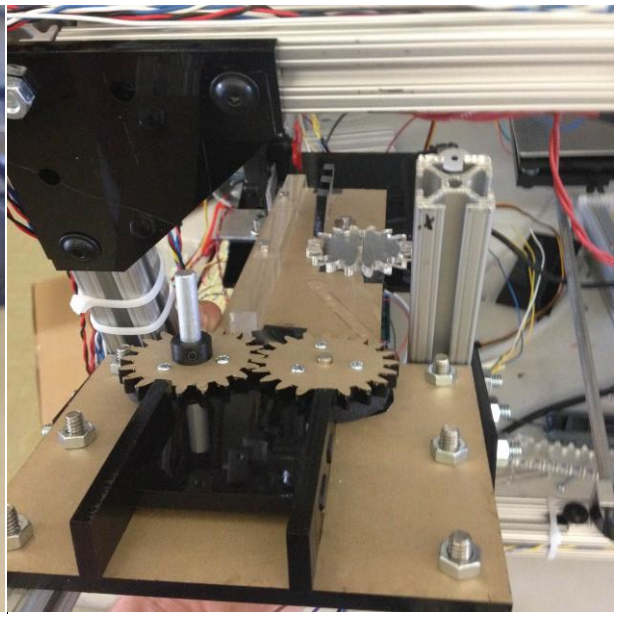

Figure 2: Part Orientater Subsystem

Future plans:

For the upcoming week we plan on designing and manufacturing our subsystem for transporting the parts from the part flipper to a point along the axis of the part placer. We have figured out how we are going to go about transporting the parts for the most part but there are still some minor details that we need to figure out. We plan on attaching a sheet metal slide that will initially have the form of an L-bracket slanted downwards so that there will be a smooth transition from the part flipper. The sheet metal slide will also be slightly angled so that parts ride along at the corner of the "L". The sheet metal will then slant upwards 90 degrees at the end so that there is a stopper for the parts as they come down. We hope to finish all of our subassemblies that deal with sorting the parts and transporting the parts. If we finish this we will have essentially finished all of the subassemblies and hopefully be able to run through the entire process from start to finish.

Individually, I will work on touching up the part orientater and part flipper subassemblies so that we can get more consistent results. I will help mounting the camera in a better position so it gets a better view of the part. I will also work on designing and manufacturing the subassembly that deals with transporting the part from the part flipper to a point in line with the part placer.