

# Individual Lab Report 6

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Team G-Bobs the Builders

Teammates-Michael O'Connor, Eric Newhall, Guillermo Cidre

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## **Individual Progress:**

Since the last checkpoint, I spent the majority of my efforts working on designing and manufacturing the subassembly for the wire placer and wire feeder subassembly. I made a CAD model for the wire placer/wire storage subassembly. This subassembly included a revolver that stored the wire, acrylic covers for the revolver, an aluminum L-bracket to mount the revolver, and the motor. I designed and 3-d printed a revolver that could store up to 20 wires at one time. The revolver had 21 holes in it that were angled at 45 degrees. The revolver had covers on both sides of it that stopped the wire from falling out of the revolver except at two points: where the wire entered the revolver and where the wire left the revolver. You can see the 3-d printed revolver in Figure 1. I worked a lot with the laser cutter, creating different profiles for various pieces. 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. Installing the L-bracket mount, revolver, and acrylic covers. You can see the complete subassembly for the wire storage system in Figure 2.

## **Challenges/Issues:**

A big issue that we have to overcome was our oversight in understanding that 3-d printed parts would not have the same level of accuracy that laser cut parts have. When we 3-d printed our revolver for the wire storage subassembly we found that the d-shaft was too small of a hole for the d-shaft of the stepper motor to fit through. In order to fix this issue I used the lathe and mill to fabricate an aluminum piece that matched the dimensions of this d-shaft. I then used a method called broaching to expand the hole to the dimensions of the aluminum rod that I fabricated. This increased the dimensions of the hole so that the d-shaft of the motor could fit through the profile in our 3-d printed revolver.

Another issue occurred when we were trying to install the acrylic covers for the revolver. We had to countersink screws into the acrylic in order to get a flush fit in between the revolver and the acrylic covers. The issue was that the acrylic was too thin for us to countersink through to our desired distance. In order to remedy this we had to disassemble our subassembly and laser cut the cover with a thicker piece of acrylic.

## **Cross-Referencing:**

This past week I collaborated with Mike in creating a design for the wire feeder and wire storage subassembly. 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 wire feeder.

While Mike and I did the majority of the work to assemble the wire feeder and wire storage subassembly, Guillermo and Eric worked to operate the motor controls using their computers. Eric worked on updating the website and creating a mount for the camera used for our computer vision. Guillermo also worked on one moving the operating system for the computer vision from the raspberry pi to his personal computer in order to decrease the run-time of the computer vision process.

## **Figures:**



Figure 1: Revolver

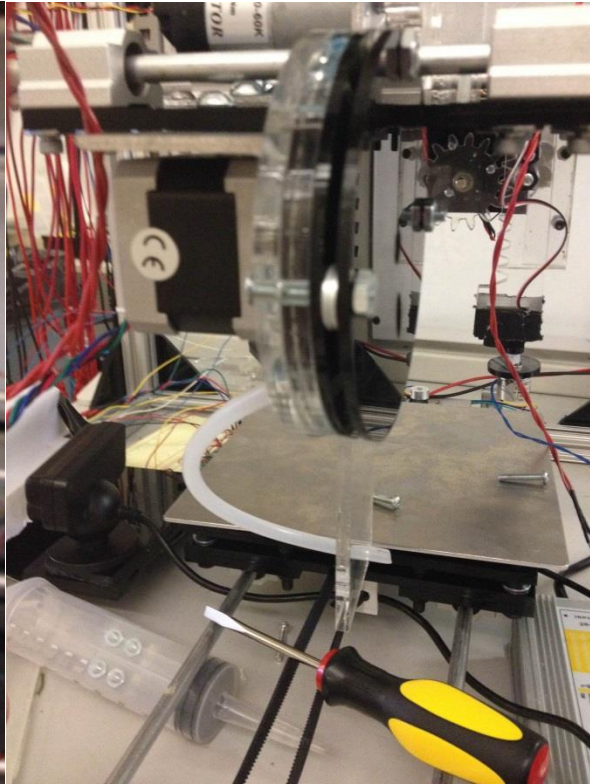


Figure 2: Wire Storage Subassembly

### **Future plans:**

For the upcoming week we plan on trying to finish our installation of the wire feeder and wire storage subassembly. There are a lot of issues with the two subsystems that still need to be resolved. An example of one issue is that the wire always gets caught on the bolt cutters after we cut one piece of wire and it is hard for us to feed the wire through again in order to cut another piece. We also hope to get motor controls running for these two subassemblies. In addition to this, we want to move forward with designing and fabricating the subassembly for our part separator. We have an idea for a way to efficiently sort through the parts and are going to move forward with that idea.

Individually, I will continue working on the fabrication and assembly work for the wire storage subassembly. I will work to design and fabricate a funnel for the tubing from the bolt cutters to the entry hole in our front cover for the revolver. In addition to this I will work on the design and fabrication process for our part separator subassembly