Monitor lift for Adjustment of Computer Display & Oil Paint Cap Removal Aid

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Thuy Pham

Work completed
For the monitor lift project, we received the guide rails and the bracket. The bracket is very sturdy and the material is sure to be able to hold the monitor and the monitor frame. The two rails have very suitable dimensions, maximum extended length is 35.5” and minimum retracted length is 19.5”. With the aid of oil, the rails move up and down smoothly. The material of the rails is very sturdy and hard. The rails still move up and down smoothly even when we tried to bend them. The images below show bracket and the rails.

Image 1 – the actuator’s bracket

Image 2 – the bracket mounted to the actuator

Image 3 – The guide rails

Katie and I contacted Dr. Hallowel regarding the new idea of purchasing the new monitor for her research. The team suggested to her that it will be a lot easier for us if she purchases a new flat panel LCD monitor. The LCD monitor has a very light weight compared to the current monitor that she owes, around 20-25lbs. If the monitor is around 20-25lbs, we will design a monitor frame that is light and easier to move up and down. Instead of the frame, we can design a wall that has a mechanism or a lock that will lock the monitor in place. This
design will reduce the moment of the monitor and the monitor frame. In the previous, if the current monitor is used, the moment of the monitor and the frame will be large, that is not safe. We planned to put weighs behind the actuator to limit the moment. However, that idea is not very practical. Therefore, we are looking forward for Dr. Hallowel to decide whether she will purchase a new flat screen monitor. I sent Dr. Hallowel the specifications of the two suggested monitors, and waiting for her reply.

For the paint cap remover, we received the motor. The motor’s size is small and compact. I tested the torque of the motor by replaced it with the old motor. The shaft rotated slowly, but the torque is very high and strong.

The Gumbacher Oil Paint Company has stopped manufacturing the old paint cap. This is the problem for our current design because we build a cap mold that can only fit the old paint cap. The old paint cap has big groove that is convenient and easy to make a mold out of it. The new paint cap, as shown in the image 5 below, does not have big grooves that we can make the mold from.

Therefore, we have to think of a total new design for the paint cap head. The most applicable idea is the clamp. We need a device that can hold the paint cap in place tightly and then we will spin the body of the paint tube. The image 6 below illustrates the new mechanism for hold the paint cap and also the new design for our paint cap remover.
This design is unique in which the artist does not need to apply much force to clamp the paint cap. The lever with long arm will create a very large moment, and the force will be decreased as the moment increases.

Image 6 – New design for the paint cap remover

The clamp is upper part of the Panavise, show in image 7 and 8 below. The advantage of the Panavise is that it has a long lever arm that helps to reduce the needed force to tighten up the clamp’s fingers.

Image 6 – The Panavise Image 7 – The upper part of the Panavise

Since the paint tube is the part that is being spinning, it has to be enclosed in a holder. The holder will have a shape that is similar to the paint tube and the paint tube will be fitted almost perfectly in this holder. The question is that what if the user uses almost all of the paint tube. The width of the paint tube will always be the same regarding how much paint is inside the tube. We can also have a special foam inside the holder, which will keep the paint tube in place regarding how much paint is inside the tube.
Project Review
Although we have to design the new design for the paint cap remover, we like the new idea. The clamp will work perfectly because of the easy-to-use-and-control lever. We received all materials for the paint cap remover and we are ready to build the device. The idea of new monitor is very beneficial. As long as Dr. Hallowel picks the new monitor, we will build the new system as planned.

Future Work
There are a lot of works needed to be done since there is a new design for both the monitor lift and the paint cap remover.

For the monitor lift:
- We need to get the suitable material for the monitor frame.
- Construct the monitor frame based on what type of monitor Dr. Hallowel will pick.
- Find out the methods to stop the actuator at 12”, whether mechanical limits switch or the microprocessor.

For the paint cap remover:
- Find out what is the good material for the paint tube holder: HDPE or Aluminum.
- Attach the paint tube holder to the motor.
- Construct a better circuit for the motor and the switch, with fuse, and more elements.
- Implement the clamp into the system.
- Order the Panavise.

Total work hours: 12 hours