The Girard-Perregaux Constant Force Escapement

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After looking over an almost impossible number of ideas for my final project I became fixated on the possibility of making a working watch in Solidworks. However, I came upon this idea with a little more than a day left before the final deadline, so I had to settle for creating an integral component of a watch’s interior mechanisms. The escapement piece of a watch is used to store residual energy and return it to the watch’s main spring so that it can continue to beat accurately for long periods of time. Constant force escapements are one method of producing highly accurate time measurement, and the design that Girard-Perregaux created instantly became my choice of project upon its discovery.
https://www.youtube.com/watch?v=ft9weaR1zq0

My replication:
I chose this object because I liked its appearance and I knew that I would feel accomplished if I was able to replicate it. The most common feature that I used was the extrude feature, closely followed by the spline and circle. In order to start I used the insert sketch picture function to use the image shown above as a reference. Because they don’t exactly put up exact dimensions for their top secret blueprints, I used this image along with various other angles of the escapement that I could find on the internet to create the pieces. I began with the purple frame structure,
outlining the shape as I saw it in the image using a combination of splines and circle and then extruded that shaped. I used this same process to create each of the individual gears (the two similar circular ones we merely copied. To create the hair spring on the bottom of the golden circle I used the helix feature to make a swirl and then swept a rectangle along that swirl. Each of the rods that go through the gears were made individually using the holes in the middle as a reference for diameter, and using a revolve to make them more complex. The gear found on the bottom of the rod used to with the two identical shapes made using the extrude cut feature on some triangles layed around the cylindrical surface using a circular array. After placing all the components into a single assembly it was a painstaking process to make certain faces of certain gears coincident with each other. The rods were made concentric with the center of their respective gear, and the axis of those rods were made coincident with reference planes if needed so that they would not go haywire when attempting to revolve them.

Because there were no exact dimensions to base my sketches off of it was difficult to make circles the exact diameter needed, and for other features to line up the way that they should. Also, because pictures only have an accurate resolution up to a certain point there were instances when I had to choose where to put lines and points that might not have necessarily been in the exact spot they should have. Overall, doing this project helped me to appreciate many of the features of Solidworks, and also gave me a lot of knowledge on how mates work. Replicating the mechanism from mainly one picture gave an immense feeling of satisfaction upon completion because of my recreations similarity to the original. I was unfortunately unable to make the escapement work as it would in real life because of issues with Solidworks animation features. I had tried creating a much simpler version of an escapement and it was there that I recognized the issues with the animation. I do however intend to work on that in my spare time. It was an original goal to branch off of the escapement and create an entire watch structure however due to time constraints I decided to stick with just what I could make in the period given.
Lamp Assembly Project

This was created after following the basic tutorials and applying the features learned from them. We were tasked with creating our leg for the table within a loose set of parameters, and this was the final result.

I took advantage of some of my limited Solidworks knowledge to make the leg, and added space themed textures to some of the components because I am a big fan of the final frontier.