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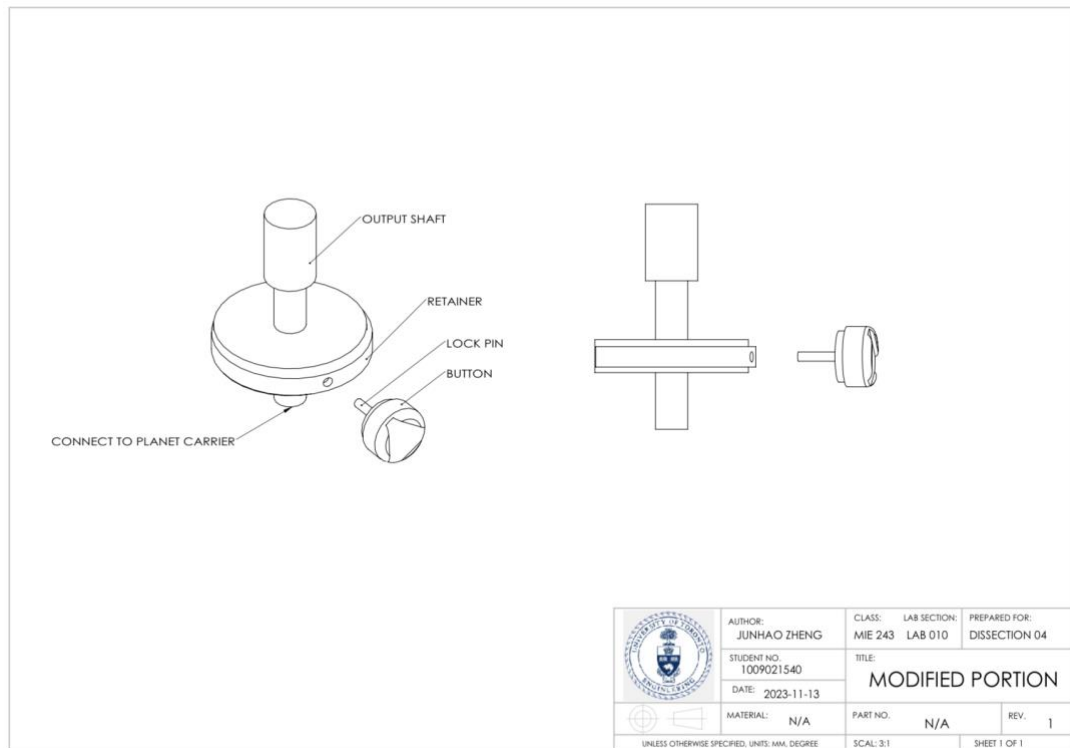
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Q1.

a.



- b. For the original gear assembly, the screwdriver used a stack of two planetary gear sets in one ring gear that encompasses all of them at once. The planet gear and the sun gear of both levels of the stack used the spur gear in order to minimize the cost. While the using spur gear has an advantage in terms of cost, we considered the spur gear in planetary arrangement to have satisfactory mechanical performance. Due to planetary gear sets being connected back to back, the gear ratio of each stack was multiplied to another, which makes achieving high gear ratio in a very compact space possible. Therefore, this gear arrangement is the most suited for screwdriver, since the size of the driver cannot be too big, while being able to output high speed in such circumstances. The operation of the planet gear is initiated by the input from motor, which makes the sun gear rotate. The planet gear then rotates due to the rotation of the sun gear. Planet gear and the sun gear achieve high gear ratio and outputs high speed rotation as a result. This is due to planet gears both being in mesh with both the ring and sun gear. We modified the assembly by fitting a retainer on the flange of the shaft. The retainer has a hole in it, and when the button is pressed, a protrusion attached to the button locks the rotation of the shaft. This is possible when the retainer does not rotate with respect to the shaft. When the screwdriver is working

g, the operation is as described above.