ME202 Project Report

Title: Pneumatic Motor

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Objective:

The aim for this project was to make a 3D model of a machine in SolidWorks incorporating and utilising all the tools and methods taught during the course ME202 – Machine Drawing.

Description:

The machine that I chose was a Pneumatic motor that is basically used to convert the compressed gas energy into mechanical energy. The Pneumatic motor I designed is a crankshaft – piston assembly where the linear motion of piston is converted into a rotatory motion.
The project has a total of 12 parts designed using SolidWorks and usage of 2 components from SolidWorks inbuilt toolbox.

1. Supports
    a. Base Plate
    For providing the base for the entire model. It used the simple techniques of Extruded Boss/Base and Hole Wizard.
    b. Mounting Bracket
    For holding the body in place on the base. It was made using 'Flange' feature and Hole Wizard.

2. Body
    a. Motor Block
    For housing the piston and crankshaft. It also provides structural support. It was made using Extrude Boss/Base, Extrude Cut and Hole Wizard.
    b. Flywheel
    It is the rotating component that stores the kinetic energy for smoothening operation by compensating for any fluctuations. Making it required the features like Extrude Boss/Base, Circular pattern and Extrude Cut.
    c. Cylinder Head
    For enclosing the volume where compressed air is regulated i.e. intakes and exhaust. It used the simple techniques of Extruded Boss/Base and Hole Wizard.

3. Crankshaft- Piston Assembly
    a. Crankshaft
       It converts the linear motion of piston to rotating motion. It is made using Revolve Boss/Base, Chamfer, Hole Wizard and Extrude Cut.
    b. Crank
       It is attached to the crankshaft and rotates along with it. It was made using Extrude Boss/Base and Hole Wizard
    c. Connecting Rod
       Links the piston to the crankshaft via crank. Made simply using Extrude Boss/Base and Extrude Cut.
    d. Piston
       It is the cylindrical component that undergoes reciprocating motion due to the expansion and compression of gas. It is made using Revolve Boss/Base.
    e. Crank Pin
       Crank Pin is used to connect the connecting rod to the crank. It used basic Extrude Boss/Base and Chamfer features.
    f. Piston Pin
       It connects piston to the connecting rod. It used basic Extrude Boss/Base and Chamfer features.
    g. Washer
       These are flat, thin rings to reduce friction between the moving part of a machine. It is made using simple Extrude Boss/Base tool.

4. In-Built Toolbox
   I used the M3 and M4 DIN nuts to assemble the whole Cad Model.

Along with the modelling of the Pneumatic motor, I also animated the model to show its working.

Citations:

For the modelling, I used the following drawing:
https://i.ytimg.com/vi/d7-ezB3T67A/maxresdefault.jpg
For the help in animation and few features like for types of holes and 'Flange' I took help from the following video:
https://www.youtube.com/watch?v=d7-ezB3T67A
For writing the report, I read from various sources available on the internet.