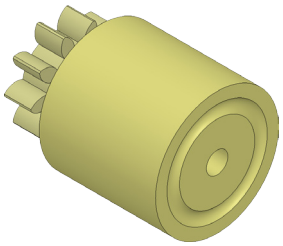
Cluster Wheel Vehicle
Rim



A. Extrude1.

Step 1. Click File Menu > New, click **Part Metric** and OK.

Step 2. Click **Right Plane** in the Feature Manager and click **Sketch** on the context toolbar, **Fig. 1**.

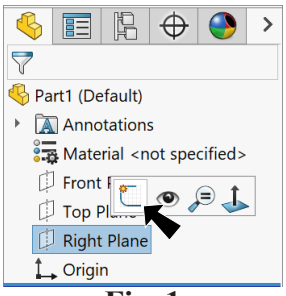


Fig. 1

Step 3. Sketch **circle at Origin** , **Fig. 2**.

Step 4. Click **Smart Dimension** (**S**) on the Sketch toolbar.

Step 5. Dimension **diameter 13.9**, **Fig. 2**.

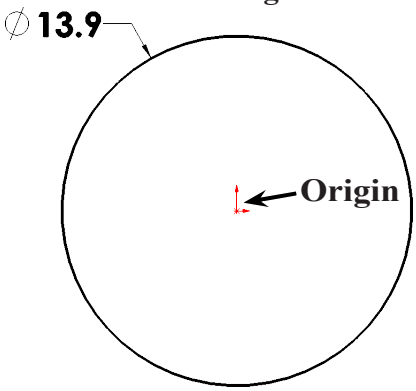


Fig. 2

Step 6. Click **Offset Entities** on the Sketch toolbar.

Step 7. In the Offset Entities Property Manager set:

under Parameters, **Fig. 3**

check **Reverse**

Distance .07 (clearance of Tire)

check **Reverse**

under Construction geometry

check **Base geometry**

click **circle**, **Fig. 4**

Yellow offset circle on inside - base geometry (construction) on outside

click OK .

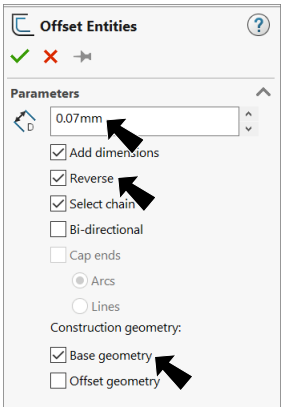


Fig. 3

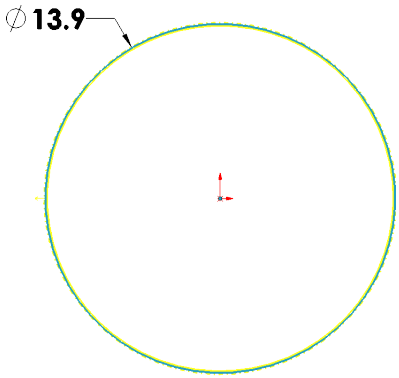


Fig. 4

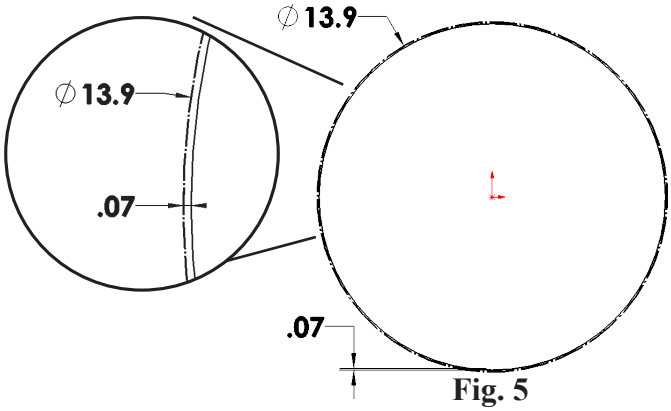


Fig. 5

Step 8. Click **Features** Features on the Command Manager toolbar.

Step 9. Click **Extruded Boss/Base** Extruded Boss/Base on the Features toolbar.

Step 10. In Boss-Extrude Property Manager set:
under Direction 1, **Fig. 6**
End Condition **Mid Plane**
Depth D1 **13**
click OK .

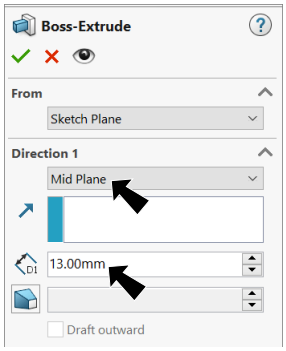


Fig. 6

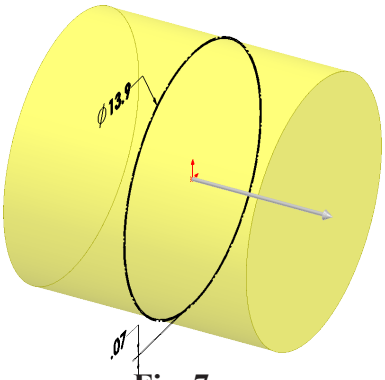


Fig. 7

B. Save as "RIM".

Step 1. Click File Menu > Save As.

Step 2. Key-in **RIM** for the filename and press ENTER.

C. Revolved Cut1.

Step 1. Click **Front Plane** in the Feature Manager and click **Sketch** on the context toolbar, **Fig. 8**.

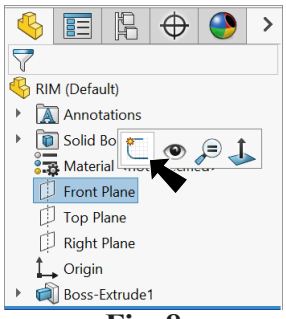


Fig. 8

Step 2. Click **Normal To** on the Standard Views toolbar. **(Ctrl-8)**

Step 3. Click **3 Point Arc** **(S)** in the **Arc flyout** on the Sketch toolbar.

Step 4. Sketch **arc with start and endpoints on righ edge and radius to left**, **Fig. 9**.

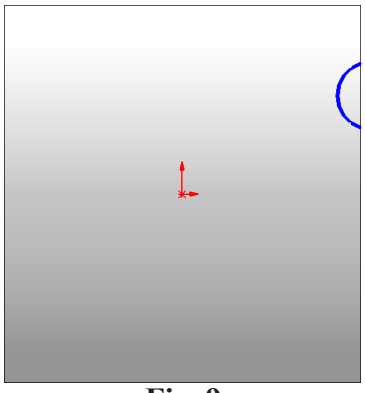


Fig. 9

Step 5. Click **Line** **(L)** on the Sketch toolbar.

Step 6. Sketch **line connecting the arc endpoints along right edge**, **Fig. 10**.

Step 7. Click **Centerline** in the **Line flyout** on the Sketch toolbar.

Step 8. Sketch a **horizontal centerline at Origin**, **Fig. 11**.

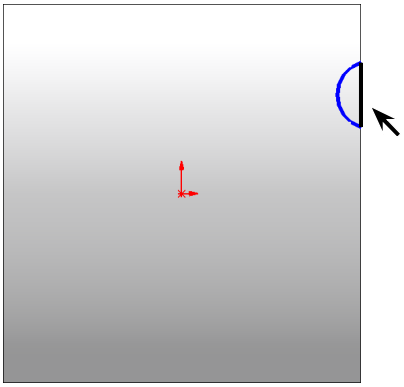


Fig. 10

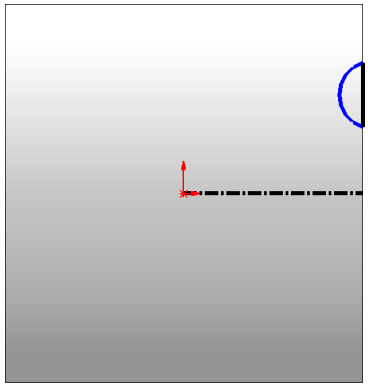


Fig. 11

Step 9. Click **Smart Dimension** 

(**S**) on the Sketch toolbar.

Step 10. Add dimensions, **Fig. 12**.

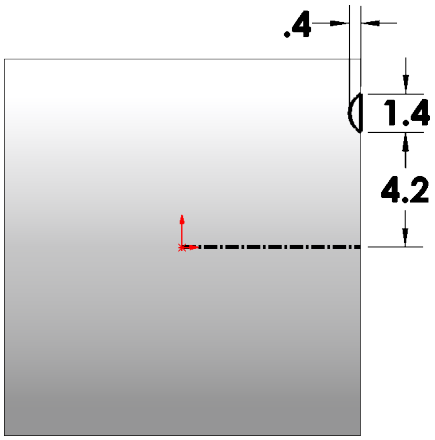


Fig. 12

Step 11. Click **Isometric**  on the Standard Views toolbar. (**Ctrl-7**)

Step 12. Click **Features** 

on the Command Manager toolbar.

Step 13. Click **Revolved Cut** 

on the Features toolbar.

Step 14. In the Cut-Revolve Property Manger click OK  .

Step 15. Save  (**Ctrl-S**).

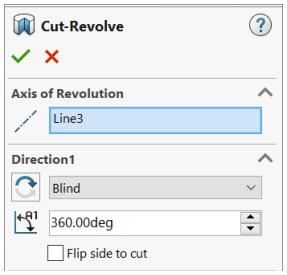


Fig. 13

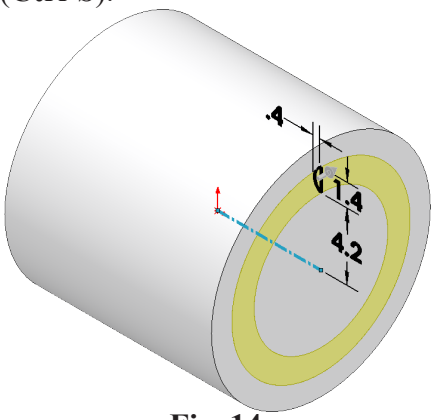


Fig. 14

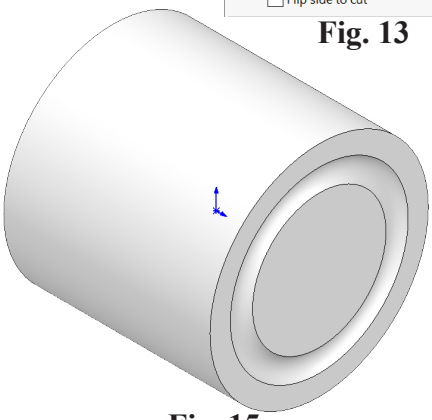
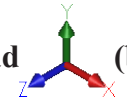


Fig. 15

D. Extrude2 Spacer.

Step 1. Rotate view to rear face. To rotate **Ctrl-Shift click the Y axis of the Reference Triad**  (bottom left corner of graphics area).

Step 2. Click the **rear face** and click **Sketch**  on the context toolbar, **Fig. 16**.

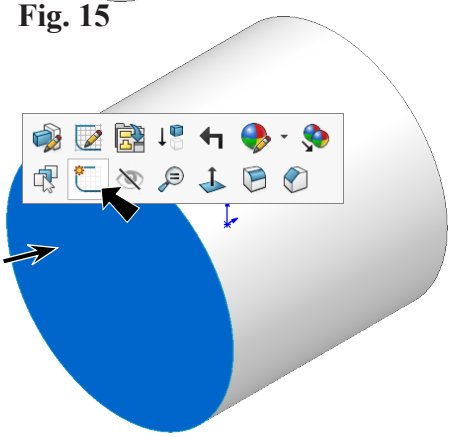


Fig. 16

Step 3. Sketch **circle at Origin** , **Fig. 17**.

Step 4. Click **Smart Dimension** (**S**) on the Sketch toolbar.

Step 5. Dimension **diameter 6.75**, **Fig. 17**.

Step 6. Click **Features** on the Command Manager toolbar.

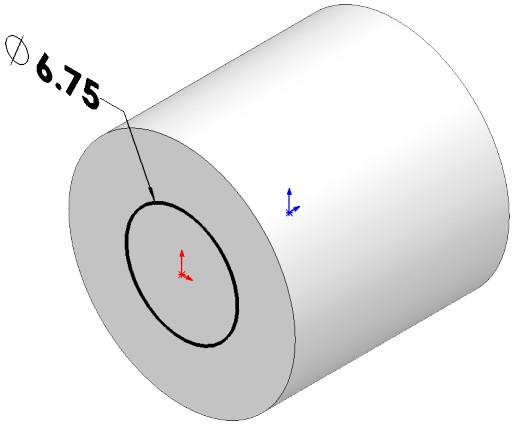


Fig. 17

Step 7. Click **Extruded Boss/Base** on the Features toolbar.

Step 8. In Boss-Extrude Property Manager set:
under Direction 1, **Fig. 18**
End Condition **Blind**
Depth **2.4**
click OK .

Step 9. Save (**Ctrl-S**).

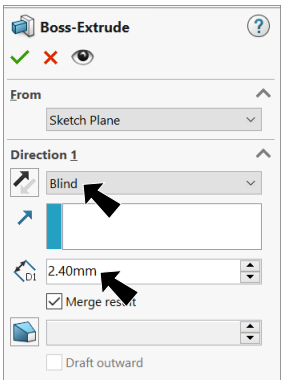


Fig. 18

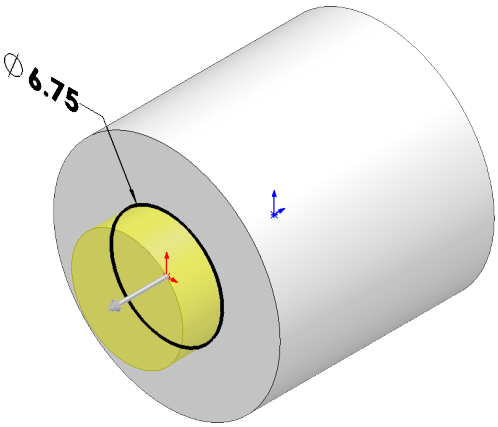


Fig. 19

E. Insert Drive Gear 10T into Part.

Step 1. Click Insert Menu > Part.

Step 2. In the Insert part Property Manger set:

click **Browse** button Browse..., **Fig. 20**

select your **DRIVE GEAR 10T part**

under Transfer

check **Solid bodies**

under Locate Part

check **Locate with Move/Copy feature**

under Properties

check **Propagate from original part**

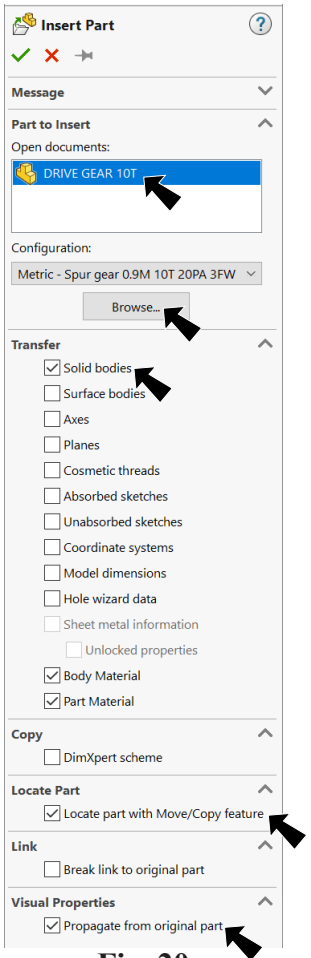


Fig. 20

Step 3. Position **Gear 10T at back circular edge of Extrude1**, **Fig. 21**. When Gear snaps into place and cursor changes to indicate a Concentric mate, click to release Gear.

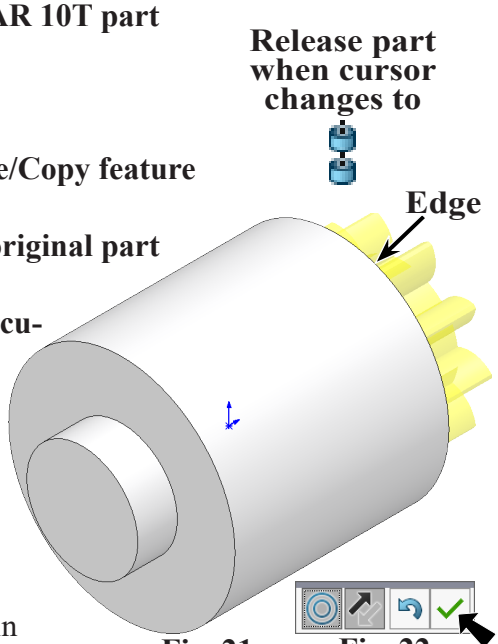


Fig. 21

Fig. 22

Step 4. Check Add/Finish Mate in Mate pop-up toolbar to add a **Concentric** mate, **Fig. 22**.

Step 5. Back in Locate Part Property Manger:

under Mate Setting, **Fig. 23**

in Entities to Mate box

click **front face of Extrude2**

rotate view, use **Left Arrow key** **4 times** and click **rear face of Gear**, **Fig. 24**.

Click OK .

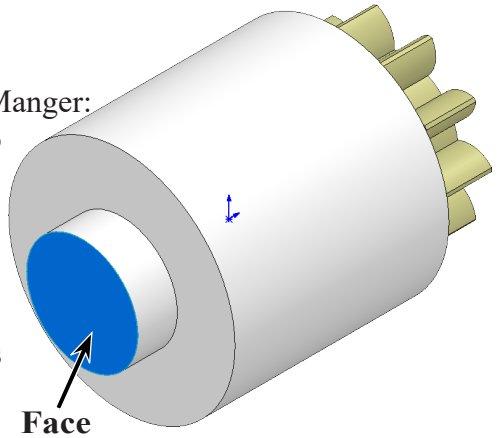


Fig. 24

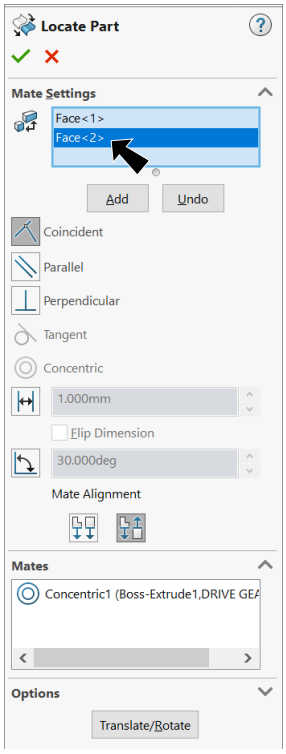


Fig. 23

Step 7. Save (**Ctrl-S**).

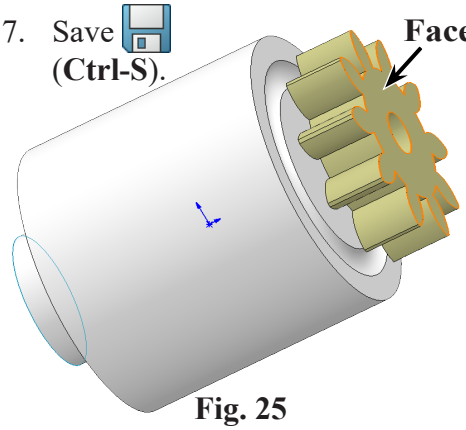


Fig. 25

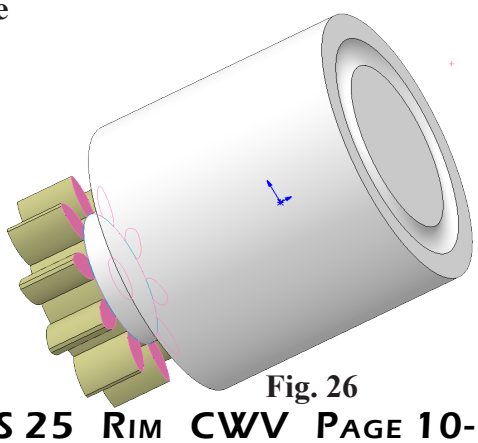


Fig. 26

F. Revolved Cut2 Axle Hole.

Step 1. Click **Front Plane** in the Feature Manager and click **Sketch** on the context toolbar, **Fig. 27**.

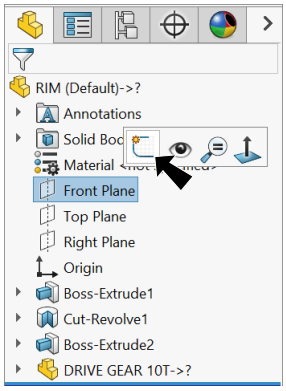


Fig. 27

Step 2. Click **Normal To** on the Standard Views toolbar. **(Ctrl-8)**

Step 3. Click **Line** **(L)** on the Sketch toolbar.

Step 4. Sketch the **8 lines**, **Fig. 28**.

Step 5. **Unselect Line tool**. To unselect, right click graphics area and click Select from menu.

Step 6. **Ctrl click** the **two short horizontal lines** to select both. Release Ctrl key and click **Make Collinear** on the context toolbar, **Fig. 29**.

Step 7. **Ctrl click two angled** to select both. Release Ctrl key and click **Make Equal** on the context toolbar, **Fig. 30**.

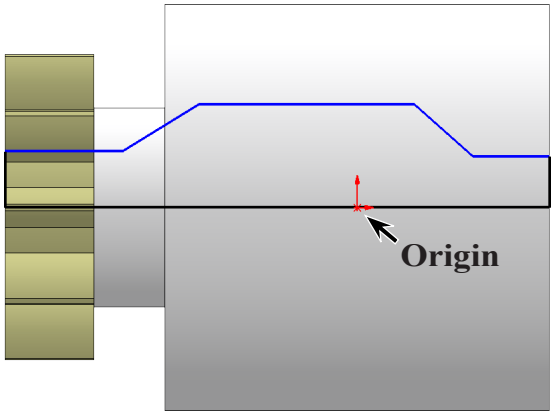


Fig. 28

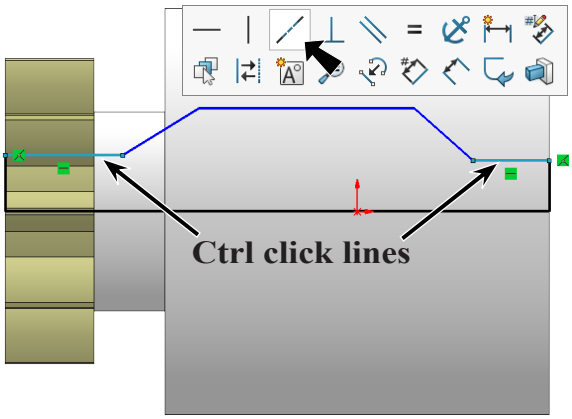


Fig. 29

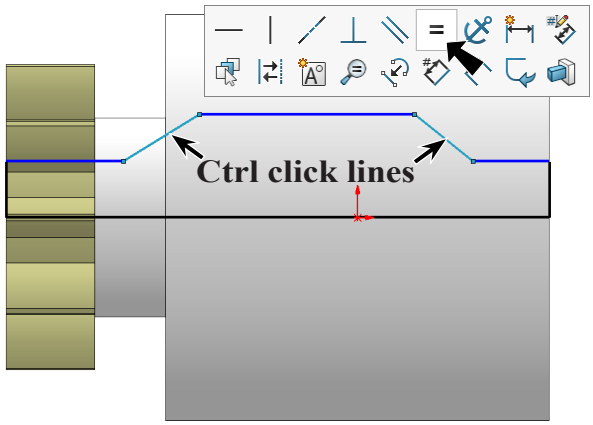


Fig. 30

Step 8. Click **Centerline** in the **Line flyout** on the Sketch toolbar.

Step 9. Sketch a **horizontal centerline out from line thru Origin**, **Fig. 31**.

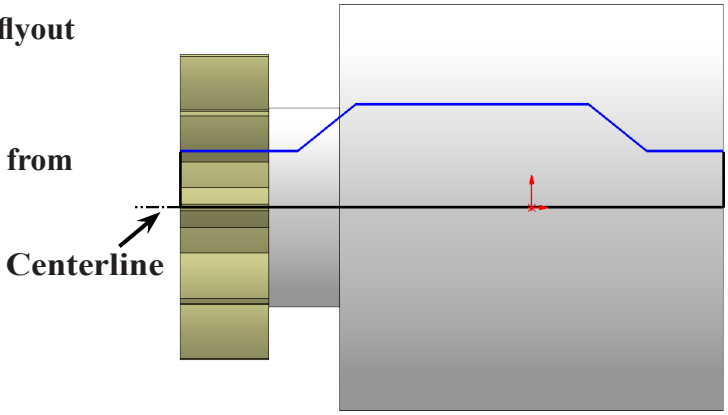


Fig. 31

Step 10. Click **Smart Dimension** 

(**S**) on the Sketch toolbar.

Step 11. Add dimensions, **Fig. 32**.

Step 12. Click **Isometric**  on the Standard Views toolbar. (**Ctrl-7**)

Step 13. Click **Features** 

on the Command Manager toolbar.

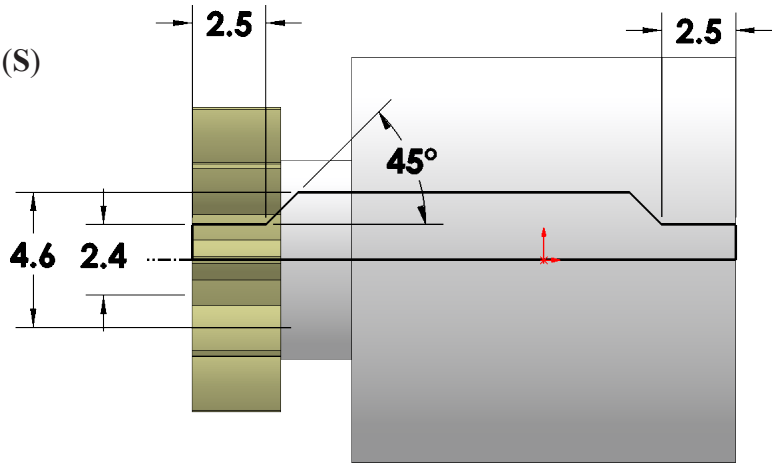


Fig. 32

Step 14. Click **Revolved Cut** 

on the Features toolbar.

Step 15. In the Cut-Revolve Property Manger set:

under Axis of Revolution  **centerline is selected**, **Fig. 33**

click OK  .

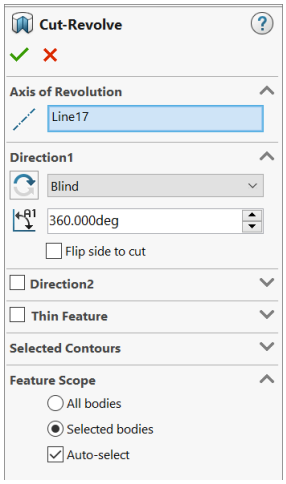


Fig. 33

Step 16. Save  (**Ctrl-S**).

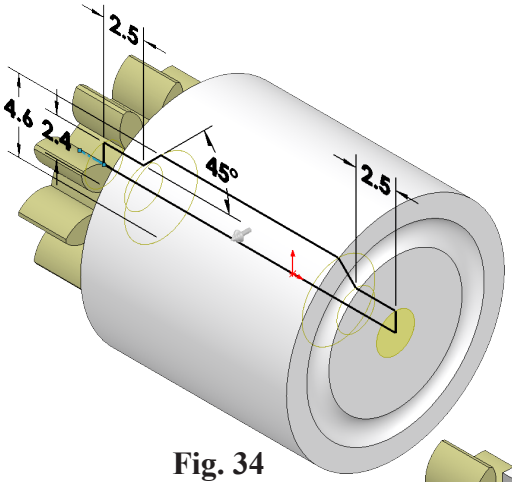


Fig. 34

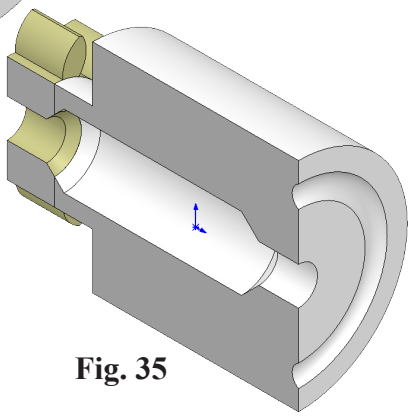
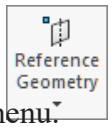


Fig. 35

G. Mate Reference.

Step 1. Click **Reference Geometry** 

on the Features toolbar and **Mate Reference** from the menu.

Step 2. In the Mate Reference Manager set:
under **Primary** Reference Entity
and click a **cylindrical face**, **Fig. 36**
click OK ✔ .

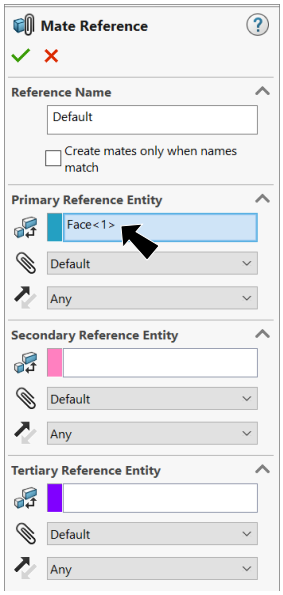


Fig. 36

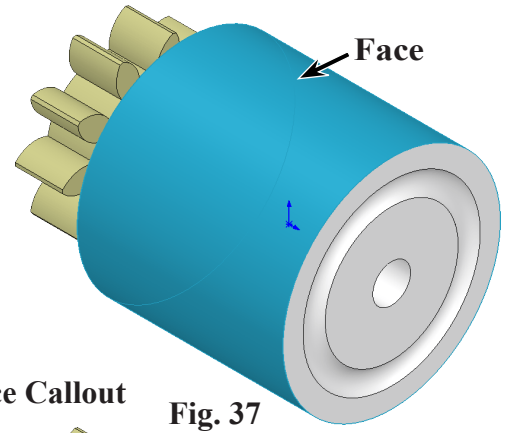


Fig. 37

H. Appearance: Green.

Step 1. Click part, click **Appearance Callout**  on the context toolbar and click **RIM**  , **Fig. 38**.

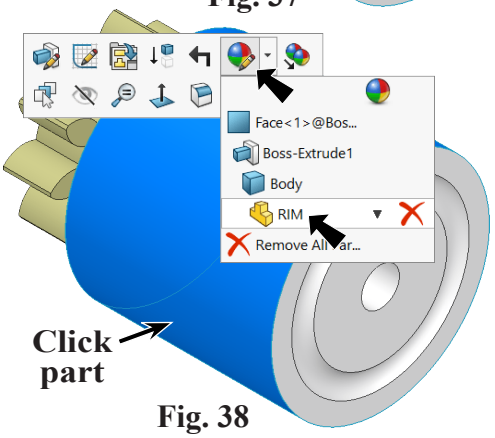


Fig. 38

Step 2. In the Appearances Task pane at the bottom select **tank** and in the lower pane select **army green plastic**, **Fig. 39**.

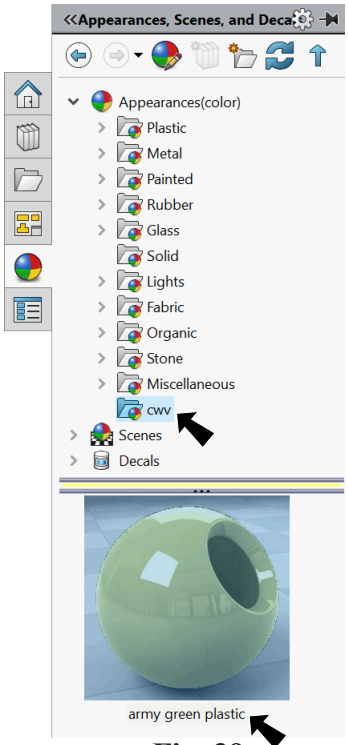


Fig. 39

Step 3. Click OK ✔ in Property Manager.

Step 4. Save  **(Ctrl-S)**.

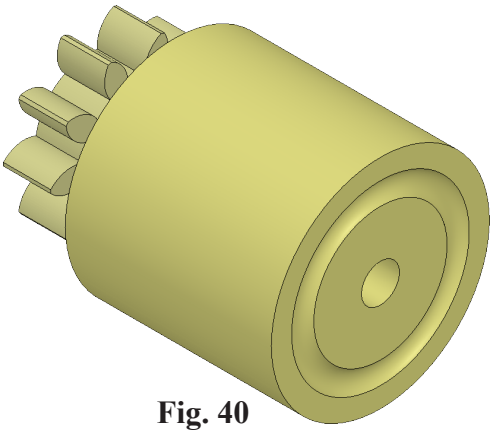


Fig. 40