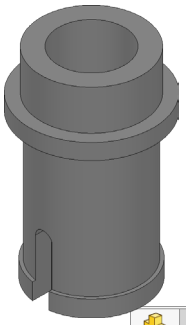
Chapter 27

Solar Train

Lego Half Pin



A. Revolve.

Step 1. Click **New** on the Standard toolbar, click **Part Metric** and OK.

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

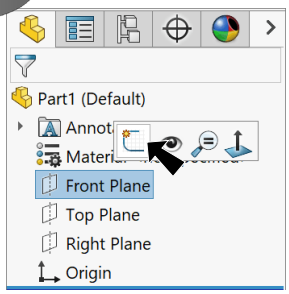


Fig. 1

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

Step 4. Sketch lines, **Fig. 2**.

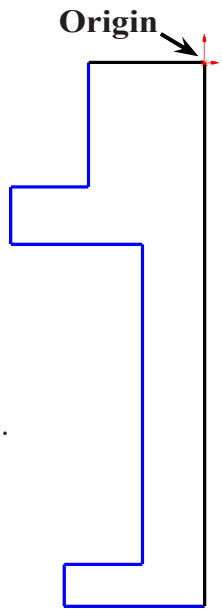


Fig. 2

Step 5. Click **Centerline** in the **Line flyout** on the Sketch toolbar.

Step 6. Sketch **vertical centerline** from Origin , **Fig. 3**.

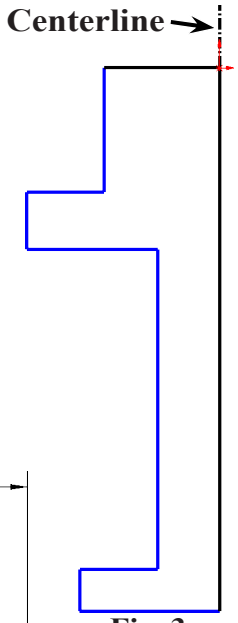


Fig. 3

Step 7. Click **Smart Dimension** **(S)** on the Sketch toolbar.

Step 8. Add dimensions, **Fig. 4**. Dimension **double distance** 4.9. To double distance dimension, click centerline and then top horizontal line, move the cursor below centerline (Origin) and click. Key-in 4.9 in the Modify box and press ENTER. Double distance dimension the other diameter dimensions.

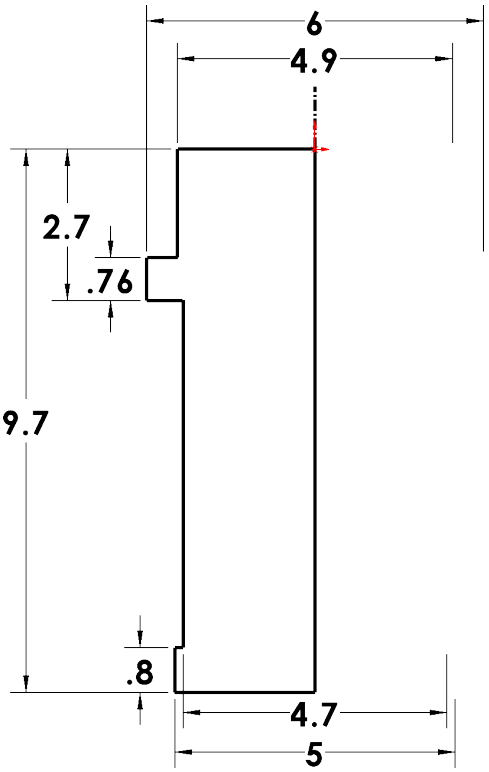


Fig. 4

Step 9. Click **Features** Features on the Command Manager toolbar.

Step 10. Click **Revolved Boss/Base** Revolved Boss/Base on the Features toolbar.

Step 11. In the Revolve Property Manger:

for Axis of Revolution , centerline will be selected, **Fig. 6**

click OK .

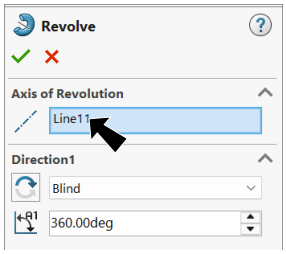


Fig. 5

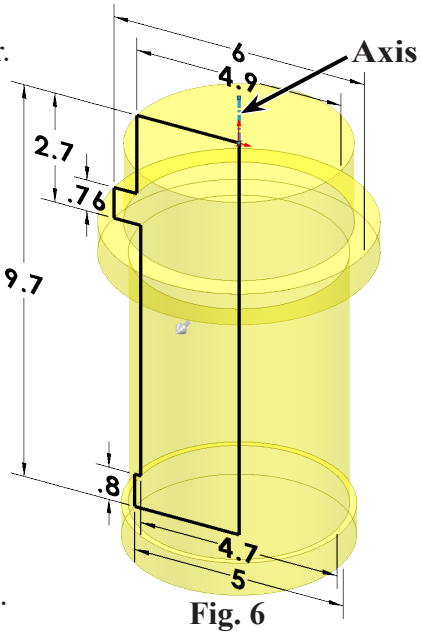


Fig. 6

B. Save as "LEGO HALF PIN".

Step 1. Click File Menu > Save As.

Step 2. Key-in **LEGO HALF PIN** for the filename and press ENTER.

C. Extruded Cut1.

Step 1. Click **Top Plane** in the Feature Manager and click **Sketch** on the context toolbar, **Fig. 7**.

Step 2. Click **Circle** **(S)** on the Sketch toolbar.

Step 3. Sketch **circle at Origin** , **Fig. 8**.

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

Step 5. Dimension **diameter 3.2**, **Fig. 8**.

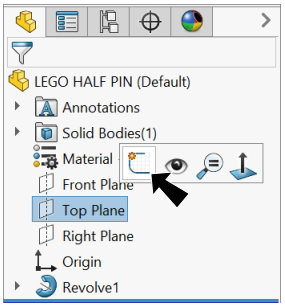


Fig. 7

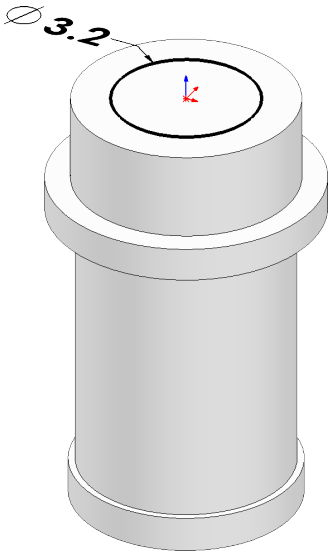


Fig. 8

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

Step 7. Click **Extruded Cut** Extruded Cut on the Features toolbar.

Step 8. In the Cut-Extrude Property Manager set:

under Direction 1, **Fig. 9**

End Condition **Through All**

click OK .

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

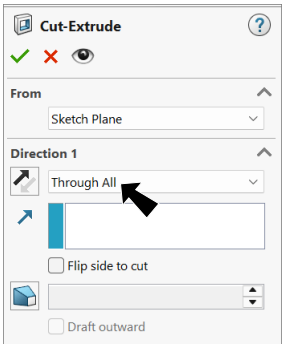


Fig. 9

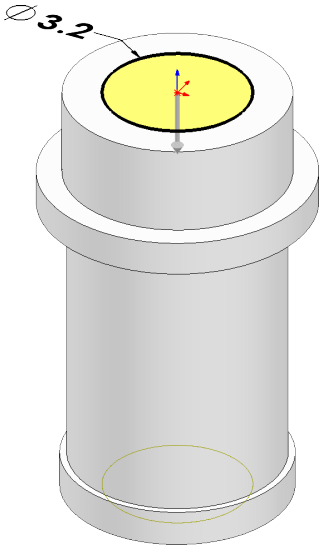


Fig. 10

D. Extruded Cut2.

Step 1. Click **Front Plane** in the Feature Manager and click **Sketch** on the context toolbar, **Fig. 11**.

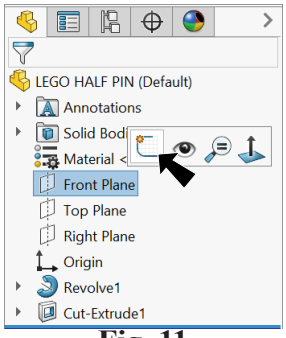


Fig. 11

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

Step 3. Click **Circle** **(S)** on the Sketch toolbar.

Step 4. Sketch **circle below Origin** , **Fig. 12**.

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

Step 6. **Ctrl click centerpoint of circle** and **Origin** to select both. Release Ctrl key and click **Make Vertical** on the context toolbar, **Fig. 13**.

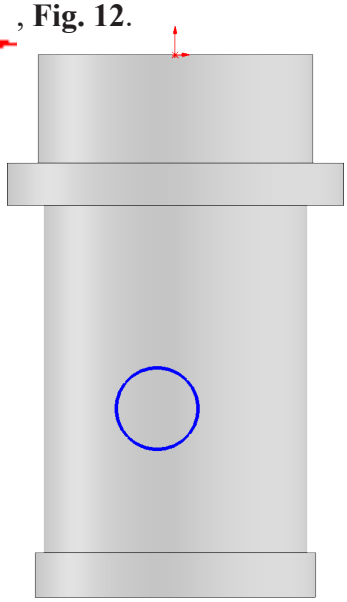


Fig. 12

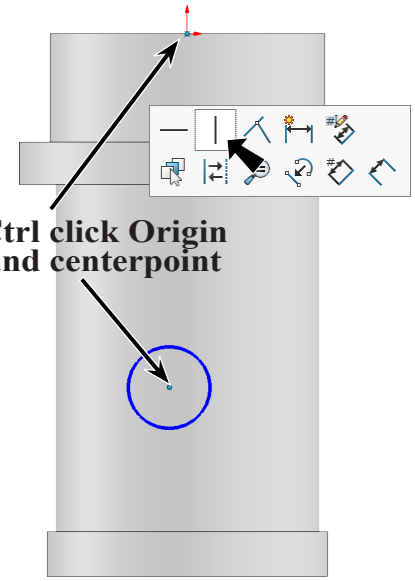


Fig. 13

Step 7. Click **Line** **(L)** on the Sketch toolbar.

Step 8. Sketch **lines** circle quadrant points **down to bottom edge of Revolve across edge and back up to quadrant point**, **Fig. 14**.

Step 9. Click **Smart Dimension** **(S)** on the Sketch toolbar.

Step 10. Add dimensions, **Fig. 15**.

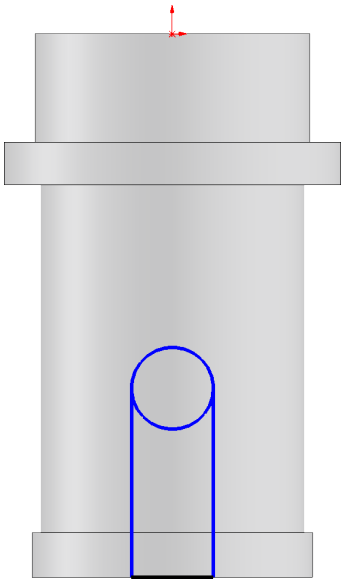


Fig. 14

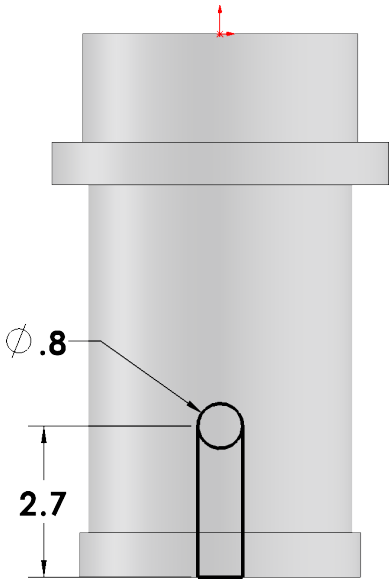


Fig. 15

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

Step 12. Click **Features** Features on the Command Manager toolbar.

Step 13. Click **Extruded Cut** Extruded Cut on the Features toolbar.

Step 14. In the Cut-Extrude Property Manager set:
under Direction 1, **Fig. 16**
End Condition **Through All - Both**
under Selected Contours
click **both contours**, **Fig. 17**
click OK .

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

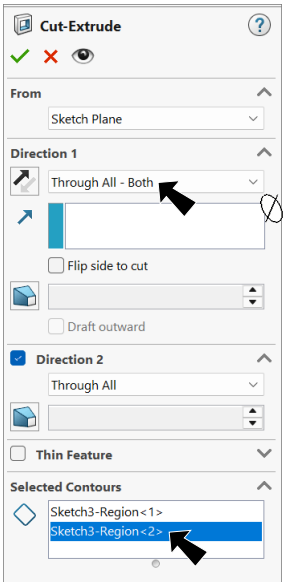


Fig. 16

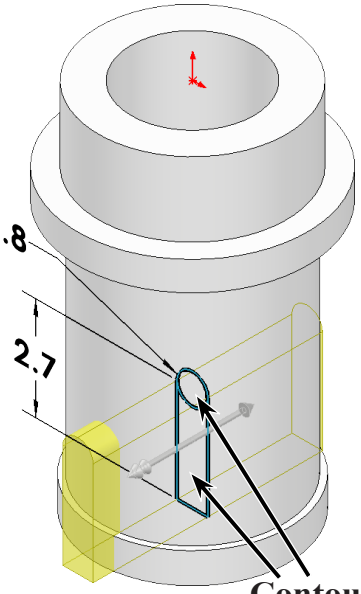


Fig. 17

E. Mate Reference.

Step 1. Rotate view to under cap, **Fig. 19**. To rotate view, **Shift click the X axis of the Reference Triad** **one time**.

Step 2. Click **Reference Geometry** Reference Geometry on the Features toolbar and **Mate Reference** from the menu.

Step 3. In the Mate Reference Manager set:
under **Primary** Reference Entity
click **top circular edge of shaft under top rim**, **Fig. 19**
click OK .

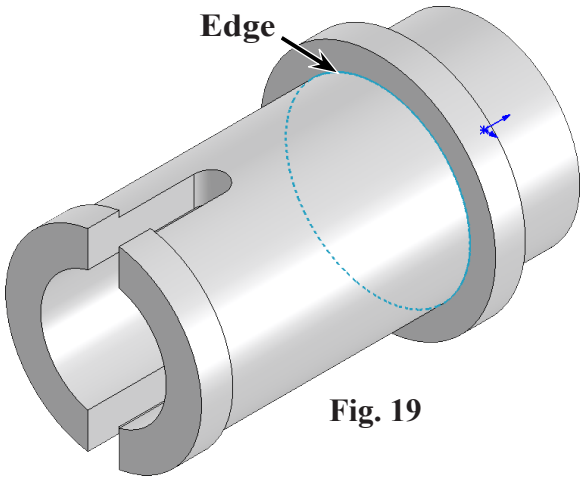


Fig. 19

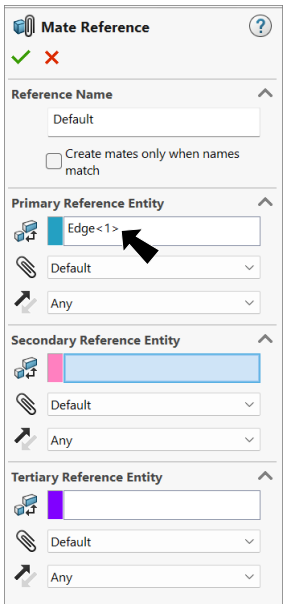


Fig. 18

F. Appearance: Light Gray Plastic.

Step 1. Click **Isometric** on the Standard Views toolbar. (**Ctrl-7**)

Step 2. Click the part, click **Appearance Callout** on the context toolbar and click **LEGO HALF PIN**, **Fig. 20**.

Step 3. In the Appearances Task Pane expand **Plastic**, click **Medium Gloss** and in the lower pane click **light gray medium gloss plastic**, **Fig. 21.**

Step 4. Click OK in the Property Manager.

Step 5. Save (**Ctrl-S**).

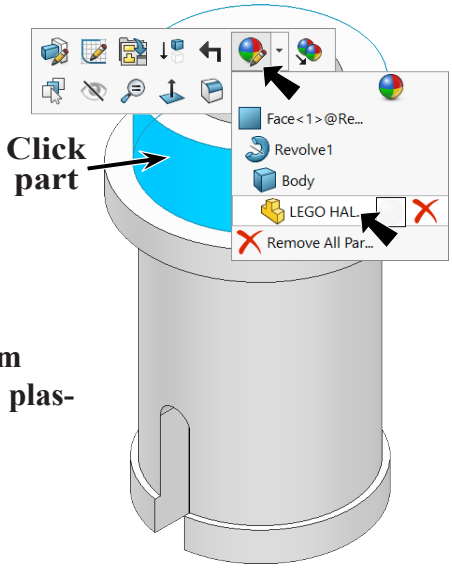


Fig. 20

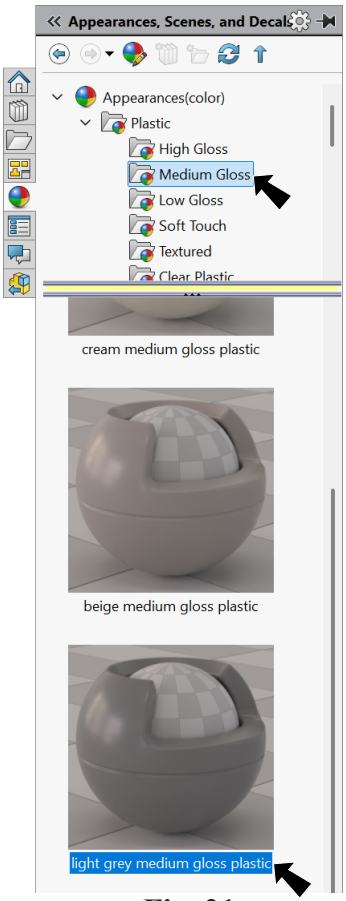


Fig. 21

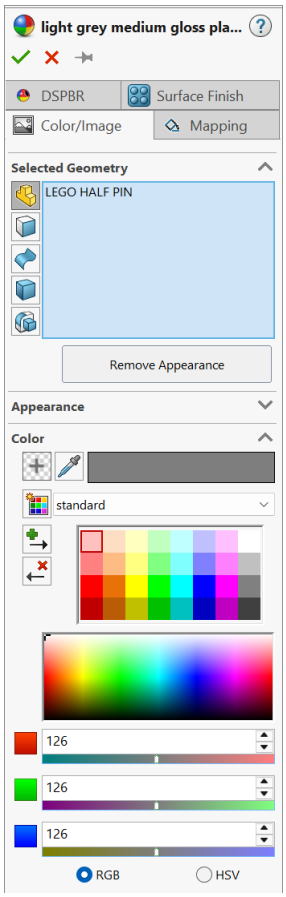


Fig. 22

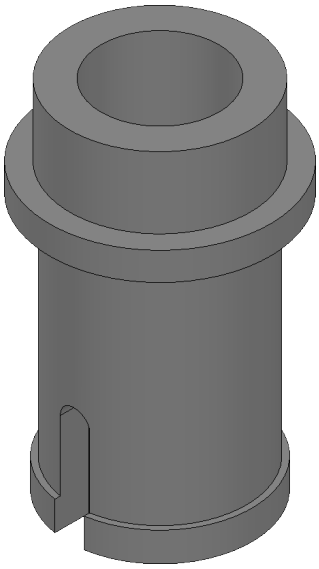


Fig. 23