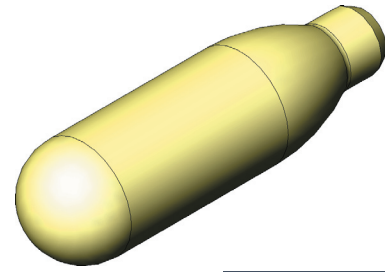


CO2 Shell Car Cartridge



A. Sketch Lines.

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

Step 2. Click **Right** (plane) in the Feature Manager and click **Sketch** from the Content toolbar, **Fig. 1**.

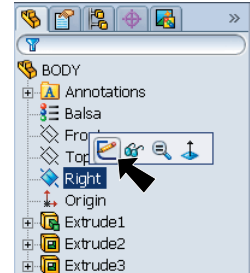


Fig. 1

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

Step 4. Draw lines as shown in **Fig. 2**. Start at the Origin .

Use the inferencing line, the dotted line that appears when you draw the lines. Do not add any extra lines. If you make a mistake, use Undo, **Ctrl-Z**. Use **L** key to start and stop line.



Fig. 2

Step 5. Click **Smart Dimension**  (S) on the Sketch toolbar.

Step 6. Add the dimensions as shown in **Fig. 3**. To Smart dimension click the line then move the cursor out away from the line and click. Key-in the dimension and press ENTER. Arrange the dimensions as **Fig. 3**.

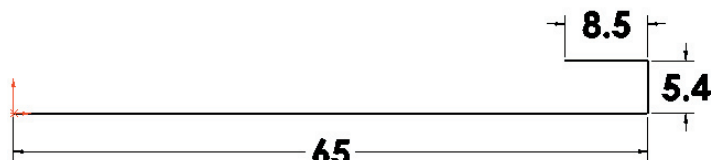


Fig. 3

Step 7. Click Zoom to Fit  (F) on the View toolbar.

B. Save as "CARTRIDGE".

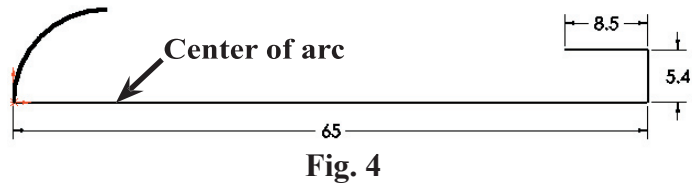
Step 1. Click File Menu > Save As.

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

C. Centerpoint Arc.

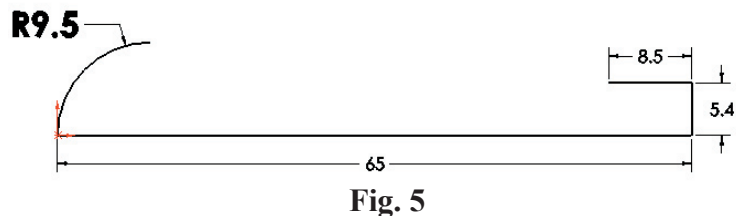
Step 1. Click **Centerpoint Arc**  (S) in the **Arc flyout**  on the Sketch toolbar.

Step 2. Click the bottom horizontal line close to the Origin to place the center of the arc. Click the Origin to start the first end point, then move cursor down and around counterclockwise 270 degrees and a 90 degrees arc. Click to place the second end point, **Fig. 4**. Use the inferencing line, the dotted line that appears when you draw the arc 90 degrees.



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

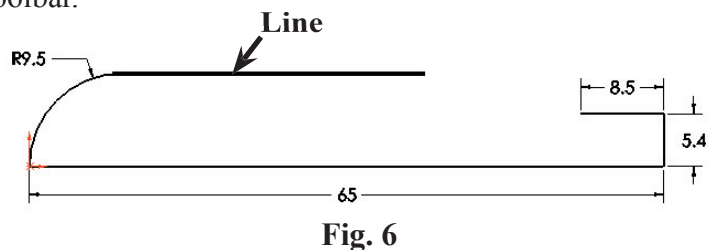
Step 4. Dimension the arc radius **9.5** as shown in **Fig. 5**. To Smart dimension click the arc then move the cursor out away from the arc and click. Key-in the dimension and press ENTER. Arrange the dimension as **Fig. 5**.



D. Line.

Step 1. Click **Line**  (L) on the Sketch toolbar.

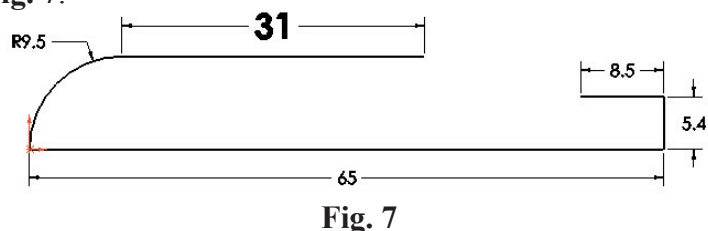
Step 2. Starting from the end of the arc, draw a horizontal line across the sketch as shown in **Fig. 6**. Keep the line away from the short horizontal line.



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

Step 4. Dimension the line **31** as shown in **Fig. 7**.

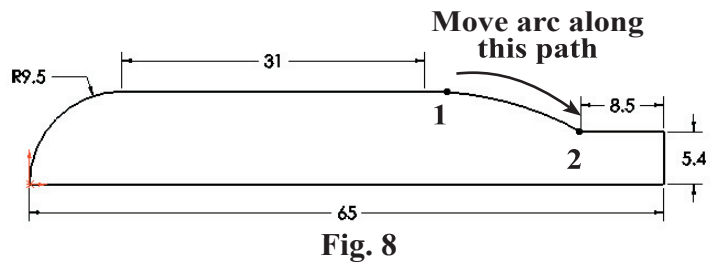
Step 5. Save. Use **Ctrl-S**.



E. Tangent Arc.

Step 1. Click **Tangent Arc**  in the **Arc flyout**  on the Sketch toolbar.

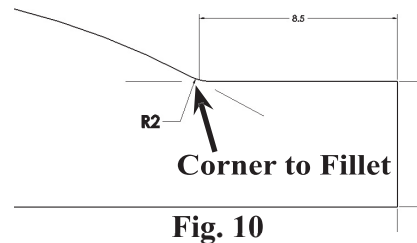
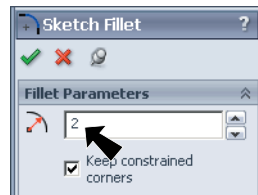
Step 2. Draw an arc between Position 1 and Position 2 in **Fig. 8**.



F. Sketch Fillet.

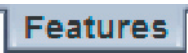
Step 1. Click **Sketch Fillet**  on the Sketch toolbar.

Step 2. Set the **Radius**  to 2 in the Sketch Fillet Property Manager, **Fig. 9**.



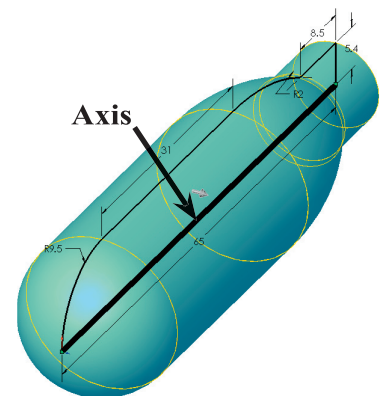
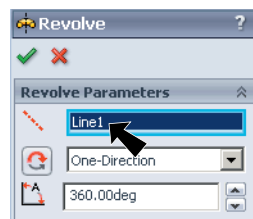
Step 3. Click the corner shown in **Fig. 10**. Click OK .

G. Revolve.

Step 1. Click **Features**  on the Command Manager toolbar.

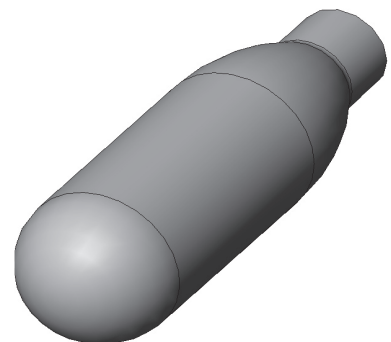
Step 2. Click **Revolved Boss/Base**  on the Features toolbar.

Step 3. In the Revolve Property Manager for the Axes of Revolution , **Fig. 11**, click the **bottom line of sketch**, **Fig. 12**. Click OK , **Fig. 13**.



Step 4. Click **Zoom to Fit**  (F) on the View toolbar.

Step 5. Save. Use **Ctrl-S**.



H. Chamfer.

Step 1. Use the left arrow on the key board to rotate view as shown in **Fig. 15**.

Step 2. Click **Chamfer**  on the Features toolbar.

Step 3. In the Chamfer Property Manager set:

Distance distance

Depth 1  to 1

Depth 2  to 2, **Fig. 14**

click the **corner edge**, **Fig. 15** and
click OK  in the Property Manager, **Fig. 16**.

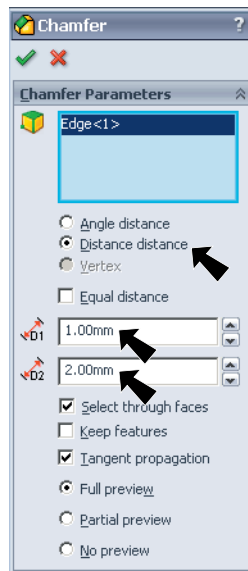


Fig. 14

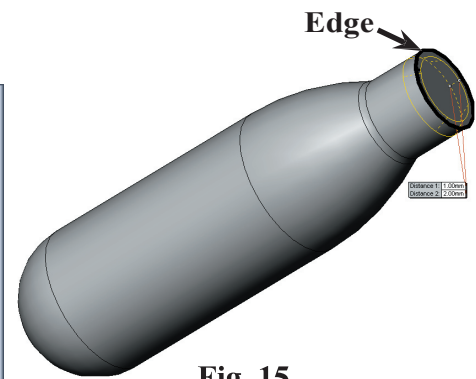


Fig. 15

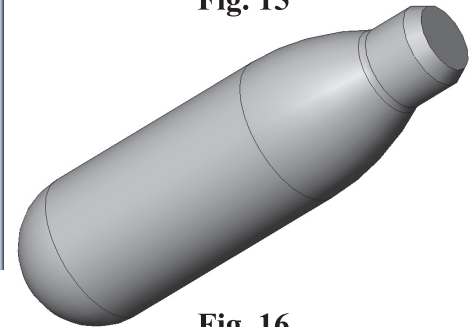


Fig. 16

Step 4. Save. Use **Ctrl-S**.

I. Shell.

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

Step 2. Click **Wireframe**  on the View toolbar.

Step 3. Click **Shell**  on the Features toolbar.

Step 4. In the Shell Property Manager, under Parameters:

Set **Distance**  to 1.25

Fig. 17

click OK  in the Property Manager, **Fig. 19**.

The Shell hollows out the inside of the cartridge.

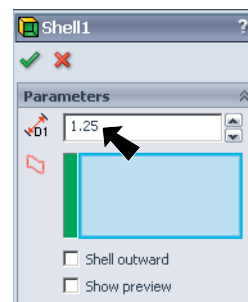


Fig. 17

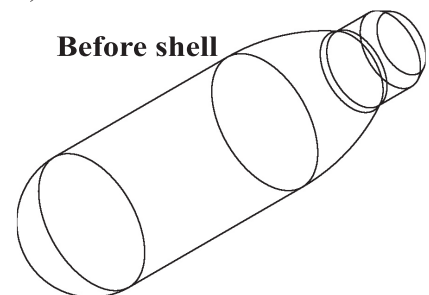


Fig. 18

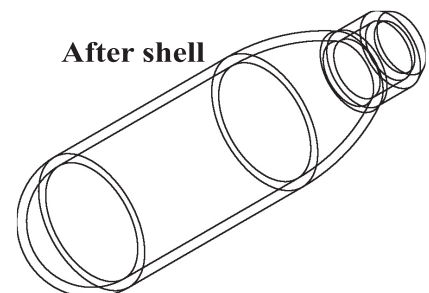


Fig. 19

Step 5. Click **Shaded With Edges**  on the View toolbar.

Step 6. Save. Use **Ctrl-S**.

J. Appearance.

Step 1. Click Edit Menu > Appearance > Material.

Step 2. Expand Steel, select **Steel AISI 304** and click OK , Fig. 20.

K. Color .

Step 1. Click **Edit Color**  on the Standard toolbar.

Step 2. In the Color and Optics Property Manager set, under Selection:

Click **Select Bodies**  and unselect others, Fig. 21.

Click the **cartridge** under Favorite:

Shiny

click second **Yellow** swatch, Fig. 21

click OK  in the Property Manager, Fig. 22.

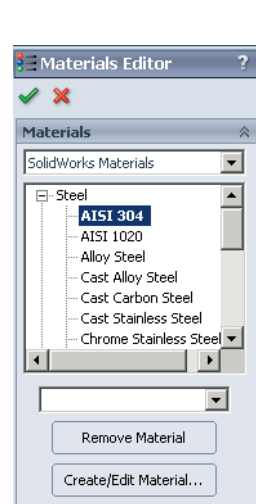


Fig. 20

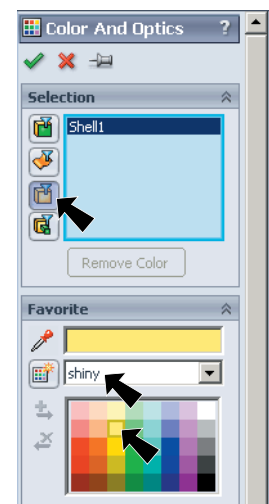


Fig. 21

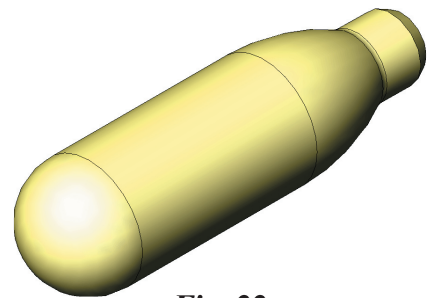


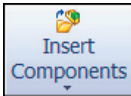
Fig. 22

Step 3. Save. Use **Ctrl-S**.

L. Insert Cartridge in Assembly.

Step 1. Click File Menu > Open. Select your ASSEMBLY file and click OK.

Step 2. Use the arrows on the keyboard to rotate assembly to view the bottom and side of the cartridge hole, Fig. 23.

Step 3. Click **Insert Components**  on the Assembly toolbar.

Step 4. Click **Browse** in the Property Manager.

Step 5. Select your **CARTRIDGE** file and click Open.

Step 6. Click approximately where the cartridge is positioned in Fig. 23.

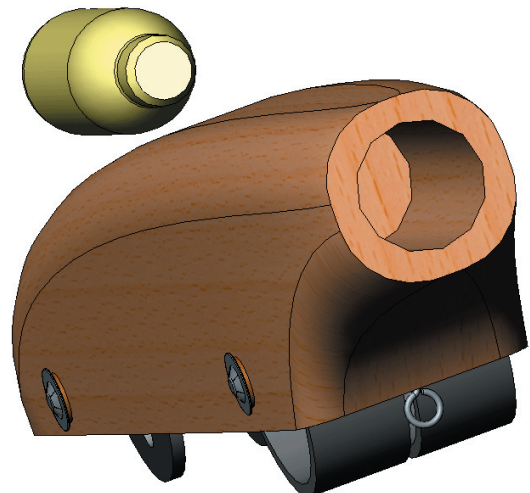


Fig. 23

M. Mate: Cartridge and Body.

Step 1. Press **X** key on keyboard to allow only face selection.

Step 2. Click **Mate**  on the Assemblies toolbar.

Step 3. Click **cylindrical face of cartridge** and **cylindrical face cartridge hole**, Fig. 24.

Step 4. Click Add/Finish Mate  in Mate pop-up toolbar to add a **Concentric** mate.

Step 5. Click **bottom face of the cartridge hole**, Fig. 25.

Step 6. Use the arrows on the keyboard to rotate assembly to view the bottom face of the cartridge, Fig. 26.

Step 7. Click **bottom face of the cartridge**, Fig. 26.

Step 8. Click Add/Finish Mate  in Mate pop-up toolbar to add a **Tangent** mate.

Step 9. Click OK  in the Property Manager when done.

Step 10. Save. Use **Ctrl-S**.

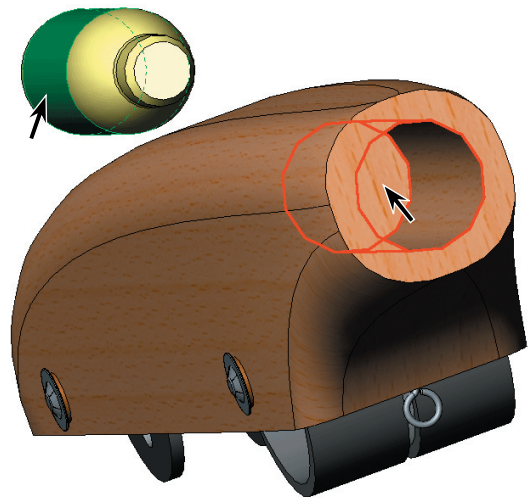


Fig. 24

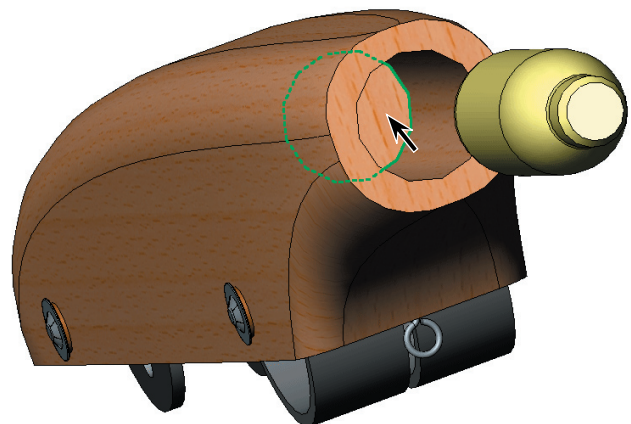


Fig. 25

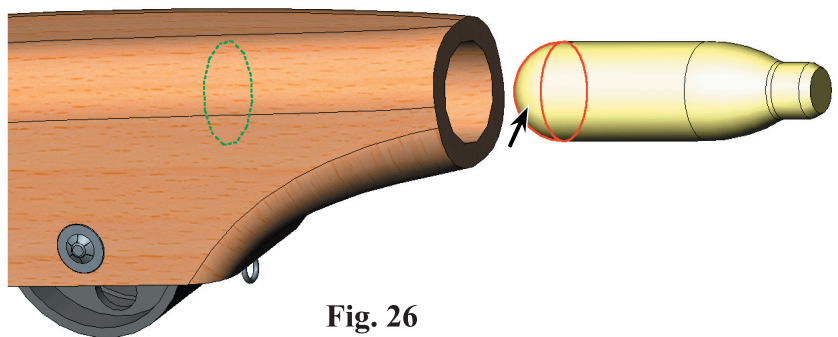


Fig. 26

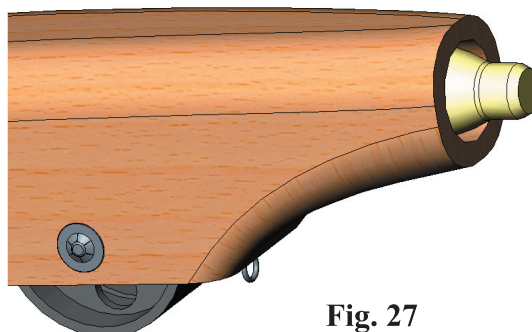


Fig. 27