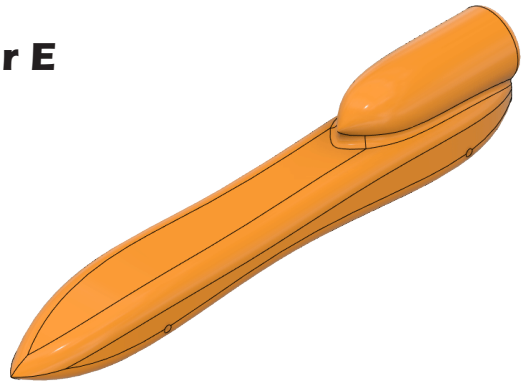
Chapter 2

CO2 Rail Car E
Body



A. Save as "BODY RAIL E".

Step 1. Open your **BLANK** file.

Step 2. Click File Menu > Save As.

Step 3. In the Save As dialog box:
Key-in **BODY RAIL E** for the filename, **Fig. 1**
Confirm **folder is Rail E**
click Save.

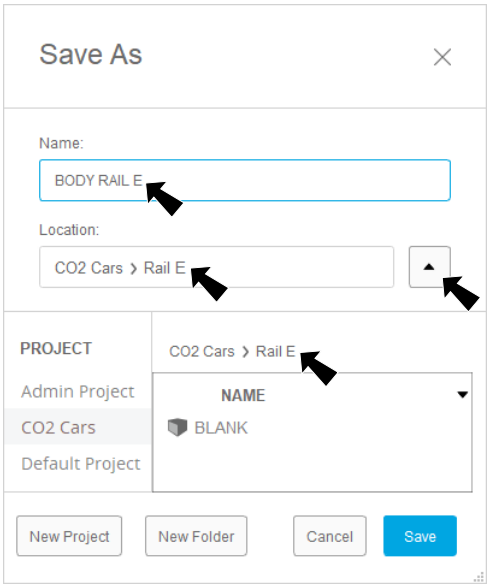


Fig. 1

B. Edit Axle Holes Sketch.

Step 1. Expand Sketches in the Browser, **right click Sketch4** and click **Edit Sketch**  , **Fig. 2**.

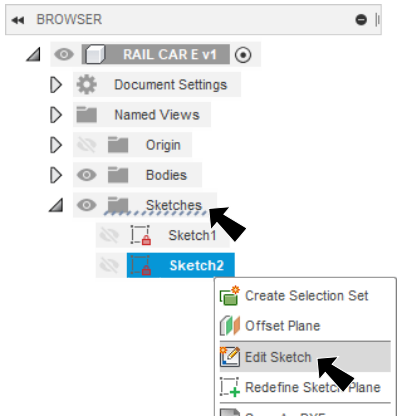


Fig. 2

Step 2. Change dimensions as shown in **Fig. 3**.

Step 3. Click **Finish Sketch**  on the toolbar.

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

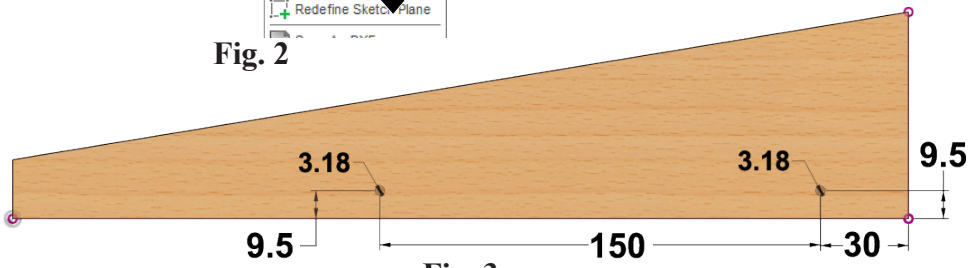


Fig. 3

C. Side Cut.

Step 1. On the Solid tab SOLID click **Create Sketch**  in the sketch area of toolbar and click **side face of body**, **Fig. 4**.

Step 2. Click **Fit**  **(F6)** on the Navigation Bar at the bottom of the canvas.

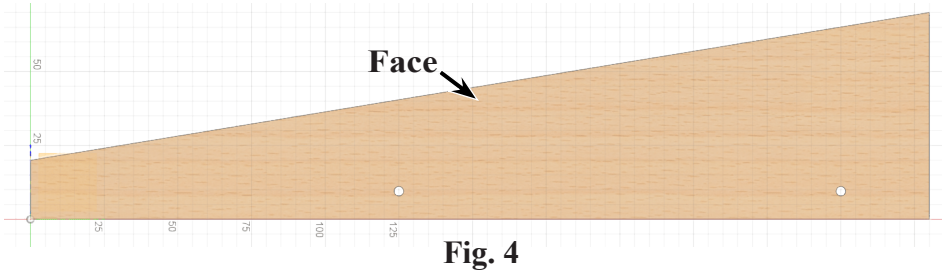


Fig. 4

Step 3. Click Sketch Menu > Spline > Control Point Spline .

Step 4. Sketch a **5 control point Spline** between rear edge of body out to left, **Fig. 5**. Press ENTER to end spline.

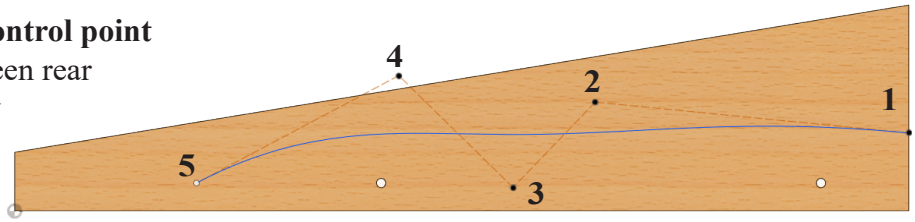


Fig. 5

Step 5. Click **Dimension** (**D**) on the toolbar.

Step 6. Add dimensions, **Fig. 6**.

Step 7. Click Sketch Menu > Spline > Control Point Spline .

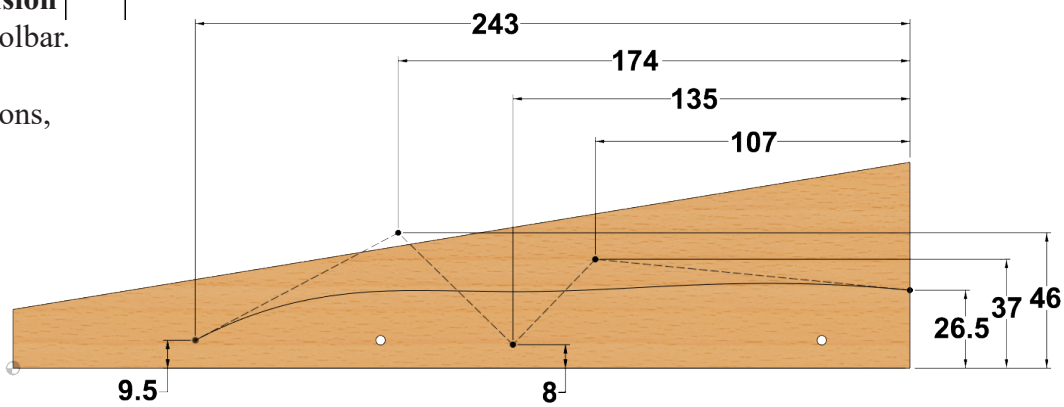


Fig. 6

Step 8. Sketch a **5 control point Spline between endpoint of spline and right rear edge of part** below first style spline, **Fig. 7**. Press ENTER to end spline.

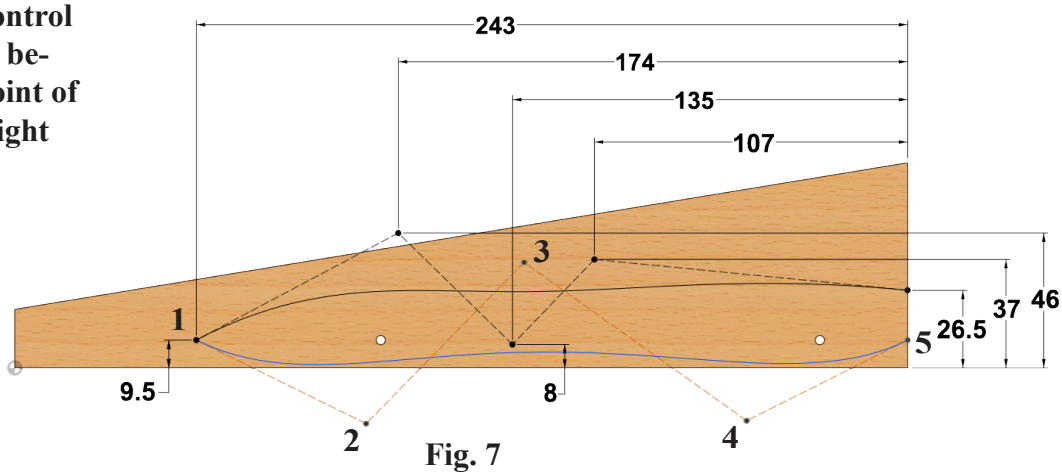


Fig. 7

Step 9. Add dimensions, **Fig. 8**.

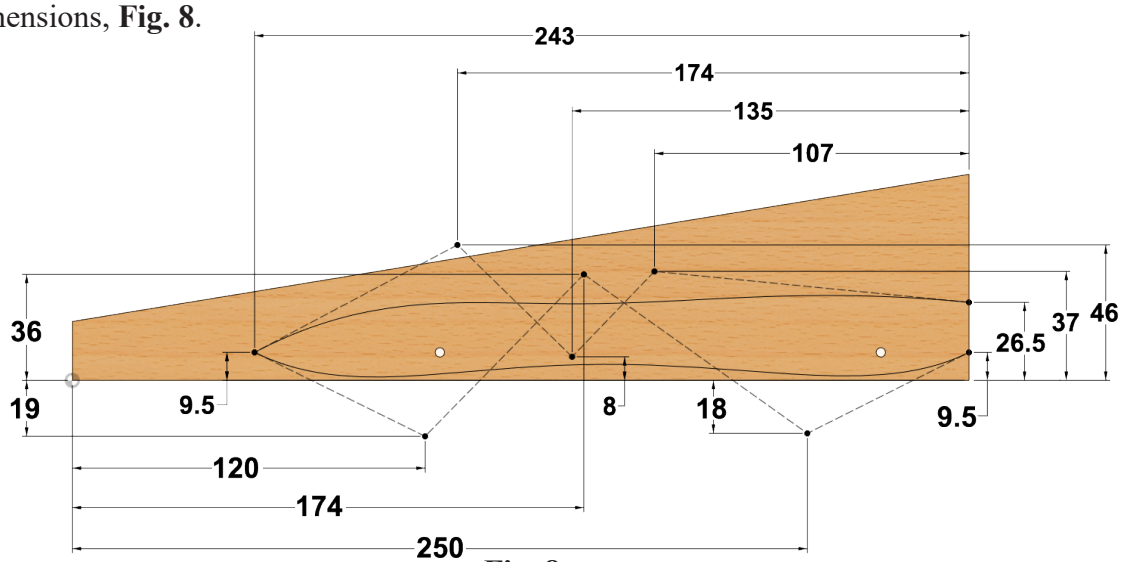


Fig. 8

Step 10. On the Solids tab SOLID click **Extrude** (**E**).

Step 11. In the Extrude panel set, **Fig. 9**

Profile **click body outside the sketches, Fig. 10**

Direction **One Side**

Extent **All**

Flip

Operation **Cut**

click OK.

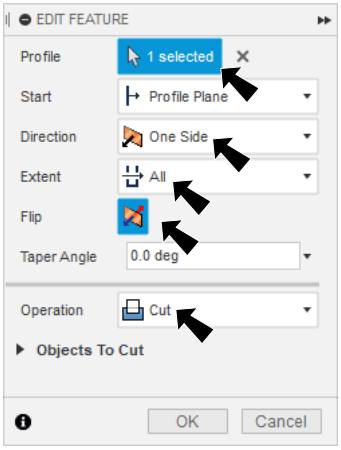


Fig. 9

Step 12. Save. Use **Ctrl-S**.

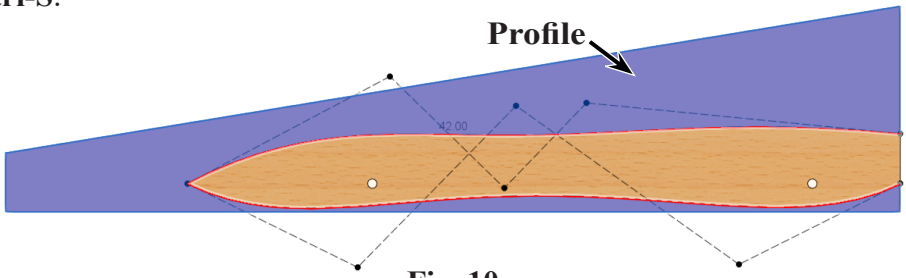


Fig. 10

D. Suppress Cartridge Hole Feature.

Step 1. In the Timeline at the bottom of the canvas, **right click Hole** feature and click **Suppress Features** from menu, **Fig. 11**.

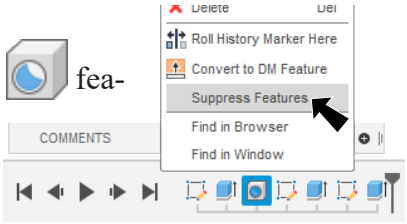


Fig. 11

E. Top Cut.

Step 1. On the Solid tab SOLID click **Create Sketch** in the sketch area of toolbar and click **Top plane** in canvas, **Fig. 12**.

Step 2. Click **Fit** **(F6)** on the Navigation Bar at the bottom of the canvas.

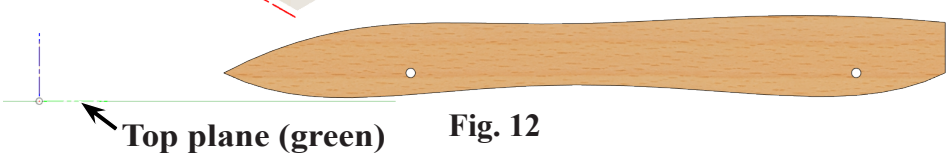


Fig. 12

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

Step 4. Sketch a vertical centerline thru body, **Fig. 13**.

Step 5. Click Constraints Menu > **Midpoint** .

Step 6. Click **top endpoint of line and top edge of body**, **Fig. 14**.

Step 7. Click **bottom endpoint of line and bottom edge of body**, **Fig. 15**.

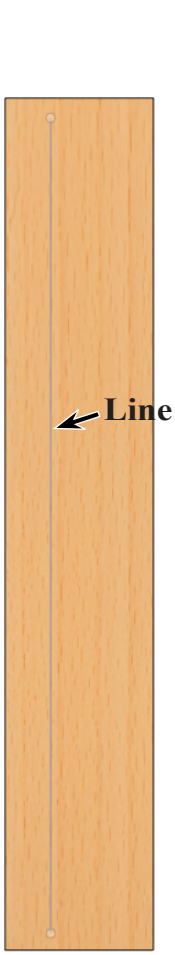


Fig. 13

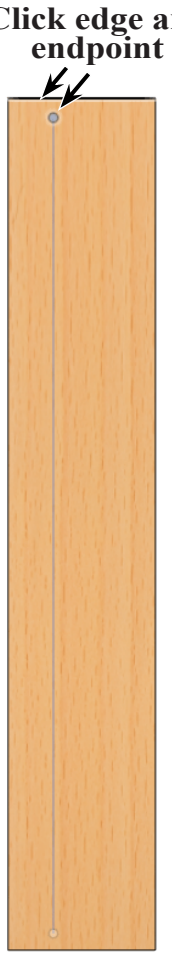


Fig. 14

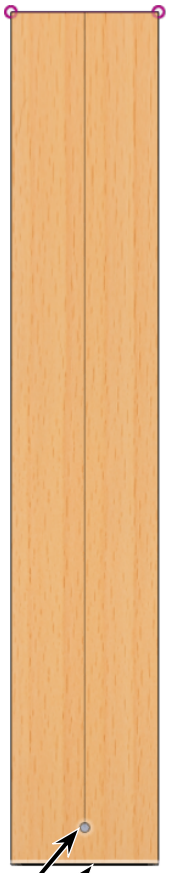


Fig. 15

Step 8. Click Sketch Menu > Spline > Control Point Spline .

Step 9. Sketch a **5 control point Spline** on left side of body, **Fig. 16**. Start spline at bottom endpoint of centerline. Press ENTER to end spline.

Step 10. Click **Dimension** (**D**) on the toolbar.

Step 11. Add dimensions, **Fig. 17**.

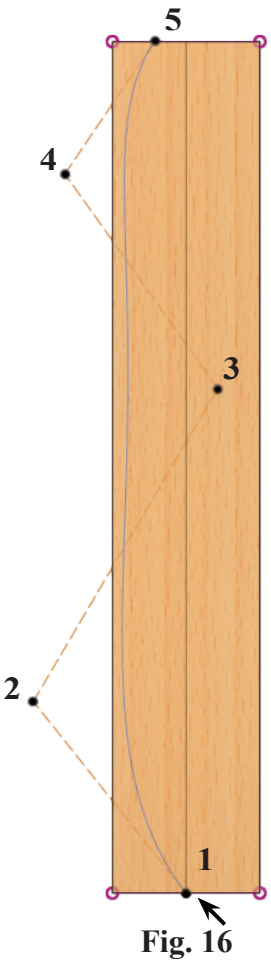


Fig. 16

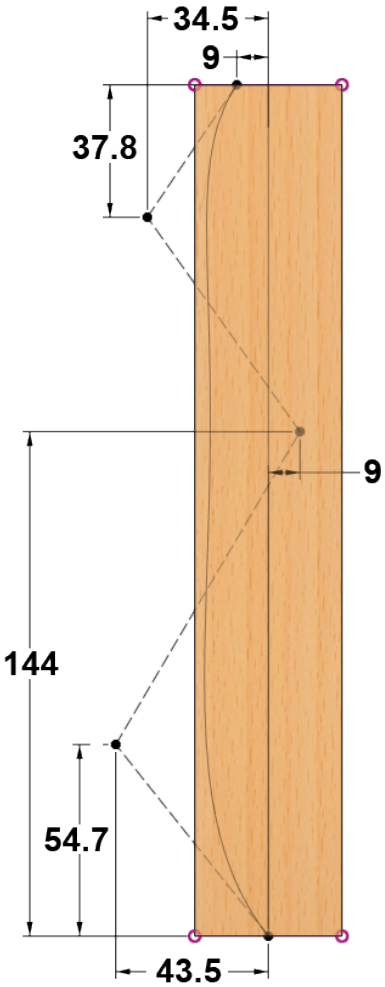


Fig. 17

Step 12. Click **Line** (**L**) on the toolbar.

Step 13. Sketch **3 lines**, start at top endpoint of spline and out to left and down to bottom body and back to bottom endpoint of spline, **Fig. 18**.
Tip: Hover cursor over corner of body, to sketch collinear to edge of body, **Fig. 19**.

Step 14. Click **Mirror** on the toolbar.

Step 15. In the Mirror panel set, **Fig. 20**
Objects click the **3 lines and spline**, **Fig. 21**
confirm 4 selected
Mirror Line **click Mirror Line button**
click **centerline**
click OK.

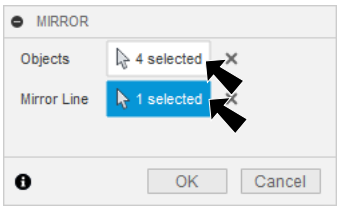


Fig. 20

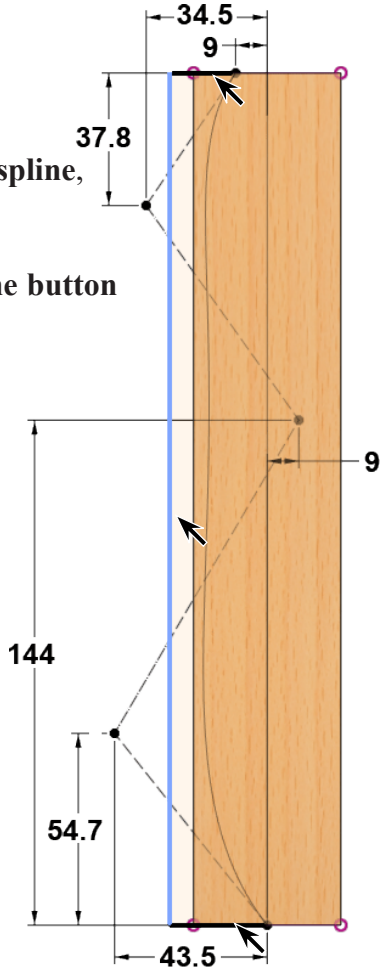


Fig. 18

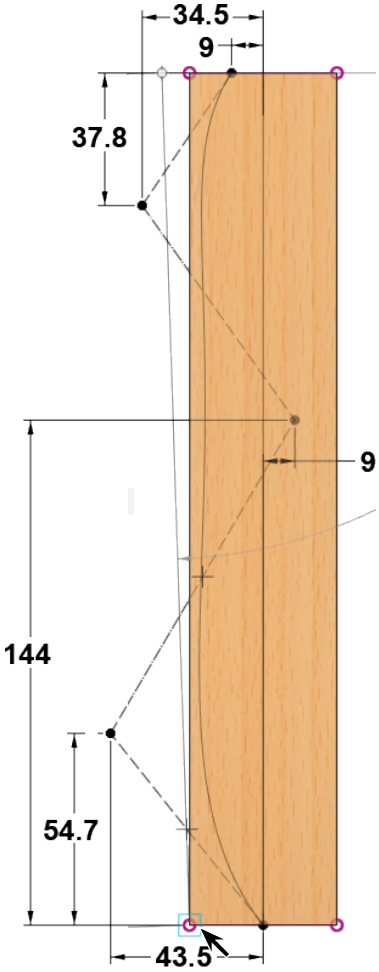


Fig. 19

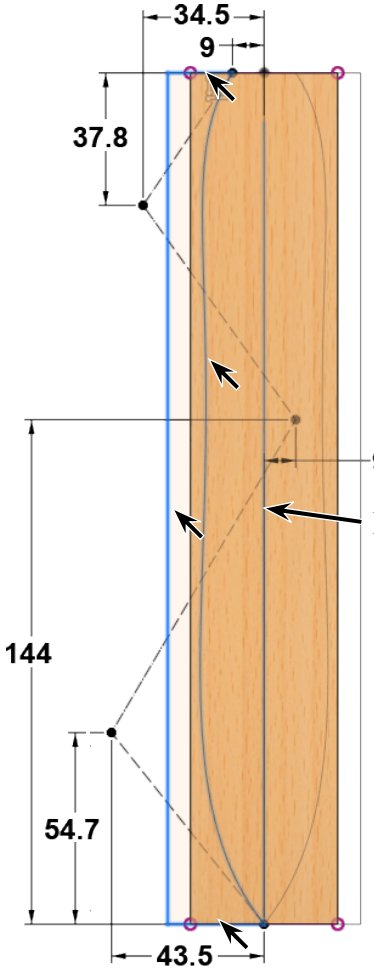


Fig. 21

Step 16. On the Solid tab SOLID click **Extrude** (**E**).

Step 17. In the Extrude panel set, **Fig. 22**
Profile **click both Profiles**, **Fig. 23**
Direction **One Side**
Extent **All**
Operation **Cut**
click OK.

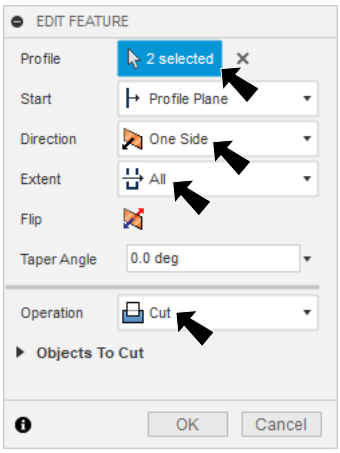


Fig. 22

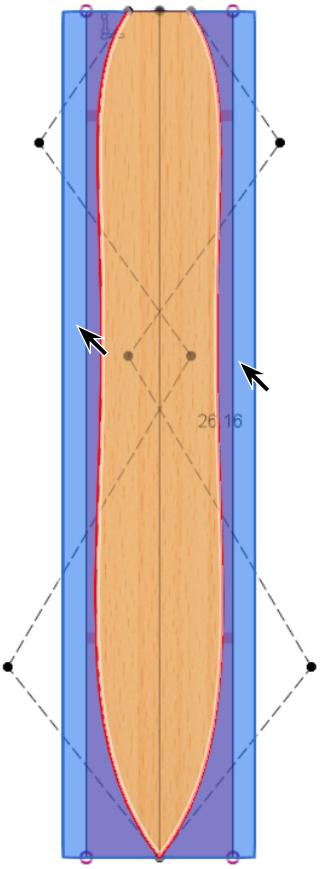


Fig. 23

Step 18. Save. Use **Ctrl-S**.

F. Cartridge Revolve .

Step 1. Click **Home** (Isometric) on View Cube .

Step 1. On the Solid tab SOLID click **Create Sketch** on toolbar and click **Right plane** in canvas, **Fig. 24**.

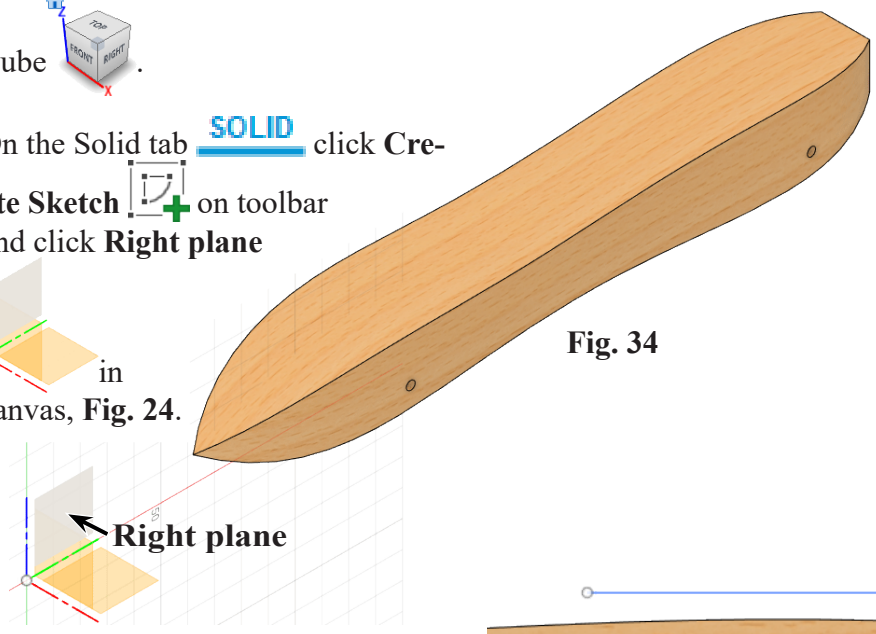


Fig. 34

Step 2. Click **Fit** (**F6**) on the Navigation Bar at the bottom of the canvas.

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

Step 4. Sketch a horizontal and vertical line off the rear end of body, **Fig. 25**.

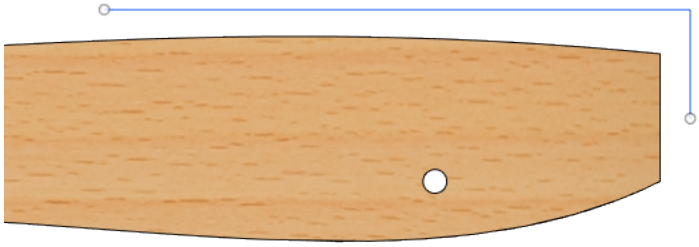


Fig. 25

Step 5. Click **Coincident** in the Constraints area of toolbar.

Step 6. Click **bottom endpoint of vertical line and rear edge of body**, **Fig. 26**.

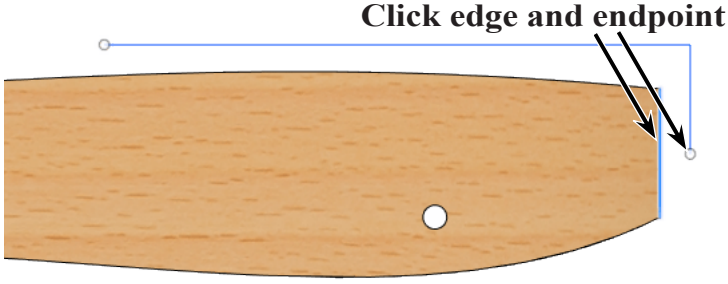


Fig. 26

Step 7. Click **Dimension** (**D**) on the toolbar.

Step 8. Add dimensions, **Fig. 27**. Dimension the 34 to Origin.

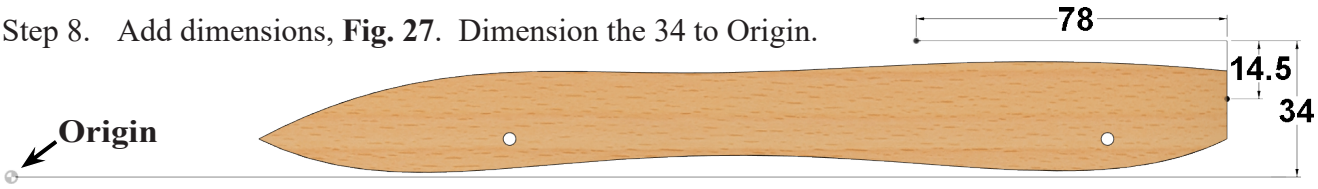


Fig. 27

Step 9. Click Sketch Menu > Spline > Control Point Spline .

Step 10. Sketch a **4 control point Spline** between endpoints of lines, **Fig. 28**. Press ENTER to end spline.

Step 11. Click **Dimension** (**D**) on the toolbar.

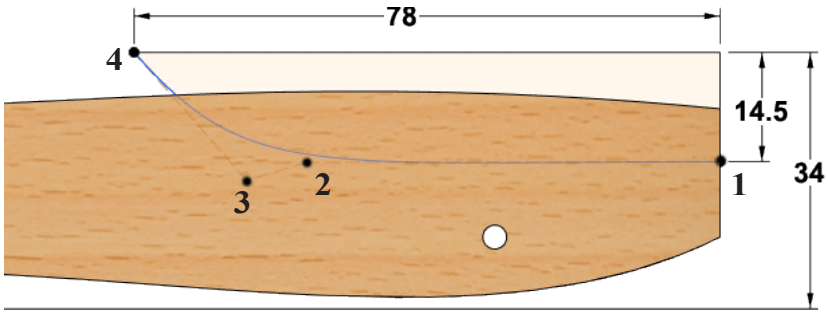


Fig. 28

Step 12. Dimension spline, **Fig. 29**.

Step 13. On the Solid tab click **Revolve**.

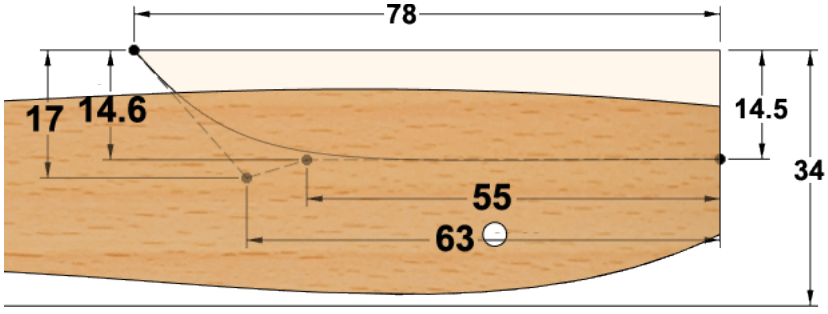


Fig. 29

Step 14. In the Edit Feature panel set, **Fig. 30**

Profile **click Profile**, **Fig. 31**

Axis **click horizontal line**

Operation **Join**

click OK.

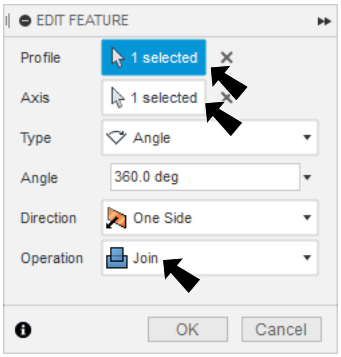


Fig. 30

Step 15. Save. Use **Ctrl-S**.

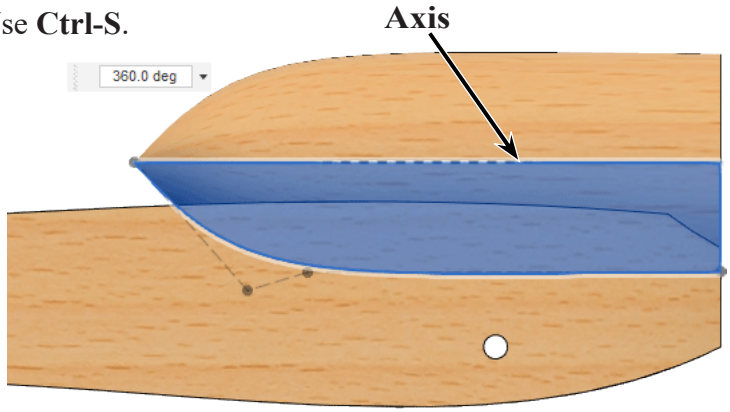


Fig. 31

G. Move Hole Feature to End.

Step 1. Rotate view to view Cartridge Hole, **Fig. 32**. Hold down middle mouse button (wheel) and drag to rotate view

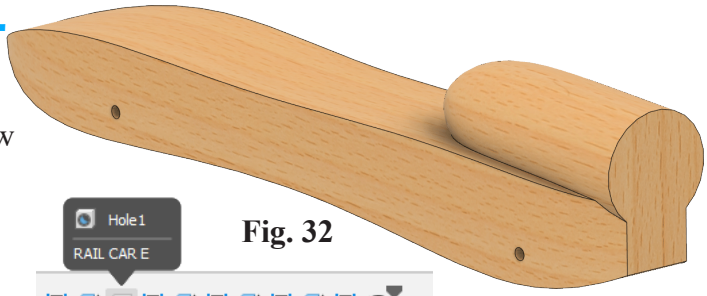


Fig. 32

Step 2. In the Timeline at the bottom of the canvas, grab the **Hole** feature, **Fig. 33**. **Drag feature to end of Timeline**, **right click** and **select Unsuppress Features** from menu, **Fig. 34**.

Fig. 33

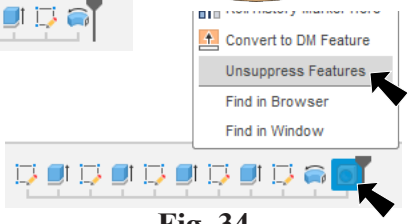


Fig. 34

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

H. Fillet Edges.

Step 1. Click **Home** (Isometric) on View Cube.

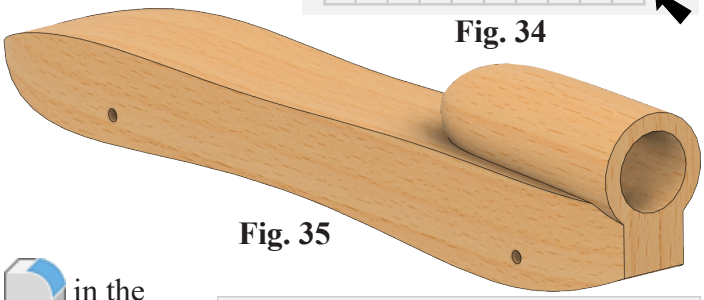


Fig. 35

Step 2. On the Solid tab SOLID click **Fillet** in the Modify area of toolbar.

Step 3. In the Fillet panel set, **Fig. 36**
uncheck **Tangent Chain**
click **both top edges** of body, **Fig. 37**
Radius 8
click OK.

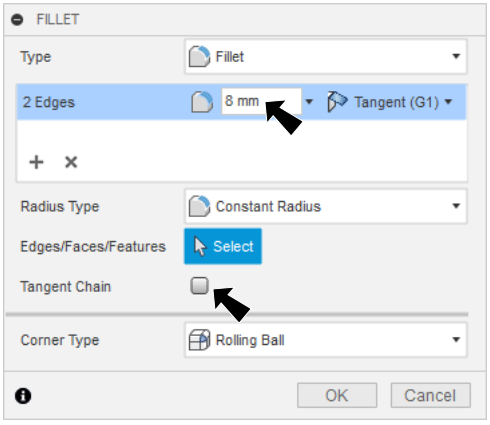


Fig. 36

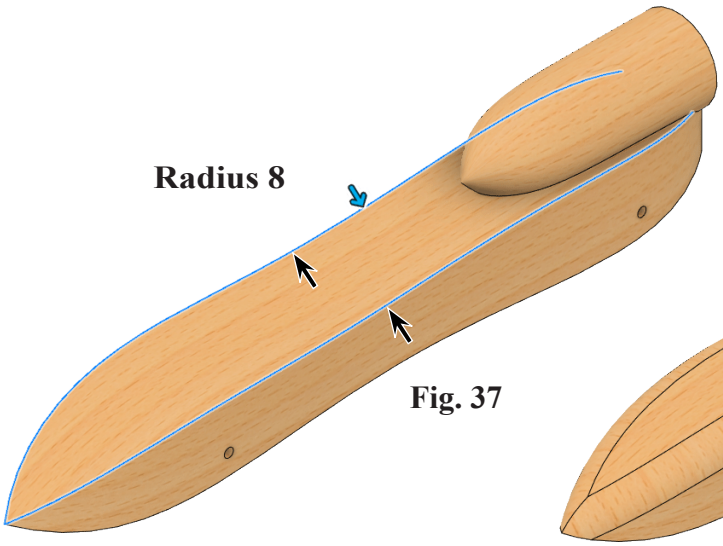


Fig. 37

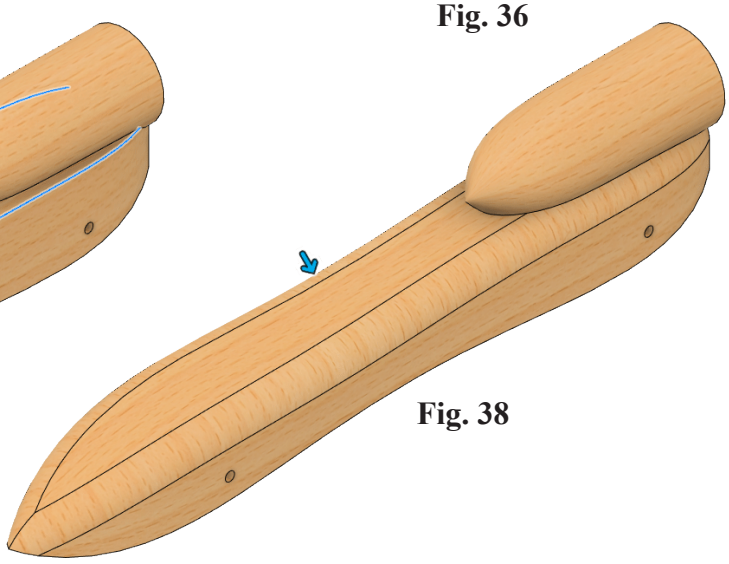


Fig. 38

Step 4. Click **Fillet**  in the Modify area of toolbar.

Step 5. In the Fillet panel set, **Fig. 39**
uncheck **Tangent Chain**
click **both bottom edges** of body, **Fig. 40**
Radius 8
click **Add new selection** ✚.

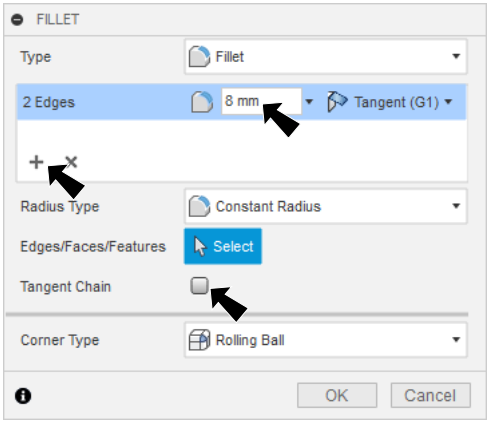


Fig. 39

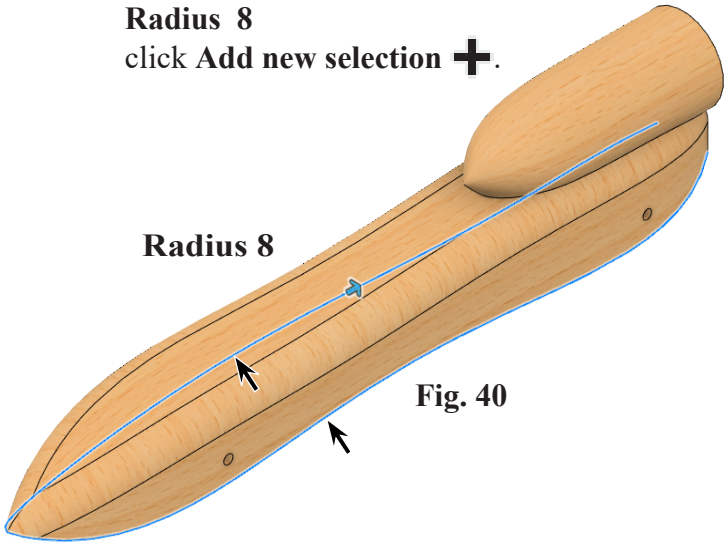


Fig. 40

Step 6. In the Fillet panel set, **Fig. 41**
check **Tangent Chain**
click **edge under cartridge revolve**, **Fig. 42**
Radius 3
click **Add new selection** ✚.

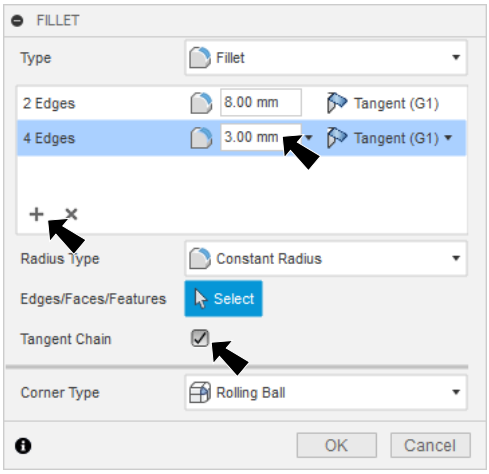


Fig. 41

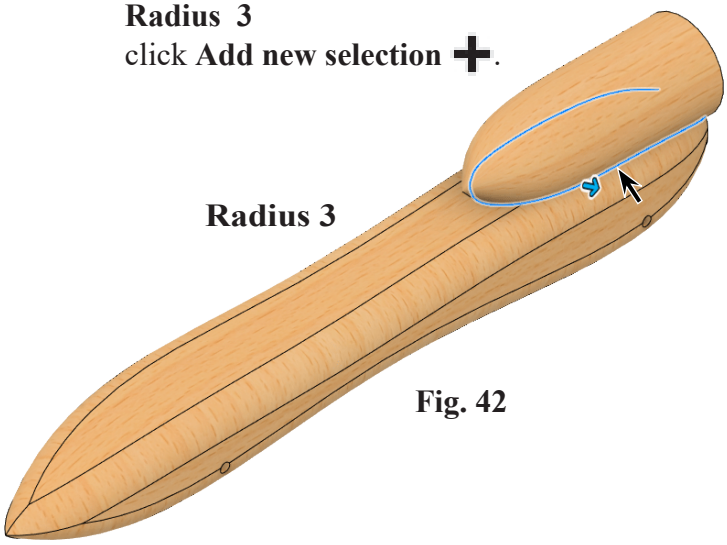


Fig. 42

Step 7. Rotate view to view **rear of body**, hold down middle mouse button (wheel) and drag to rotate view, **Fig. 44**.

Step 8. In the Fillet panel set, **Fig. 43**
check **Tangent Chain**
click **rear outside edges (8)** of body, **Fig. 44**
Radius 3
click **OK.**

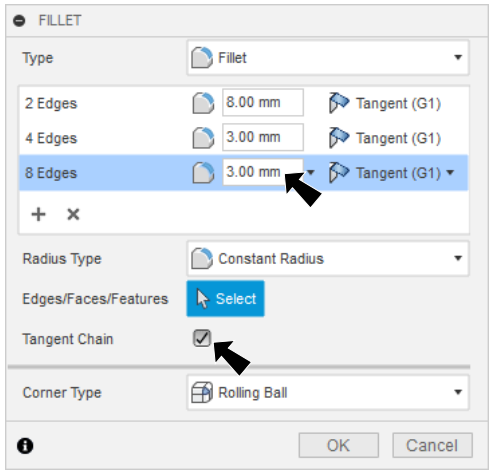


Fig. 43

Radius 3

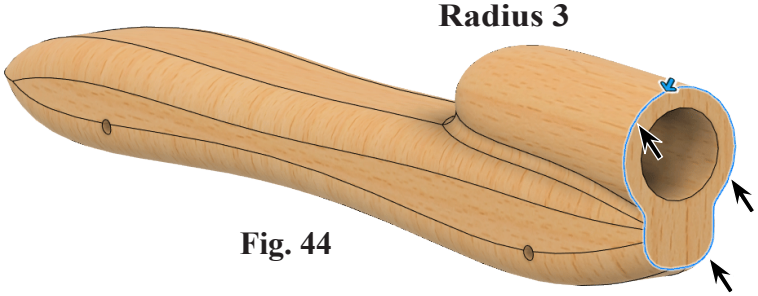


Fig. 44

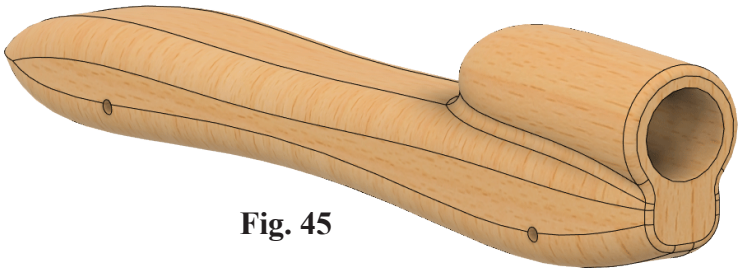


Fig. 45

I. Add Appearance.

Step 1. Click **Home** (Isometric) on View Cube .

Step 2. Display the Appearance panel, use **A** key.

Step 3. In the Appearance Panel:
under Library, **Fig. 46**
scroll down to Paint and expand Glossy
drag Glossy Blue onto body in canvas, **Fig. 47**.

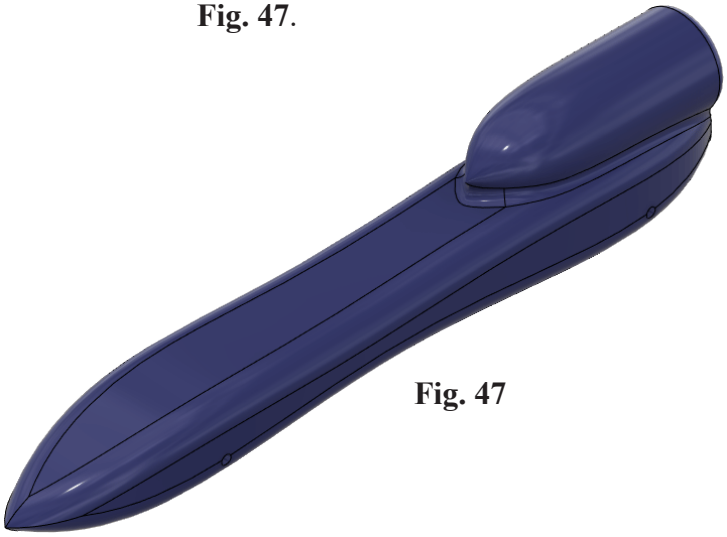


Fig. 47

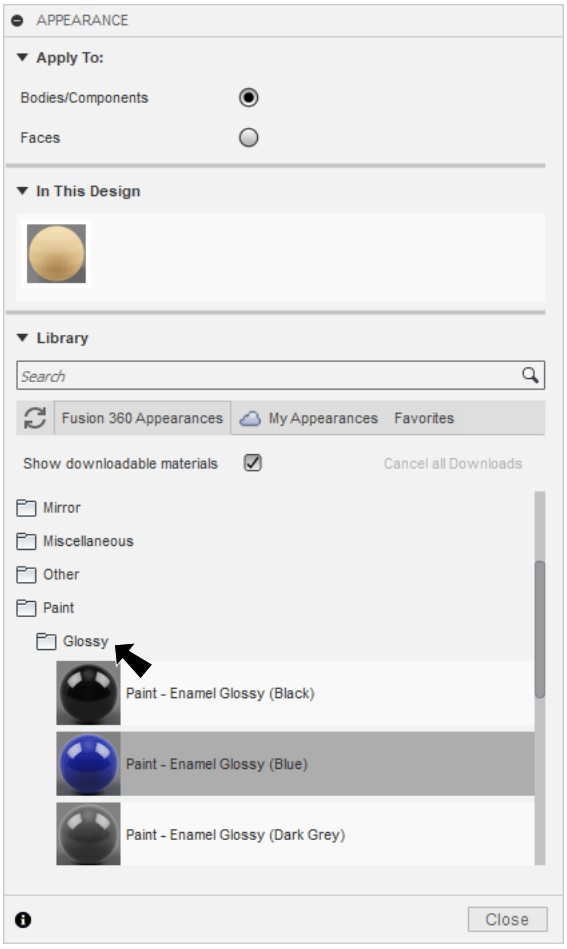


Fig. 46

Step 4. In the Appearance Properties panel:
under In This Design, **Fig. 48**.
double click the **Blue swatch**.

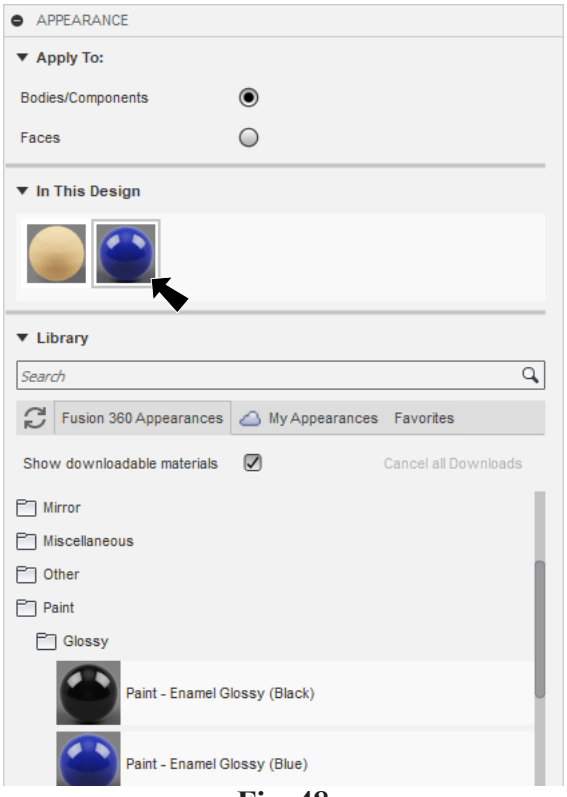


Fig. 48

Step 5. In the Material Editor:
Rename **Glossy Orange**, **Fig. 49**.
set **RGB values:**
R 255
G 157
B 9
click **Done.**

Step 6. In the Appearance Panel:
click **Close**.

Step 7. Save. Use **Ctrl-S**.

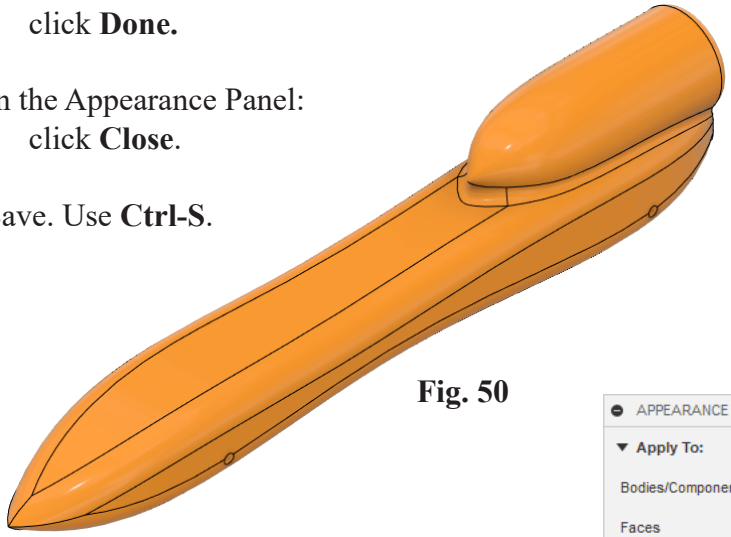


Fig. 50

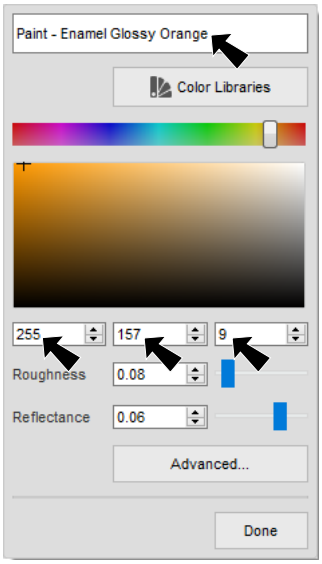


Fig. 49

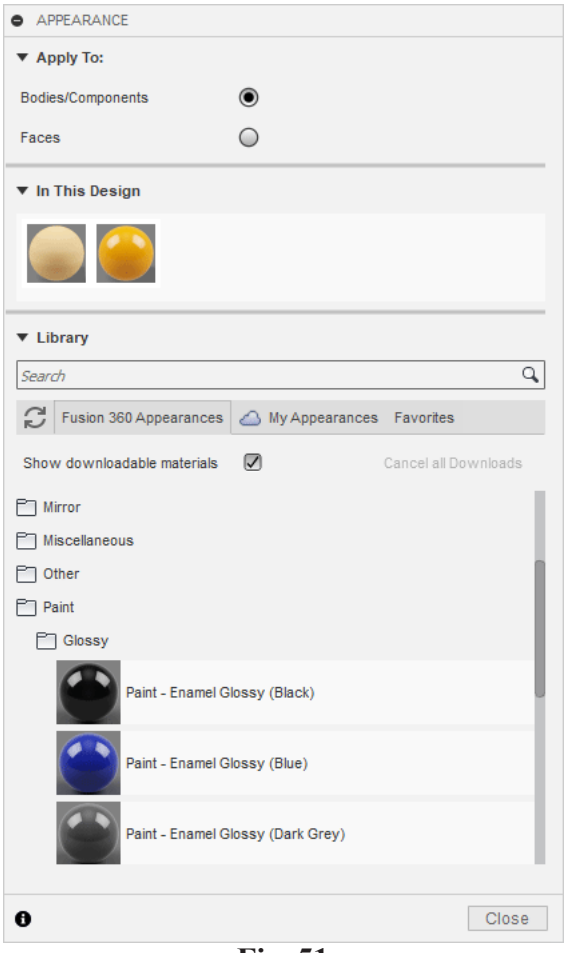


Fig. 51