

CO2 Rail Car E Assembly



A. Insert Axles, Washers, E-Clips and Wheels.

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

Step 2. Select your **BODY RAIL E** file and click Open from the Open dialog box.

Step 3. In the Begin Assembly Property Manager set:

click **Keep Visible** , **Fig. 1**

Click OK  in the Property Manager. This will place Body origin at the assembly origin and fix the position so Body cannot move. This fixed component should have a **(f)** before its name in the Feature Manager  (f) BODY RAIL E<1>.

Step 4. Click **Browse**  in the Property Manager, **Fig. 1**.

Step 5. Select your **FRONT AXLE** file and click Open.

Step 6. Back in the Begin Assembly Property Manager:
under Part/Assembly in Insert, **Fig. 3**
select **FRONT AXLE** to highlight it.

Step 7. Move cursor in the graphic area and Front Axle will snap into Front Axle hole, **Fig. 4**.
Click graphic area to place part.

Step 8. Zoom in around **Front Axle**, **Fig. 4**.

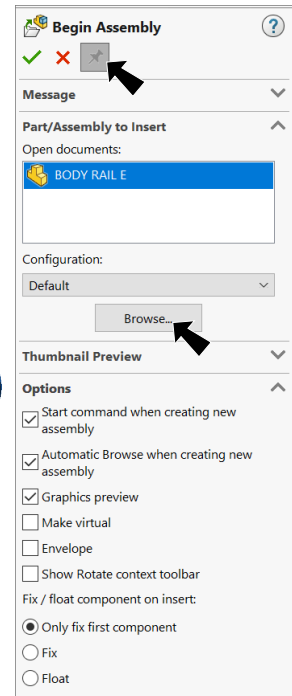


Fig. 1

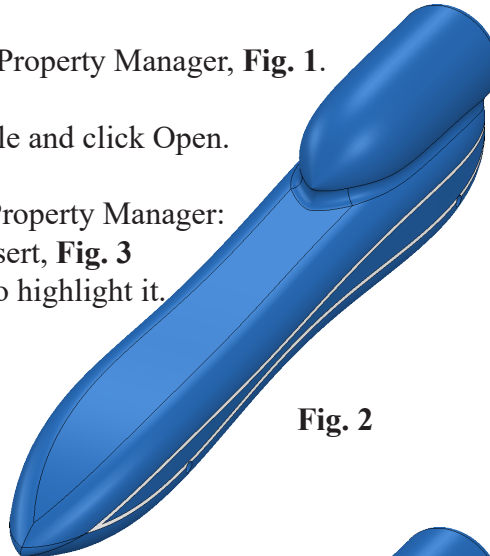


Fig. 2

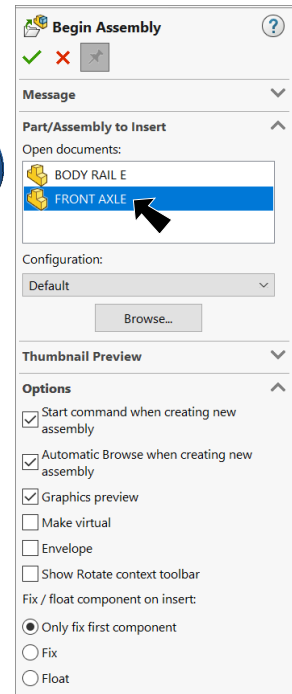


Fig. 3

Release part
when cursor
changes to

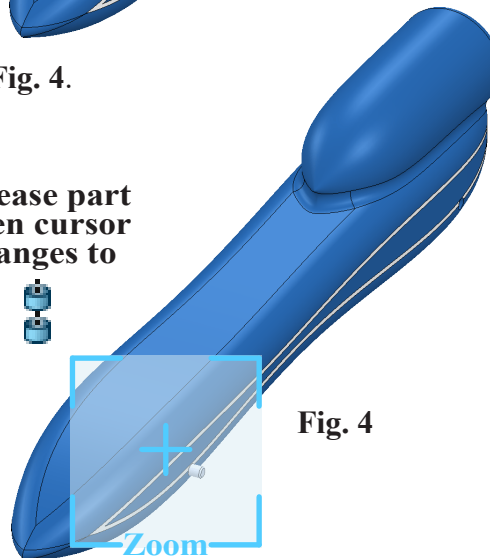


Fig. 4

Zoom

Step 9. Click **Browse** in the Property Manager.

Step 10. Select **WASHER** and click Open.

Step 11. Back in Begin Assembly Property Manager:
under Part/Assembly in Insert, **Fig. 5**
select **WASHER** to highlight it.

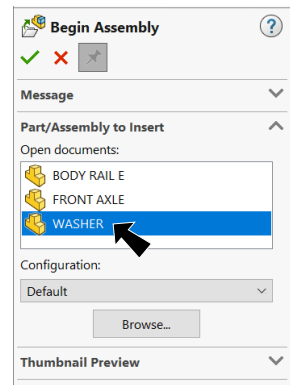



Fig. 5

Step 12. Place **Washer on Front Axle** close to the body, **Fig. 6**. When Washer snaps into place and cursor changes to indicate a Concentric mate , click to release Washer.

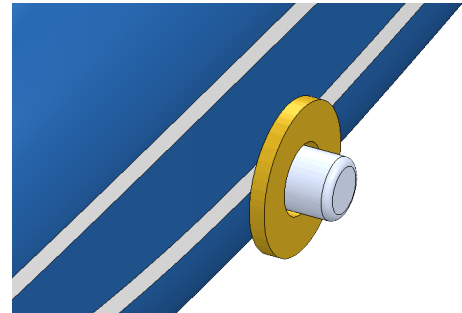



Fig. 6

Step 13. Click Add/Finish Mate in Mate pop-up toolbar to add a **Concentric** mate, **Fig. 7**.

Release part when cursor changes to 



Fig. 7

Step 14. **Browse** and place **two E-Clips on Front Axle**, **Fig. 8**. Keep parts close to Washer. Release when cursor changes to indicate a Concentric mate .

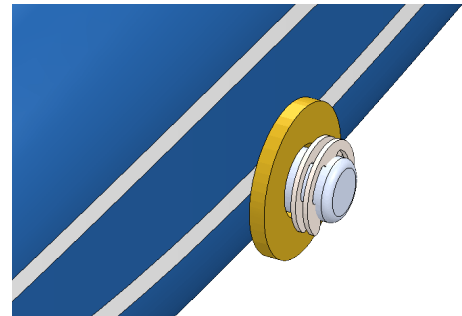



Fig. 8

Step 15. Click Add/Finish Mate in Mate pop-up toolbar to add a **Concentric** mate.

Step 16. **Browse** and place **FRONT WHEEL** on Front Axle, **Fig. 9**. Place cursor on cylindrical face of Washer and release when cursor changes to indicate a Concentric mate .

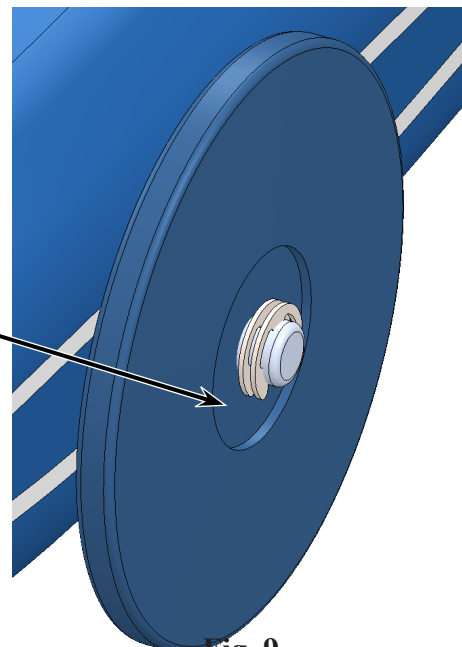



Fig. 9


Step 17. If necessary, flip Wheel so counterbore is on outside, use **Flip Mate Alignment**  in Mate pop-up and Add/Finish Mate in Mate pop-up toolbar to add a **Concentric** mate, **Fig. 10**.

Counterbore on outside

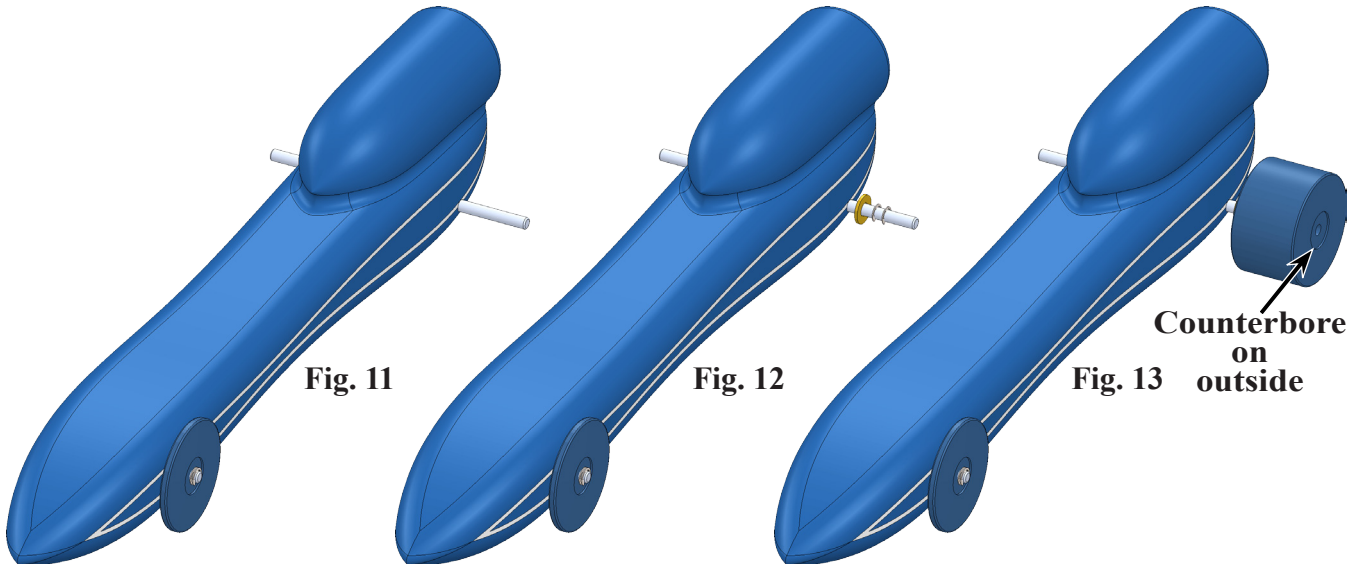


Fig. 10

Step 18. Click Zoom to Fit  (F) on the View toolbar.

Step 19. Repeat, Browse and place at Rear Axle hole **REAR AXLE, WASHER, 2 E-CLIPS** and **REAR WHEEL**, **Fig. 11-13**. If necessary, flip Wheel counterbore to outside, use **Flip Mate Alignment**  in Mate pop-up, **Fig. 10**.

Step 20. Click OK  in the Property Manager.



B. Save as "RAIL CAR E ASSEMBLY".

Step 1. Click File Menu > Save As.

Step 2. Key-in **RAIL CAR E ASSEMBLY** for the filename and press ENTER.

C. Mate: Washer<1>.

Step 1. Zoom in around **Front Wheel**, **Fig. 14**. To zoom, place the cursor over the Front Wheel and spin the wheel on mouse back. While spinning the wheel keep cursor on the Front Wheel.

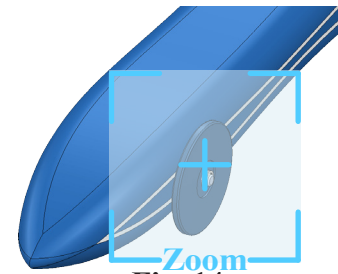


Fig. 14

Step 2. Drag Wheel and E-Clips slightly off Axle, **Fig. 15**.

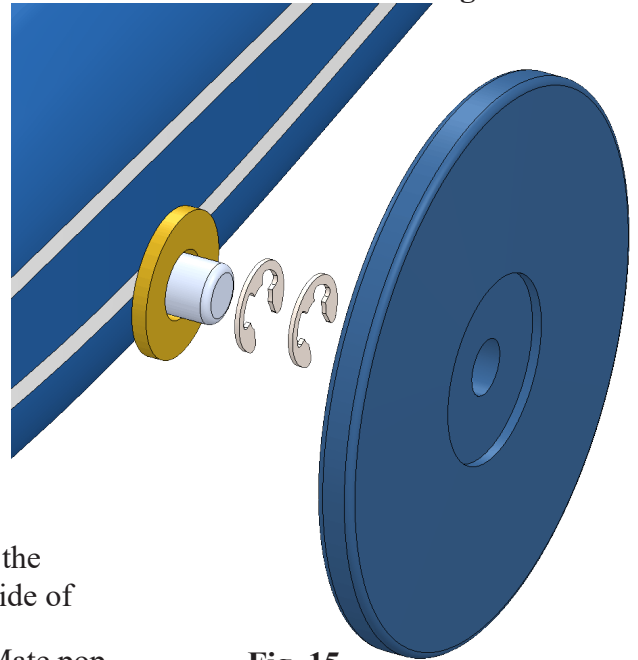





Fig. 15

Step 3. Click **Mate**  on the Assembly toolbar.

Step 4. Expand the flyout Feature Manager design tree (click ) in the top left corner of the graphics area and click **Right Plane** , **Fig. 16**.

Step 5. Expand **WASHER<1>** and click **Right Plane** , **Fig. 16**.




Step 6. Click **Distance**  in Mate pop-up, **Fig. 17**. Set **distance 18.1** and press ENTER. The Washer should set slightly into the Body, **Fig. 18**. If positioned on opposite side of Body, click **Flip Dimension**  in the Mate pop-up. Click Add/Finish Mate  to add Distance mate.



Fig. 17

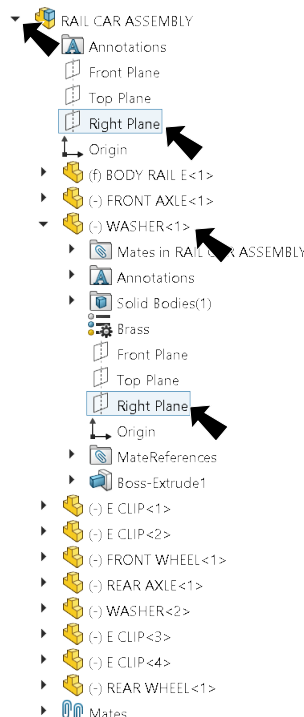


Fig. 16

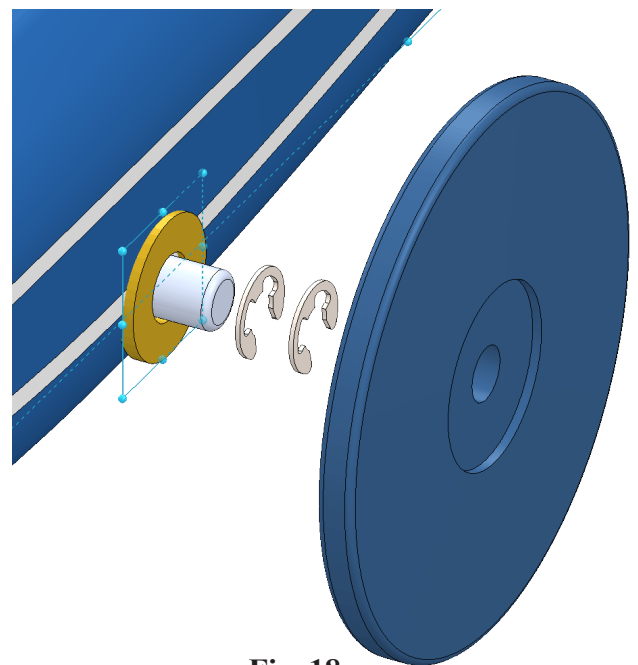


Fig. 18

D. Mate: E-Clip<1>.

Step 1. Click **side face of Washer** and **hide outside inside face of E- Clip<1>**, click **inside face of E- Clip<1>**. To hide face, hover cursor over face and press **Alt key**, Fig. 19.

Tip: Turn on **Filter Faces**



(X) on the **Selection Filter toolbar** at the bottom of the display. If necessary, use **F5 key** to display the toolbar.



Fig. 19

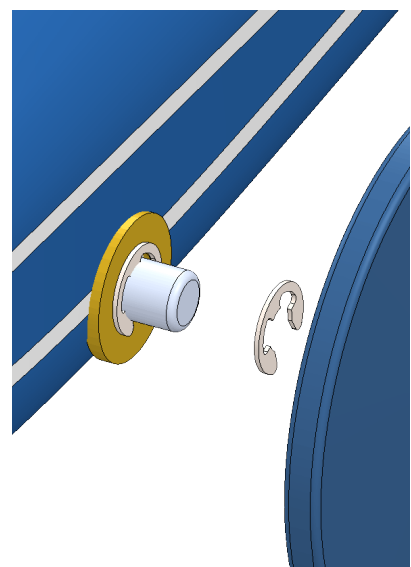




Fig. 20

Step 2. Click **Add/Finish Mate**  in **Mate pop-up toolbar** to add a **Coincident** mate.

Tip: If **Alt key** does not hide face, Turn off enhanced graphics performance. Click **Options**  on the **Standard toolbar**. Under **System Options, Performance**, **uncheck Enhanced Graphics Performance**.

E. Mate: Front Wheel.

Step 1. Click **outside face of E-Clip<1>** and **hide outside face of Wheel**, click **inside face of Wheel**. To hide face, hover cursor over face and press **Alt key**, Fig. 21.

Step 2. Click **Add/Finish Mate**  in **Mate pop-up toolbar** to add a **Coincident** mate.

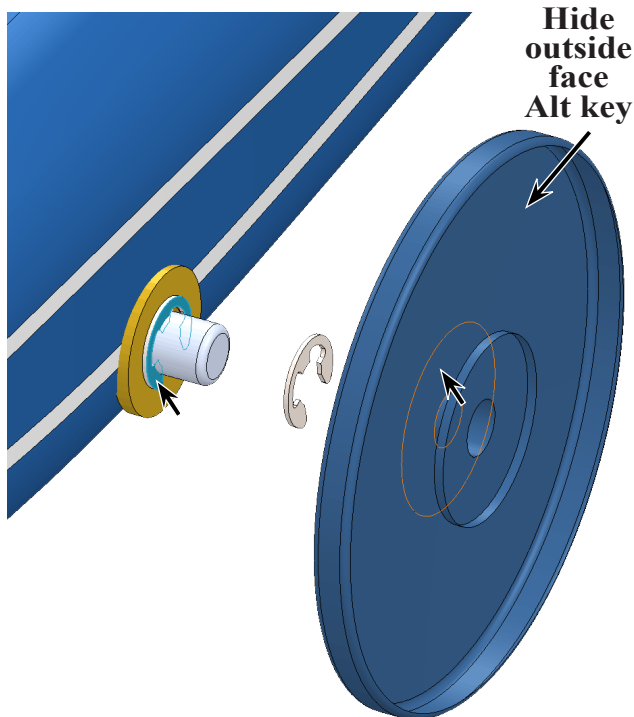


Fig. 21

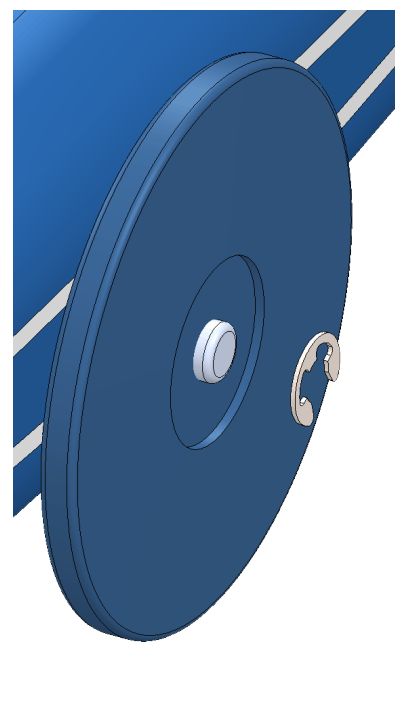



Fig. 22

F. Mate: E-Clip<2>.

Step 1. Click **bottom face of counterbore in Front Wheel**, **hide outside face of E-Clip<2>** and click **inside face of E-Clip**, Fig. 23.

Step 2. Click **Add/Finish Mate**  in **Mate pop-up toolbar** to add a **Coincident** mate.

Step 3. Click **OK**  in the **Property Manager** when done.

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

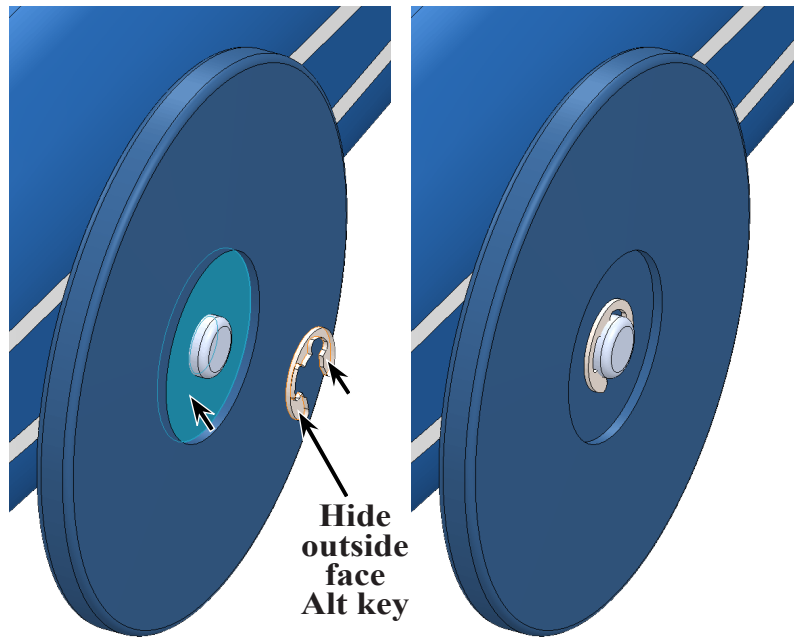


Fig. 23

Fig. 24

G. Mate: Washer<2>.

Step 1. Click **Zoom to Fit**  (**F**) on the **View toolbar**.

Step 2. Zoom in around **Rear Wheel**, Fig. 25.

Step 3. Position **Wheel and E-Clips** on **Axle** as shown in Fig. 26.

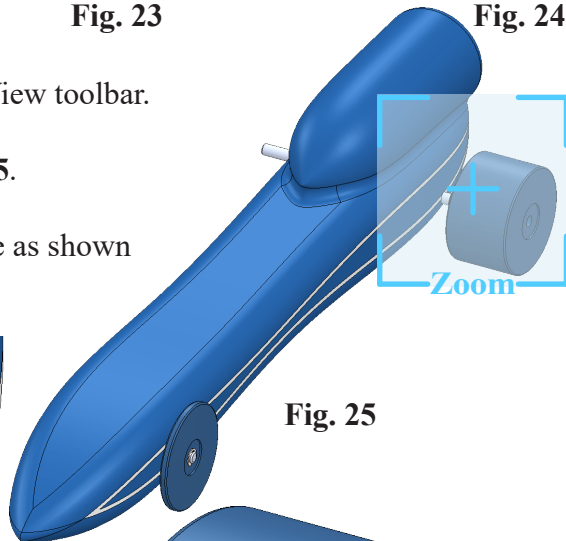


Fig. 25

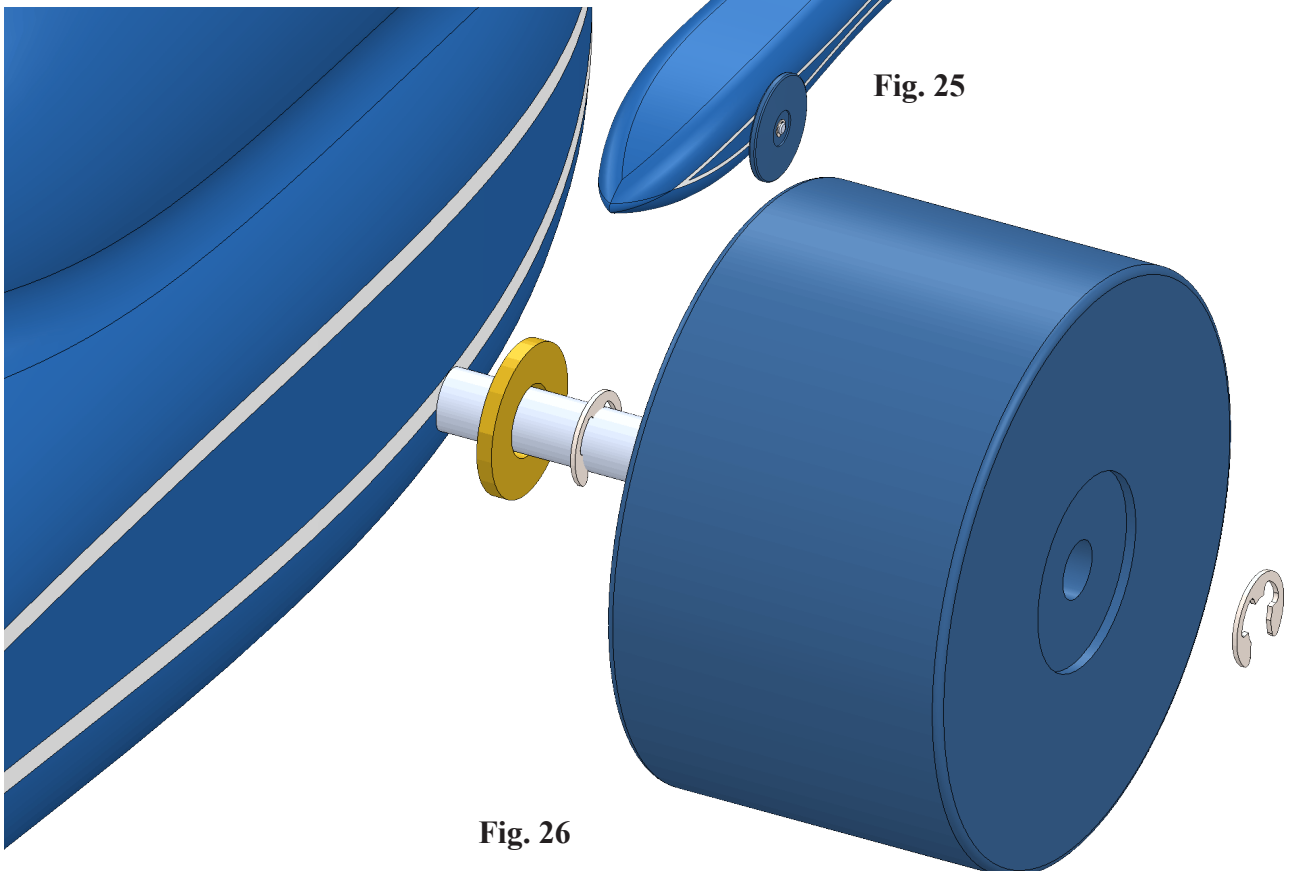







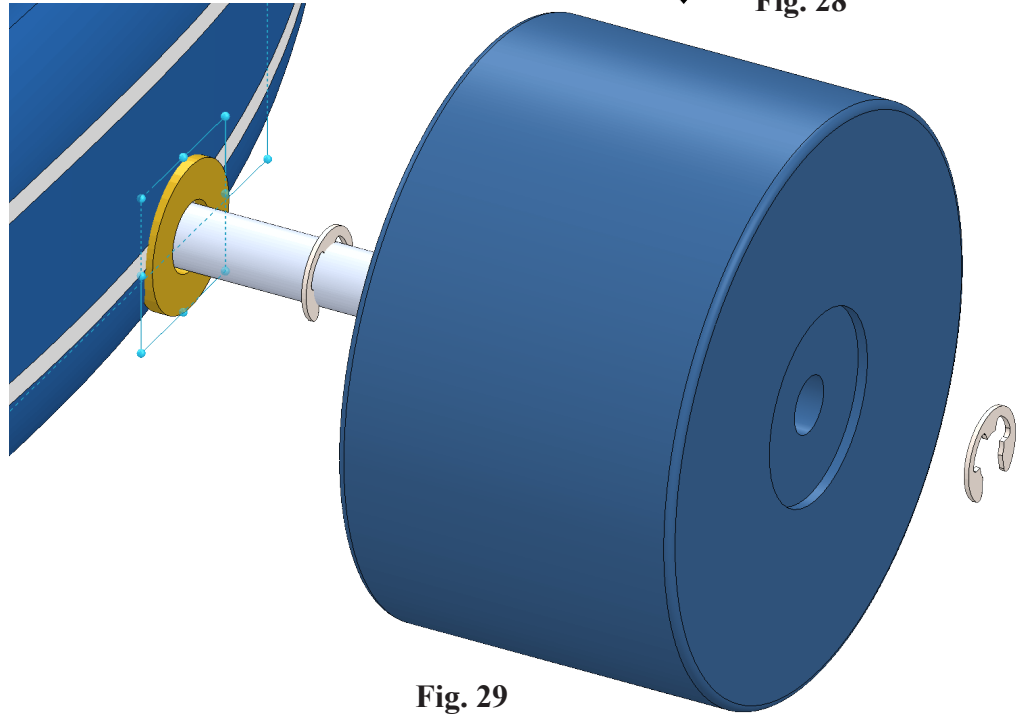
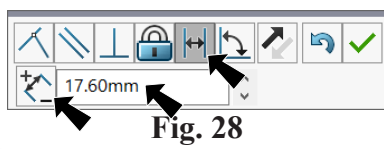
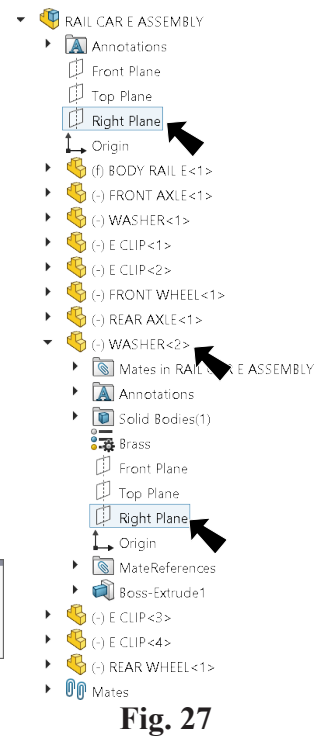
Fig. 26

Step 4. Click **Mate**  on the Assembly toolbar.

Step 5. Expand the flyout Feature Manager design tree in the top left corner of the graphics area and click **Right Plane** , **Fig. 27**.

Step 6. Expand **WASHER<2>** and click **Right Plane** , **Fig. 27**.

Step 7. Click **Distance**  in Mate pop-up, **Fig. 28**. Set distance to **17.6** and press ENTER. The Washer should set next to the Body, **Fig. 29**. If positioned in opposite direction, click **Flip Dimension**  in the Mate pop-up. Click Add/Finish Mate  to add Distance mate.



H. Mate: E-Clip<3>.

Step 1. Click side face of Washer<2> and hide outside inside face of E-Clip<3>, click inside face of E-Clip, Fig. 30.

Step 2. Click Add/Finish Mate  in Mate pop-up toolbar to add a **Coincident** mate.

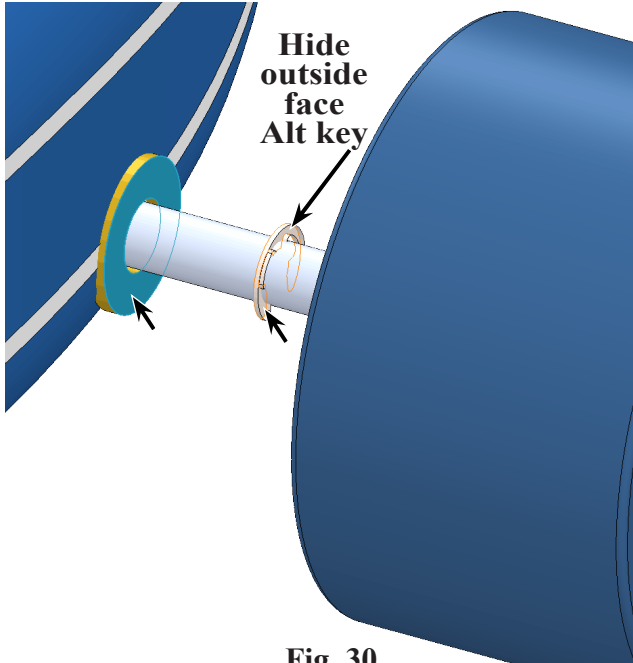


Fig. 30

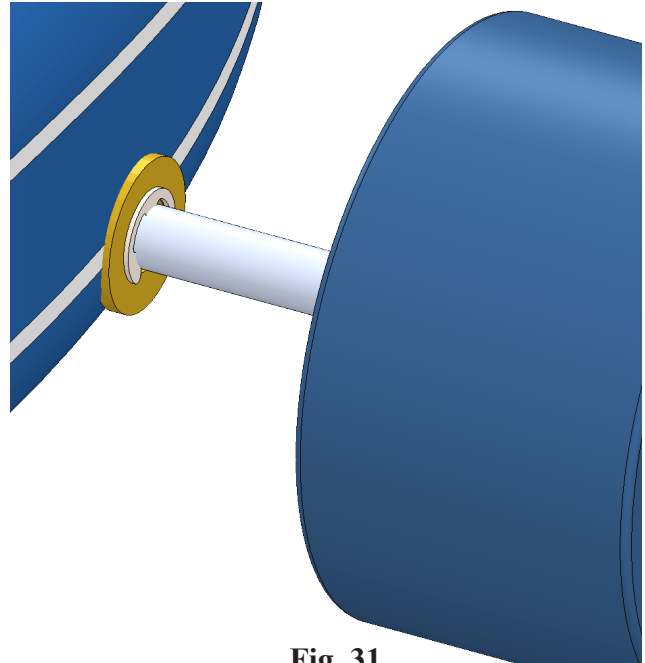


Fig. 31

I. Mate: Rear Wheel.

Step 1. Click outside face of E-Clip<3> and hide cylindrical face of Rear Wheel, click inside face of Rear Wheel, Fig. 32.

Step 2. Click Add/Finish Mate  in Mate pop-up toolbar to add a **Coincident** mate.

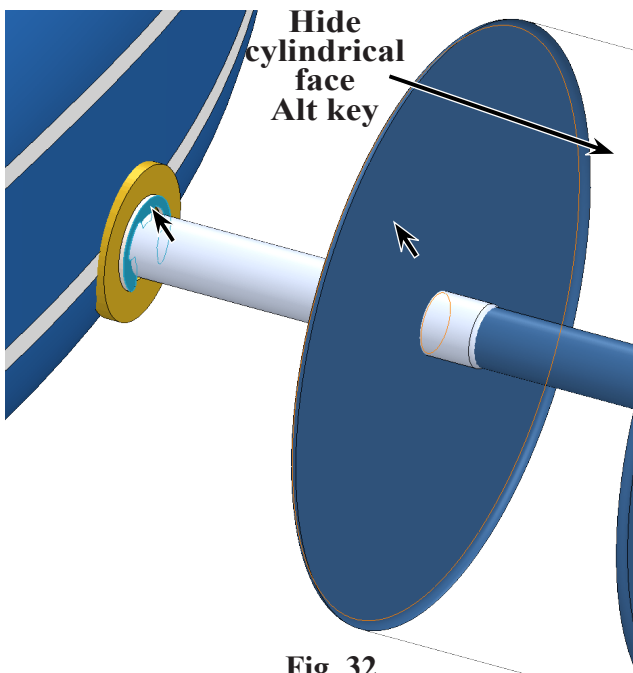


Fig. 32

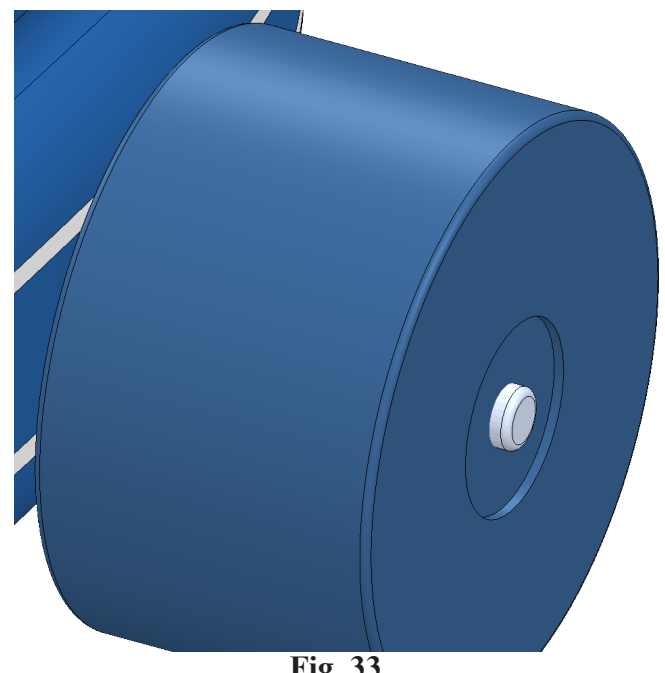


Fig. 33

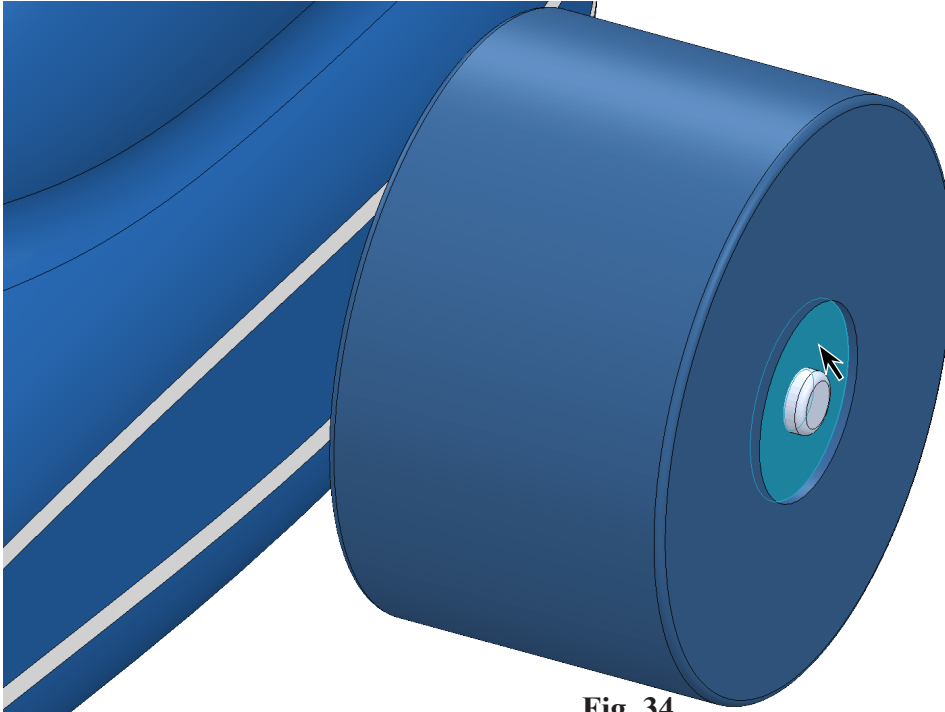
J. Mate: E-Clip<4>.

Step 1. Click **bottom face of counterbore in Rear Wheel**, **hide outside face of E-Clip<4>** and click **inside face of E-Clip**, Fig. 34.

Step 2. Click Add/Finish Mate  in Mate pop-up toolbar to add a **Coincident** mate.

Step 3. Click OK  in the Property Manager.

Step 4. Save  (Ctrl-S).



Hide
outside
face
Alt key



Fig. 34

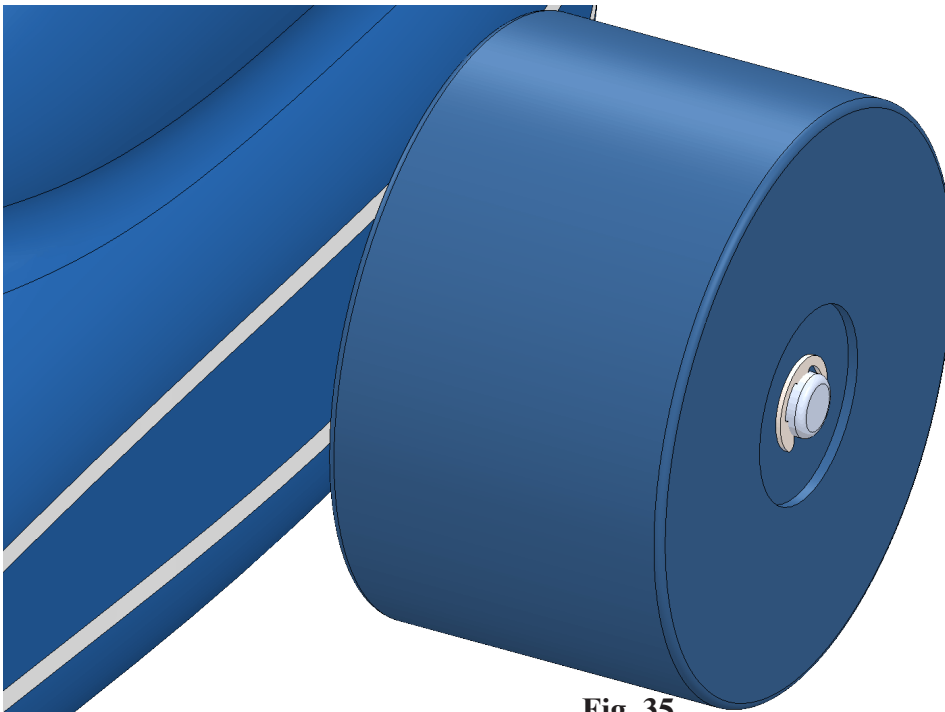




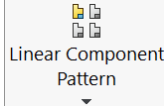


Fig. 35

K. Mirror.

Step 1. Click **Bottom**  on the Standard Views toolbar. (Ctrl-6)

Step 2. **Ctrl click Right Plane** , **both Washers, all four E Clips and both Wheels** in the Feature Manager to select Right Plane and all Parts except Body Rail E and Axles, **Fig. 36**. To Ctrl click, hold down Ctrl key and **Parts and Right Plane** .

Step 3. Click **Mirror Components**  in the **Linear Component Pattern flyout**  on the Assembly toolbar.

Step 4. In the Mirror Property Manager click OK , **Fig. 37**.

Step 5. Save  (Ctrl-S).

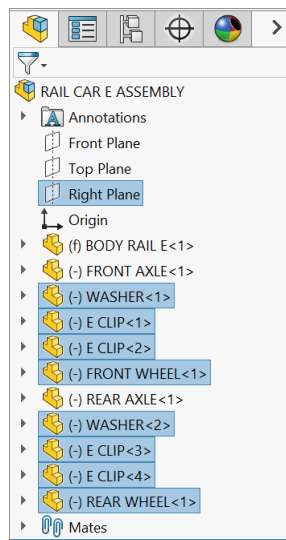


Fig. 36

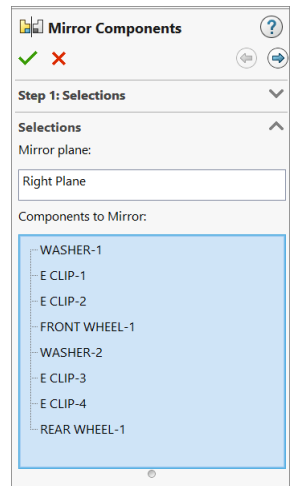


Fig. 37

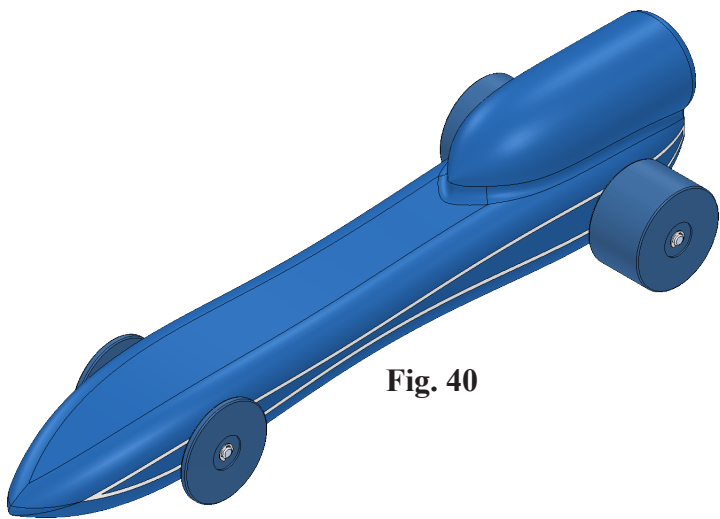


Fig. 40

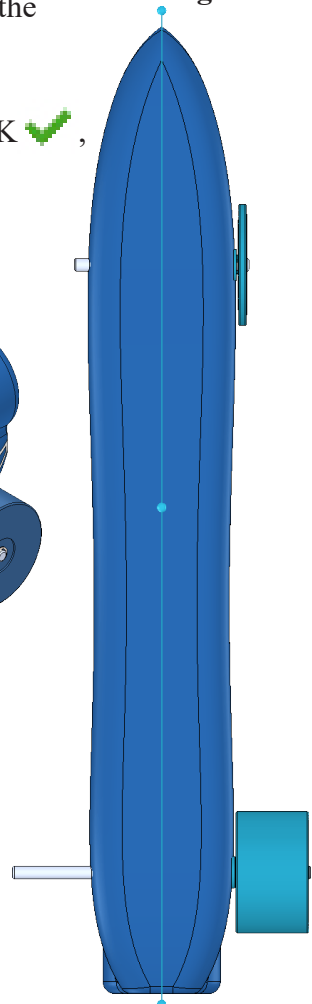


Fig. 38

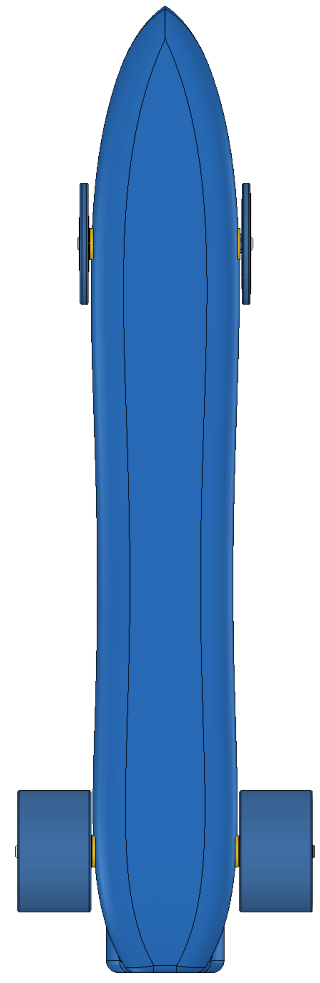


Fig. 39