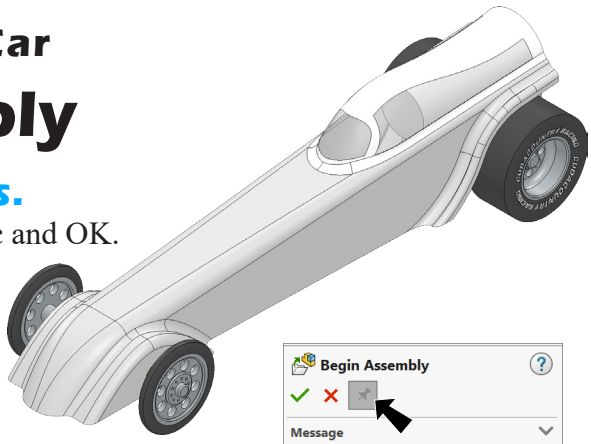
Chapter 12

CO2 Rail Car
Assembly



A. Insert Axles, Washer and Wheels.

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

Step 2. Select your **BODY RAIL** 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<1>.

Step 4. Click **Browse** 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. Position **Front Axle near Front Axle hole**, **Fig. 4**. When Axle snaps into place and cursor changes to indicate a Concentric mate , click to release Axle.

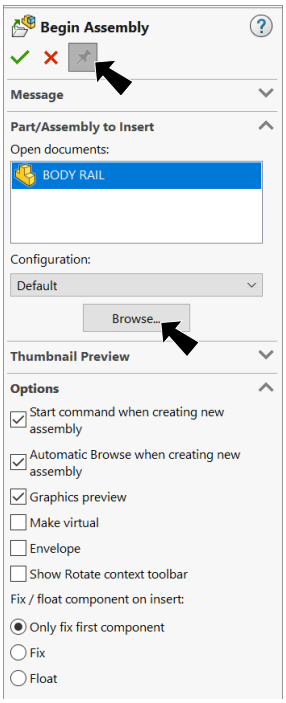


Fig. 1

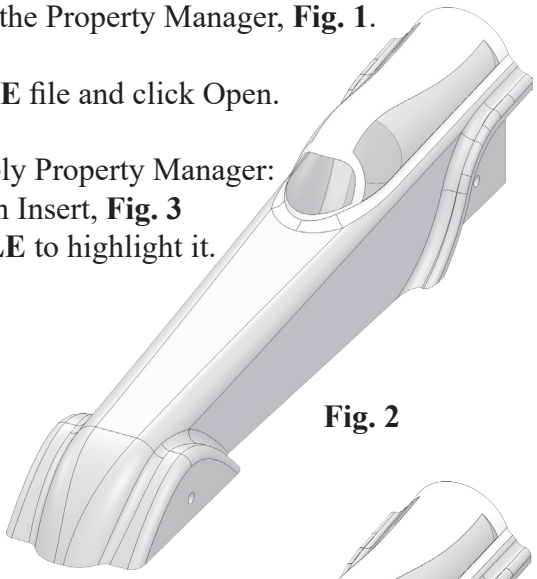


Fig. 2

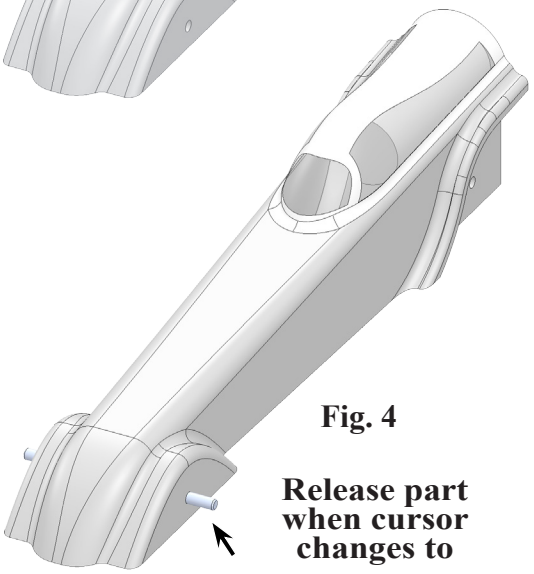


Fig. 4

Release part when cursor changes to

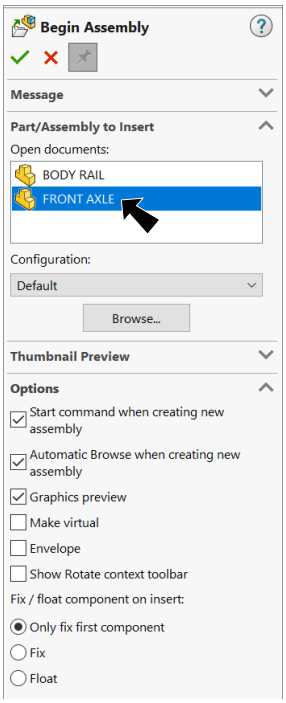


Fig. 3

Step 8. Click **Browse** Browse... in the Property Manager.

Step 9. Select your **REAR AXLE** file and click Open.

Step 10. Back in Begin Assembly Property Manager:
under Part/Assembly in Insert, **Fig. 5**
select **REAR AXLE** to highlight it.

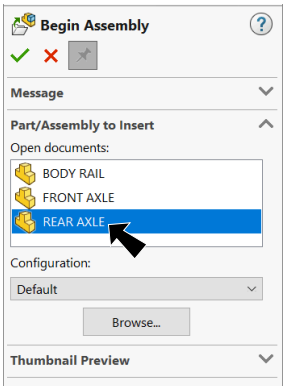


Fig. 5

Step 11. Position **Rear Axle near Rear Axle hole**, **Fig. 6**. When Axle snaps into place and cursor changes to indicate a Concentric mate, click to release Axle.

Step 12. Click **Browse** Browse... in the Property Manager.

Step 13. Select **WASHER** and click Open.

Step 14. Place **Washer on Axle**, **Fig. 7**. When Washer snaps into place and cursor changes to indicate a Concentric mate, release Washer.

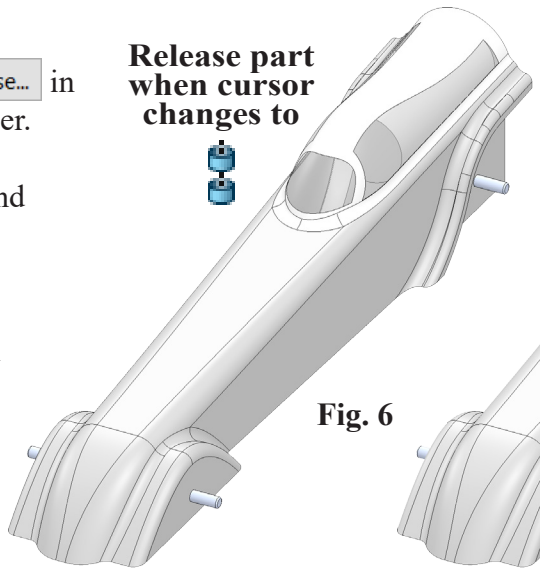


Fig. 6

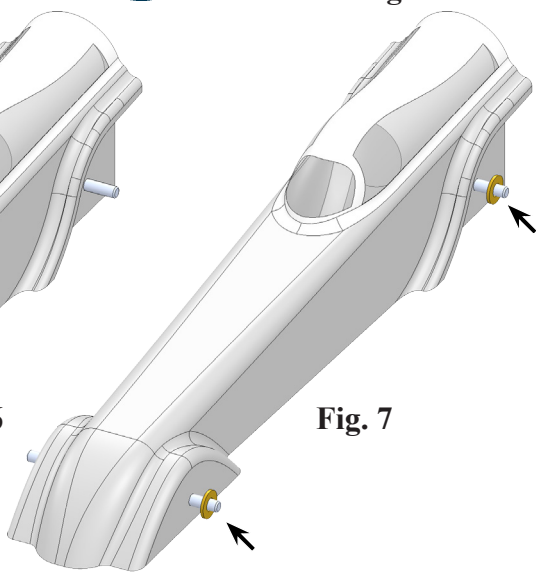


Fig. 7

Step 15. Click Add/Finish Mate in Mate pop-up toolbar to add a **Concentric** mate, **Fig. 8**.

Fig. 8

Step 16. **Add Washer to other Axle** by repeating Steps 13 and 14.

Step 17. Click **Browse** Browse... and in the Open dialog box.

Step 18. Place **FRONT WHEEL ASSEMBLY** on Front Axle, **Fig. 9**. Release when cursor changes to indicate a Concentric mate .

Step 19. If necessary, flip Wheel Assembly. Use **Flip Mate Alignment** in the Mate pop-up, **Fig. 10**.

Fig. 10

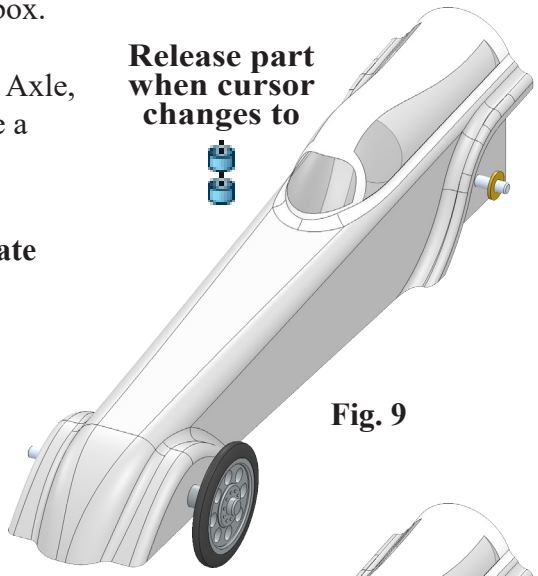


Fig. 9

Step 20. Click Add/Finish Mate in Mate pop-up toolbar to add a **Concentric** mate, **Fig. 10**.

Step 21. Browse Browse... and place **REAR WHEEL ASSEMBLY** on Real Axle, **Fig. 11**. Release when cursor changes to indicate a Concentric mate .

Step 22. To flip Wheel Assembly, click **Flip Mate Alignment** in the Mate pop-up, **Fig. 10**.

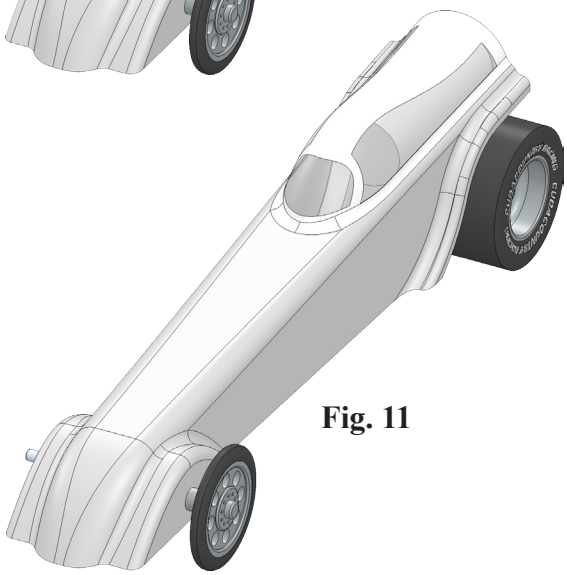


Fig. 11

Step 23. Click Add/Finish Mate in Mate pop-up toolbar to add a **Concentric** mate,.

Step 24. Click OK in the Property Manager when done.

B. Save as "RAIL CAR ASSEMBLY".

Step 1. Click File Menu > Save As.

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

C. Mate: Washer to Front Wheel Assembly.

Step 1. Drag **Rear Wheel Assembly** and **Front Wheel Assembly** off Axles, **Fig. 12**.

Step 2. Zoom in on **Front Wheel**, **Fig. 12**.

Step 3. Click **Mate** 

on the Assembly toolbar.

Step 4. Click **outside face of Washer** and **hide cylindrical face of Rim**, click **inside face of Rim**, **Fig. 13**. To hide face, hover cursor over face and press **Alt key**.

Step 5. Click Add/Finish Mate  in Mate pop-up toolbar to add a **Coincident** mate.

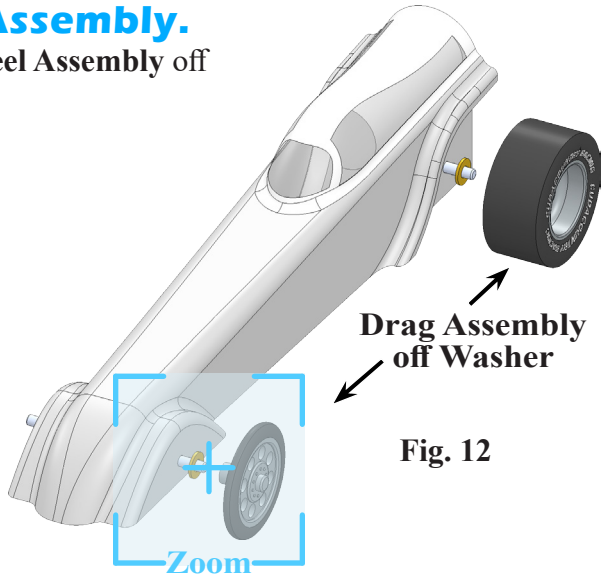


Fig. 12

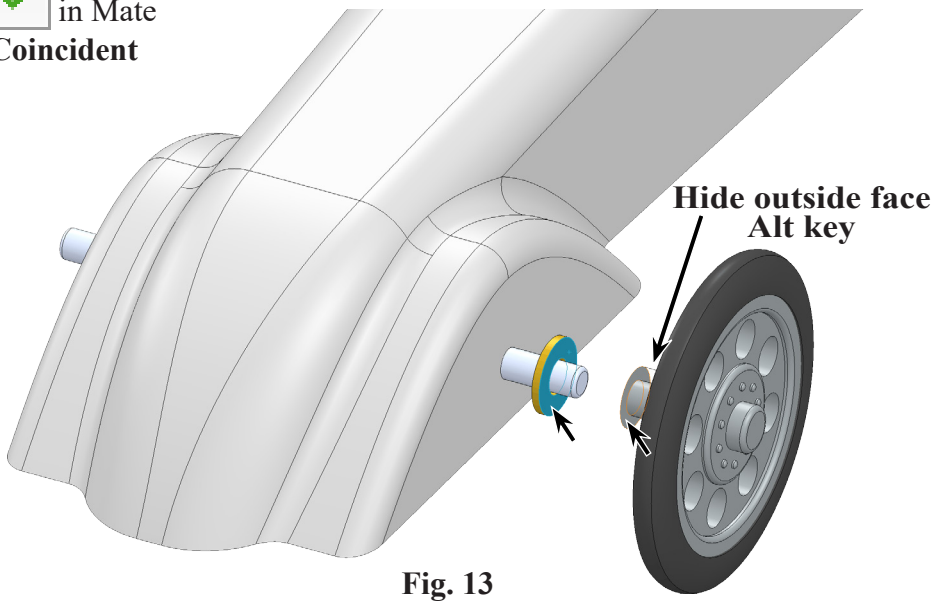


Fig. 13

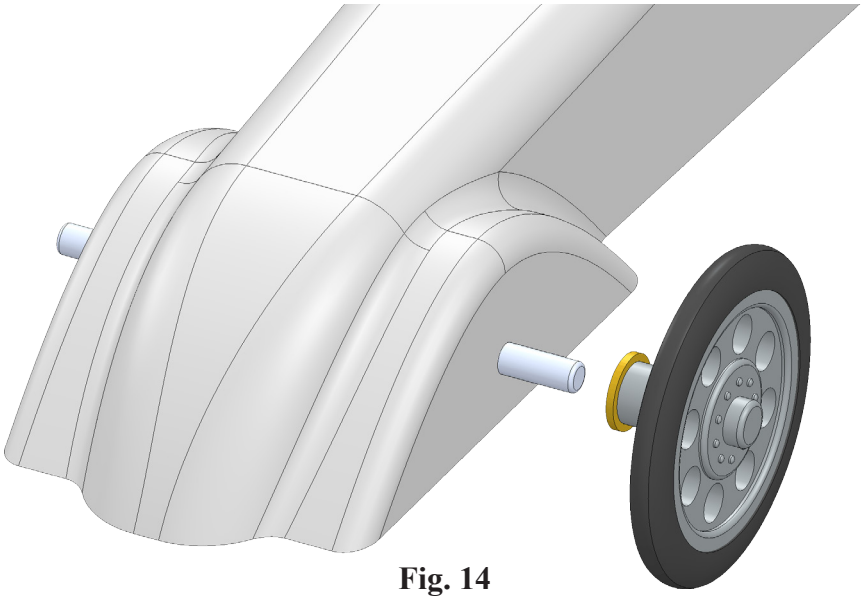


Fig. 14

D. Mate: Washer to Rear Wheel Assembly.

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

Step 2. Zoom in around **Rear Wheel**, **Fig. 15**.

Step 3. Click **side face of Washer**, **Fig. 16**.

Step 4. Click **outside face of Washer** and **hide face of Tire and Rim**, click **inside face of Rim**, **Fig. 16**. Keep Alt-clicking to hide faces.

Step 5. Click Add/Finish Mate in Mate pop-up toolbar to add a **Coincident** mate.

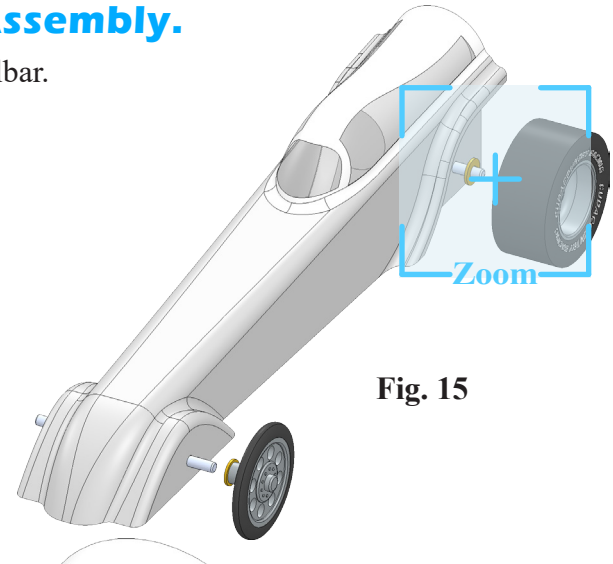


Fig. 15

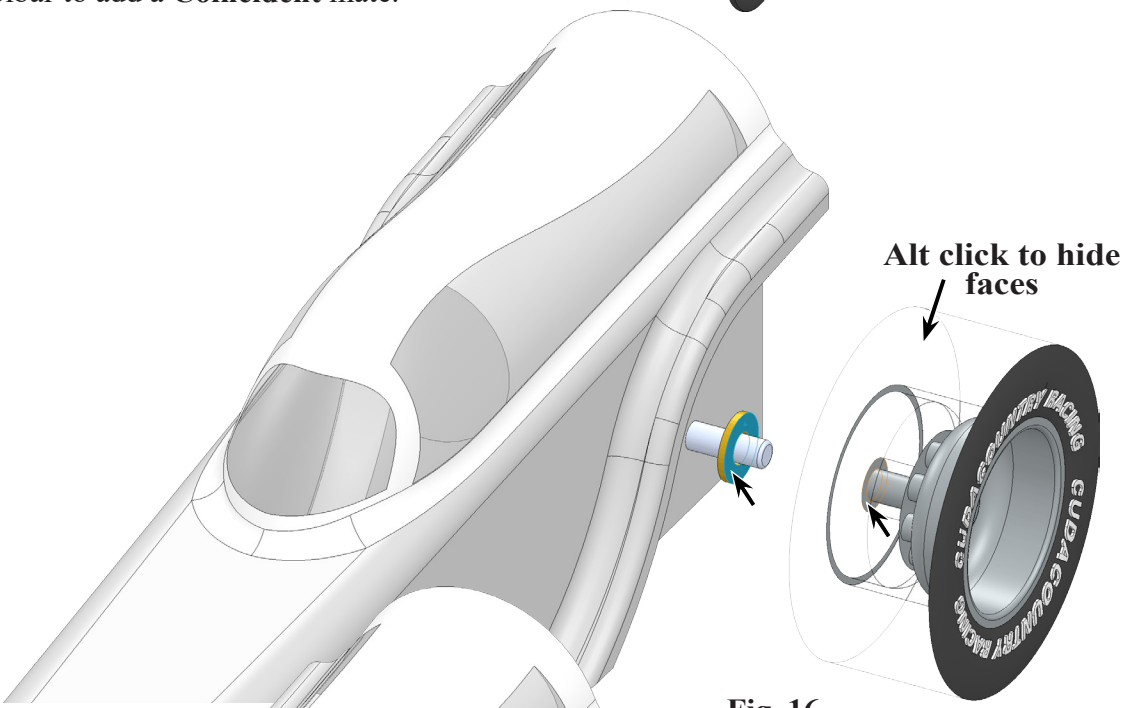


Fig. 16

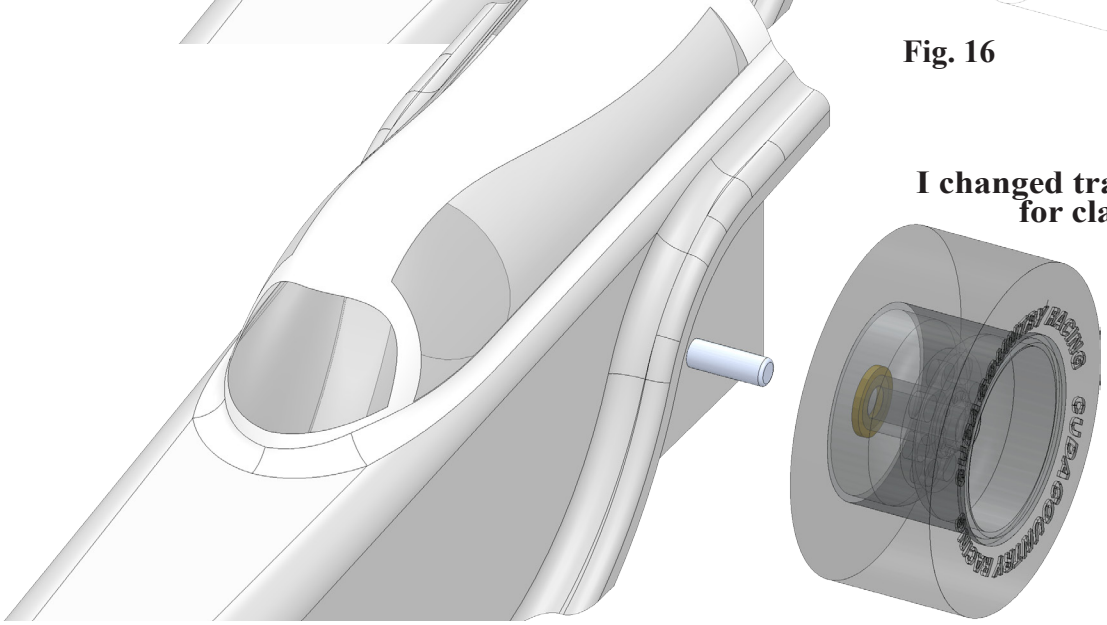


Fig. 17

E. Distance Mate: Front Wheel Assembly.

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

Step 2. Expand the flyout Feature Manager design tree (click ▸) in the top left corner of the graphics area and click **Right Plane**, **Fig. 18**.

Step 3. Expand **FRONT WHEEL ASSEMBLY** and click **Right Plane**, **Fig. 18**.

Step 4. Click **Distance** in Mate pop-up, **Fig. 19**. Set **distance to 30.5 (32.3 for spoke wheel)** and press ENTER. The Washer should set next to the Body, **Fig. 20**. If positioned in opposite direction, click **Flip Dimension** in the Mate pop-up. Click Add/Finish Mate to add Distance mate.

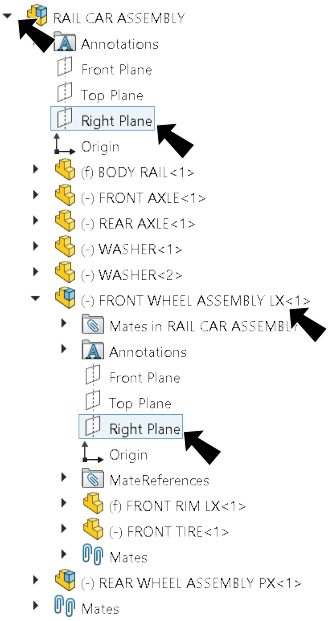


Fig. 18

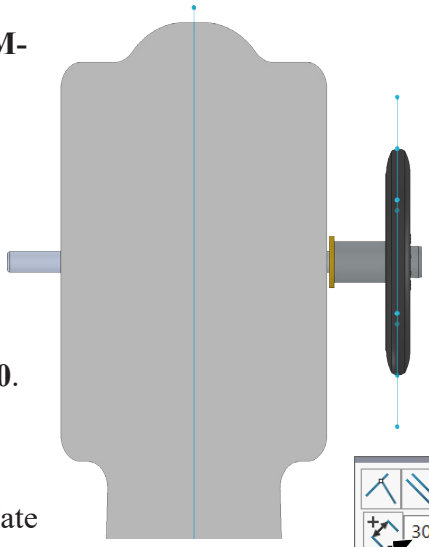


Fig. 20

Fig. 19

F. Distance Mate: Rear Wheel Assembly.

Step 1. Click **Right Plane**, **Fig. 21**.

Step 2. Expand **REAR WHEEL ASSEMBLY** and click **Right Plane**, **Fig. 21**.

Step 3. Click **Distance** in Mate pop-up, **Fig. 22**. Set **distance to 31** and press ENTER. The Washer should sit next to the body, **Fig. 23**. If positioned in opposite direction, click **Flip Dimension** in the Mate pop-up, **Fig. 21**. Click Add/Finish Mate to add Distance mate.

Step 4. Click OK in the Property Manager when done.

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

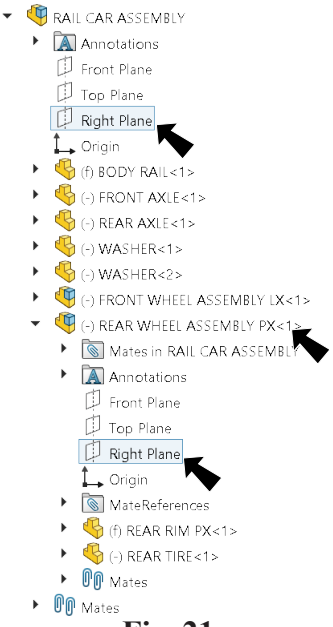


Fig. 21

Fig. 22

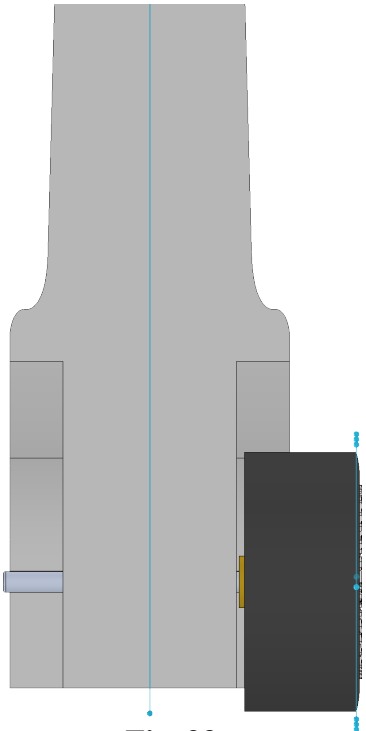


Fig. 23

G. Mirror.

Step 1. **Ctrl click Right Plane**, **both Washers** and **Wheel Assemblies** in the Feature Manager, **Fig. 24**. To Ctrl click, hold down the Ctrl key and click Right Plane, both Wheel Assemblies and Washers.

Step 2. Click **Mirror Components** Mirror Components in the **Linear Component Pattern flyout** Linear Component Pattern on the Assembly toolbar.

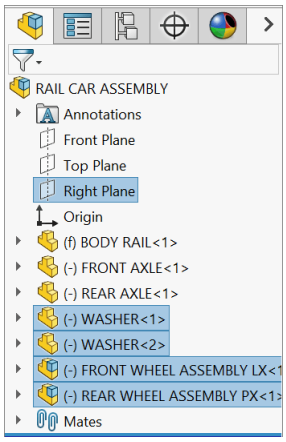


Fig. 24

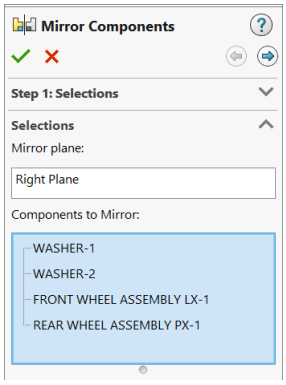


Fig. 25

Step 3. In the Mirror Property Manager click OK, **Fig. 25**.

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

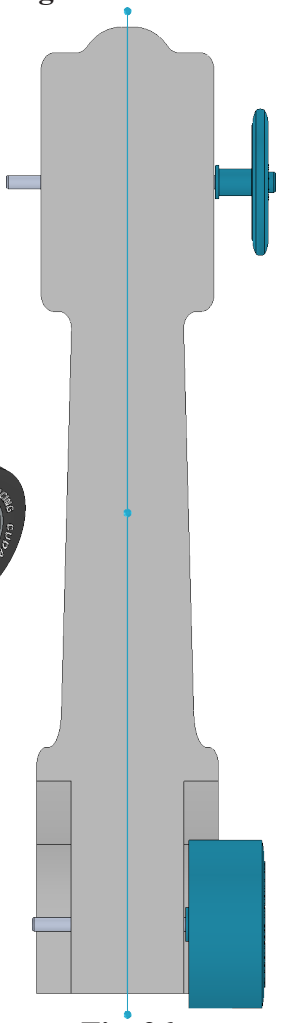


Fig. 26

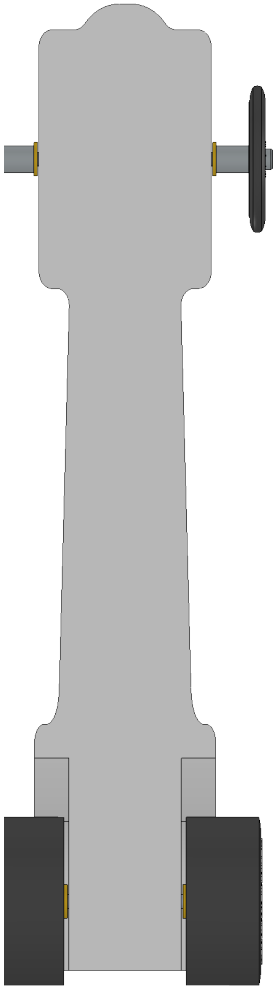


Fig. 27

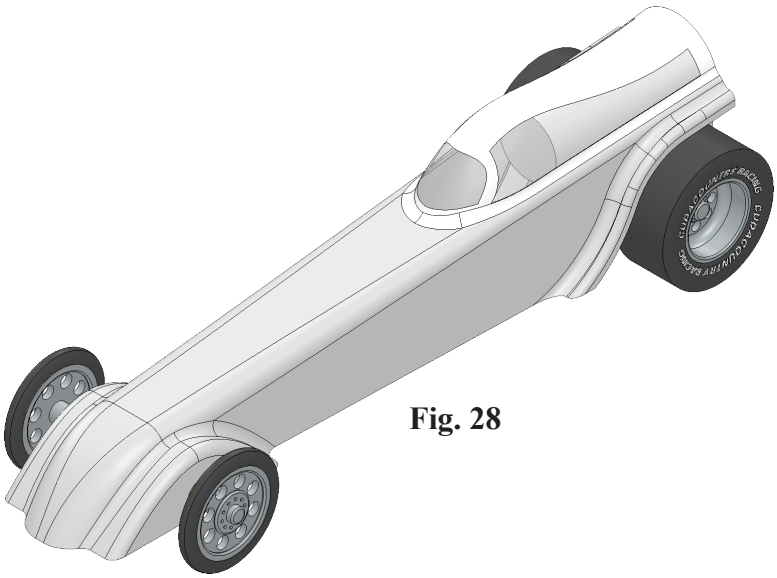


Fig. 28