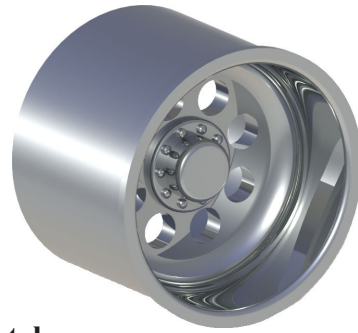




# CO<sub>2</sub> Rail Car Rear Rim Px




## A. Lines Inside Rim.

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

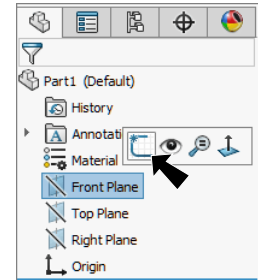
Step 2. Click **Front Plane**  in the Feature Manager and click **Sketch**  on the context toolbar, **Fig. 1**.

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

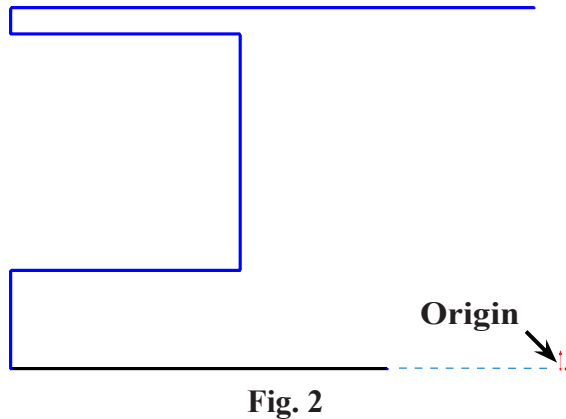
Step 4. Sketch lines starting at the Origin , **Fig. 2**.

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

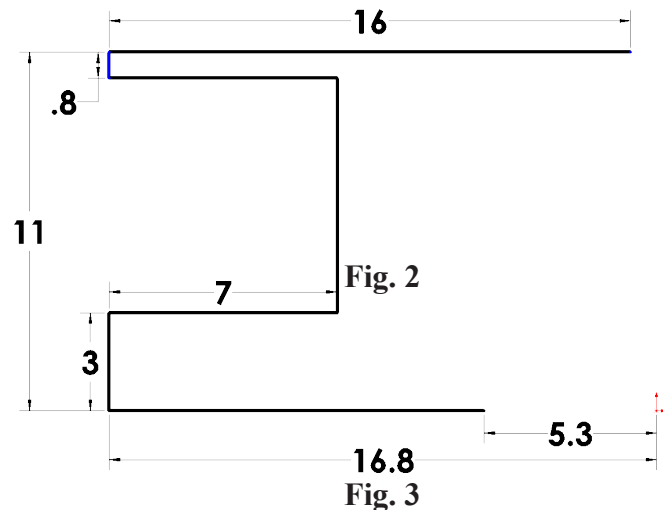
Step 6. Add dimensions, **Fig. 3**. Dimension the 16.8 first and the 11 last.



**Fig. 1**




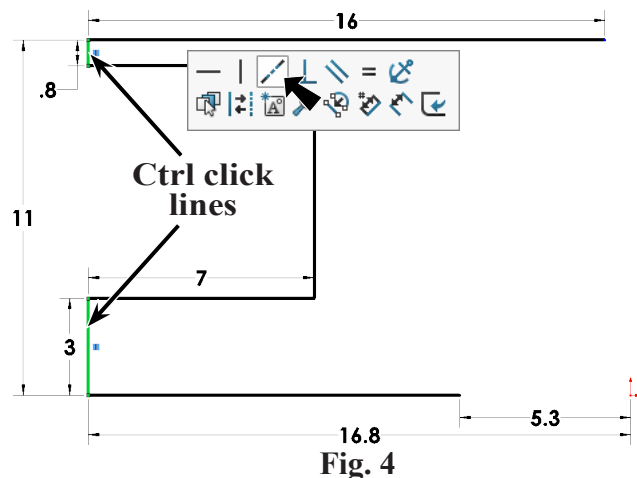
**Fig. 2**



**Fig. 3**

Step 7. **Right click graphics area and click Select** from menu to unselect Smart Dimension.

Step 8. **Ctrl click both vertical lines** to select both. Release Ctrl key and click **Make Collinear**  on the context toolbar, **Fig. 4**.



**Fig. 4**

## B. Save as "REAR RIM PX".

Step 1. Click File Menu > Save As.

Step 2. Key-in **REAR RIM PX** for the filename and press ENTER.

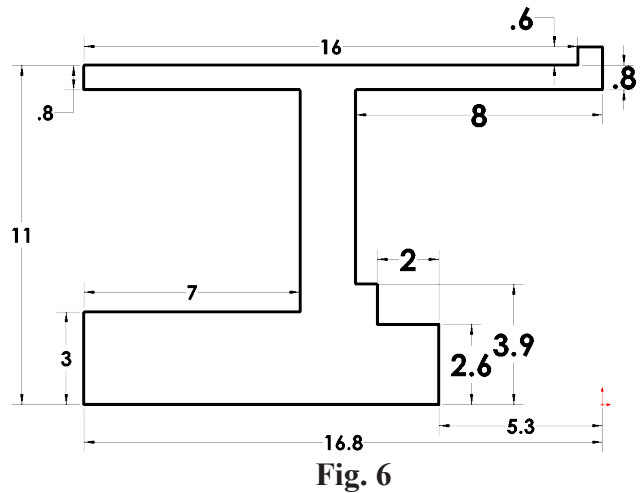
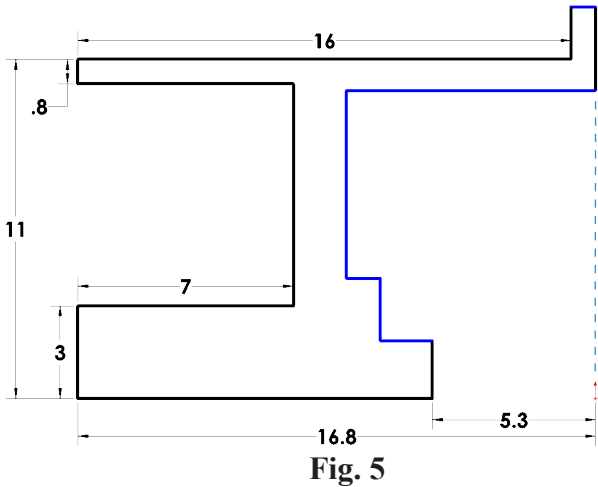
### C. Lines Outside Rim.

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

Step 2. Sketch lines, **Fig. 5**. Keep right vertical line aligned (coincident) with Origin.

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



Step 4. Add dimensions, **Fig. 6**.

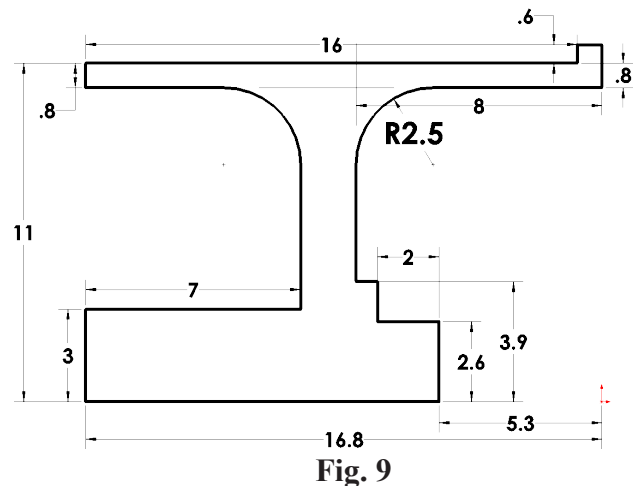
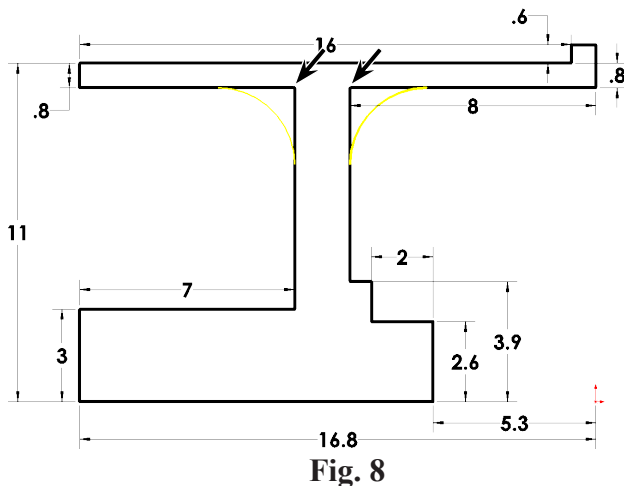
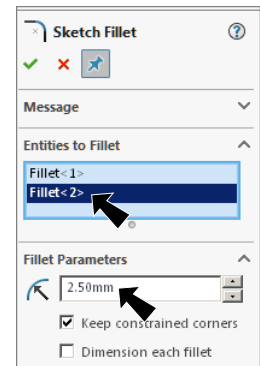


### D. Sketch Fillet.

Step 1. Click **Sketch Fillet**  (S) on the Sketch toolbar.

Step 2. In the Sketch Fillet Property Manager set:  
under Fillet Parameters, **Fig. 7**

**Radius**  **2.5, Fig. 7**  
click **top inside corners, Fig. 8**  
click **OK twice** .




## E. Revolved Boss/Base.

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 Manger set:

under Axis of Revolution  
click **bottom line of sketch**,  
**Fig. 11**  
click OK .

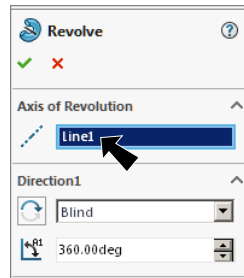


Fig. 10

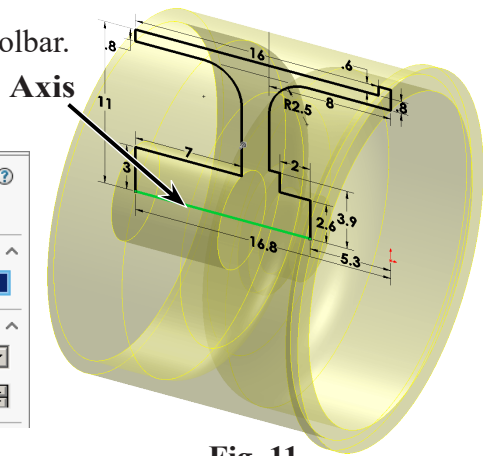



Fig. 11

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

## F. Hole for Axle.

Step 1. Rotate view to view **inside of rim**, hold down middle mouse button (wheel) and drag to rotate view, **Fig. 12**.

Step 2. Click **inside face of hub** and click **Sketch**  on the context toolbar, **Fig. 12**.

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

Step 4. Sketch a circle for the hole starting at the Origin **Fig. 13**.

**Inside face hub**

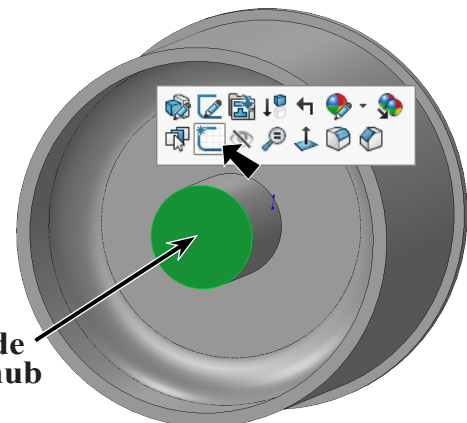


Fig. 12

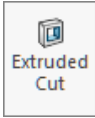
Step 5. Click **Smart Dimension**  (S) on the Sketch toolbar.



Step 6. Dimension **diameter 3.5**, **Fig. 13**.

Step 7. Click **Features**  on the Command Manager toolbar.



Fig. 13

Step 8. Click **Extruded Cut**  on the Features toolbar.

Step 9. In the Cut-Extrude Property Manager set:  
 under Direction 1, Fig. 14  
**Depth**  **10.5**  
 click OK .

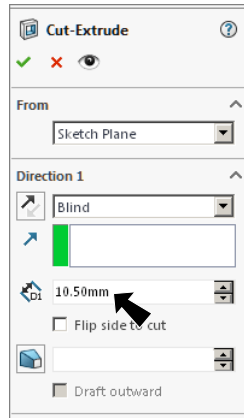


Fig. 14

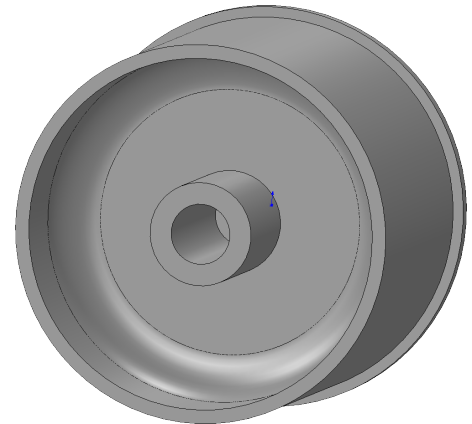


Fig. 15

## G. Hole in Rim.

Step 1. Click **Right**  on the Standard Views toolbar. (Ctrl-4)

Step 2. Click **side flat face of rim** and click **Sketch**  on the content toolbar, Fig. 16.

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



Step 4. Sketch a circle for the hole above the Origin , Fig. 17.

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

Step 6. Add dimensions, Fig. 17.

Step 7. **Right click graphics area and click Select** from menu to unselect Smart Dimension.

Step 8. **Ctrl click centerpoint of circle and Origin**

 to select both.  
 Release Ctrl key  
 and click **Make Vertical**  on the context toolbar,  
 Fig. 18.

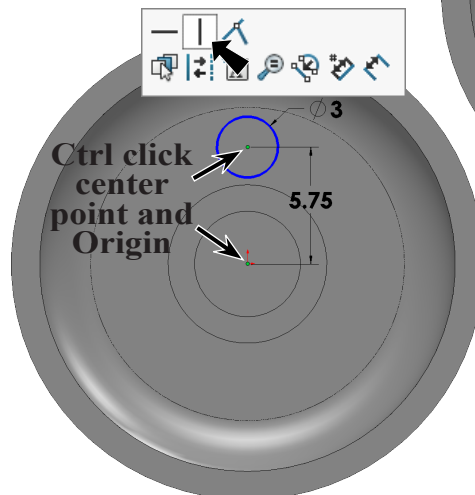


Fig. 18

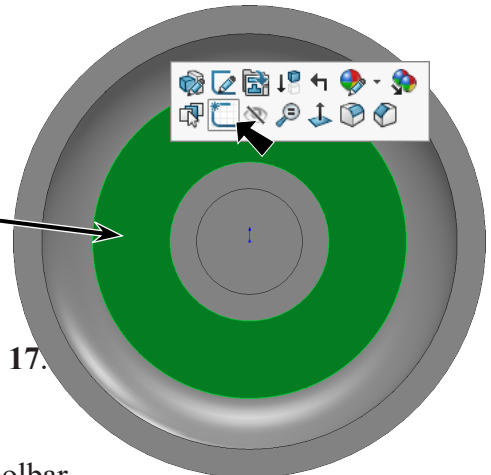


Fig. 16

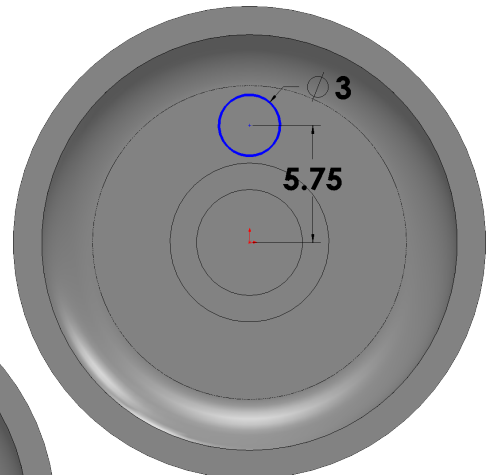

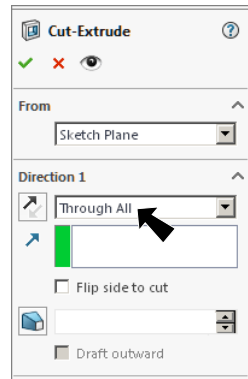


Fig. 17

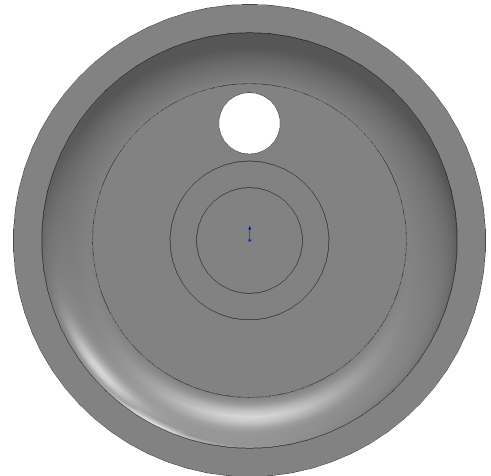
Step 9. Click **Features**  on the Command Manager toolbar.

Step 10. Click **Extruded Cut**  on the Features toolbar.

Step 11. In the Cut-Extrude Property Manager set:  
 under Direction 1, **Fig. 19**  
 End Condition  
**Through All**  
 click OK .



**Fig. 19**



**Fig. 20**

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

## H. Circular Pattern for Hole.

Step 1. Rotate view to view **hole inside of rim**, hold down middle mouse button (wheel) and drag to rotate view, **Fig. 22**.

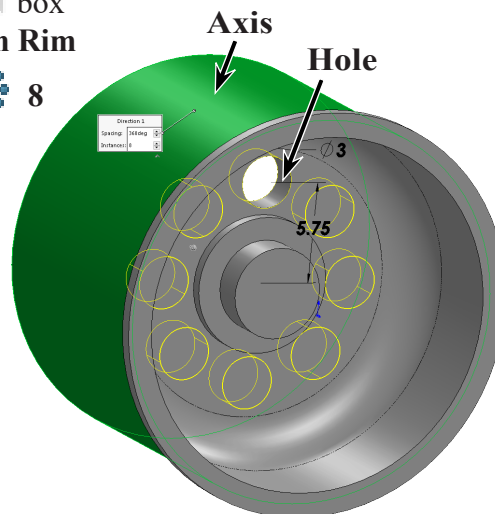
Step 2. Click **Circular Pattern**  in the **Linear Pattern** flyout  on the Features toolbar.

Step 3. In the Circular Pattern Property Manager set:  
 under Features and Faces, **Fig. 21**  
 click **hole in rim (Cut-Extrude2)**, **Fig. 22**  
 under Parameters

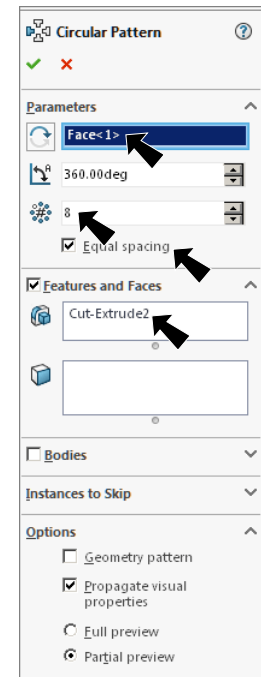
click in **Pattern Axes**  box  
 click a **cylindrical face on Rim**

**Number of Instances**  **8**

check **Equal spacing**  
 click OK .



**Fig. 22**



**Fig. 21**

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


## J. Bolt.

Step 1. Click **side face of wheel cap** and click **Sketch**

 on the context toolbar, **Fig. 23**.

Step 2. Click **Normal To**  on the Standard Views toolbar.



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

Step 4. Sketch a circle above the Origin , **Fig. 24**.

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

Step 6. Add dimensions, **Fig. 24**.

Step 7. **Right click graphics area and click Select** from menu to unselect Smart Dimension.

Step 8. **Ctrl click centerpoint of circle and Origin**  to select both. Release Ctrl key and click **Make Vertical**  on the context toolbar, **Fig. 25**.

Step 9. Rotate view slightly to view **inside rim**, hold down middle mouse button (wheel) and drag to rotate view and zoom in on Wheel cap face, **Fig. 26**.

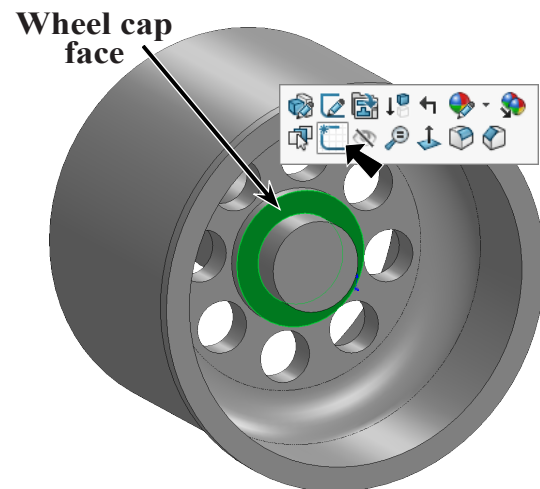


Fig. 23

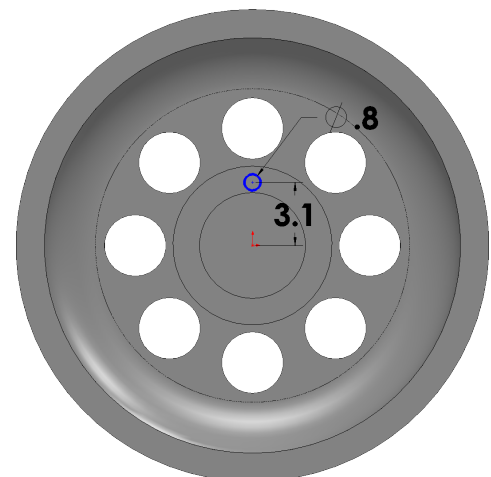


Fig. 24

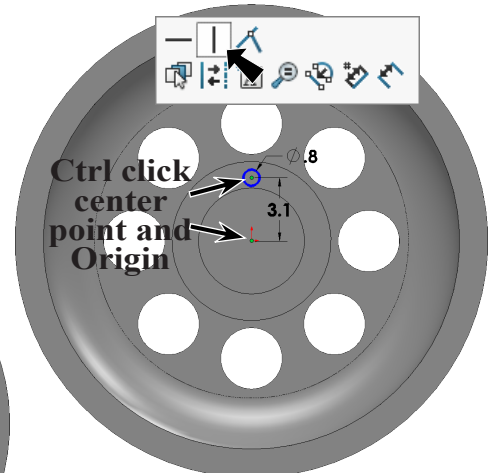


Fig. 25

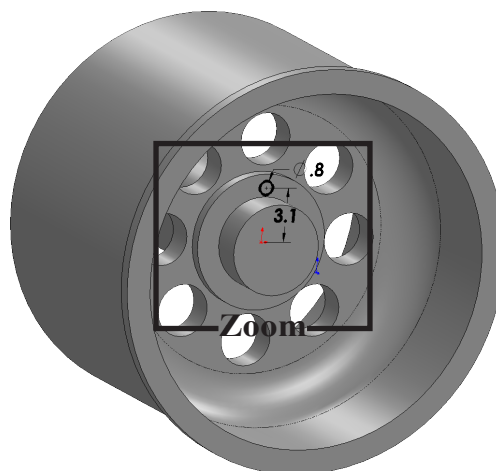


Fig. 26

Step 10. Click **Features**  on the Command Manager toolbar.

Step 11. Click **Extruded Boss/Base**  on the Features toolbar.

Step 12. In the Property Manager set:  
under Direction 1, **Fig. 27**


**Depth**  **.2**  
click OK .

Step 13. Save. Use **Ctrl-S**.

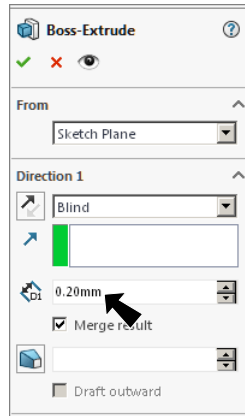
### J. Dome Top Face of Bolt.

Step 1. Click **Dome**  on the Features toolbar.

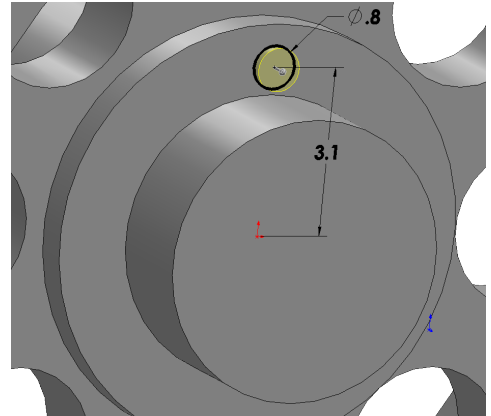
Step 2. In the Dome Property Manager set:  
under Parameters, **Fig. 29**  
click **top face of the extruded boss**, **Fig. 30**

**Distance** **.2**  
click OK .

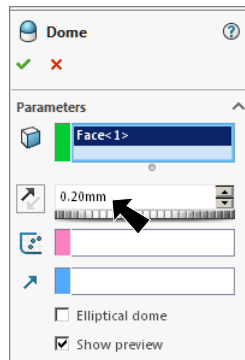
Step 3. Save. Use **Ctrl-S**.



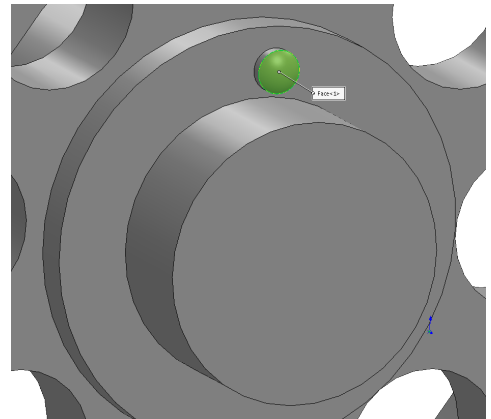
**Fig. 27**



**Fig. 28**



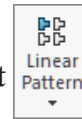
**Fig. 29**



**Fig. 30**

## K. Circular Pattern for Bolt.

Step 1. Click **Circular Pattern**  in the **Linear Pattern flyout** on the Features toolbar. Click the **flyout arrow**  to select Circular Pattern.



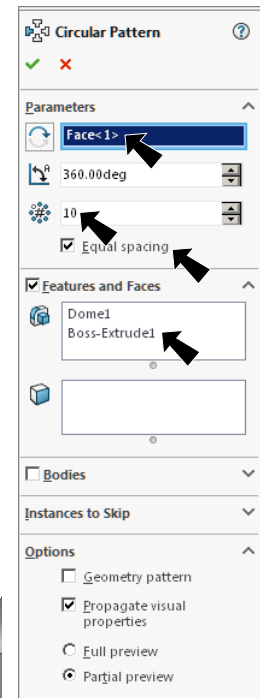
on the Fea-

Step 2. In the Circular Pattern Property Manager set:  
 under Features and Faces, **Fig. 31**  
 click **Dome1** and **Extrude1**, **Fig. 32**  
 under Parameters

click in **Pattern Axes**  box  
 click **cylindrical face Rim**

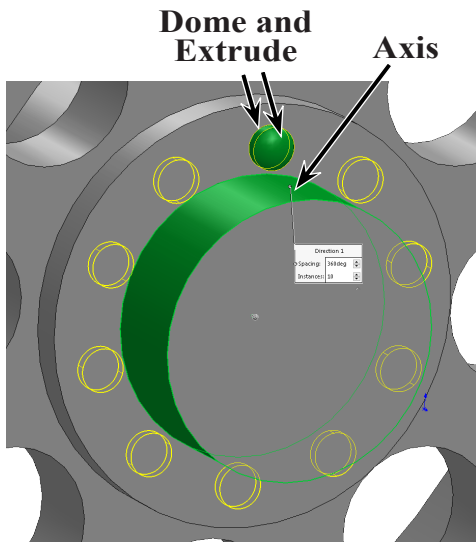
**Number of Instances**  **10**  
 check **Equal spacing**

click OK .

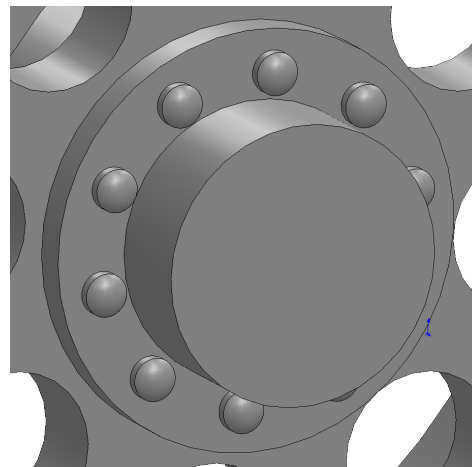


**Fig. 31**

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



**Fig. 32**






**Fig. 33**

## L. Fillet Edges of Rim.

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

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

Step 3. In the Fillet Property Manager set:  
 select **FilletXpert**, Fig. 34  
 set **Radius**  .5  
 click the **two edges**, Fig. 35  
 click **Apply**

Step 4. Set **Radius**  .3  
 click edge, Fig. 37  
 click **OK** .

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

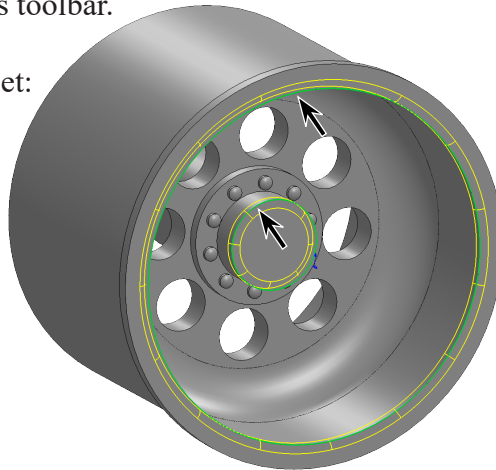


Fig. 35

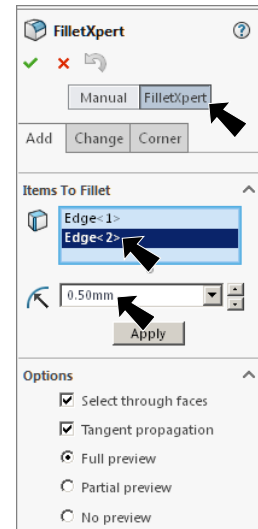


Fig. 34

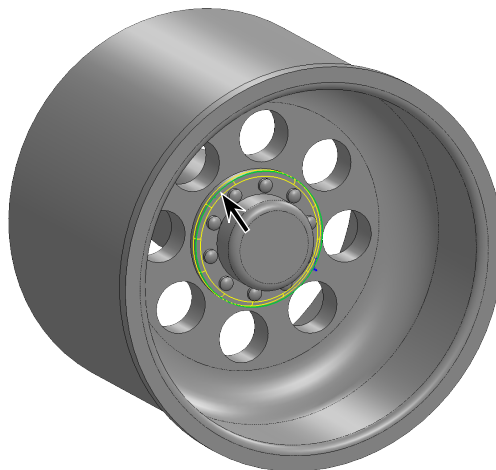


Fig. 37

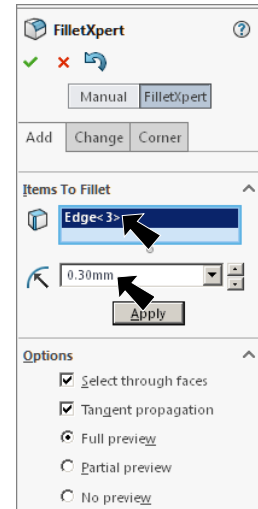



Fig. 36

## M. Material Chrome Stainless Steel.

Step 1. **Right click** **Material**  in the Feature Manager and click **Edit Material**, Fig. 38.

Step 2. **Expand Steel** in the material tree and select **Chrome Stainless Steel**. Click **Apply** and **Close**.

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



Fig. 39

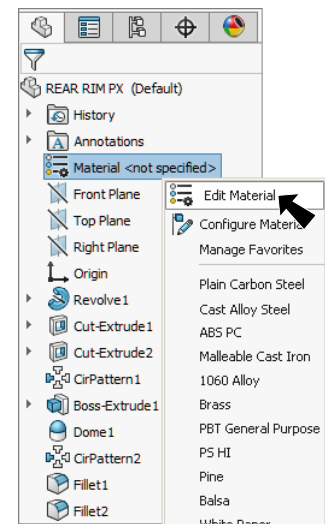


Fig. 38