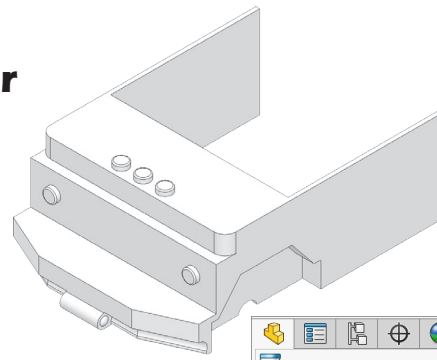





# E's Small Car Hatch



## A. Cut Sweep1 Sketch1 Hinge.

Step 1. Open your **Hatch** part file.


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

Step 3. Click **Normal To**  on the Standard Views toolbar. (**Ctrl-8**)

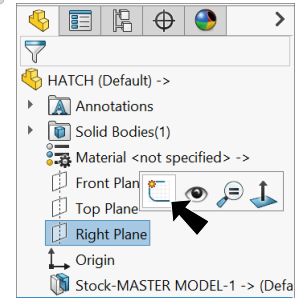
Step 4. Zoom on **front of body**, **Fig. 2**.

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

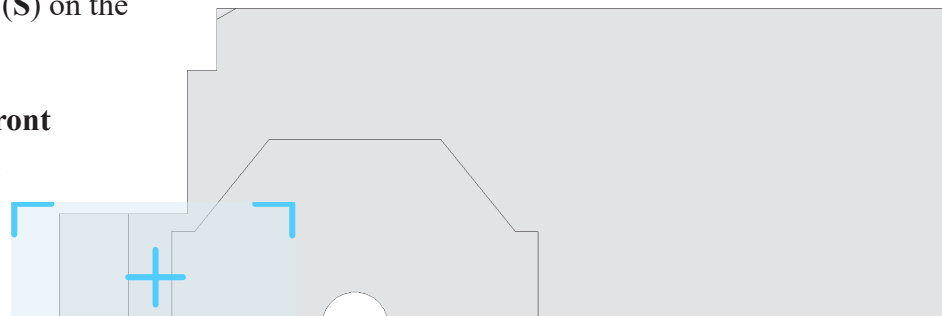
Step 6. Sketch **circle on front edge near bottom corner of body**, **Fig. 3**.

Step 7. Click **Smart Dimension**  (S) on the Sketch toolbar.

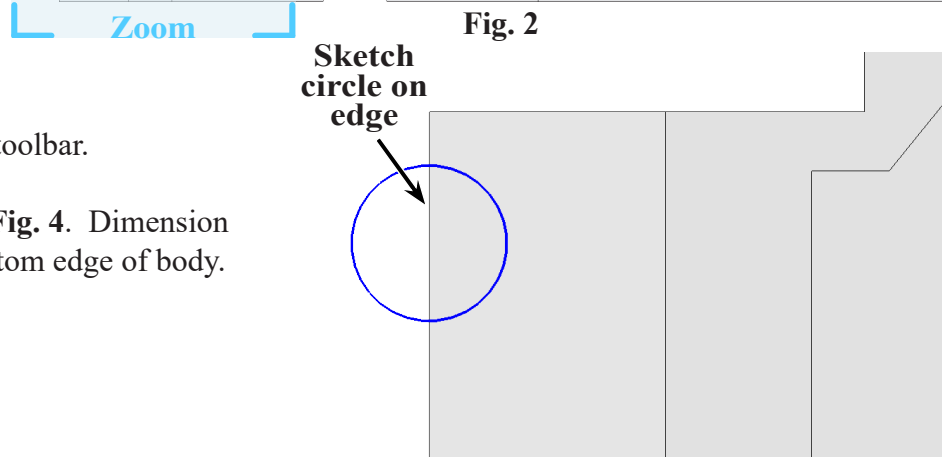
Step 8. Add dimensions, **Fig. 4**. Dimension the 2.46 to the bottom edge of body.



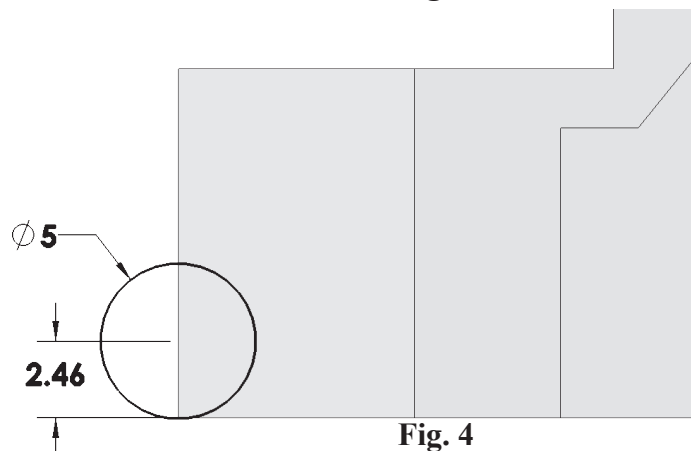
**Fig. 1**



**Fig. 2**



**Fig. 3**



**Fig. 4**

Step 9. Click **Offset Entities**  on the Sketch toolbar.

Step 10. In the Offset Entities Property Manager set:  
under Parameters, **Fig. 5**

**Distance**  **.3 (clearance for Hinge)**

uncheck **Reverse**

uncheck **Bi-directional**

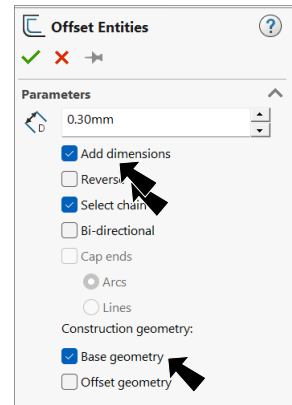
under Construction geometry

check **Base geometry**

click **circle**, **Fig. 6**

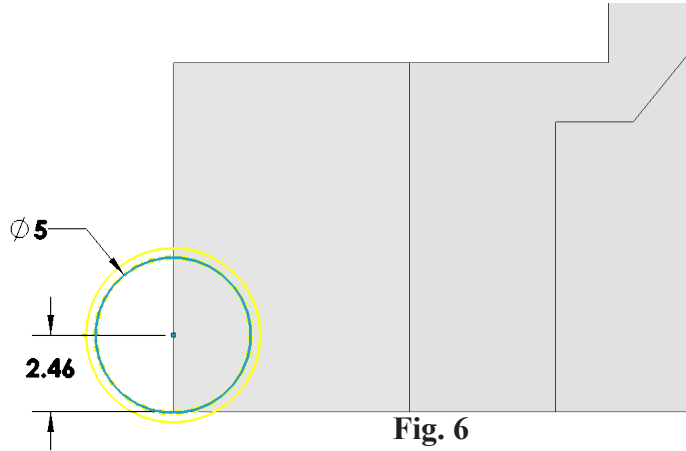
**yellow offset circle on outside - base geometry (construction) on inside**

click OK  .

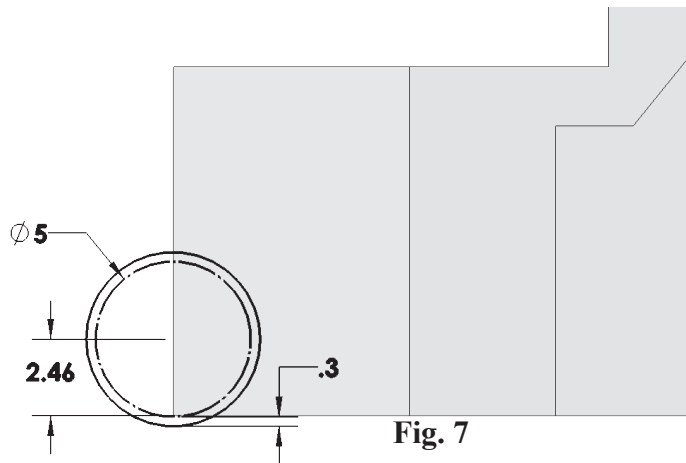


**Fig. 5**

Step 11. Click **Exit Sketch**  on the Sketch toolbar.



**Fig. 6**



**Fig. 7**

## B. Cut Sweep1 Hinge.

Step 1. Rotate view to **hinge cut**, Fig. 9. Use **Right Arrow key**  once and use **Up Arrow key**  once.

Step 2. Click **Features**  on the Command Manager toolbar.

Step 3. Click **Swept Cut**  on the Features toolbar.

Step 4. In the Cut-Sweep Property Manager:  
under Profile and Path, Fig. 8

**Profile**  click circle, Fig. 9

**Path**  right click and click **Selection Manager** from menu

click **Select Group**  in Selection Manager, Fig. 10  
click the **3 edges along bottom of Sweep Cut**, Fig. 9

click OK in Selection Manager 

select **Bidirectional** 

under Options

check **Align with end faces**

click OK 

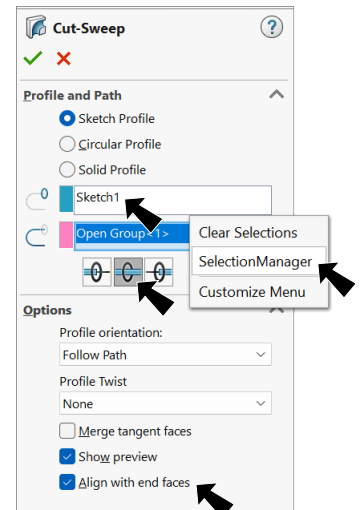


Fig. 8

Step 5. Save  (Ctrl-S).

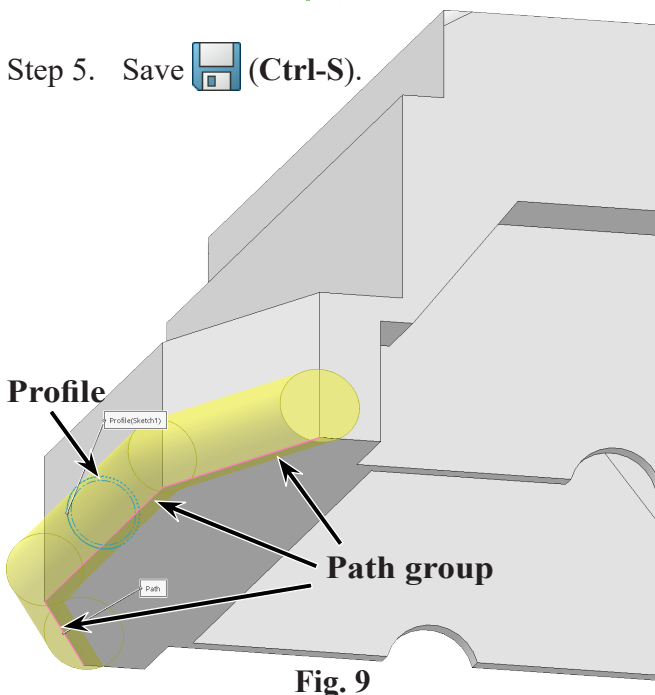


Fig. 9

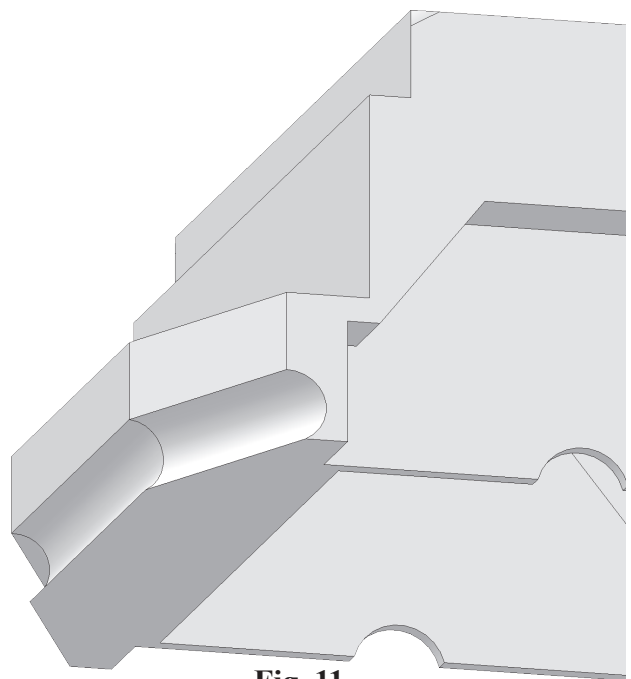


Fig. 11

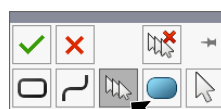



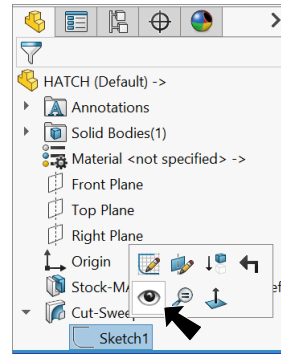


Fig. 10

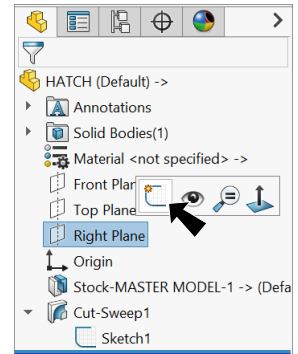
## C. Extrude1 Sketch2 Hinge.

Step 1. **Show Sketch1** . To show, expand **Cut-Sweep1** in the Feature Manager, click **Sketch1**  and **Show**  on the context toolbar, **Fig. 12**.




**Fig. 12**

Step 2. Click **Right Plane**  in the Feature Manager and click **Sketch**  on the context toolbar, **Fig. 13**.

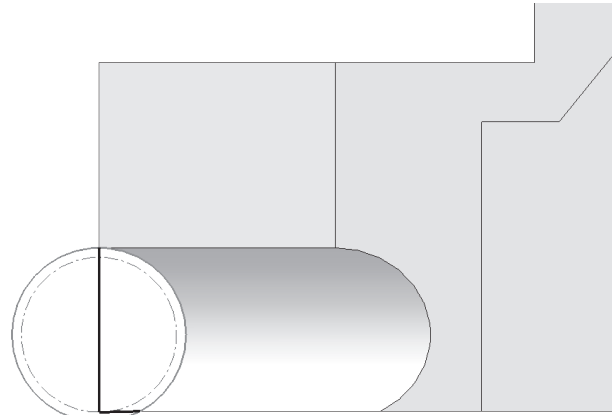


**Fig. 13**

Step 3. Use **Previous View**  on the Standard Views toolbar. (**Ctrl-Shift-Z**) to return to previous zoomed in view.


Step 4. Click **Line**  (L) on the Sketch toolbar.

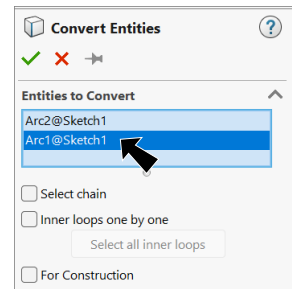
Step 5. Sketch a **vertical line down to construction circle in Sketch1** and **line across to vertex of cut**, **Fig. 14**. The line across will **not be horizontal**.



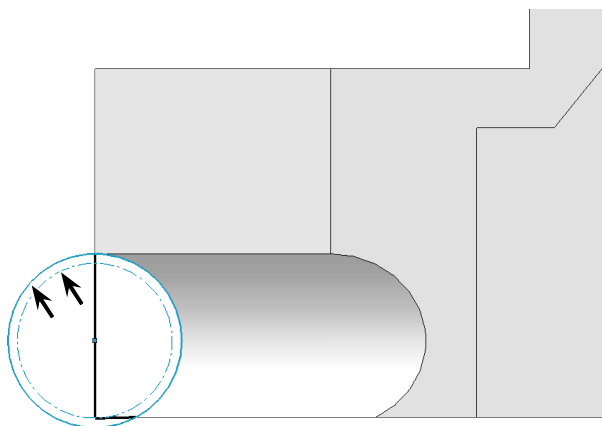
**Fig. 14**

Step 6. Click **Convert Entities**  on the Sketch toolbar.

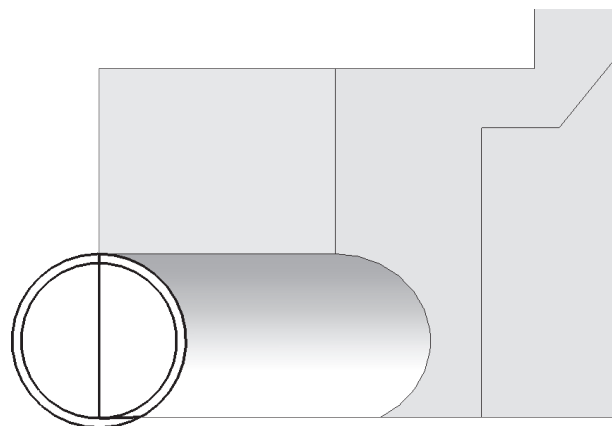
Step 7. In the Convert Entities Property Manager: under Entities to Convert, **Fig. 15** click the **2 circles in Sketch1**, **Fig. 16** click OK .



**Fig. 15**

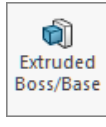



**Fig. 16**

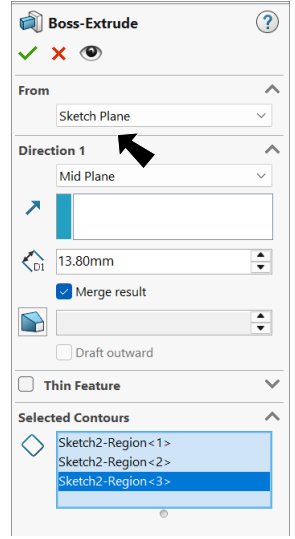


**Fig. 17**





Step 8. Click **Features**  on the Command Manager toolbar.

Step 9. Click **Extruded Boss/Base**  on the Features toolbar.




Step 10. In the Boss-Extrude Property Manager set:  
under Direction 1, **Fig. 18**  
End Condition **Mid Plane**  
**Depth**  **13.8**  
under Selected Contours  
click the **3 contours**, **Fig. 19**

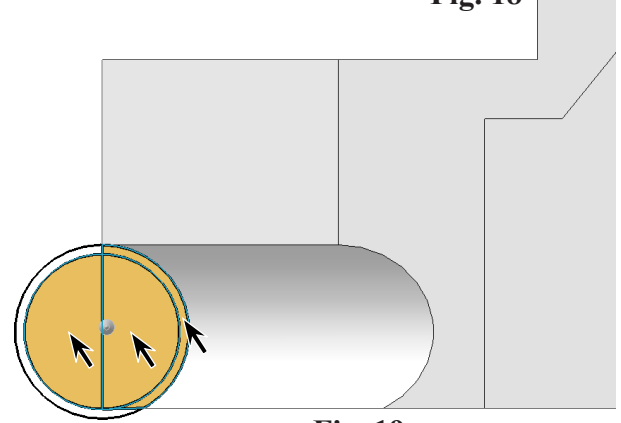


**Fig. 18**

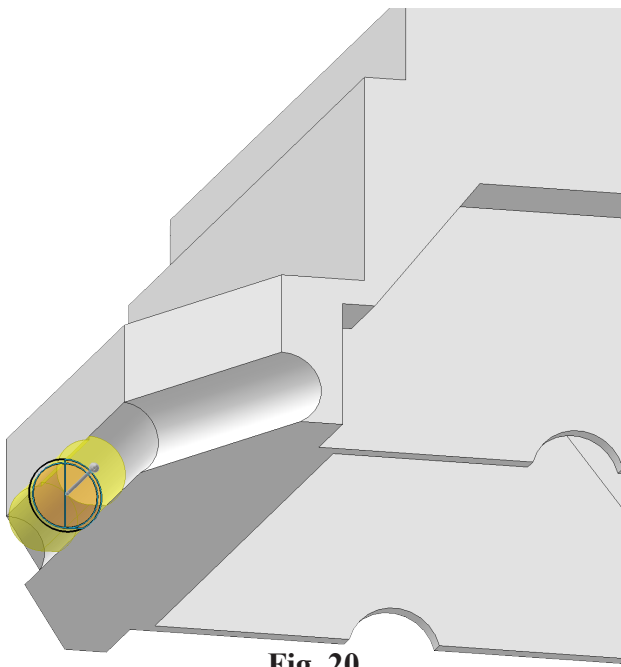
Rotate view to **hinge extrude**, **Fig. 20**. Use **Previous View**  on the Standard Views toolbar. (**Ctrl-Shift-Z**) (**Right Arrow key**  **once** and use **Up Arrow key**  **once**)  
click **OK** .

Step 11. Save  (**Ctrl-S**).

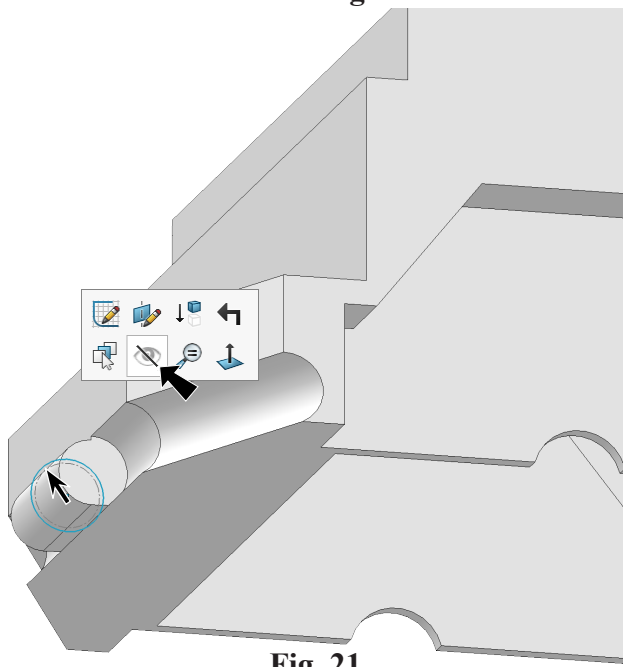
Step 12. **Hide Sketch1** . To hide, click **Sketch1**  in the graphics area and **Hide**  on the context toolbar, **Fig. 21**.



**Fig. 19**



**Fig. 20**



**Fig. 21**

## D. Split Line and Dome Sketch3 for Hinge.

Step 1. Click the **side face of hinge** and click **Sketch**  on the context toolbar, **Fig. 22**.

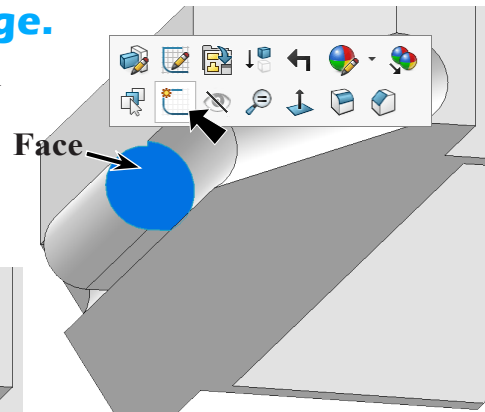


Fig. 22

Step 2. Click **Circle**  (S) on the Sketch toolbar.

Step 3. **Sketch circle at centerpoint of cut, Fig. 23**. To wake up centerpoint, hover cursor over circular edge of cut.

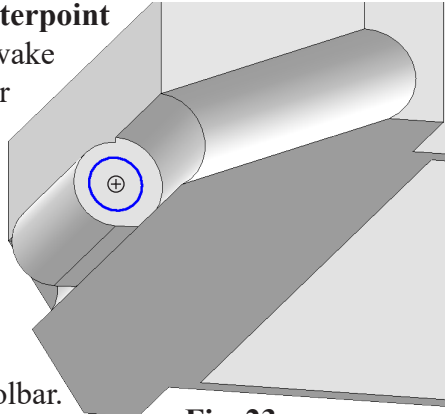



Fig. 23

Step 4. Click **Smart Dimension**  (S) on the Sketch toolbar.

Step 5. Dimension **diameter 3**, **Fig. 24**.

Step 6. Click Insert Menu > Curve > Split Line.

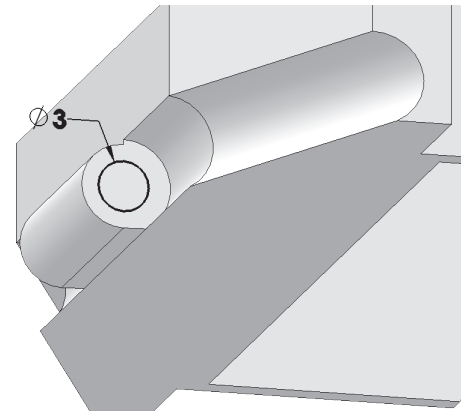





Fig. 24

Step 7. In the Split Line Property Manager set: under Type of Split, **Fig. 25** select **Projection**

under Selections  **Sketch is selected**

in Faces to Split field  click **side face**, **Fig. 26** click OK .

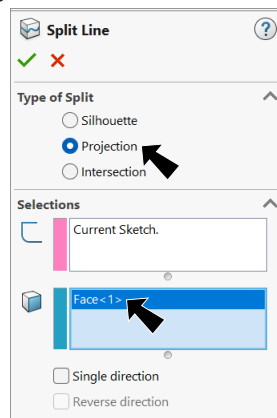


Fig. 25

Step 8. Click **Dome**  on the Features toolbar.

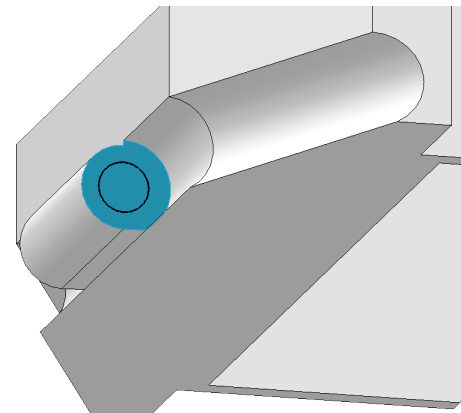


Fig. 26

Step 9. In the Dome Property Manager set: under Parameters, **Fig. 27** click **split line face**,

**Fig. 28**

**Distance .7**

click OK .

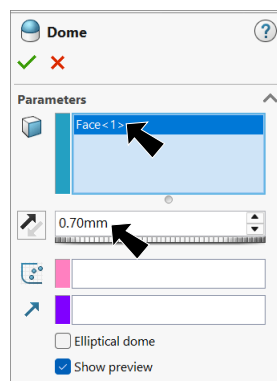


Fig. 27

Step 10. Save  (Ctrl-S).

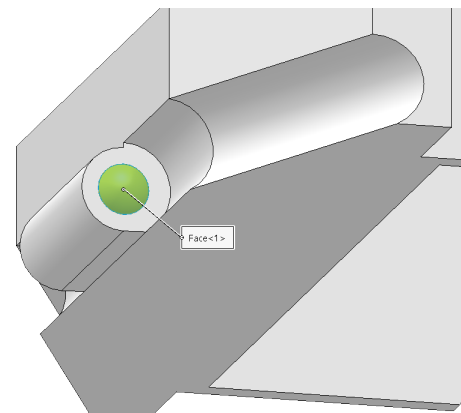




Fig. 28

## E. Mirror Hinge.

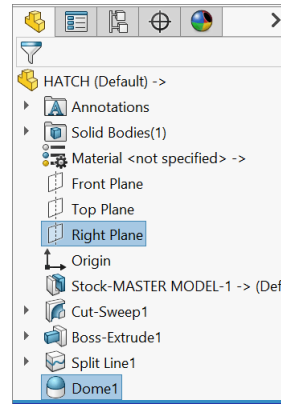
Step 1. Click **Isometric**  on the Standard Views toolbar. (**Ctrl-7**)

Step 2. **Ctrl click Right Plane**  and **Dome1** features to select Plane and features, **Fig. 29**.

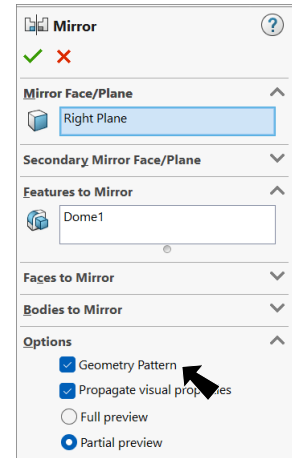
Step 3. Click **Mirror**  on the Features toolbar.

Step 4. In the Mirror Property Manager set:  
Plane and Dome were preselected under Options  
check **Geometry Pattern**  
click **OK**  .

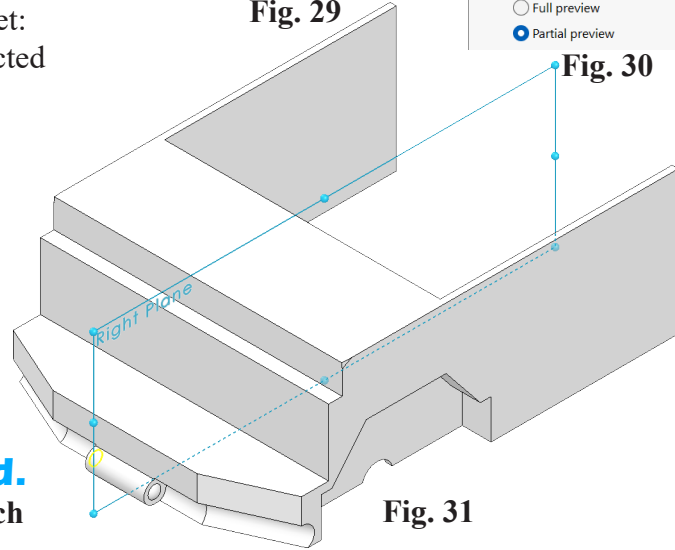
Step 5. Save  (**Ctrl-S**).



**Fig. 29**




**Fig. 30**



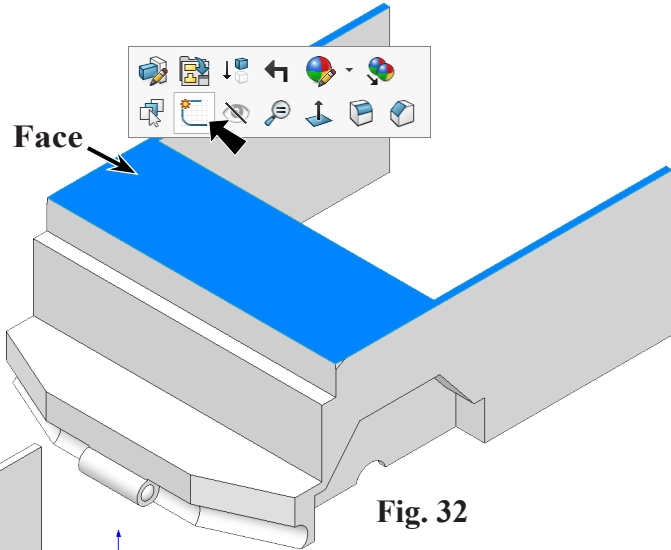
**Fig. 31**

## F. Extrude4 Sketch4 3 Stud.

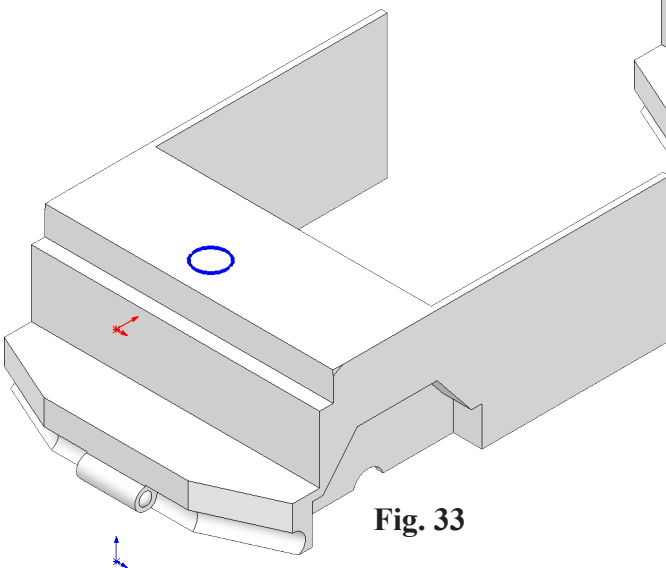
Step 1. Click the **top face** and click **Sketch**  on the context toolbar, **Fig. 32**.

Step 2. Click **Circle**  (S) on the Sketch toolbar.

Step 3. Sketch **circle**, **Fig. 33**.



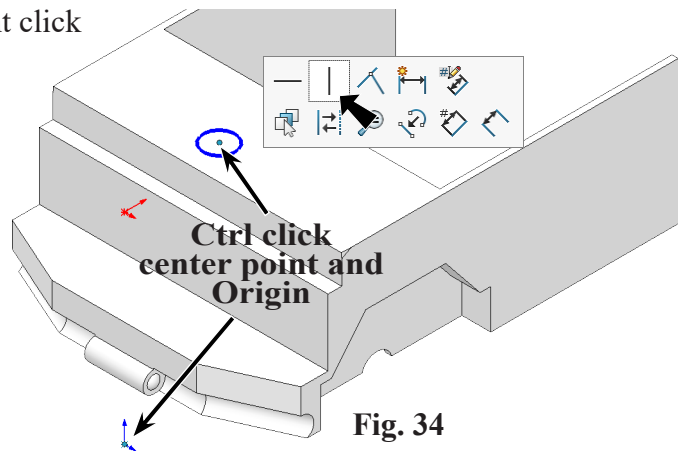
**Fig. 32**



**Fig. 33**

Step 4. **Unselect Circle tool.** To unselect, right click graphics area and click **Select** from menu.

Step 5. **Ctrl click centerpoint of circle and Origin (blue)** to select both. Release Ctrl key and click **Make Vertical** on the context toolbar, **Fig. 34.**



**Fig. 34**

Step 6. Click **Smart Dimension (S)** on the Sketch toolbar.

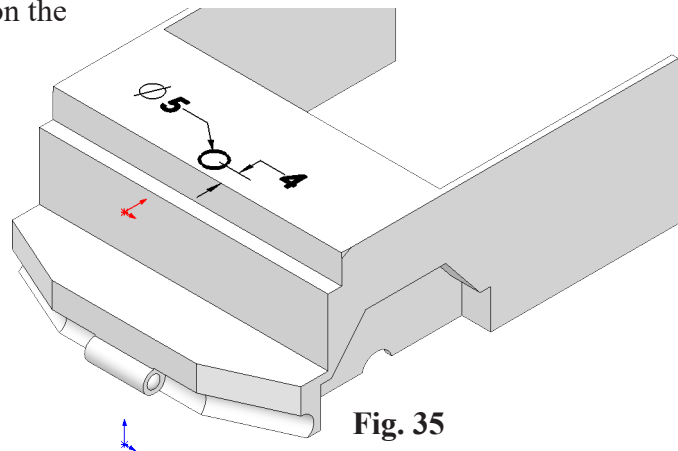
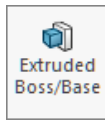


Step 7. Add dimensions, **Fig. 35.**

Step 8. Click **Features** on the Command Manager toolbar.

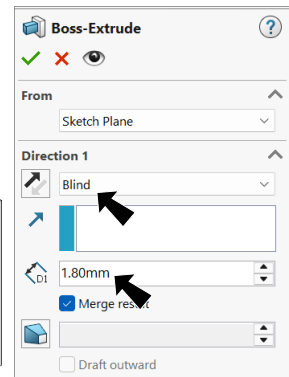


Step 9. Click **Extruded Boss/Base** on the Features toolbar.



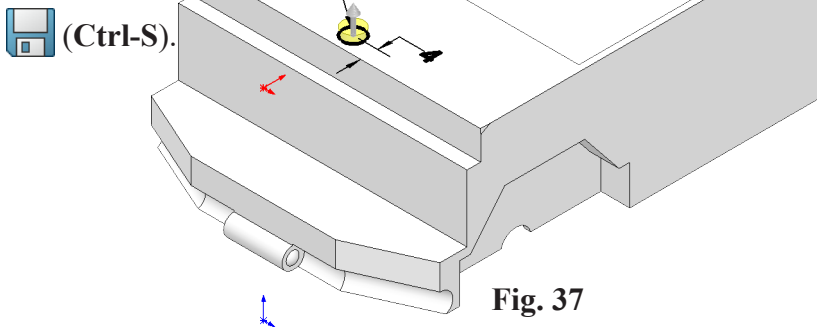
**Fig. 35**

Step 10. In the Property Manager set:  
 under Direction 1, **Fig. 36**  
 End Condition **Blind**  
**Depth 1.8**  
 click **OK**.



**Fig. 36**

Step 11. Save **(Ctrl-S).**



**Fig. 37**

## G. Linear Pattern Studs.

Step 1. Click **Linear Pattern**  on the Features toolbar.

Step 2. In the Linear Pattern Property Manager set:

under Direction 1, **Fig. 38**  
click a **front edge**, **Fig. 39**

Spacing  8

Number of Instances  2

under Direction 2

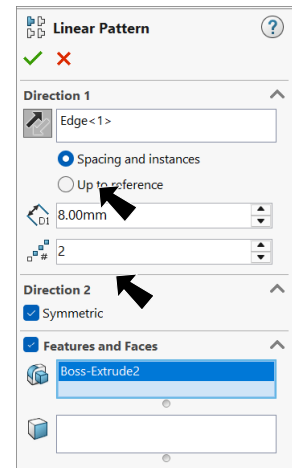
check **Symmetric**

under Features and Faces

click in  box

click **Boss-Extrude2**

click OK .



**Fig. 38**

**Direction** 

## H. Extrude3 Sketch5 Headlight Studs.

Step 1. Click the **front face of grill**

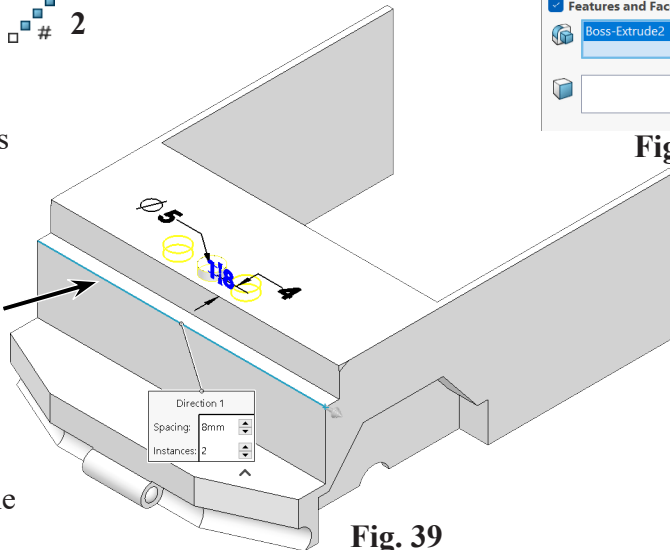
and click **Sketch**  on the context toolbar, **Fig. 40**.

Step 2. Click **Circle**  (S) on the Sketch toolbar.

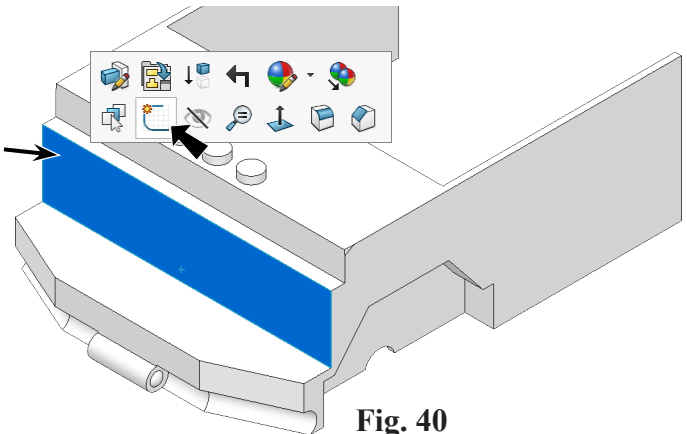
Step 3. Sketch **circle on front face**, **Fig. 41**.

Step 4. Click **Smart Dimension**  (S) on the Sketch toolbar.

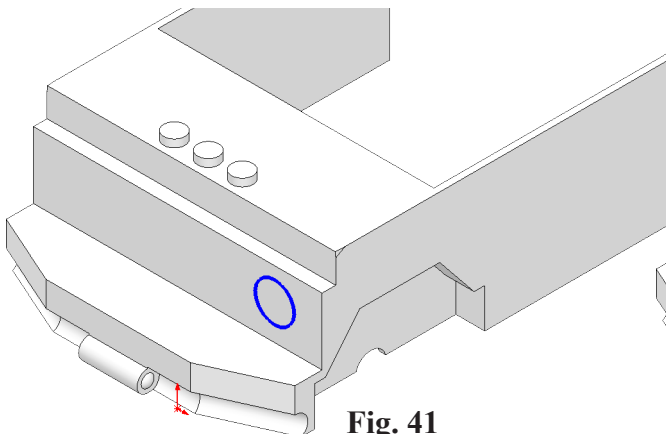
Step 5. Add dimensions, **Fig. 42**.



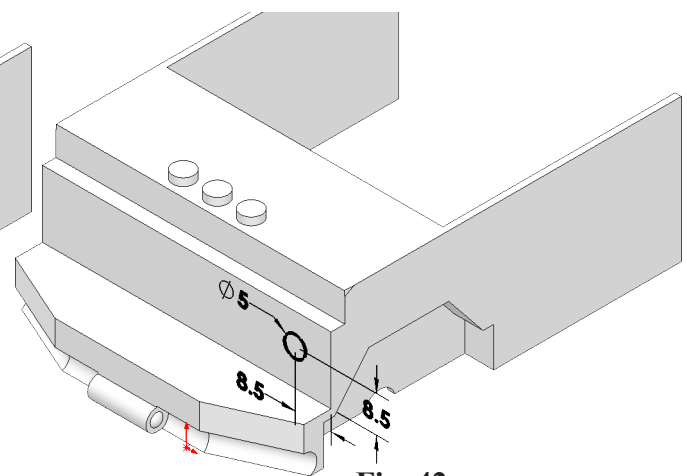
**Fig. 39**



**Fig. 40**



**Fig. 41**




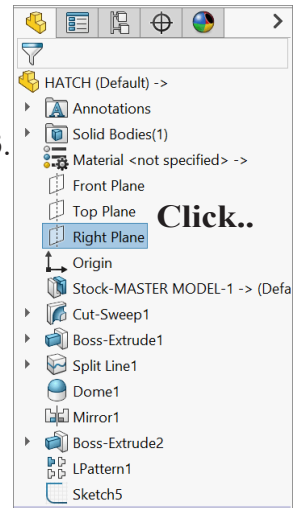
**Fig. 42**

Step 6. **Unselect Smart Dimension.** To unselect, right click graphics area and click Select from menu.

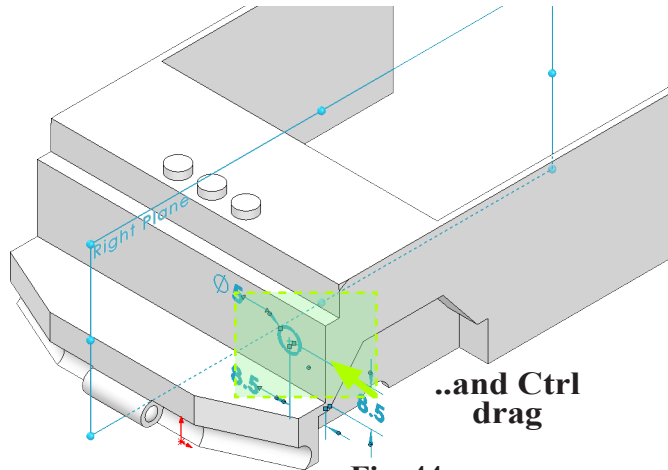
Step 7. **Click Right Plane**  in the Feature Manager to select plane, **Fig. 43.**

Step 8. **Ctrl drag circle to select plane and circle, Fig. 44.**

Step 9. Click **Mirror Entities**  **Mirror Entities** on the Sketch toolbar.





**Fig. 43**

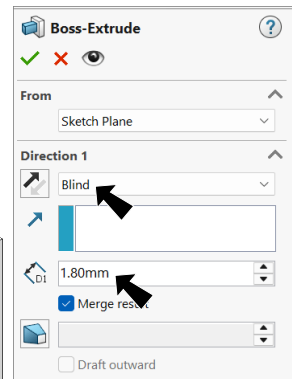


**Fig. 44**

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

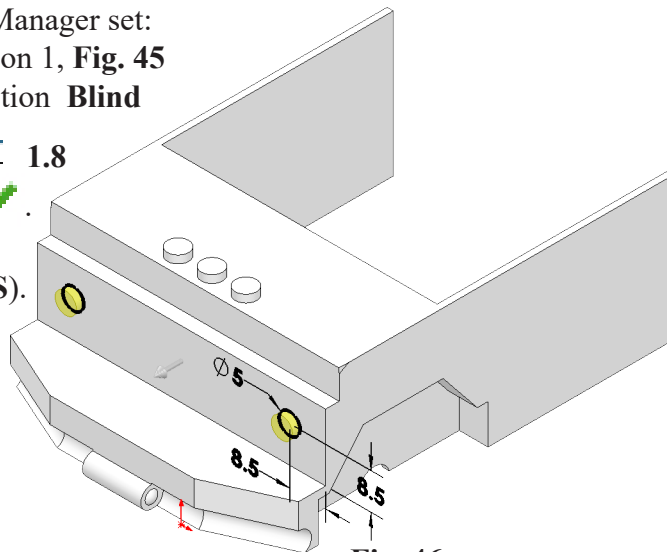
Step 11. Click **Extruded Boss/Base**  on the Features toolbar.

Step 12. In the Property Manager set:  
 under Direction 1, **Fig. 45**  
 End Condition **Blind**  
**Depth**  **1.8**  
 click OK .



**Fig. 45**

Step 13. Save  (**Ctrl-S**).



**Fig. 46**

# I. Fillets 1-3.

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

Step 2. In the Fillet Property Manager set:  
select **FilletXpert**, Fig. 47

① **Radius**  **4**  
click side edges of front (2), Fig. 48  
click Apply

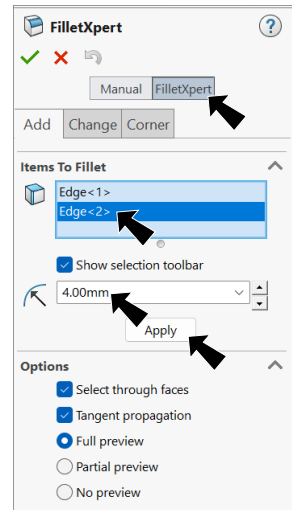
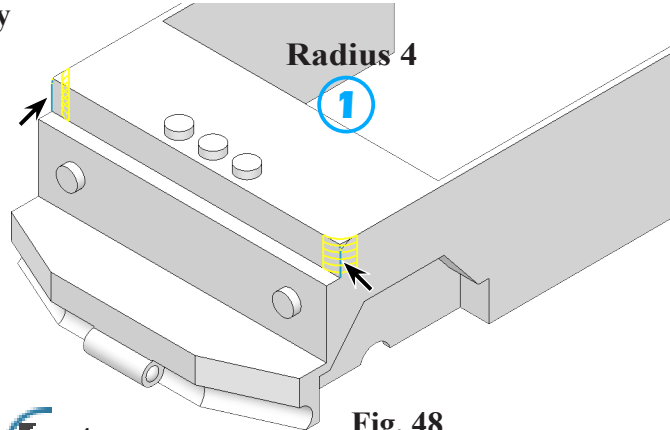



Fig. 47

② **Radius**  **.4**  
click top circular edge of all studs (5)  
Fig. 49  
click Apply

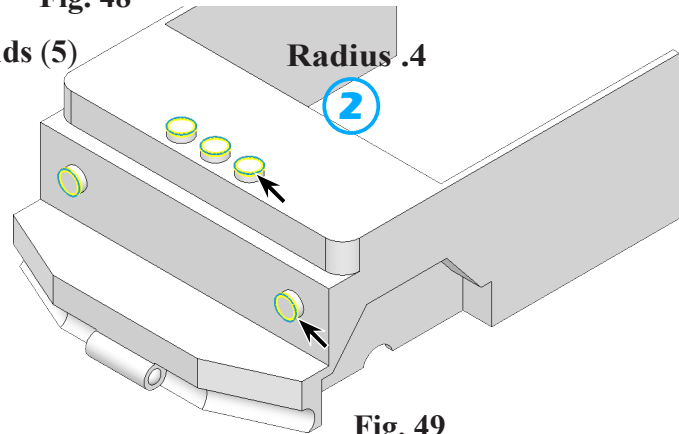


Fig. 49

③ **Radius**  **.9**  
click bottom edges along Sweep-Cut of hinge (4), Fig. 50  
click OK .

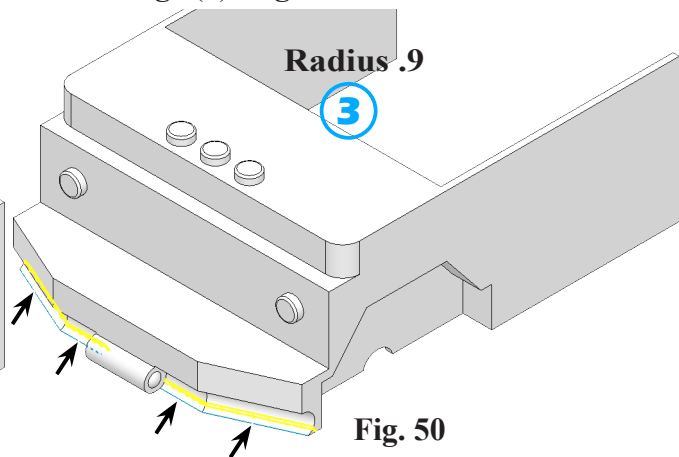


Fig. 50

Step 3. Save  (Ctrl-S).

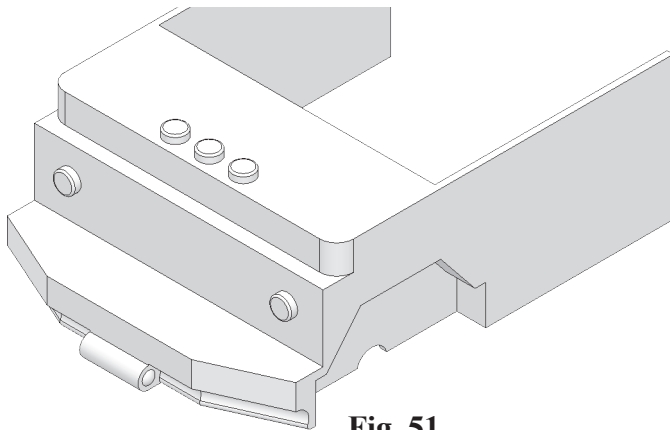


Fig. 51