

A. Revolve.

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**.

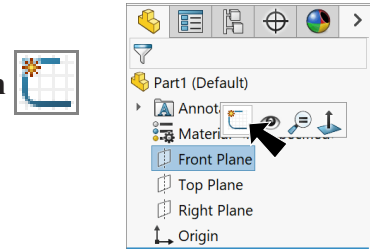



Fig. 1

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

Step 4. Sketch 6 lines with **Origin**  in the bottom left corner, **Fig. 2**.

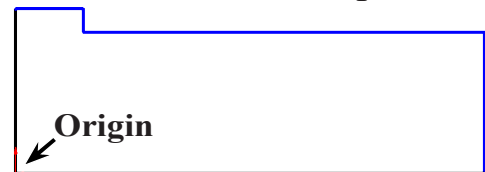


Fig. 2

Step 5. Click **Centerline**  in the **Line** flyout  on the Sketch toolbar.

Step 6. Sketch a **short horizontal centerline out from left endpoint of horizontal line**, **Fig. 3**.

Centerline

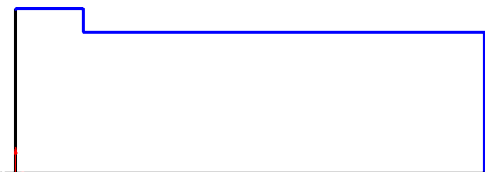


Fig. 3

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

Step 8. Add dimensions, **Fig. 4**. **Double distance the diameters.** To double distance dimension, click centerline and then top horizontal line, move the cursor below centerline (Origin) and click. Key-in the diameter in the Modify box and press ENTER.

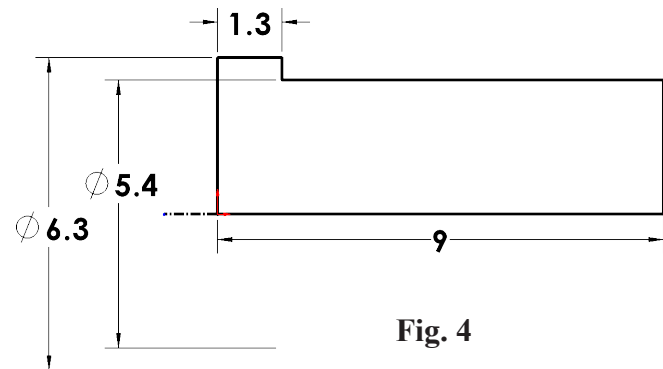


Fig. 4


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

Step 10. Click **Revolved Boss/Base**  on the Features toolbar.

Step 11. In the Revolve Property Manger set:

under Axis of Revolution ,

Fig. 5

construction line auto-selected click OK .

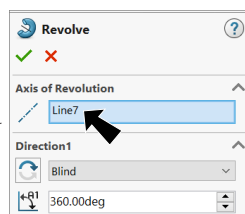


Fig. 5

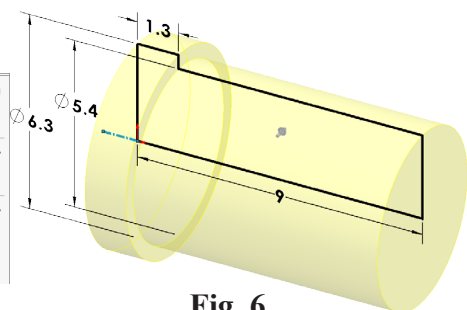


Fig. 6

B. Save as "GRIP".

Step 1. Click File Menu > Save As.

Step 2. Key-in **GRIP** for the filename and press ENTER.

C. Hole Wizard.

Step 1. Click **Hole Wizard**  on the Features toolbar.

Step 2. In the Property Manager on the Type tab set:
under Hole Type, **Fig. 7**

select **Hole** 

under Standard:

select **ANSI Metric**

under Type:

Drill Sizes

under Size:

check **Show custom sizing**

Through hole diameter  4.25

Angle at Bottom  90

under End Condition

End Condition **Offset From Surface**

select **Depth up to Tip** 

click the **right face**, **Fig. 8**

Offset Distance  .6

click **Positions tab**  at top of the Property Manager.

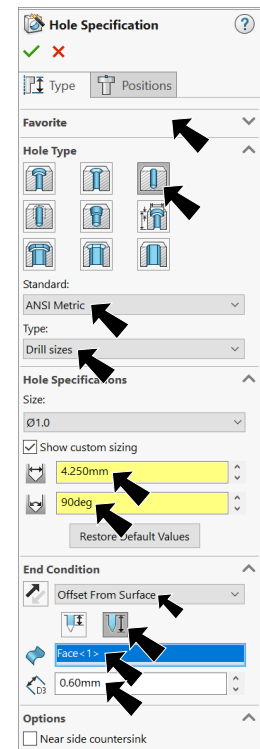


Fig. 7

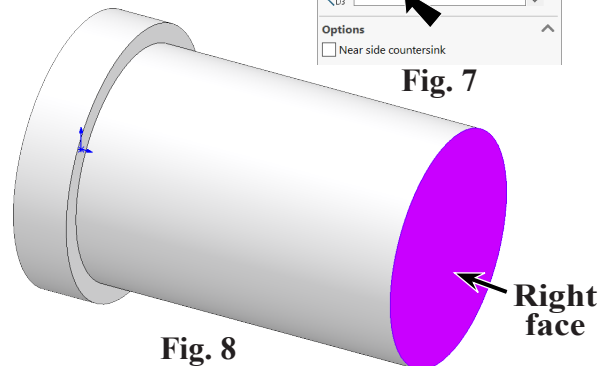




Fig. 8

Step 3. Rotate view to left side, **Fig. 9**.

To rotate view, click **Shift-Ctrl** click the **Y axis of the Reference Triad**

 (bottom left corner of graphics area).

Step 4. Click **left face** one time as face for hole and click the **Origin**

 to place the point, **Fig. 9**.

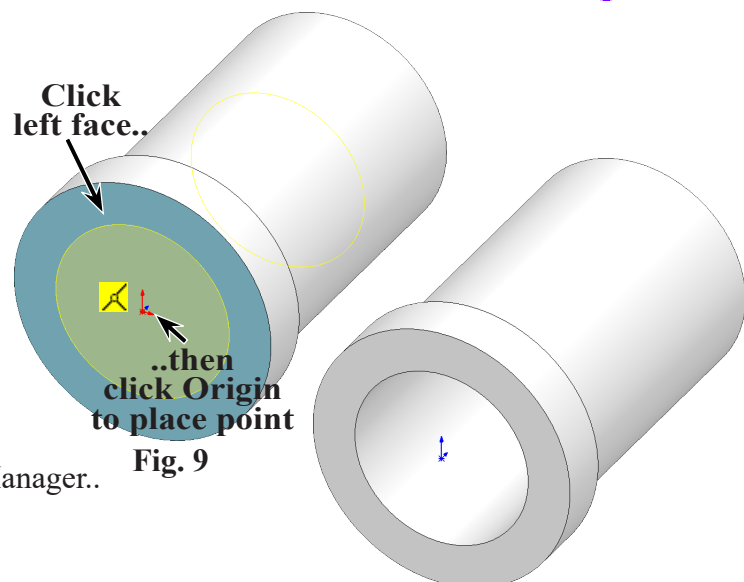


Fig. 9

Step 5. Click OK  in Hole Property Manager..



Step 6. Save  (Ctrl-S).


Fig. 10

D. Cut Extrude.

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

Step 2. Click the **right side face** and click **Sketch**  on the context toolbar, Fig. 11.

Step 3. Click **Centerline**  in the **Line flyout**  on the Sketch toolbar.

Step 4. Sketch **vertical centerline up from top quadrant point**  of rear face, Fig. 12.

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


Step 6. Sketch **circle at top endpoint of centerline**, Fig. 13.

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

Step 8. Dimensions **diameter 1 and centerline .1**, Fig. 14.

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. 15
 End Condition **Up To Surface**
 click the **boss face**
 click OK .

Step 12. Save  (Ctrl-S).

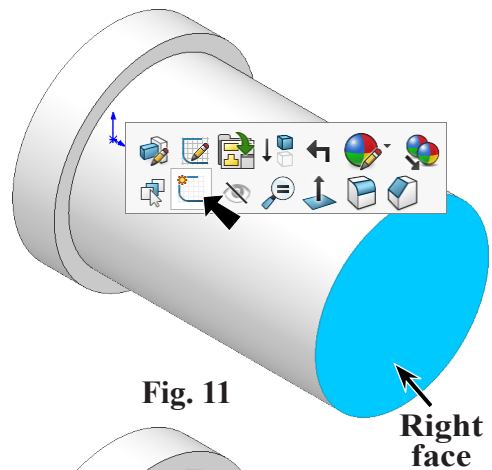


Fig. 11

Right face

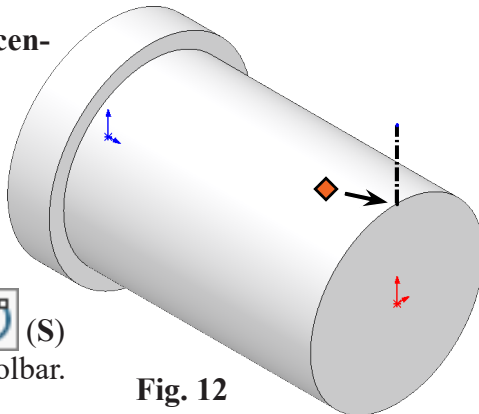


Fig. 12

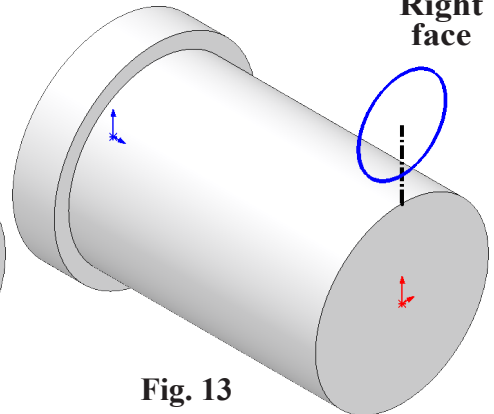


Fig. 13

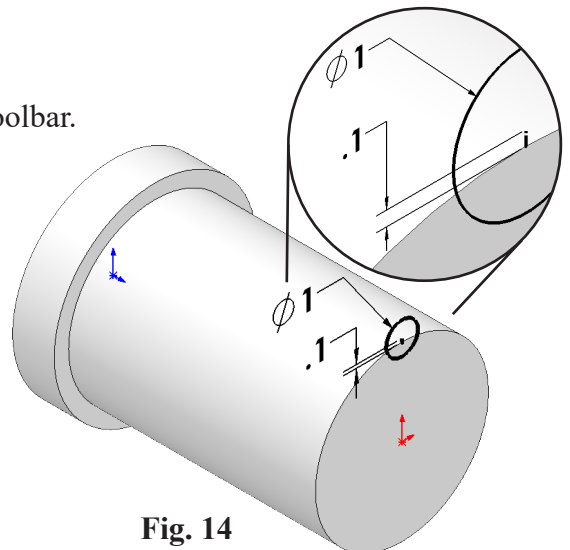


Fig. 14

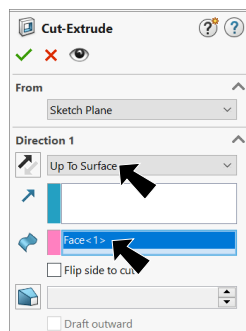


Fig. 15

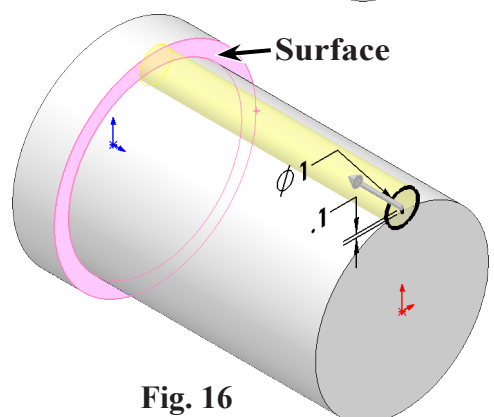


Fig. 16

E. Fillet Edges.

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

Step 2. In the Fillet Property Manager set:
select **FilletXpert**, Fig. 17

① Radius  .4

click **both circular edges at base**, Fig. 18
click **Apply**

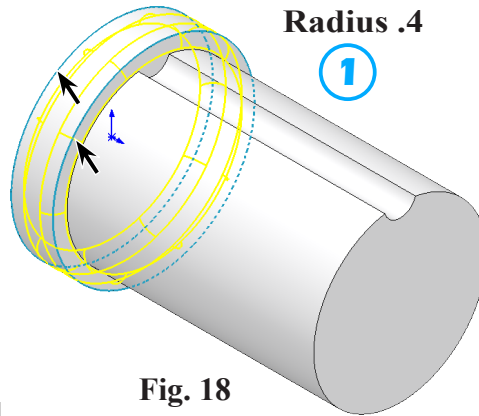


Fig. 18

② Radius  1

click **rear circular edge**, Fig. 19
click **Apply**

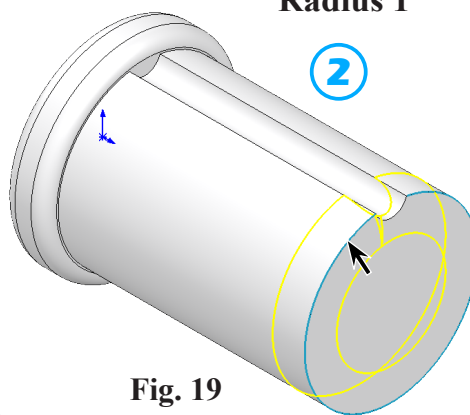


Fig. 19

③ Radius  .3

click **edge along cut**, Fig. 20
click **OK** .

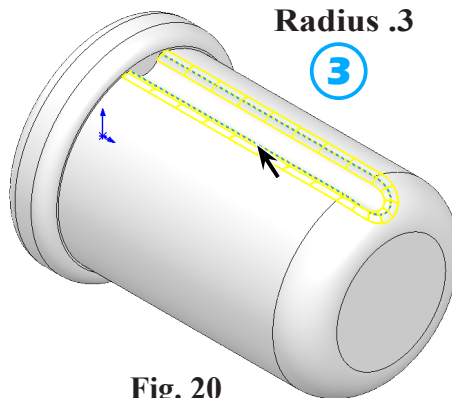


Fig. 20

Step 3. Save  (Ctrl-S).

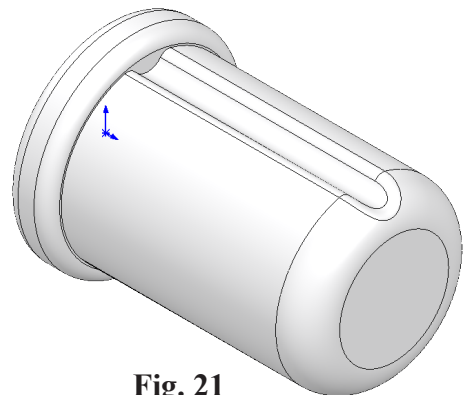


Fig. 21

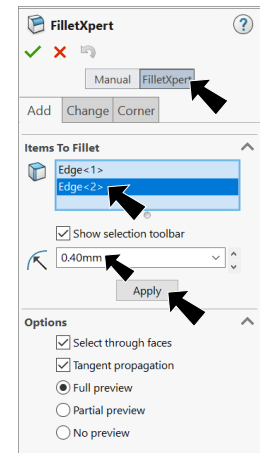
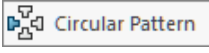





Fig. 17

F. Circular Pattern.

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

Step 2. In the Circular Pattern Property Manager:
 under Features and Faces, **Fig. 22**
 click **Cut-Extrude1** and
Fillet3 in graphics area, **Fig. 23**
 under Direction 1
 click in Pattern Axes box
 click a **cylindrical face**
 check **Equal spacing**
Number of Instances  **11**
 click OK .

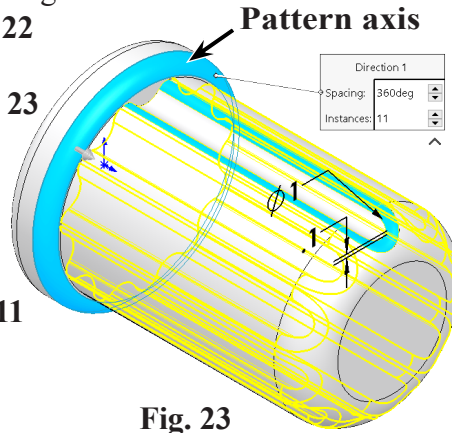


Fig. 23

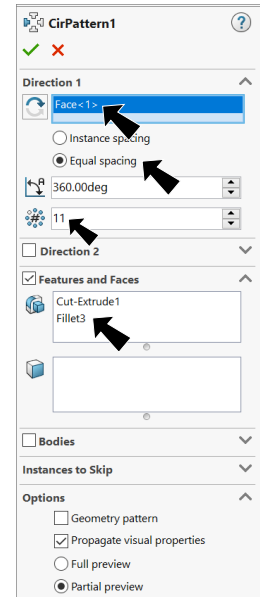


Fig. 22

Step 3. Save  (Ctrl-S).

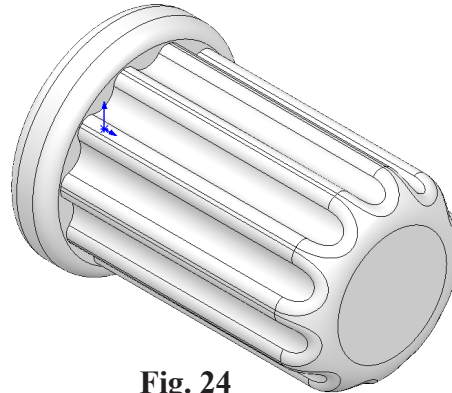



Fig. 24

G. Appearance: Black Plastic.

Step 1. Click the part to select part, click **Appearances**

Callout  on the context toolbar and click **GRIP** , Fig. 25.

Click part

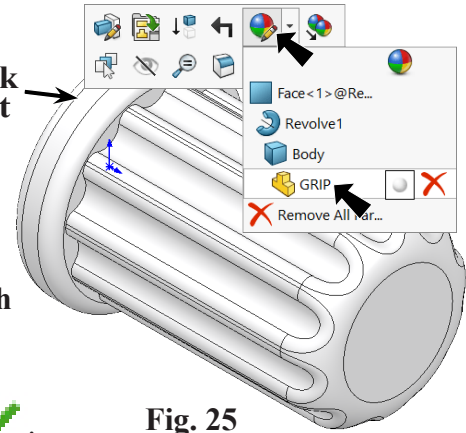


Fig. 25

Step 2. In the Appearances Task pane, expand **Plastic**, click **High Gloss** and in the lower pane select **dark grey high gloss plastic**, Fig. 26.

Step 3. Over in the Appearances Property Manager click OK .

Step 4. Save  (Ctrl-S).

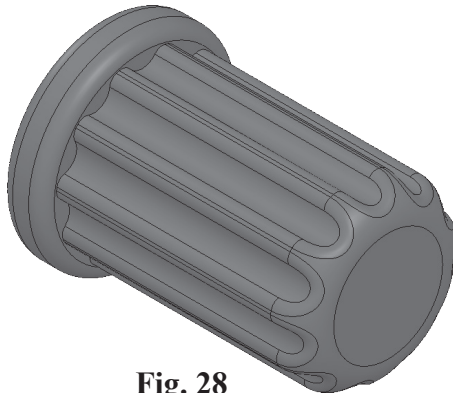


Fig. 28

H. Open Bike Assembly File and Insert Grip.

Step 1. Open your **BIKE ASSEMBLY** file.

Step 2. Click **Isometric**  on the Standard Views toolbar. (Ctrl-7)

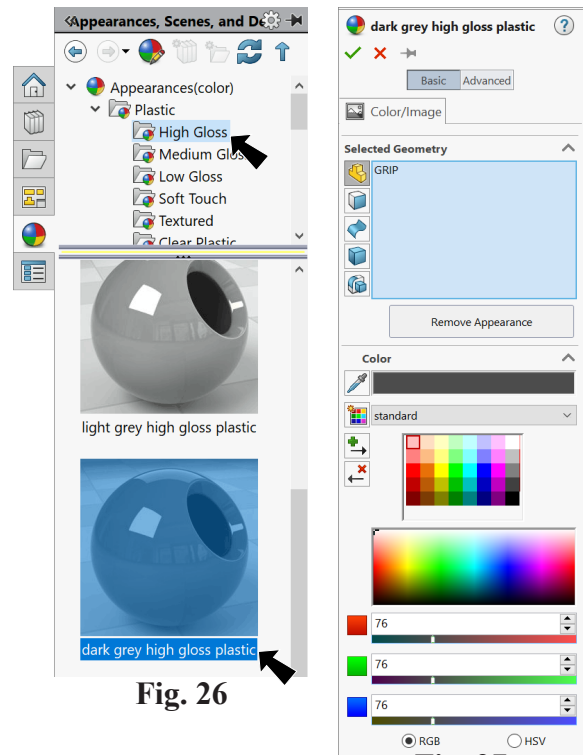


Fig. 26

Fig. 27

Step 3. Click **Insert Components**  on the Assembly toolbar.

Step 4. Click **GRIP** file and click Open from the Open dialog box.

Step 5. Click to place Grip, **Fig. 29**.

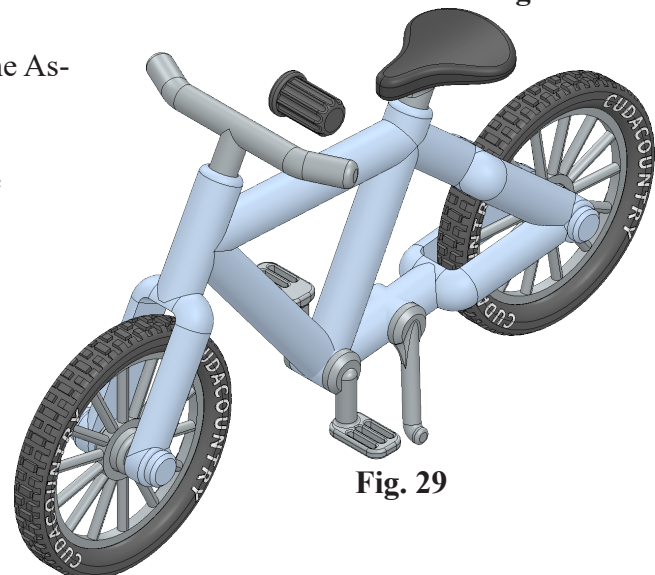



Fig. 29

I. Mate: Grip.

Step 1. Rotate view to view side face of Grip, Fig. 33. Use Left Arrow key  three times. Zoom in.

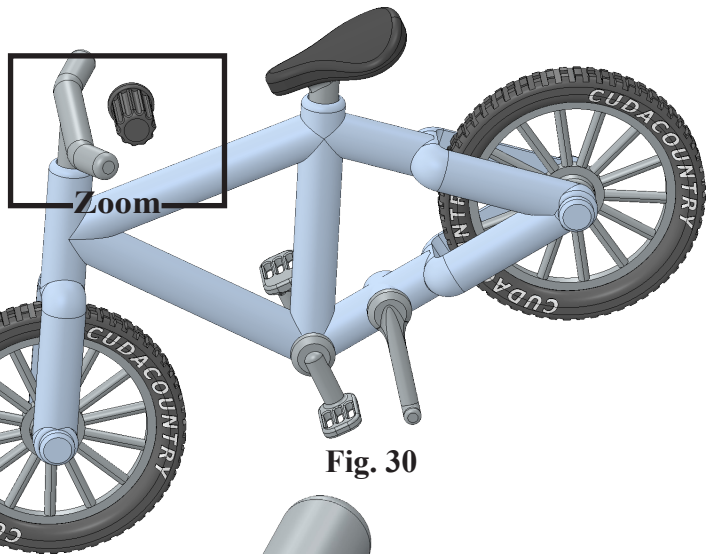


Fig. 30

Step 2. Click **Mate**  on the Assembly toolbar.

Step 3. Click **end face of Handlebars** and **hide outside side face Grip**, click **circular edge of Hole Wizard shoulder at tip**, Fig. 34. To hide face, hover cursor over face and press **Alt** key.

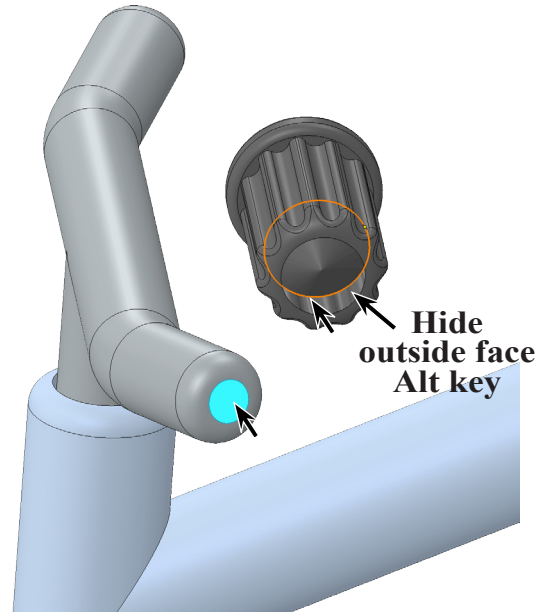



Fig. 31

Step 4. Click **Add/Finish Mate**  to add a **Coincident** mate.

Step 5. Click a **cylindrical face Grip** and a **cylindrical face of Handlebar**, Fig. 35.

Step 6. Check **Lock Rotation** and **Add/Finish Mate**  in Mate pop-up toolbar to add a **Concentric** mate, Fig. 36.

Step 7. Click **OK**  in the Property Manager.

Step 8. Save  (Ctrl-S).

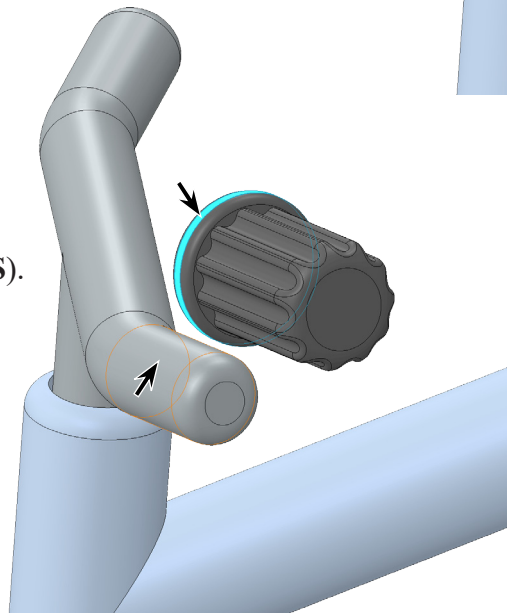


Fig. 32



Fig. 33

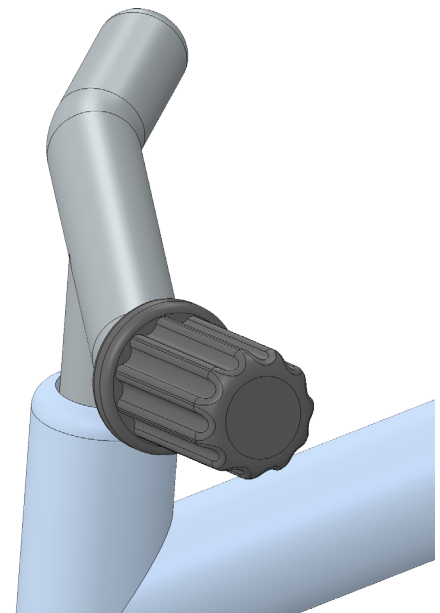




Fig. 34

I. Mirror Component.

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

Step 2. Click **MirrorComponent1**  in the Feature Manager and **Edit Feature**  in the content toolbar, **Fig. 35**.

Step 3. In the Mirror Property Manager:
 Step 1: Selections, **Fig. 36**
 under Components to Mirror
 click the **Grip** to add, **Fig. 37**
 click **Next**  to view mirrored component

Step 5. Still in Mirror Property Manager:
 Step 2: Set Orientation
 Confirm mirrored component, **Fig. 38**
 click **OK** .

Step 6. Save  (Ctrl-S).

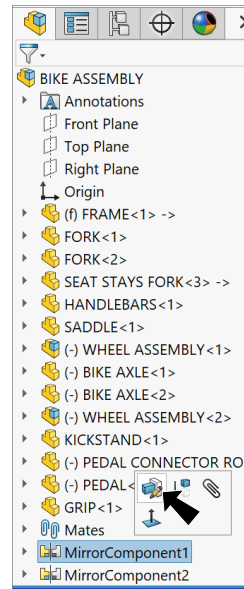


Fig. 35

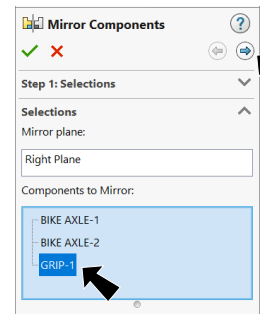


Fig. 36

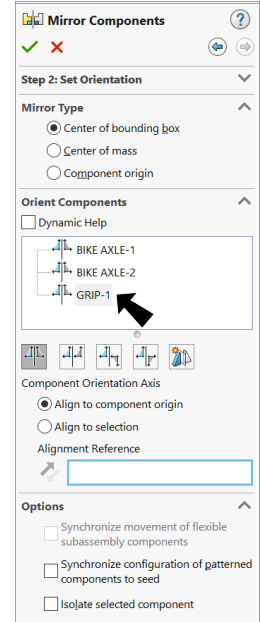


Fig. 37

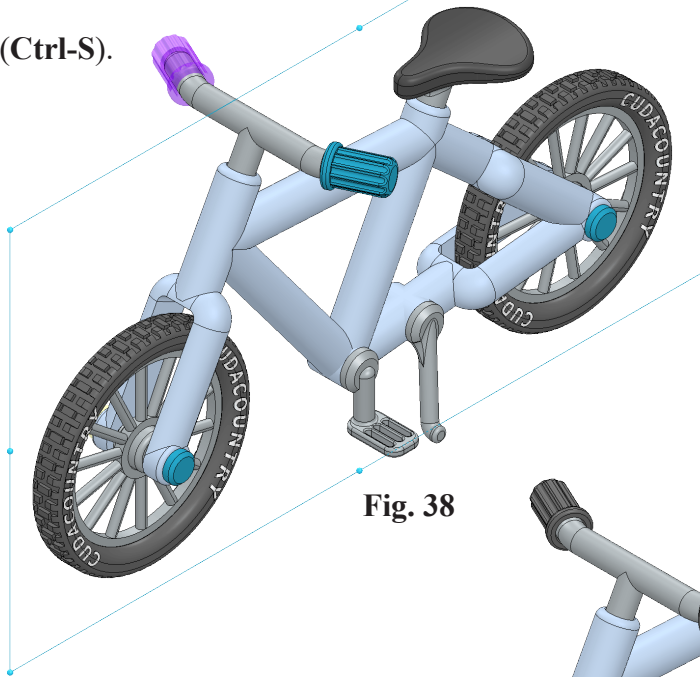


Fig. 38

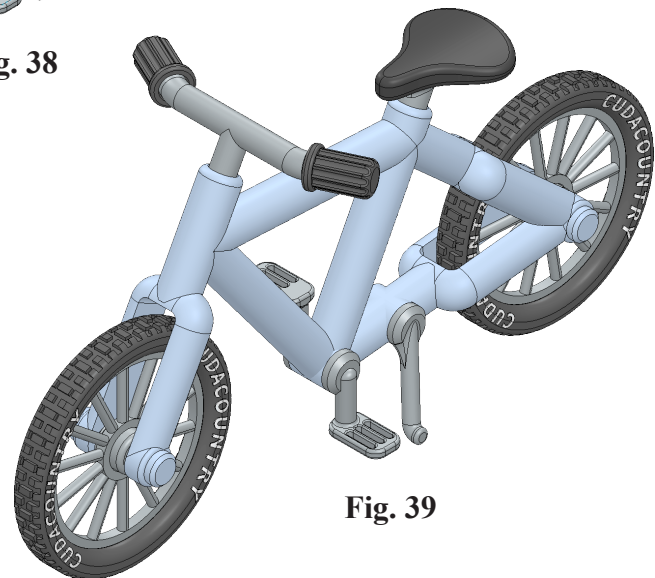


Fig. 39