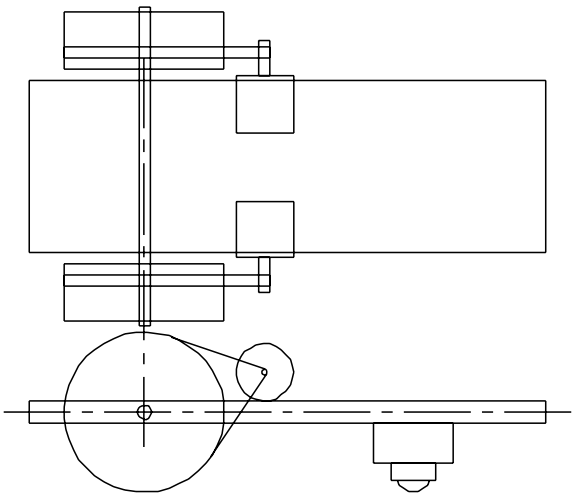
Chapter 23 SUMO CAR 2D

A. OPEN B FILE.

Step 1. When you start a new drawing away start with the B file. If you started this drawing with the B file go directly to Steps B. If your did not start with the B file complete these Steps: Click **Open** from the File Menu. Click **No** to save current part. Key in **a:b** for the filename and press ENTER.

B. CREATE A RECTANGLE FOR TOP VIEW.



Step 1. ESC to Main Menu.

Step 2. F1 CREATE.

Step 3. F1 LINE.

Step 4. F7 RECTANGLE.

Step 5. F2 WIDTH/HEIGHT.

Step 6. Key in **9** for width and press ENTER.

Step 7. Key in **3** for height and press ENTER.

Step 8. F9 KEY IN.

Step 9. Key in:
Zero (0) for coordinate X and press ENTER.
0 for Y and press ENTER.
0 for Z and press ENTER.

Step 10. ESC to Main Menu.

Step 11. Use **ALT-A** to center the rectangle on the screen. Hold down ALT and press A.

C. CREATE A RECTANGLE FOR SIDE VIEW.

Step 1. Use **Alt-H two** times to reduce the drawing half size twice. Hold down ALT and press H **two times**.

Step 2. ESC to Main Menu.

Step 3. F1 CREATE.

Step 4. F1 LINE.

Step 5. F7 RECTANGLE.

Step 6. F2 WIDTH/HEIGHT.

Step 7. Key in **9** for width and press ENTER.

Step 8. Key in **.4** for height and press ENTER.

Step 9. F9 KEY IN.

Step 10. Key in:
0 for X and press ENTER.
-3 for Y and press ENTER.
0 for Z and press ENTER. **Fig. 1**

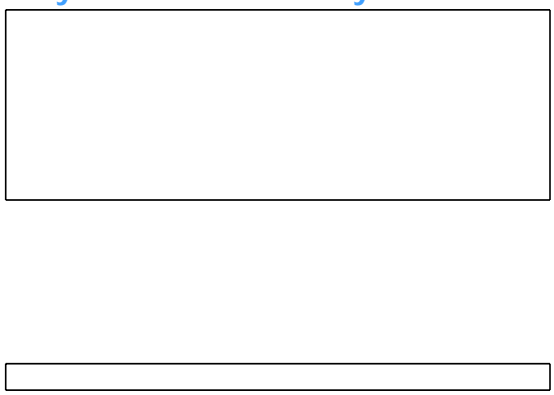


FIG. 1

Step 11. ESC to Main Menu.

Step 12. Use **ALT-A** to center the rectangle on the screen. Hold down ALT and press A.

Step 13. At this time it is a good idea to save the drawing. Click **Save As** from the File Menu. Key **a:sumo** filename and press ENTER. Press ESC for Part Description.

D. CREATE HORIZONTAL and VERTICAL CENTER LINES.

Step 1. Draw the center lines in a different color. Change the color to **green**. Click the color swatch in the side Tool Bar. Click green, number 1.

Step 2. Change the line type to Center Lines. Use **ALT-T**. Hold down ALT and press T. Click the Center Line, line number 3. Click OK.

Step 3. ESC to Main Menu.

Step 4. F1 CREATE.

Step 5. F1 LINE.

Step 6. F5 HORIZONTAL/ VERTICAL.

Step 7. F3 BOTH.

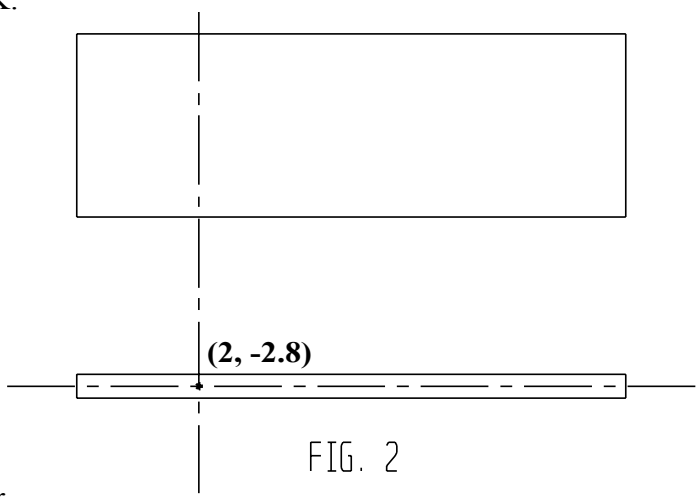


FIG. 2

Step 8. Move cursor to coordinates **(2, -2.8)** and click for the location of the center lines, **Fig. 2**. Use the Cursor Tracking Window located in the lower-left corner of the display.

Fit on Screen ALT-A	Delete CTRL-Q	Redraw CTRL-R	Half Size ALT-H

E. DRAW WHEELS IN SIDE VIEW.

Step 1. Draw the wheels **red**. Change the color to red. Click the color swatch in the side Tool Bar. Click red, number 2.

Step 2. Change the line type back to Object Lines. Use **ALT-T**. Hold down ALT and press T. Click the Object line, Line number 1. Click OK.

Step 3. ESC to Main Menu.

Step 4. F1 CREATE.

Step 5. F3 CIRCLE.

Step 6. F2 CENTER/DIAMETER.

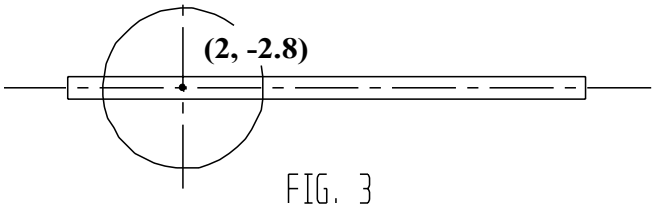


FIG. 3

Step 7. Key in **2.8 for diameter** and press ENTER.

Step 8. Draw the wheel in the Side View. Move cursor to coordinates **(2, -2.8)** and click for the center of the back wheel, **Fig. 3**.

Step 9. Save the drawing. Use **CTRL-S**. Hold down CTRL and press S.

F. DRAW WHEELS IN TOP VIEW.

Step 1. Reduce the drawing down to make room for the wheels in Top View, use **ALT-S**. Hold down ALT and press S. Key in **.7** and **press ENTER two times**.

Step 2. ESC to Main Menu.

Step 3. F1 CREATE.

Step 4. F1 LINE.

Step 5. F7 RECTANGLE.

Step 6. F1 CORNERS.

Step 7. Draw the **back wheels** in the Top View, **Fig. 4**. Start the rectangle with a click at coordinate **(.6, 4.2)** Move the cursor to stretch the rectangle to **(3.4, 3.2)** and click.

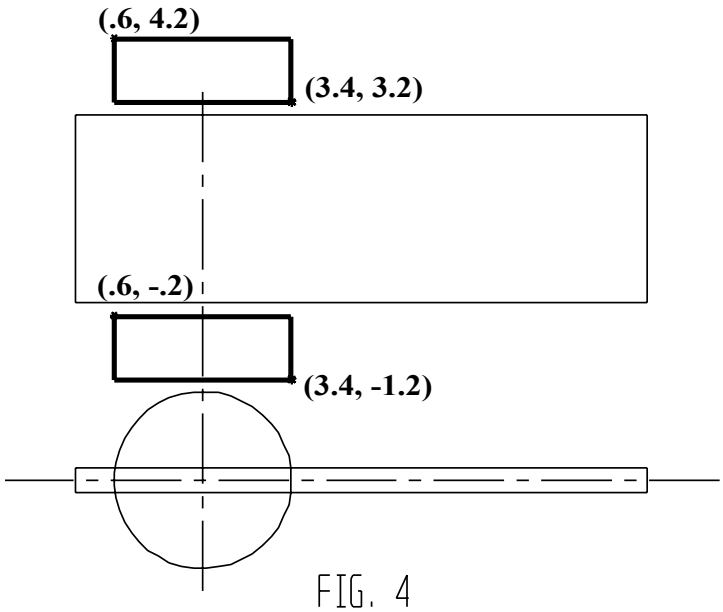


FIG. 4

Step 8. Draw the **other back wheel**. Start the rectangle with a click at coordinate **(.6, -.2), Fig. 4**. Move the cursor to stretch the rectangle to **(3.4, -1.2)**, **Fig. 4** and click.

Fit on Screen ALT-A	Delete CTRL-Q	Redraw CTRL-R	Half Size ALT-H

G. DRAW BALL GUIDE.

Step 1. **Set the Snap to .1**. Use **CTRL-G**. Hold down CTRL and press G. Change the **Snap Properties Increment** to **X = .1** and **Y = .1** Click OK, **Fig. 5**.

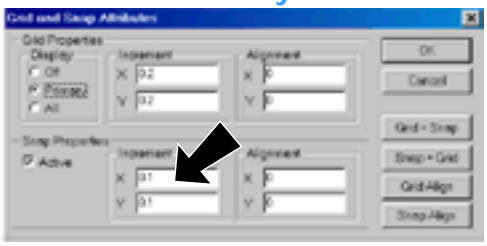


FIG. 5

Step 2. Use **ALT-W** to zoom in on the front of the Side View.. Hold down ALT and press W. Move the cursor to the top middle of the Side View., **Fig. 6**. Click to start the window. Stretch the window by moving the mouse to surround the front of the Side View. Click to set the window.

Step 3. Draw the ball guide block peach. Change the color to **peach**. Click the color swatch in the side Tool Bar. Click peach, number 12.

Step 4. ESC to Main Menu.

Step 5. F1 CREATE.

Step 6. F3 CIRCLE.

Step 7. F2 CENTER/DIAMETER.

Step 8. Key in **.6 for diameter** and press ENTER.

Step 9. Draw the wheel in the Side View. Move cursor to coordinates **(6.7, -3.9)** and click for the center of the back wheel, **Fig. 7**.

Step 10. Save the drawing. Use **CTRL-S**.

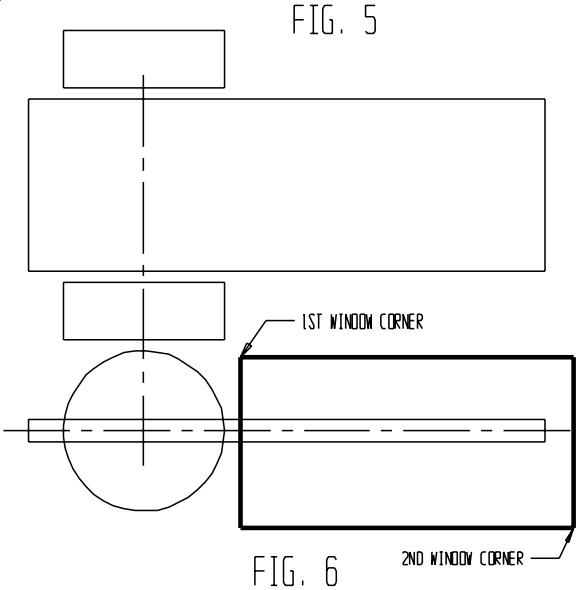


FIG. 6

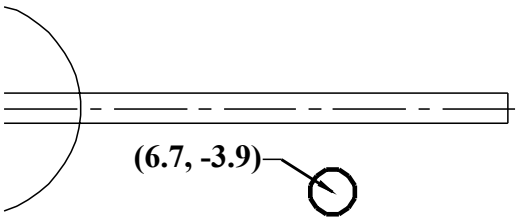


FIG. 7

H. DRAW BALL GUIDE BLOCK.

Step 1. ESC to Main Menu.

Step 2. F1 CREATE.

Step 3. F1 LINE.

Step 4. F7 RECTANGLE.

Step 5. F1 CORNERS.

Step 6. Draw the ball guide block in the Side View, **Fig. 8**. Start the rectangle with a click at coordinate **(6, -3)**. Move the cursor to stretch the rectangle to **(7.4, -3.7)** and click.

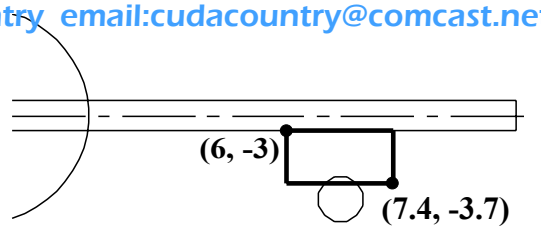


FIG. 8

Step 7. Save the drawing. Use **CTRL-S**.

I. DRAW BALL GUIDE CASE.

Step 1. Draw the caster dark blue. Change the color to **gray**. Click the color swatch in the side Tool Bar. Click dark blue, number 14.

Step 2. ESC to Main Menu.

Step 3. F1 CREATE.

Step 4. F1 LINE.

Step 5. F7 RECTANGLE.

Step 6. F1 CORNERS.

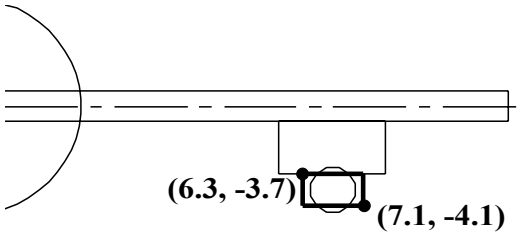


FIG. 9

Step 7. Draw the ball guide block in the Side View, **Fig. 9**. Start the rectangle with a click at coordinate **(6.3, -3.7)**. Move the cursor to stretch the rectangle to **(7.1, -4.1)** and click.

Step 8. Save the drawing. Use **CTRL-S** to save.

J. TRIM BALL GUIDE CIRCLE.

Step 1. ESC to Main Menu.

Step 2. F2 EDIT.

Step 3. F1 TRIM/EXTEND.

Step 4. F3 DOUBLE.

Step 5. Click the bottom of the ball guide circle Line 1, **Fig. 10**, as the line to keep, then click the intersections with the circle, Lines 2 and 3.

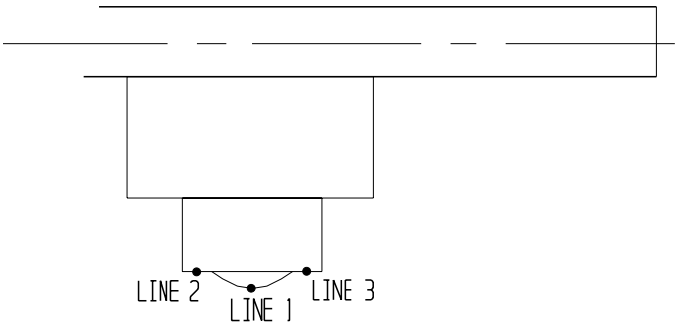


FIG. 10

K. DRAW AXLE IN SIDE VIEW.

Step 1. Use **ALT-A** to center the drawing on the screen. Hold down ALT and press A.

Step 2. Draw the axles **yellow**. Change the color to yellow. Click the color swatch in the side Tool Bar. Click yellow, number 4.

Step 3. ESC to Main Menu.

Step 4. F1 CREATE.

Step 5. F3 CIRCLE.

Step 6. F2 CENTER/DIAMETER.

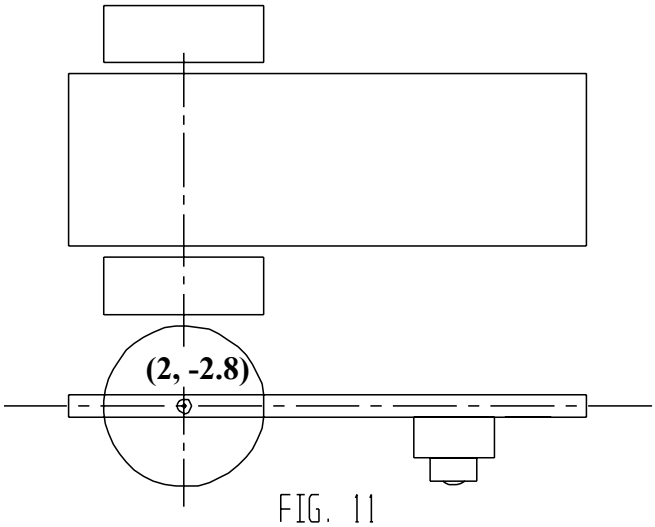


FIG. 11

Step 7. Key in **.25** for diameter and press ENTER.

Step 8. Draw axle in the Side View, **Fig. 11**. Move cursor to coordinates **(2, -2.8)** and click for the center of the back axle.

Step 9. Save the drawing. Use **CTRL-S**.

L. AXLE IN TOP VIEW.

Step 1. ESC to Main Menu.

Step 2. F1 CREATE.

Step 3. F1 LINE.

Step 4. F7 RECTANGLE.

Step 5. F1 CORNERS.

Step 6. Draw the axle for the back wheel in the Top View, **Fig. 12**. Start the rectangle with a click at coordinate **(1.9, 4.3)**. Move the cursor to stretch the rectangle to **(2.1, -1.3)** and click.

Step 7. Save the drawing. Use **CTRL-S**.

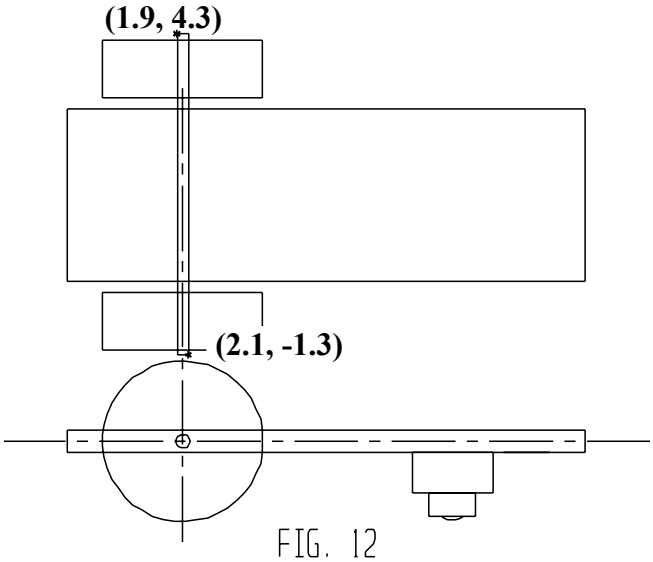


FIG. 12

M. DRAW MOTOR IN SIDE VIEW.

Step 1. Draw the motor **purple**. Change the color to purple. Click the color swatch in the side Tool Bar. Click purple, number 6.

Step 2. ESC to Main Menu.

Step 3. F1 CREATE.

Step 4. F3 CIRCLE.

Step 5. F2 CENTER/DIAMETER.

Step 6. Key in **1** for diameter and press ENTER.

Step 7. Draw the motor in the Side View, **Fig. 13**. Move cursor to coordinates **(4.1, -2.1)** and click for the center of the motor.

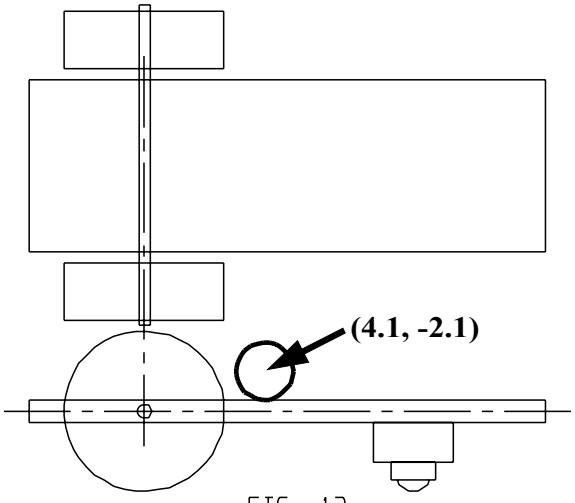


FIG. 13

N. DRAW MOTORS IN TOP VIEW.

Step 1. ESC to Main Menu.

Step 2. F1 CREATE.

Step 3. F1 LINE.

Step 4. F7 RECTANGLE.

Step 5. F1 CORNERS.

Step 6. Draw the motors in the Top View, **Fig. 14**. Start the rectangle with a click at coordinates **(3.6, 3.1)** and move the cursor to stretch the rectangle to coordinates **(4.6, 2.1)** and click.

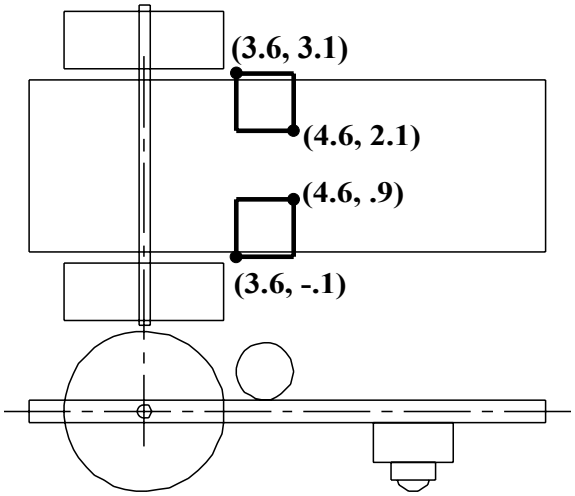


FIG. 14

Step 7. Draw the second motor, **Fig. 14**. Start the rectangle with a click at coordinates **(3.6, -.1)** and move the cursor to stretch the rectangle to coordinates **(4.6, .9)** and click.

Step 8. Save the drawing. Use **CTRL-S**.

O. DRAW MOTOR SHAFT IN SIDE VIEW.

Step 1. Draw the motor shafts **gray**. Change the color to gray. Click the color swatch in the side Tool Bar. Click gray, number 14.

Step 2. ESC to Main Menu.

Step 3. F1 CREATE.

Step 4. F3 CIRCLE.

Step 5. F2 CENTER/DIAMETER.

Step 6. Key in **.1** for diameter and press ENTER.

Step 7. Draw the motor shaft in the Side View, **Fig. 15**. Move cursor to coordinates **(4.8, -2.1)** and click for the center of the motor.

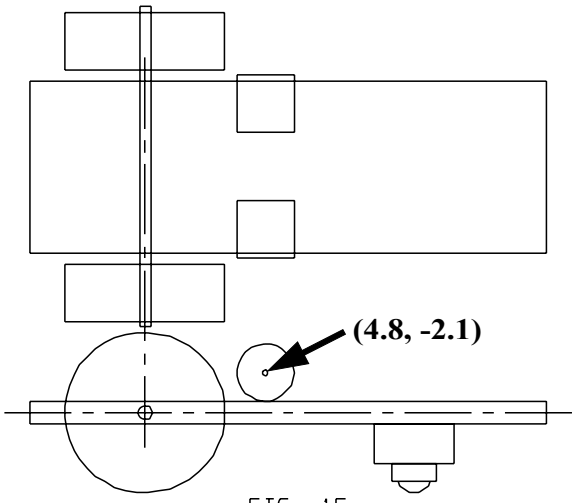


FIG. 15

P. DRAW MOTOR SHAFT IN SIDE VIEW.

Step 1. ESC to Main Menu.

Step 2. F1 CREATE.

Step 3. F1 LINE.

Step 4. F7 RECTANGLE.

Step 5. F1 CORNERS.

Step 6. Draw the motor shaft in the Top View, **Fig. 16**. Start the rectangle with a click at coordinates **(4, 3.1)** and move the cursor to stretch the rectangle to coordinates **(4.2, 3.7)** and click.

Step 7. Draw the second motor shaft, **Fig. 16**. Start the rectangle with a click at coordinates **(4, -.1)** and move the cursor to stretch the rectangle to coordinates **(4.2, -.7)** and click.

Step 8. Save the drawing. Use **CTRL-S**.

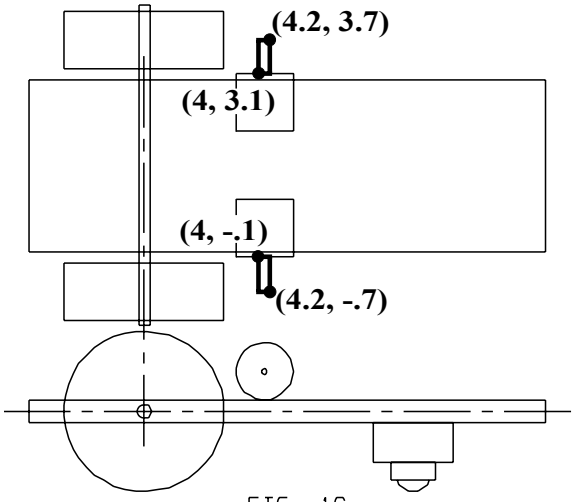


FIG. 16

Q. DRAW RUBBER BAND BELTS IN SIDE VIEW.

Step 1. Draw the belts **peach**. Change the color to peach. Click the color swatch in the side Tool Bar. Click peach, number 12.

Step 2. ESC to Main Menu.

Step 3. F1 CREATE.

Step 4. F1 LINE.

Step 5. F4 TANGENT/PERPENDICULAR.

Step 6. F3 TANGENT/TANGENT.

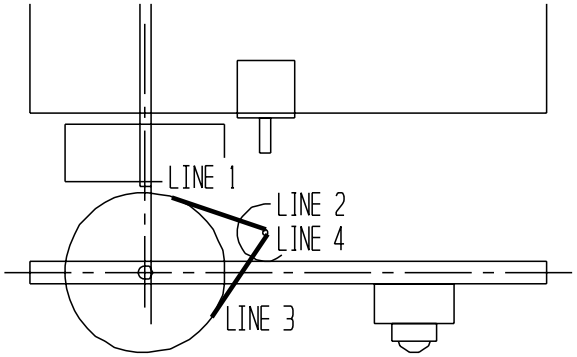


FIG. 17

Step 7. Draw the rubber band belts in the Side View, **Fig. 17**. Start the line with a click on the top of the wheel, Line 1, **Fig. 14**, then click the top of the motor shaft Line 2.

Step 8. F10 BACKUP.

Step 9. Draw the second rubber band belts in the Side View, **Fig. 17**. Start the line with a click on the **bottom** of the wheel, Line 3, **Fig. 14**, then click the **bottom** of the motor shaft Line 4.

R. DRAW RUBBER BAND BELTS IN TOP VIEW.

Step 1. ESC to Main Menu.

Step 2. F1 CREATE.

Step 3. F1 LINE.

Step 4. F7 RECTANGLE.

Step 5. F1 CORNERS.

Step 6. Draw the belts in the Top View, **Fig. 18**. Start the rectangle with a click at coordinates **(.6, 3.4)** and move the cursor to stretch the rectangle to coordinates **(4.2, 3.6)** and click.

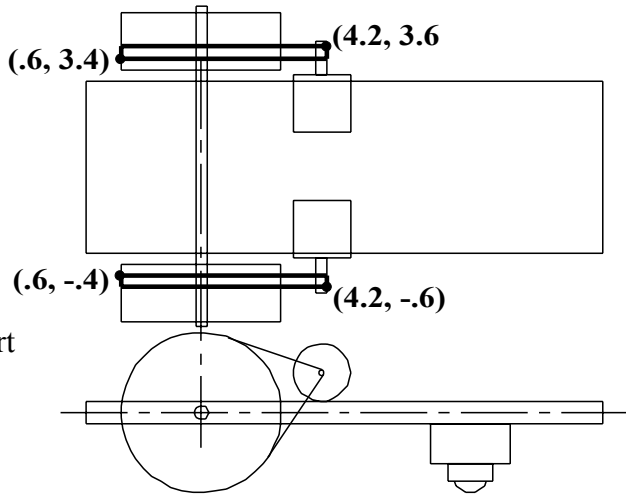


FIG. 18

Step 7. Draw the second belt, **Fig. 18**. Start the rectangle with a click at coordinates **(.6, -.4)** and move the cursor to stretch the rectangle to coordinates **(4.2, -.6)** and click.

S. ADD YOUR NAME and PERIOD TO DRAWING.

Step 1. Use: **Detail, Note, Key-In** commands to add text. Save the drawing. Use **CTRL-S**.

Fit on Screen ALT-A	Delete CTRL-Q	Redraw CTRL-R	Half Size ALT-H