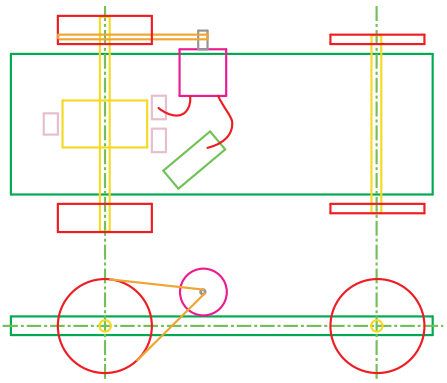
E Car



A. Create Rectangle For Views.

Step 1. If necessary start a new Mastercam file, click New  on the Quick Access Toolbar QAT (**Ctrl-N**).

Step 2. On the Wireframe tab WIREFRAME click **Rectangle** 

Step 3. In the Rectangle function panel:

under Dimensions, **Fig. 1**

Lock  **both Width and Height**

Width 9

Height 3 and press ENTER

Press **O key** on keyboard to select AutoCursor Origin override

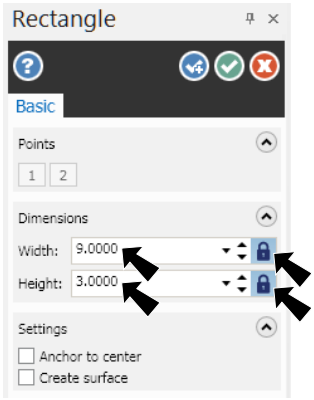
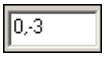


Fig. 1

under Dimensions, **Fig. 2**

Height .4 and press ENTER

Press **spacebar** to activate Fast Point 

Key-in **0, -3** 

and press ENTER **twice**

Click OK  .

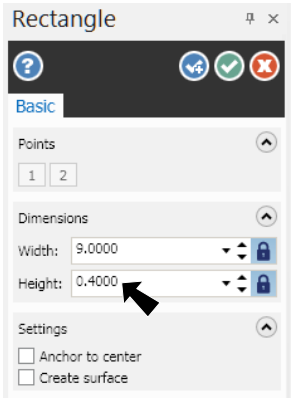


Fig. 2

Step 4. **Right click** the graphics window and click Fit  (**Alt-F1**).

B. Save As "E CAR"

Step 1. Click **Save As**  (**Ctrl-Shift-S**) on the Quick Access Toolbar QAT.

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

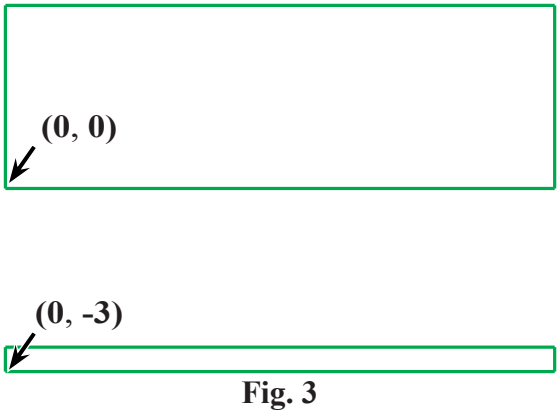


Fig. 3

http://www.cudacountry.net email:cudacountry@hotmail.com

C. Set Attributes-Green/Center Line.

Step 1. Change **line style to center**. **Right click** in the graphics window and on the Mini Toolbar click **Line Style** drop down arrow and select **center line**, **Fig. 4**.

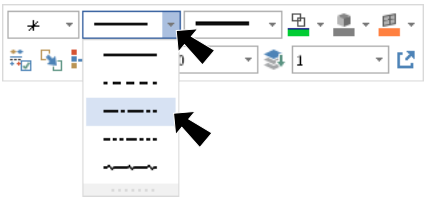
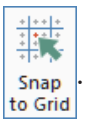


Fig. 4

D. Set Grid and Snap .2.

Step 1. On the View tab VIEW click **Show Grid** 

and **Snap to Grid** 

.

Step 2. Click the **Dialog Box Launcher** (Alt-G), **Fig. 5**.

Step 3. In the Grid Settings dialog box:
under Spacing, **Fig. 6**
X and Y Spacing .2
Click OK 
.

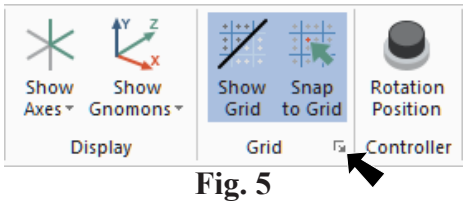


Fig. 5

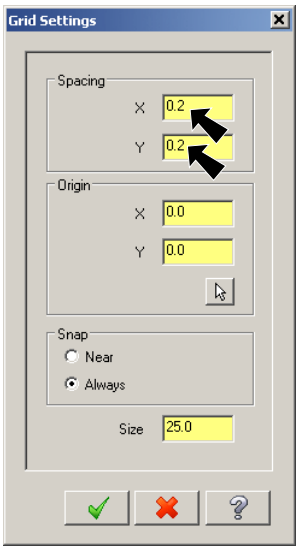
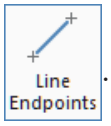


Fig. 6

E. Create Center Lines.

Step 1. On the Wireframe tab WIREFRAME click **Line Endpoints** 

.

Step 2. In the Line Endpoints function panel:
under Entity, **Fig 7**
select **Horizontal**
Sketch a horizontal line 1 grid outside of left side of Side View rectangle to outside other side of rectangle 1 grid, **Fig. 8**
Click **OK and Create New Operation** .

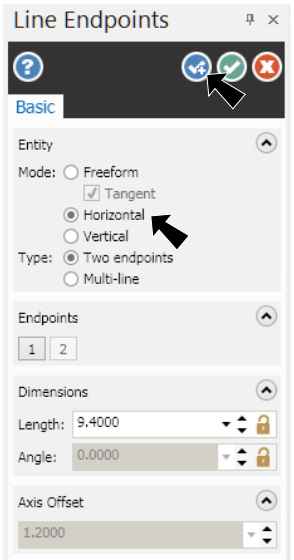


Fig. 7

Fig. 8

Step 3. In the Line Endpoints function panel:
under Entity, **Fig 9**
select **Vertical**
Sketch a vertical line from (**2**, **4**) down to (**2**, **-4.4**), **Fig. 10**.
Use the tracking in Status Bar to determine coordinates.
Click **OK and Create New Operation** .

Sketch a second vertical line from (**7.8**, **4**) to (**7.8**, **-4.4**), **Fig. 10**.
Click OK .

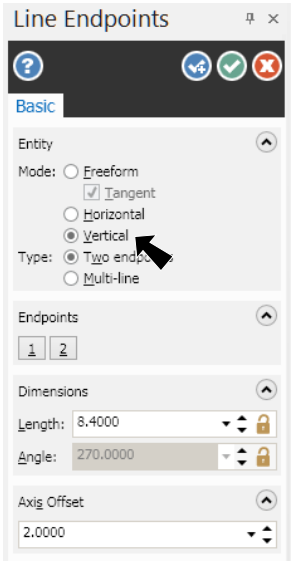


Fig. 9

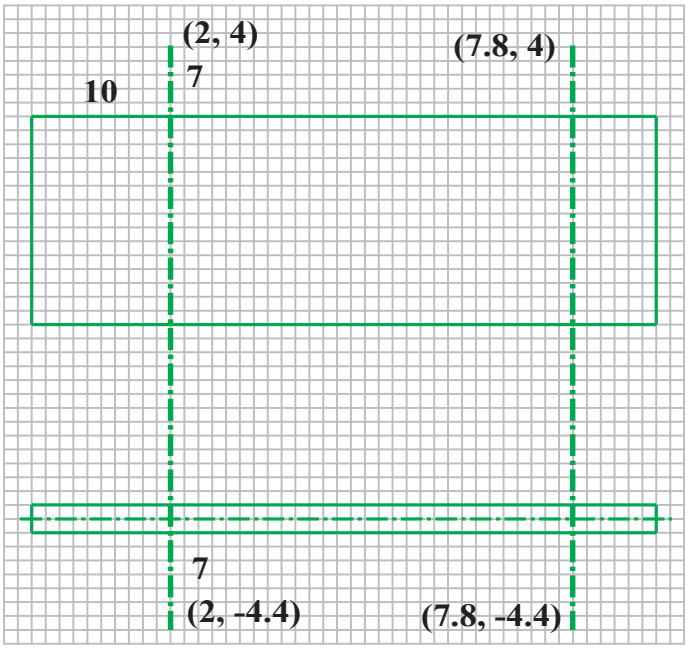


Fig. 10

F. Set Attributes-Red/Solid Line.

Step 1. Sketch **wheel red** and change **line style back to solid**. **Right click** in the graphics window and on the Mini Toolbar click **Line Style** drop down arrow and select **solid style** and click **Wireframe Color** drop down arrow and select **red**, **Fig. 11**.

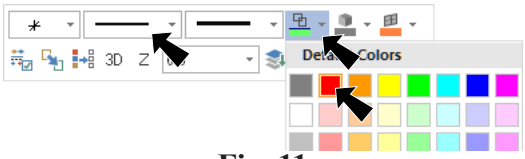
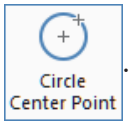


Fig. 11

G. Wheels In Side View.

Step 1. On the Wireframe tab WIREFRAME click **Circle Center Point** 

.

Step 2. In the Circle Center Point function panel:
under Size, **Fig. 12**
Click **Locked**
Diameter **2** and press ENTER
Click the intersection of rear wheel centerlines **(2, -2.8)** and front wheel centerlines **(7.8, -2.8)**, **Fig. 13**.
Click OK .

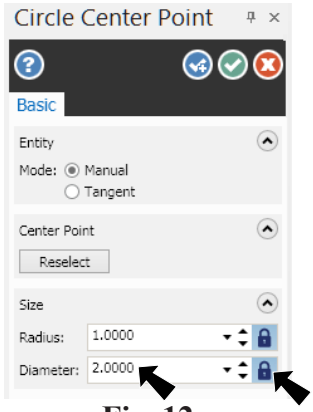


Fig. 12

Step 3. Save (**Ctrl-S**).

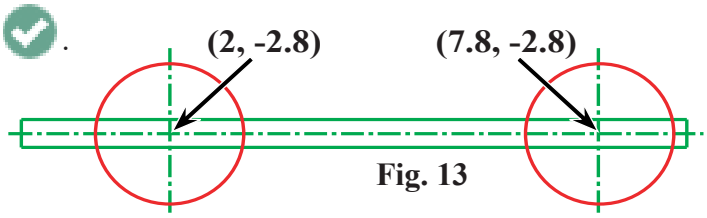


Fig. 13

H. Wheels In Top View.

Step 1. On the Wireframe tab WIREFRAME click **Rectangle** 

.

Step 2. In the Rectangle function panel:
If necessary, **unlock**
Sketch four rectangles for wheels, **Fig. 14**
Use the tracking in Status Bar to determine coordinates
Press ENTER after each rectangle or **OK and Create New Operation**
Click OK when done.

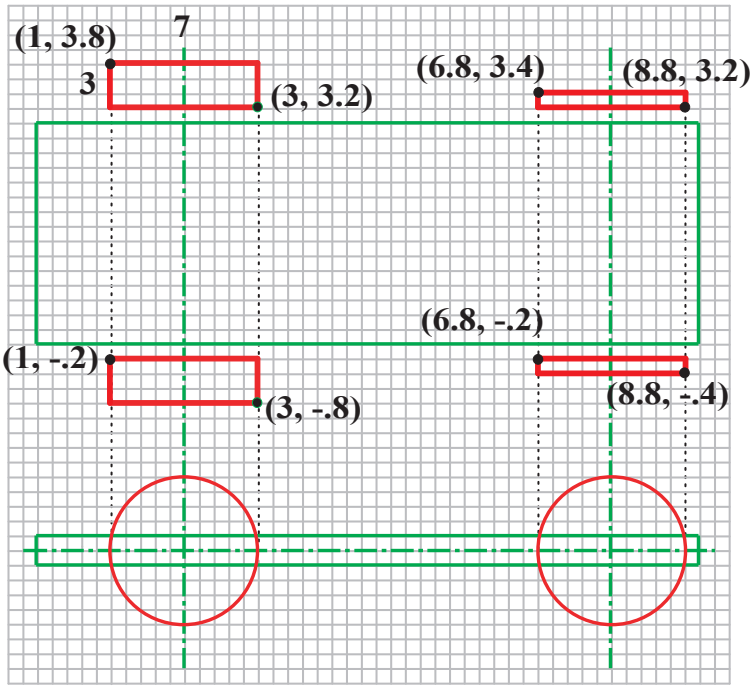


Fig. 14

I. Axles In Side View.

Step 1. Sketch axles **yellow**. **Right click** in the graphics window and on the Mini Toolbar click **Wire-frame Color** drop down arrow and select **yellow**, **Fig. 15**.

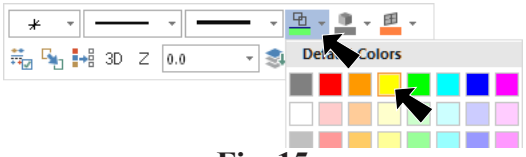


Fig. 15

Step 2. On the Wireframe tab WIREFRAME click **Circle Center Point** Circle Center Point.

Step 3. In the Circle Center Point function panel:
under Size, **Fig. 16**
Click **Locked**
Diameter .25 and press ENTER
Click the intersection of rear wheel centerlines **(2, -2.8)** and front wheel centerlines **(7.8, -2.8)**, **Fig. 17**.
Click OK.

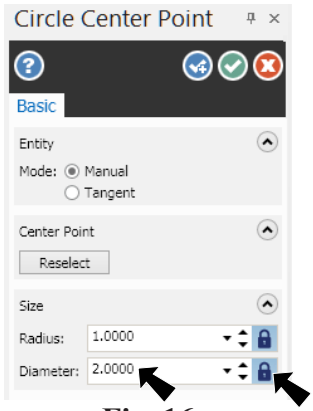


Fig. 16

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

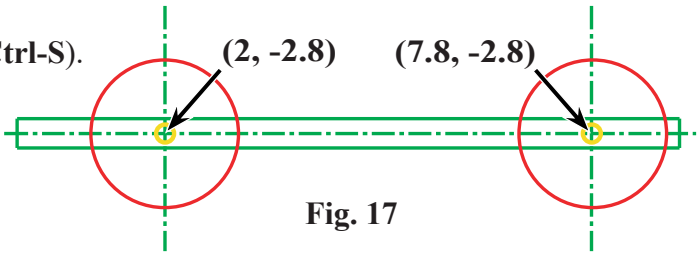


Fig. 17

J. Set Grid and Snap .1.

Step 1. Use **Alt-G** to display Grid dialog box, **Fig. 18**
Set **X and Y Spacing .1**
Click OK.

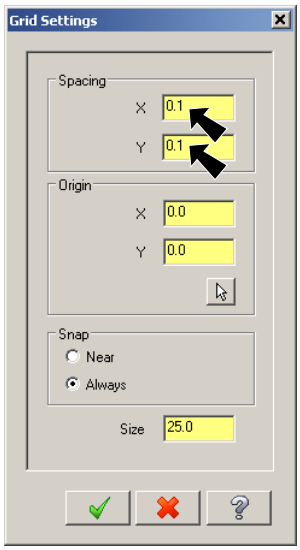


Fig. 18

K. Axles In Top View.

Step 1. On the Wireframe tab WIREFRAME click **Rectangle** Rectangle.

Step 2. In the Rectangle function panel:
Sketch a rectangle for both axles in Top View, **Fig. 19**. The axles should be 2 grids wide.
Click OK when done.

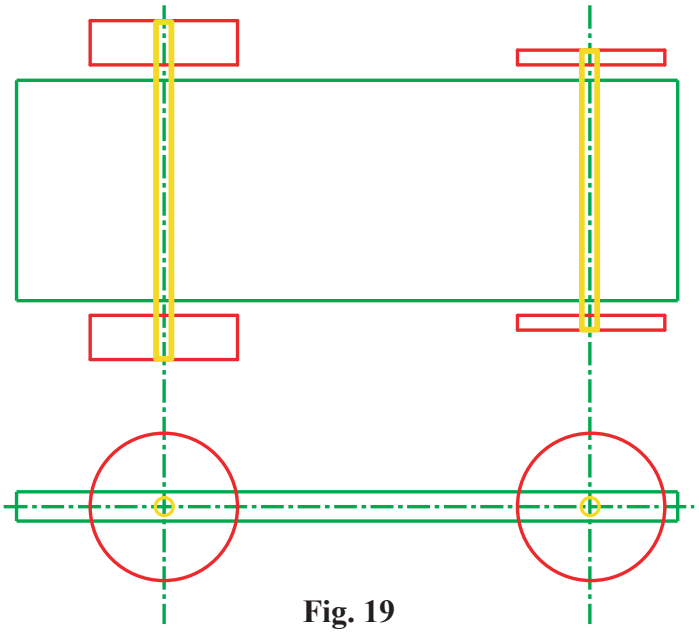


Fig. 19

L. Motor In Side View.

Step 1. Zoom-in around area just in front of rear wheel in Side View. Use **F1** and make a zoom window, **Fig. 20**.

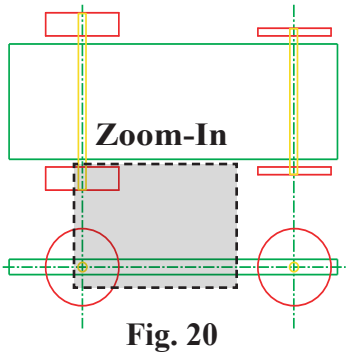


Fig. 20

Step 2. Sketch **motors magenta**. **Right click** in the graphics window and on the Mini Toolbar click **Wireframe Color** drop down arrow and select **magenta**, **Fig. 21**.

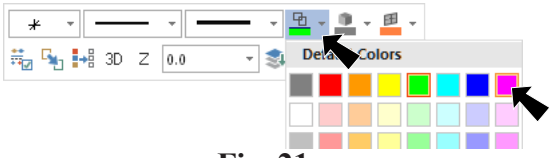


Fig. 21

Step 3. On the Wireframe tab WIREFRAME click **Circle Center Point** Circle Center Point.

Step 4. In the Circle Center Point function panel:
under Size, **Fig. 22**
Diameter 1 and press ENTER
Click **(4.1, -2.1)** , **Fig. 23**

Or press **spacebar** to activate Fast Point and key-in **4.1, -2.1** 4.1,-2.1 and press ENTER **twice**

Click OK .

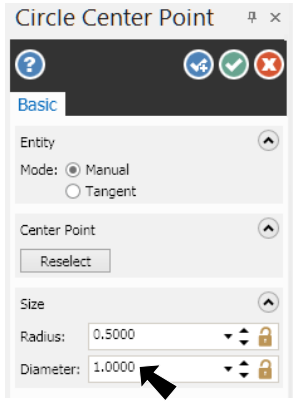


Fig. 22

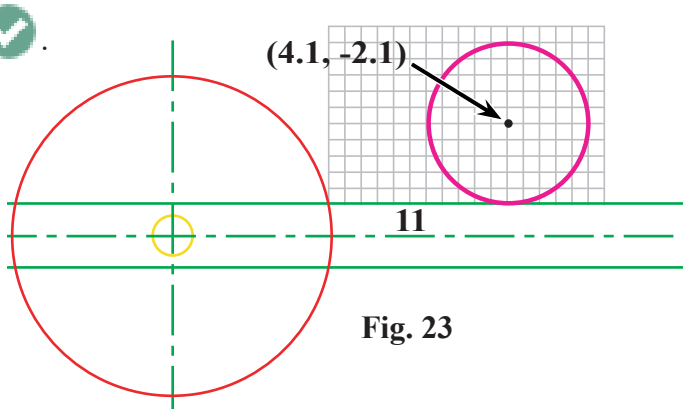


Fig. 23

M. Motor In Top View.

Step 1. **Fit**  **(Alt-F1)**.

Step 2. On the Wireframe tab WIREFRAME click **Rectangle** 

.

Step 3. In the Rectangle function panel:
Sketch a rectangle for motor, **Fig. 24**
Click OK  .

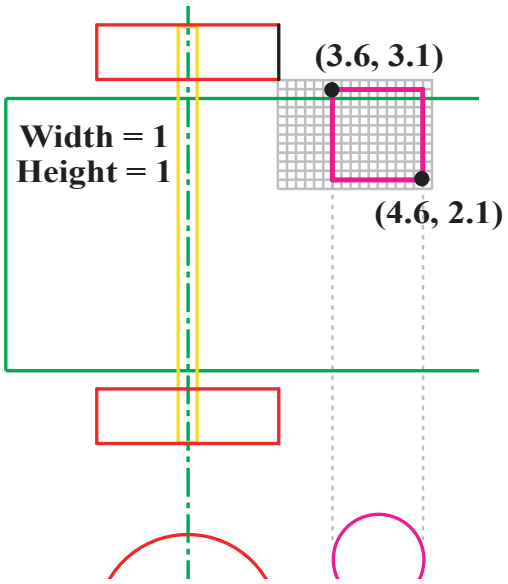


Fig. 24

N. Motor Shaft In Side View.

Step 1. Sketch motor shaft **light gray**. **Right click** in the graphics window and on the Mini Toolbar click **Wireframe Color**  drop down arrow and select **light gray**, **Fig. 25**.

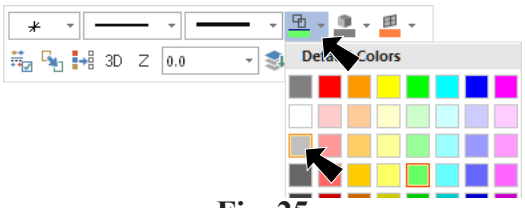
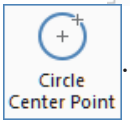


Fig. 25

Step 2. On the Wireframe tab WIREFRAME click **Circle Center Point** 

.

Step 3. In the Circle Center Point function panel:
under Size, **Fig. 26**
Diameter .1 and press ENTER
Press **C key** for AutoCursor **Arc Center** override and **click motor circle**, **Fig. 27**
Click OK  .

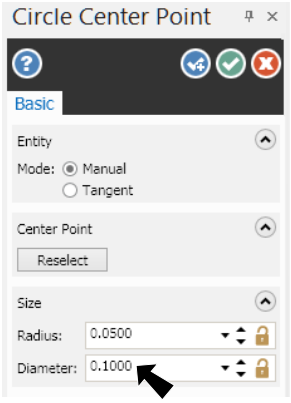


Fig. 26

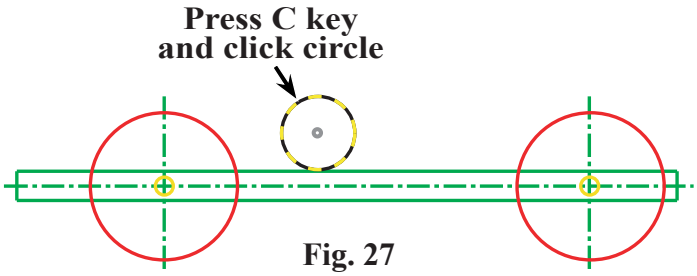


Fig. 27

O. Motor Shaft In Top View.

Step 1. Zoom-in around the motor in the Top View. Use **F1** and make a zoom window, **Fig. 28**.

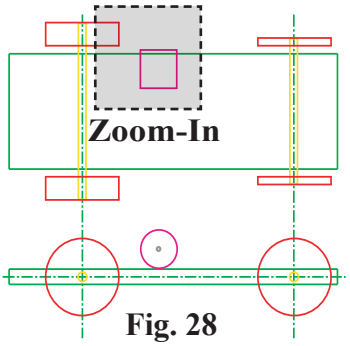


Fig. 28

Step 2. On the Wireframe tab WIREFRAME click **Rectangle** 

Step 3. In the Rectangle function panel:
Sketch a rectangle for motor shaft, **Fig. 29**.
Use the tracking in Status Bar to determine coordinates
Click OK .

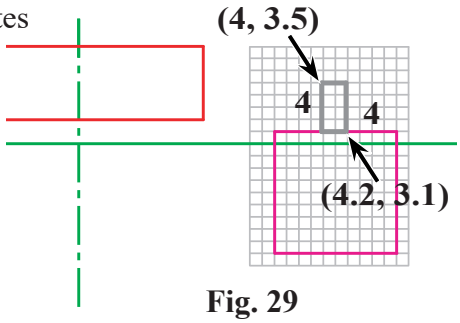
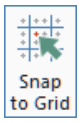


Fig. 29

P. Turn Off Snap.

Step 1. On the View tab VIEW click **Snap to Grid** 

to turn **off**.

Q. Rubber Band Belt In Side View.

Step 1. **Fit**  **(Alt-F1)**.

Step 2. Sketch rubber bands **tangerine**. **Right click** in the graphics window and on the Mini Toolbar click **Wireframe Color**  drop down arrow and select **magenta**, **Fig. 30**.

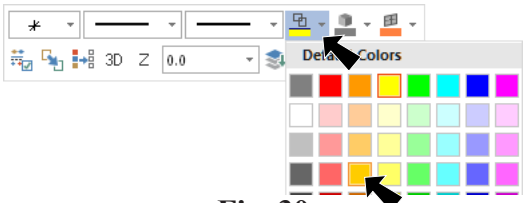


Fig. 30

Step 3. In the Line Endpoints function panel:
under Entity, **Fig 31**
select **Tangent**
Sketch rubber band belt line in Side View.
Click **top of motor shaft circle** and **top of wheel circle**, **Fig. 32**
Press ENTER to apply
Sketch another tangent line across bottoms of circles
Click OK .

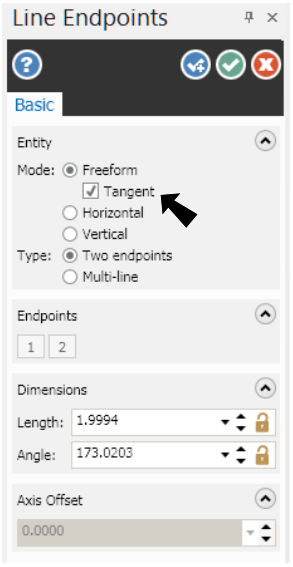


Fig. 31

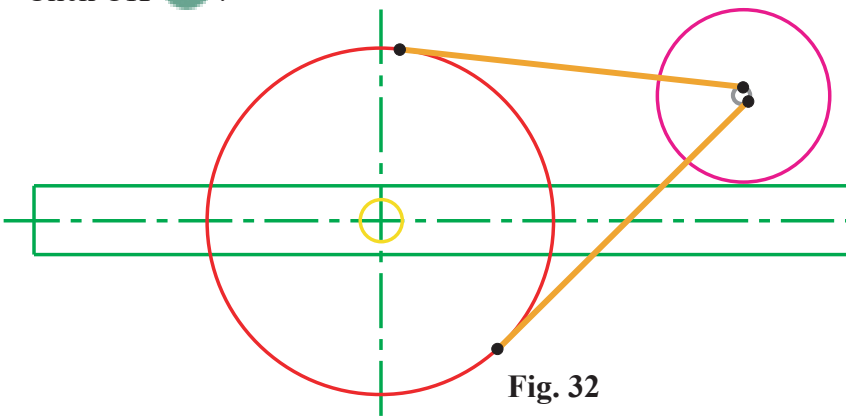
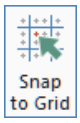


Fig. 32

R. Turn Snap On.

Step 1. On the View tab VIEW click **Snap to Grid** 

to turn **on**.

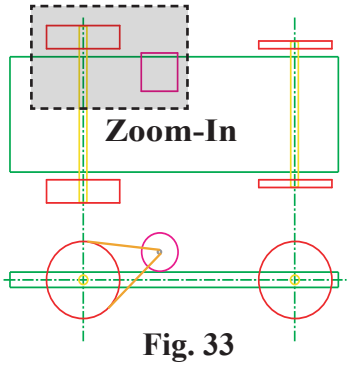


Fig. 33

S. Rubber Band Belt In Top View.

Step 1. Zoom-in around left wheel and motor in Top View. Use **F1**, **Fig. 33**.

Step 2. In the Rectangle function panel:
Sketch rectangle for rubber band, **Fig. 34**.
Use the tracking in Status Bar to determine coordinates.
Click OK .

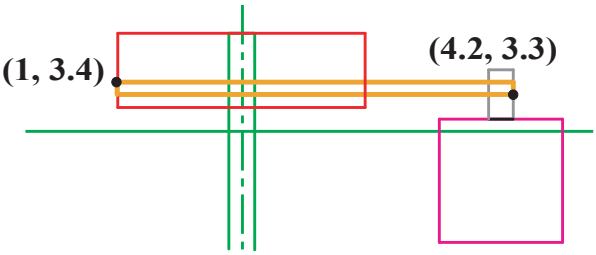


Fig. 34

T. Battery.

Step 1. Sketch battery **yellow**. **Right click** in the graphics window and on the Mini Toolbar click **Wireframe Color** drop down arrow and select **yellow**, **Fig. 35**.

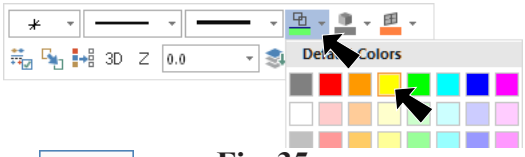
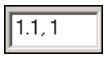


Fig. 35

Step 2. On the Wireframe tab WIREFRAME click **Rectangle** 

Step 3. In the Rectangle function panel:
under Dimensions, **Fig. 36**
Width 1.8
Height 3 and press ENTER

Press **spacebar** to activate Fast Point 

Key-in **1.1**, **1** 

and press ENTER **twice**

Click OK .

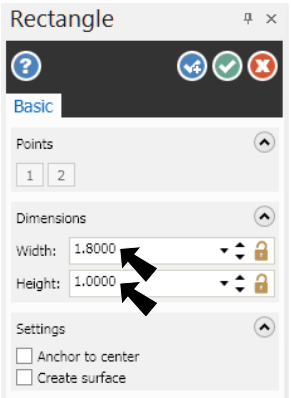


Fig. 36

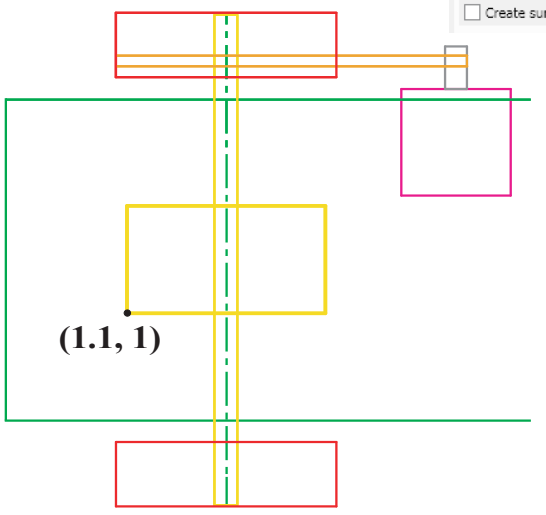


Fig. 37

U. L-Brackets.

Step 1. Sketch **L-Brackets light magenta**. **Right click** in the graphics window and on the Mini Toolbar click **Wireframe Color** drop down arrow and select **light magenta**, **Fig. 38**.

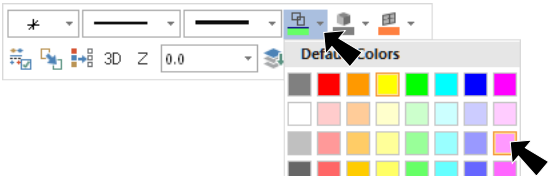


Fig. 38

Step 2. On the Wireframe tab WIREFRAME click **Rectangle** Rectangle.

Step 3. In the Rectangle function panel:
Sketch the **three rectangles** in **Fig. 39**.
Use grid to determine location of the rectangles.
Click **OK and Create New Operation**.

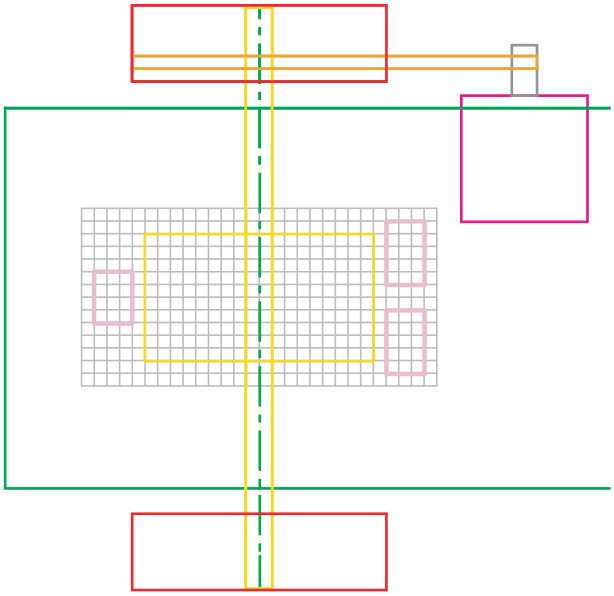


Fig. 39

Y. Switch.

Step 1. Sketch **switch light green**. **Right click** in the graphics window and on the Mini Toolbar click **Wireframe Color** drop down arrow and select **light green**, **Fig. 40**.

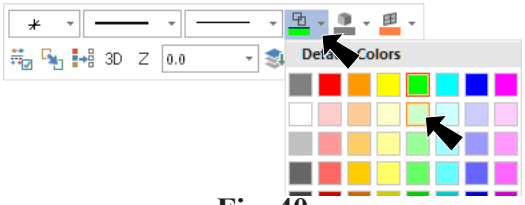


Fig. 40

Step 2. In the Rectangle function panel:
Sketch rectangle in **Fig. 41**.
Use grid to determine location of rectangle.
Click OK.

Step 3. Save (**Ctrl-S**).

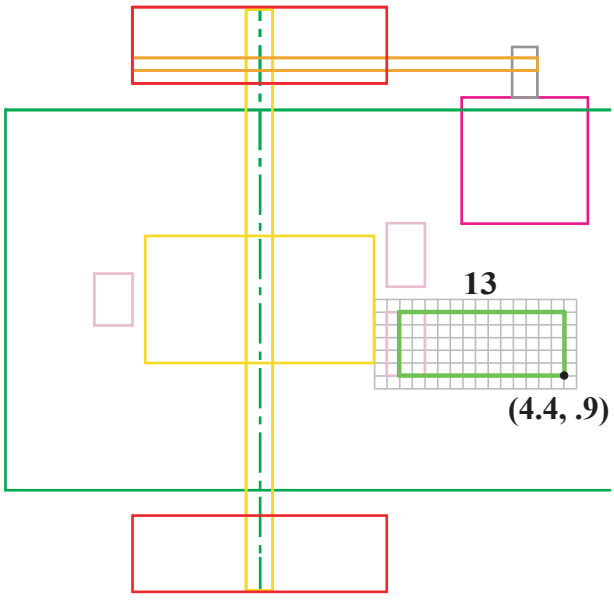


Fig. 41

W. Rotate Switch.

Step 1. On the Transform tab TRANSFORM click **Rotate** Rotate.

Step 2. **Shift click** a line of **switch rectangle** in the Side View to chain select rectangle and click **End Selection** End Selection **(ENTER)**.

Step 3. In the Rotate dialog box:

Select **Move** **Fig. 43**

Number of Steps # **1**

Rotation Angle **40**

Click **Define Center Point**

Press **spacebar** to activate Fast Point

Key-in **4.4, 1.15** 4.4,1.15 and press ENTER

Click OK .

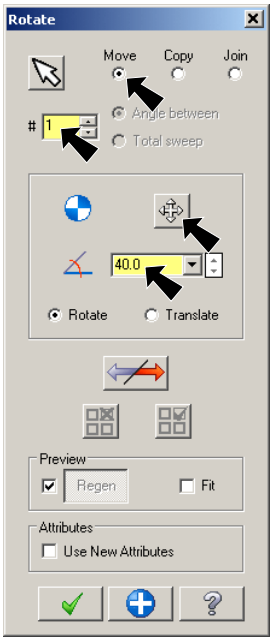


Fig. 43

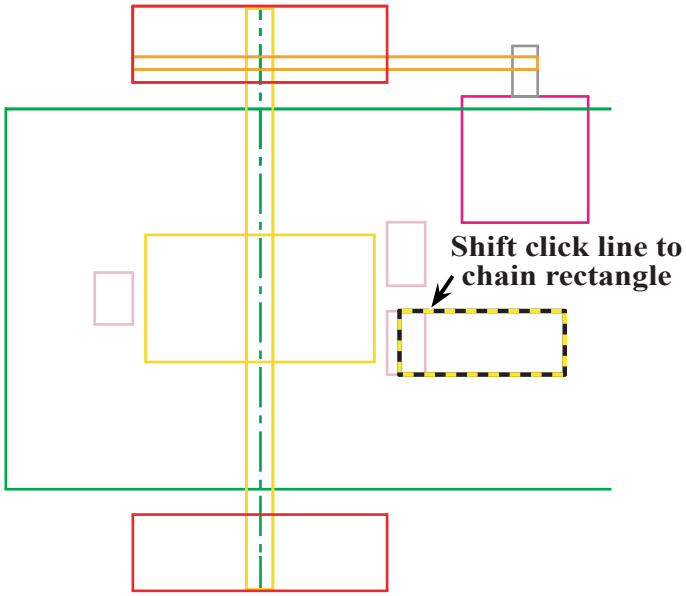


Fig. 42

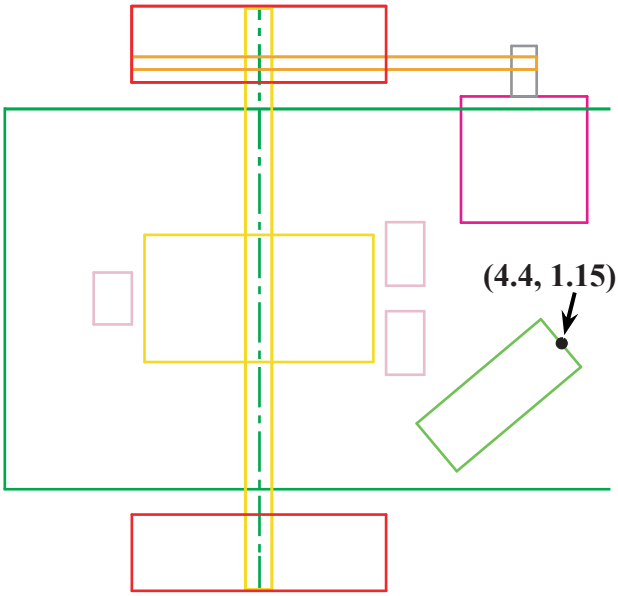


Fig. 44

X. Sketch Wires Using Spline.

Step 1. Sketch the wires **red**. **Right click** in the graphics window and on the Mini Toolbar click **Wireframe Color**  drop down arrow and select **red**, **Fig. 45**.

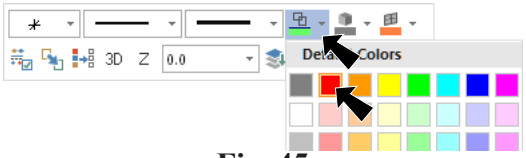
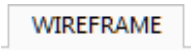
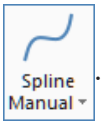


Fig. 45

Step 2. On the Wireframe tab 

click **Spline Manual** 

.

Step 3. In the Spline function panel:
Sketch the 2 splines for the wires, **Fig. 46**.
Use **three points** to Sketch each spline.
Press ENTER to end spline.
Click OK  .

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

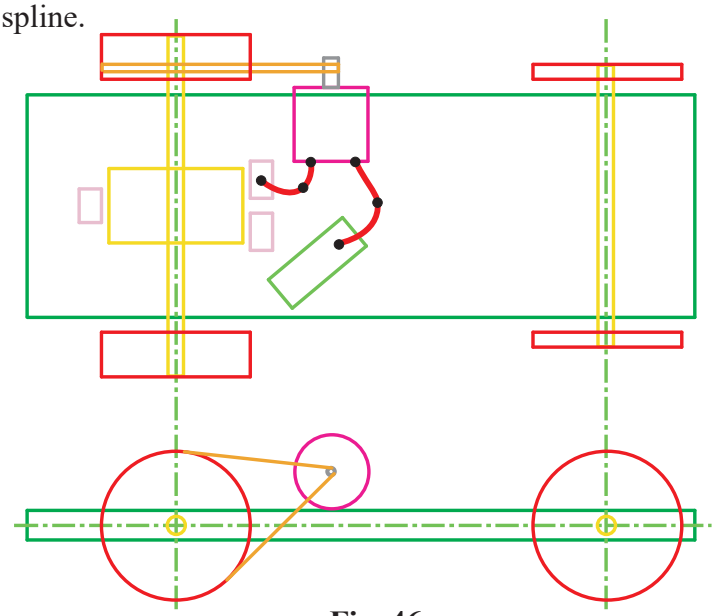


Fig. 46