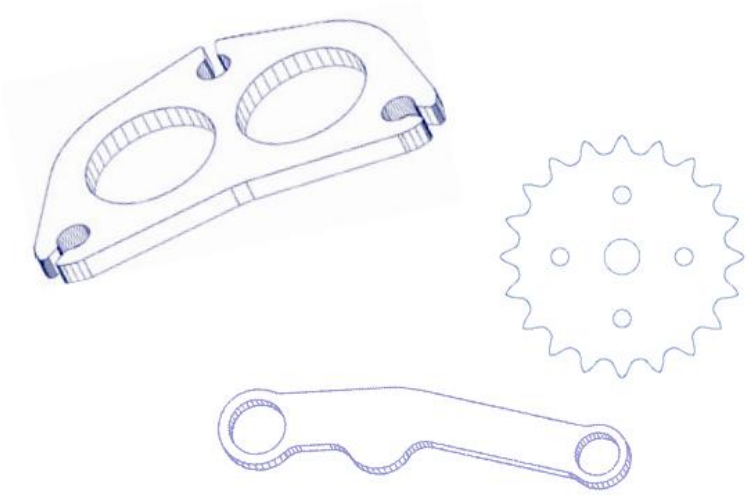
FastCAM®

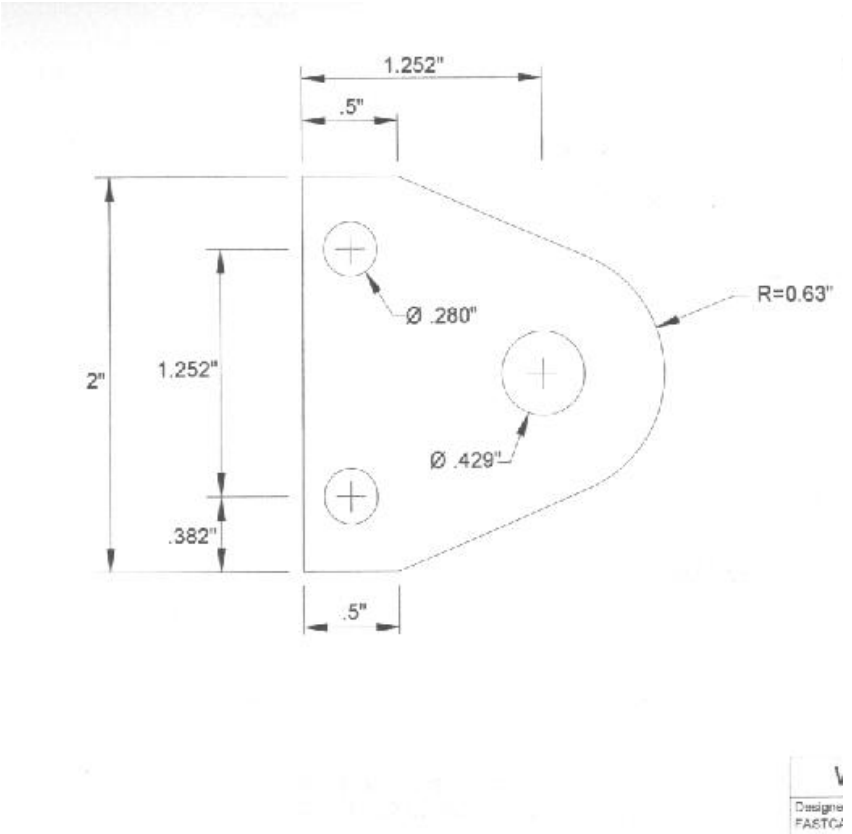
FastCAM Reference Manual Supplement

How to Draw A Part



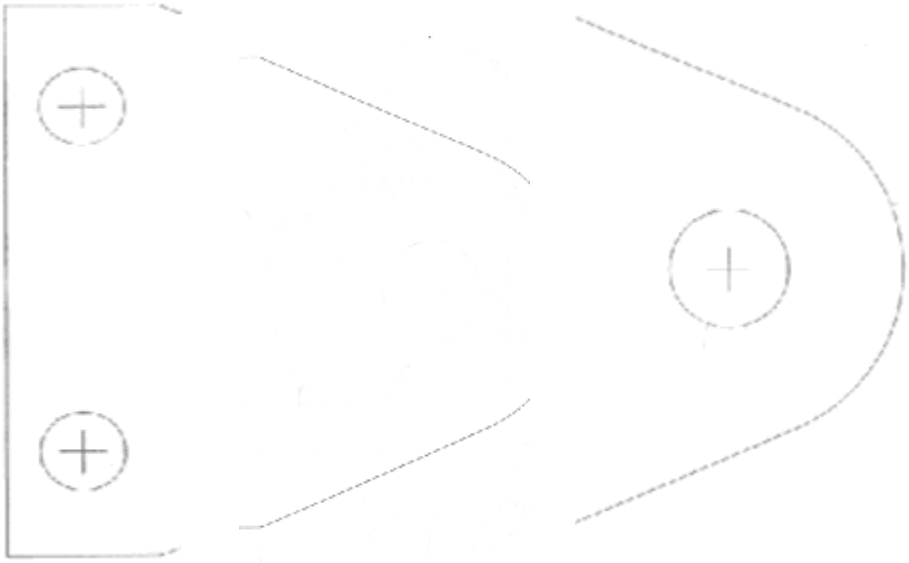
WIDGET

Here you will go through the process of drawing a part in FastCAM® based upon a scaled part drawing. For example you might receive a drawing from a customer like the one below:



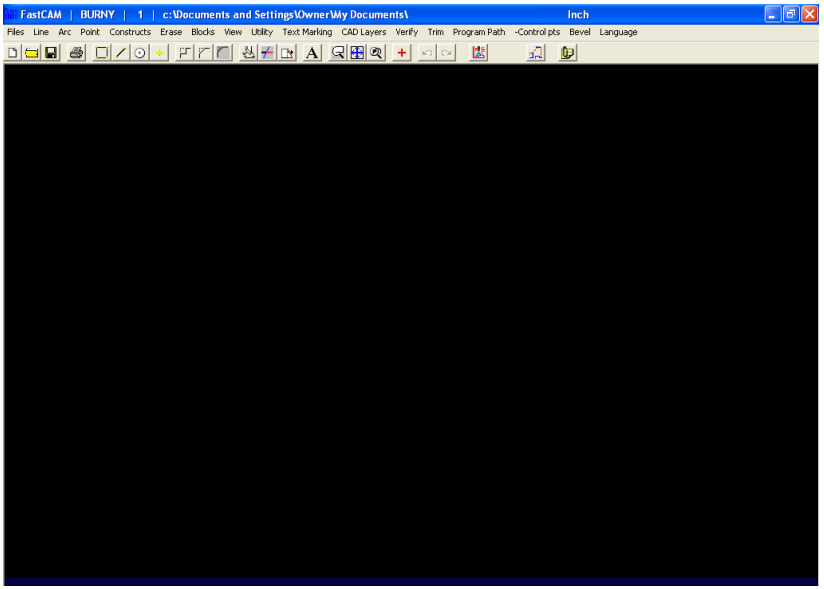
With any drawing you do in FastCAM®, the first step is to identify the individual shapes within your part. This may take some time at first, but with practice and experience, you will learn how to quickly evaluate and determine what entities are necessary to create a part.

In our WIDGET, it is important to notice there is a rectangle on the left side within the part. This rectangle also has two smaller internal circles. On the right side, you can see a 2-circle ring. The rectangle and ring appear to be blended together with two lines.

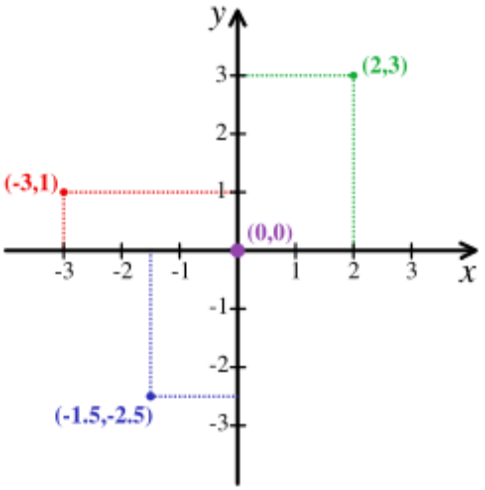


Rectangle *Connecting Tangent Lines* *Ring*

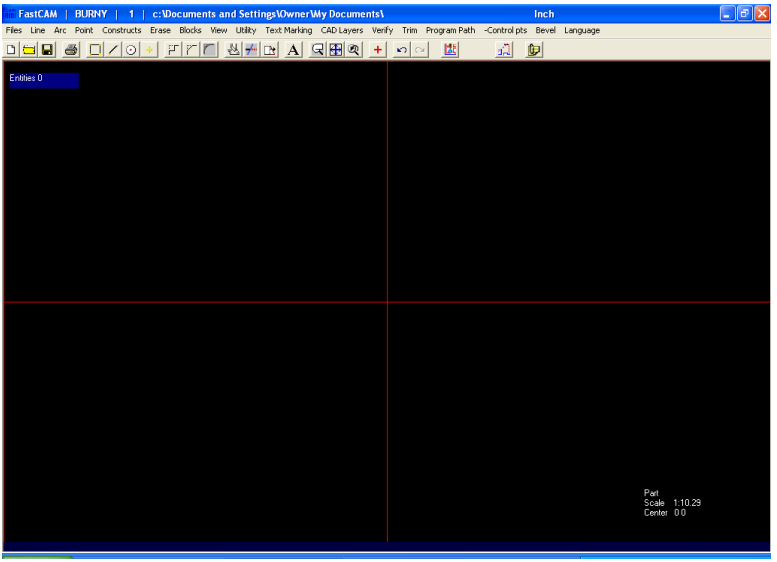
Once you have identified the different entities in the part, we start by running the FastCAM® drawing editor. Upon opening FastCAM®, you should see the screen below.



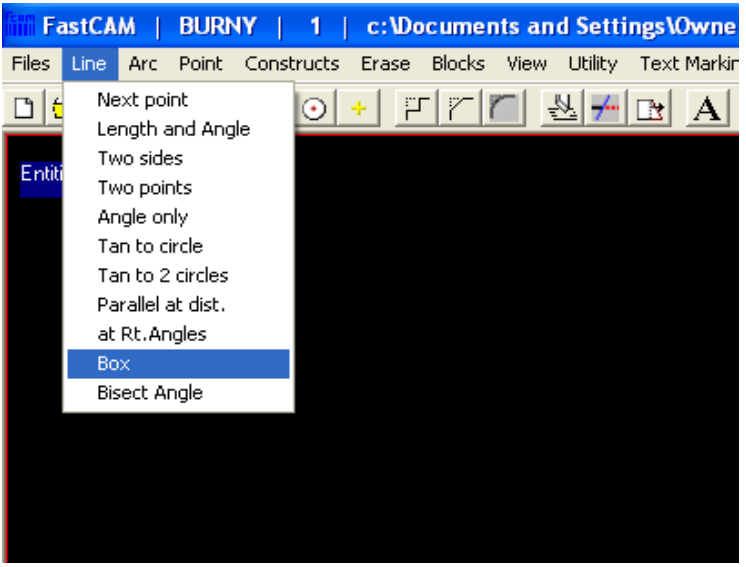
To create drawings to scale, it is easiest to use absolute coordinates. Absolute coordinates are based upon the Cartesian coordinate system as shown below.



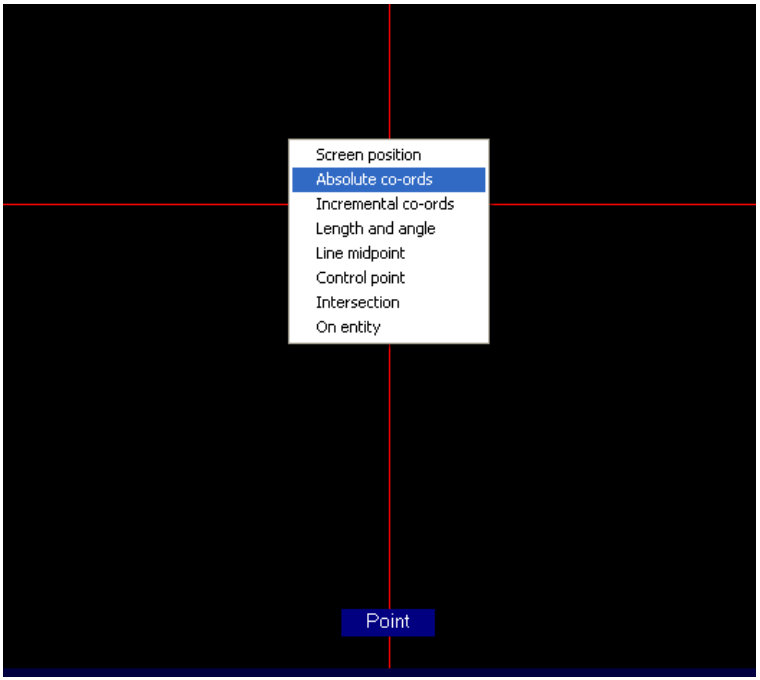
If you are unfamiliar with the Cartesian coordinate system, it is a good idea to review or practice using this principle. In FastCAM®, you can choose to display the x and y axis to assist you in drawing your parts. Click on the View menu and select Change Display. From here, check the box for Axes and then press ENTER.



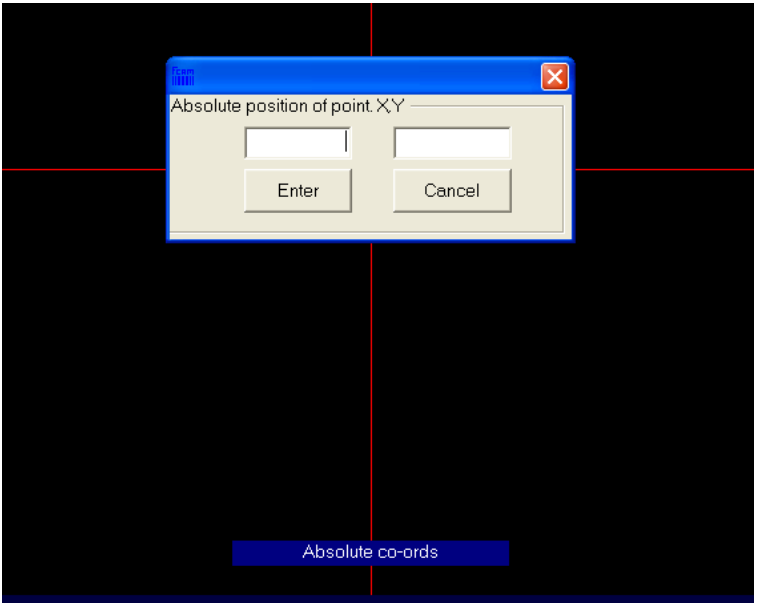
You can start by drawing, the rectangle. It is best to do this using the Box feature. From the Line menu select Box.

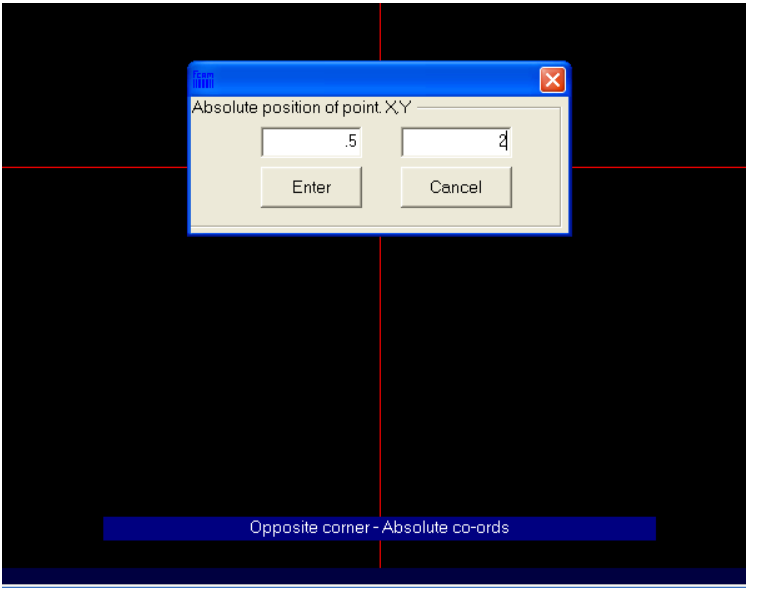


By default, FastCAM® is set to draw a box using screen positions. This function allows you to quickly draw rectangles by simply clicking on the screen but does not allow for parts to be drawn to scale. To draw your part to scale, you must switch to the absolute coordinates by right clicking once on your drawing space and selecting Absolute Coordinates.

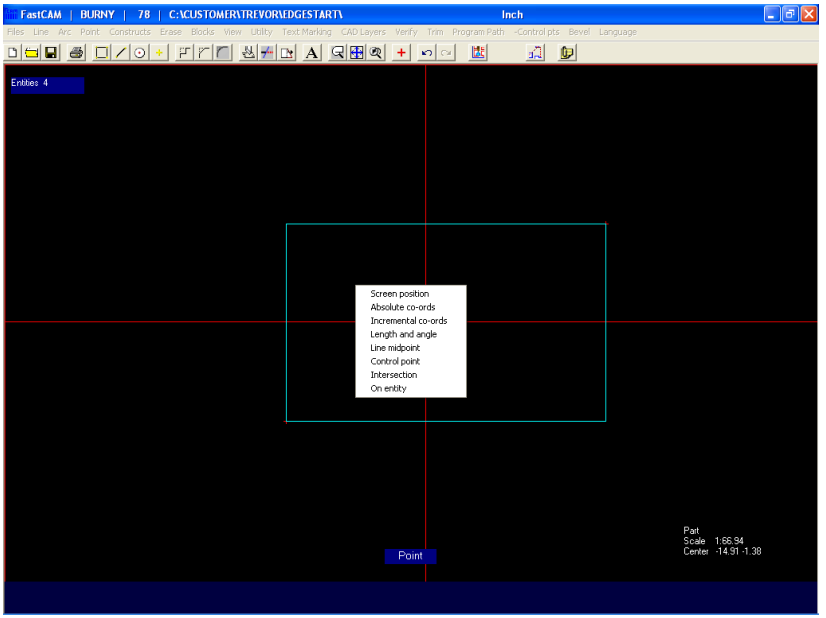


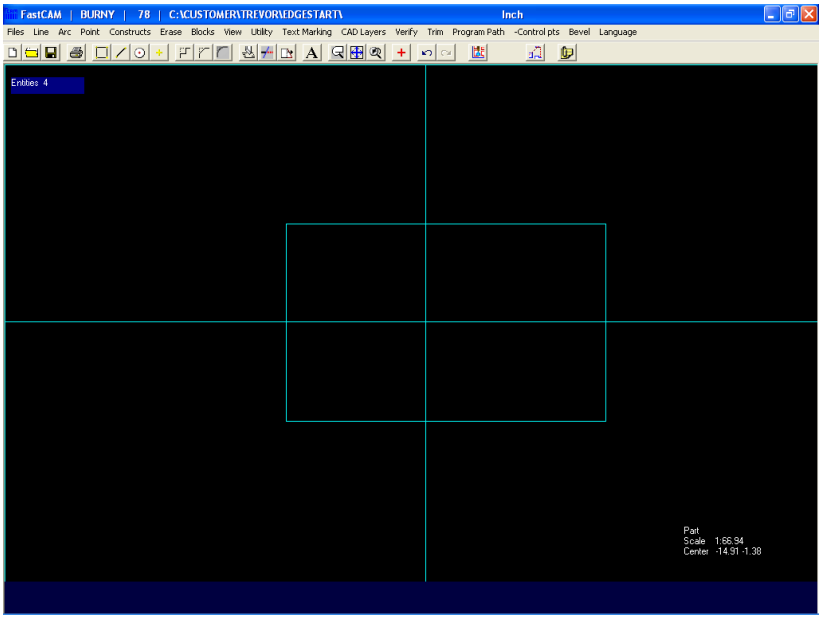
You can now enter the x,y coordinates for two opposite corners of you rectangle. Based upon your drawing, you can enter two diagonally opposite corners of your box. You can use a first point of (0,0), a second point of (0.5,2) and click 'Enter'.



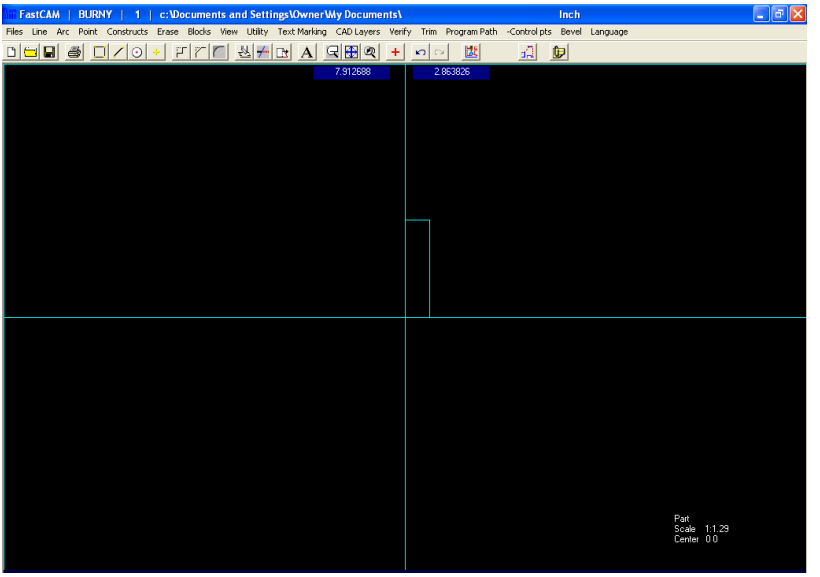


Many of the drawing functions in FastCAM® are repetitive. To get out of any command or popup window, you will need to right-click until the menu bar is back to active.

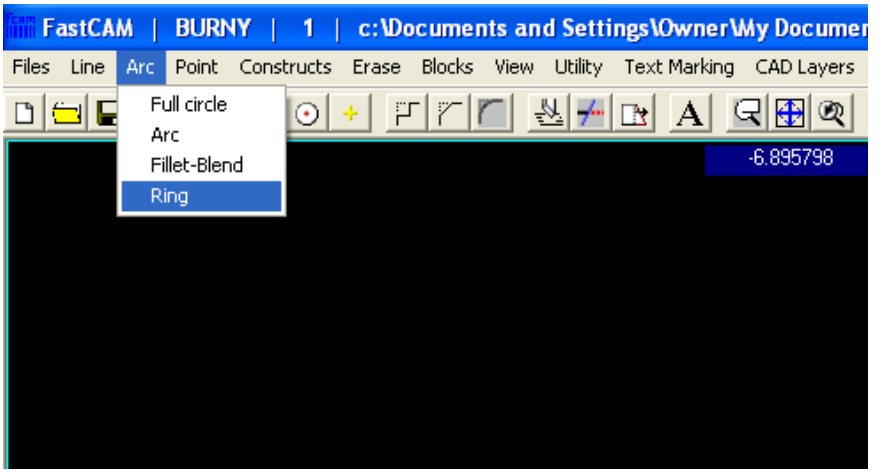




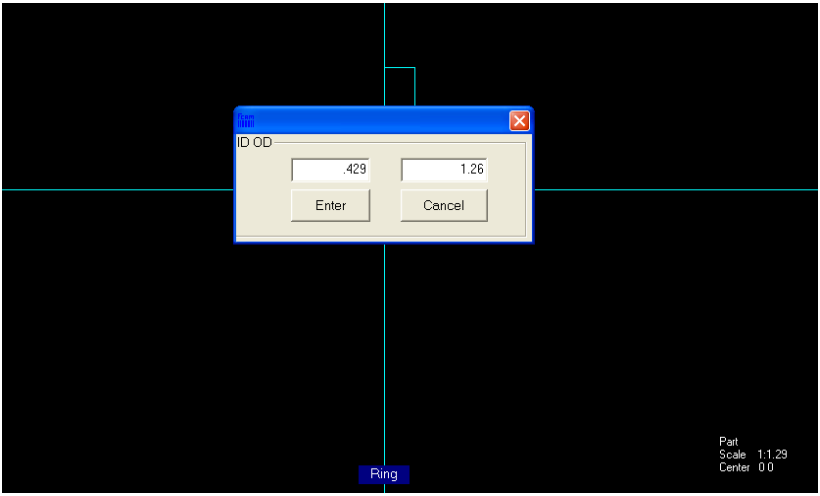
The rectangle should now be drawn to scale and appear on the screen as shown below. *When drawing items; FastCAM® often automatically prompts for a second item to be drawn. If this is not desired, you may simply hit cancel and right click on the screen repeatedly to get out of any popup menu windows.*



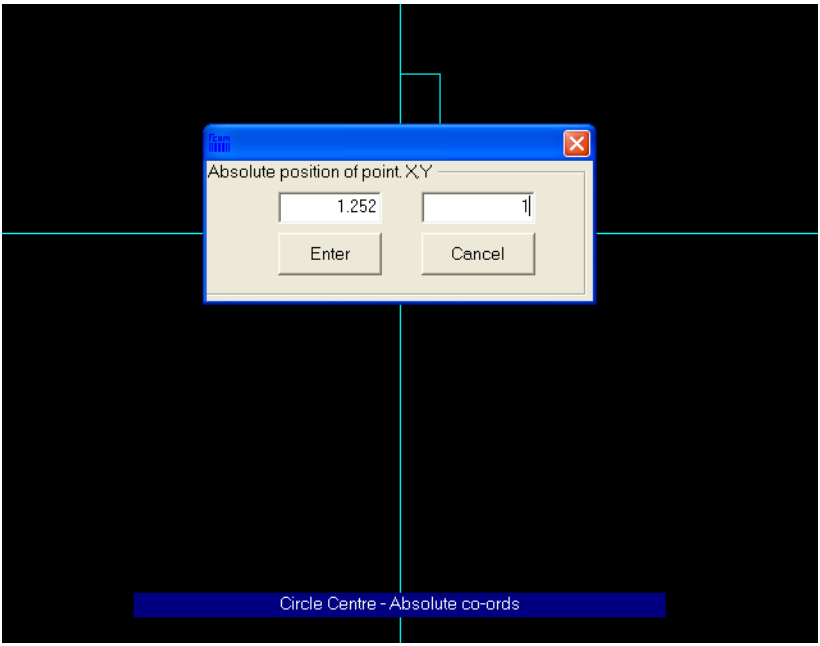
The next step would be to create the other side of our drawing (the rings.) You could draw two full circles with the same center, but it is easier to use the Ring feature under the Arc menu.



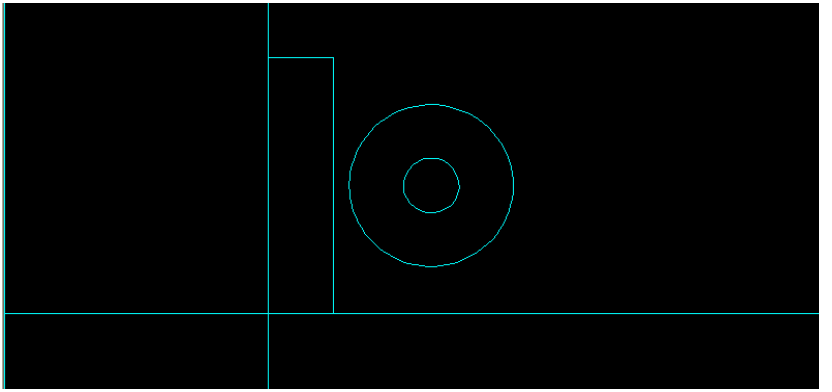
FastCAM® will prompt you for an inside diameter and an outside diameter of the two circles that make up the ring. Here you can key in .429 for the ID, 1.26 for the OD and click 'Enter'.



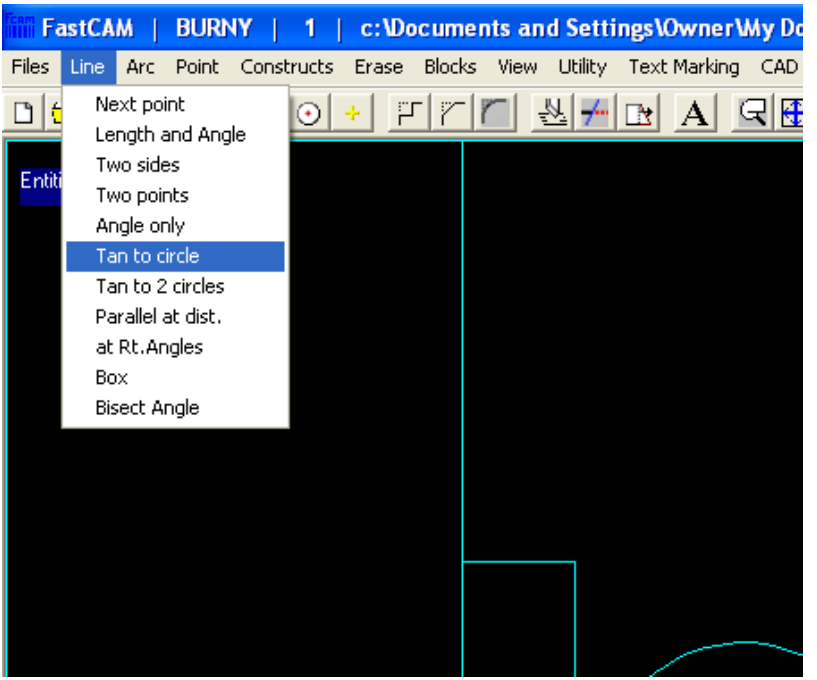
Next, you will be prompted to select the center point for your ring. Again, you can use absolute coordinates, key in (1.252,1) and click 'Enter'.



You should now see a full ring just to the right side of your previously drawn rectangle. If at anytime you need to refresh your screen (if the image of your drawing is not clear), hit the Enter key once.

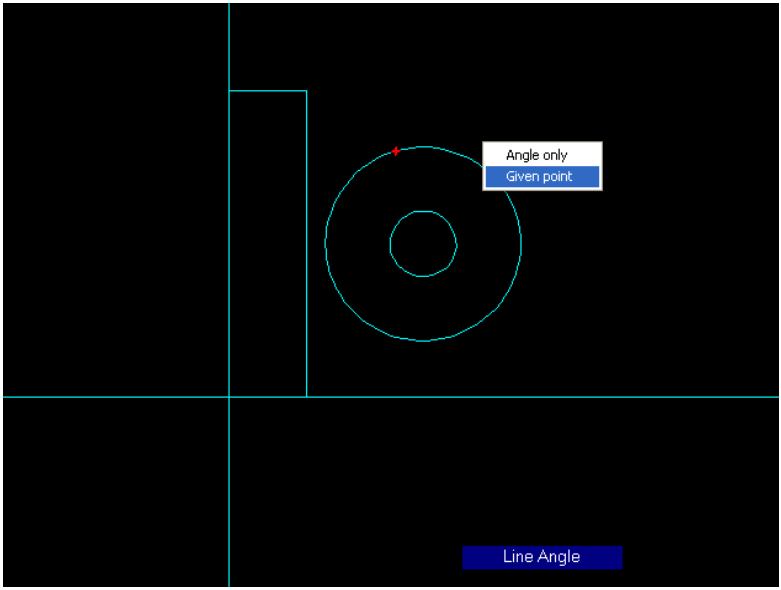


Finally, you need to draw lines to connect the rectangle to the ring. There are many choices for drawing a line however, you can see from the scaled drawing that you need to use tangent lines. Therefore, you need to select the Tan to circle option under the Line menu.

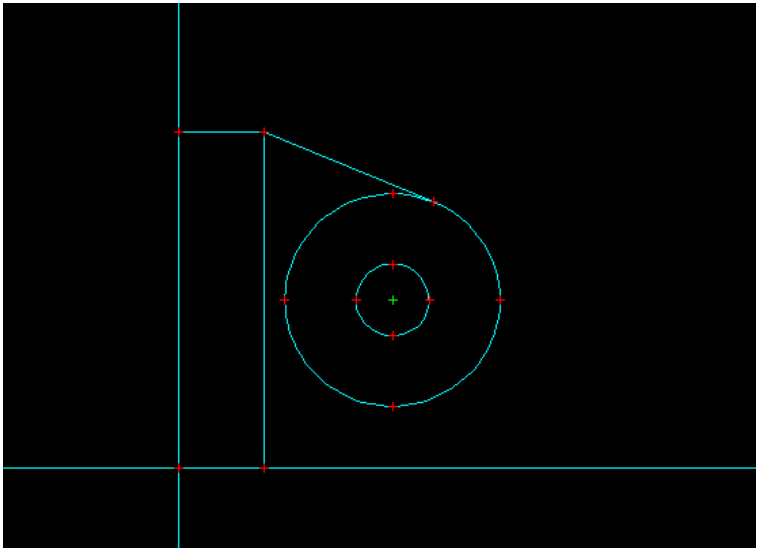


You will first need to select the arc (circle) in order to start the line. To do this you must click on the outer circle on the nearest side to where the line will intersect.

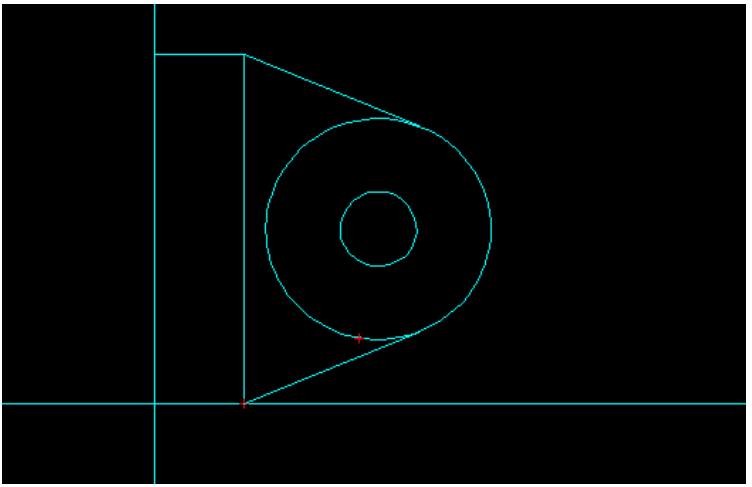
Note : Horizontal infinite lines will be created by left-click of mouse cursor at the approximate 6 and 12 O'clock positions. Likewise, vertical infinite line will be drawn by left-click of mouse cursor at the approximate 3 and 9 O'clock positions. In order to not get an infinite line, just be off these positions when selecting the circle/arc.



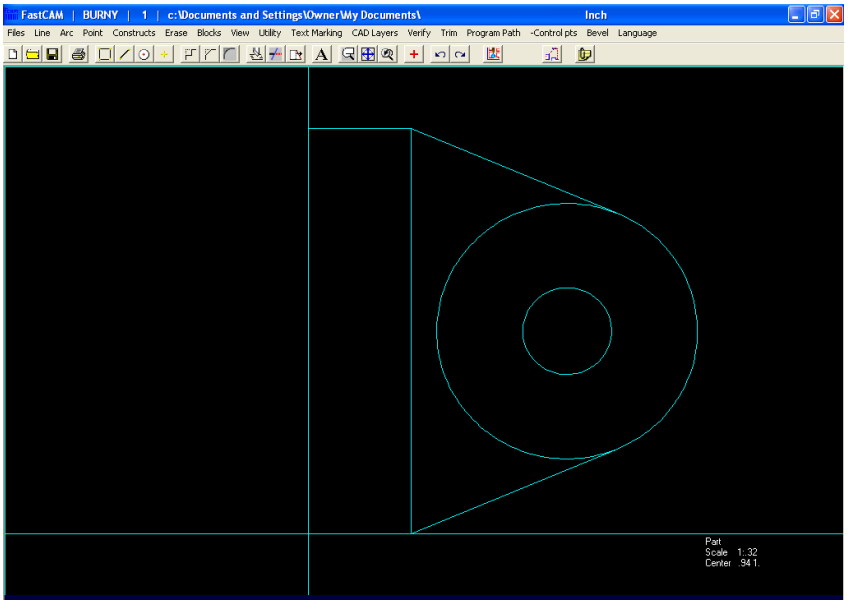
FastCAM® will then prompt you to choose an angle or a given point as an endpoint of your line. In this situation, you will want to select Given point and then click on the upper right-hand corner of the rectangle. After selecting Given point, the program will automatically switch to Control Points (from Absolute Coordinates) as can be seen by the prompt message on the screen. This means that as long as you click near the point, the line will "snap" exactly to this point. These points are called control points and you can see them in green and red below.



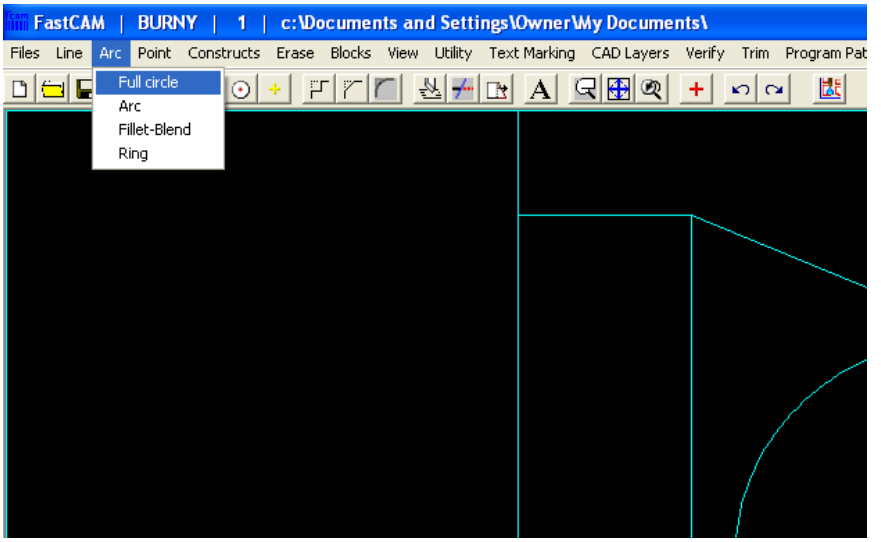
Repeat these steps for the other connecting line and you should then have the same as the drawing below. Be sure that you clicked at the appropriate point on your entity and that the correct tangent line appears.



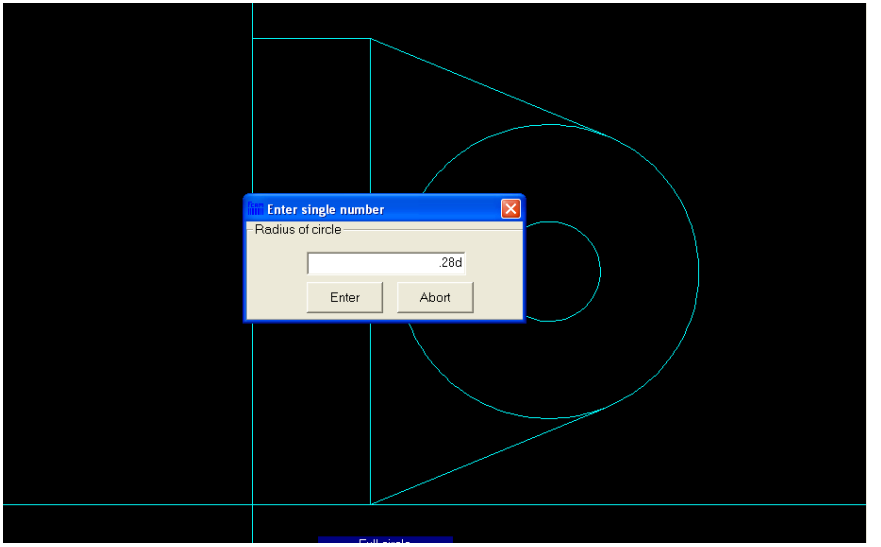
Our part is now drawn except for a couple of internal circles. First, you can zoom into this part by choosing Autoscale under the View menu, or by hitting the number 5 on the numerical keypad of your keyboard.



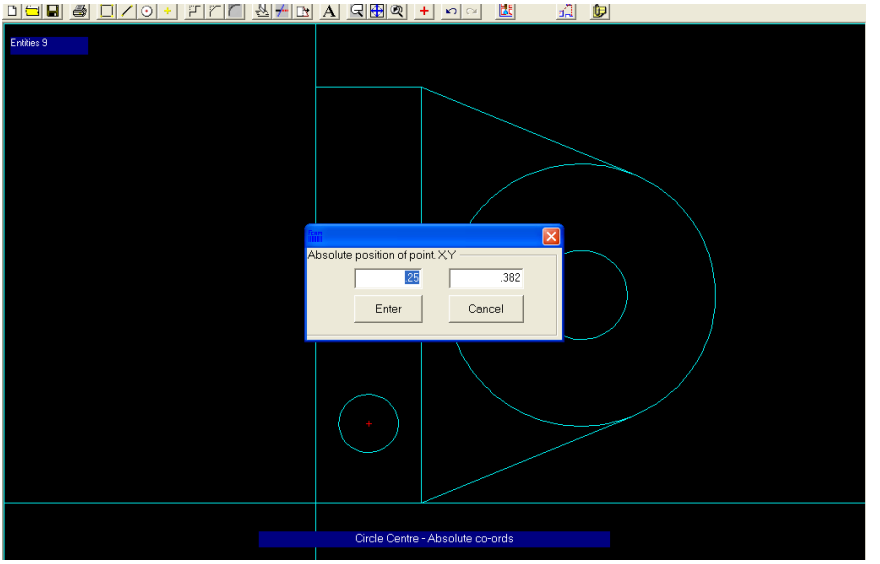
To draw a circle, go back up to the arc menu and select Full circle.



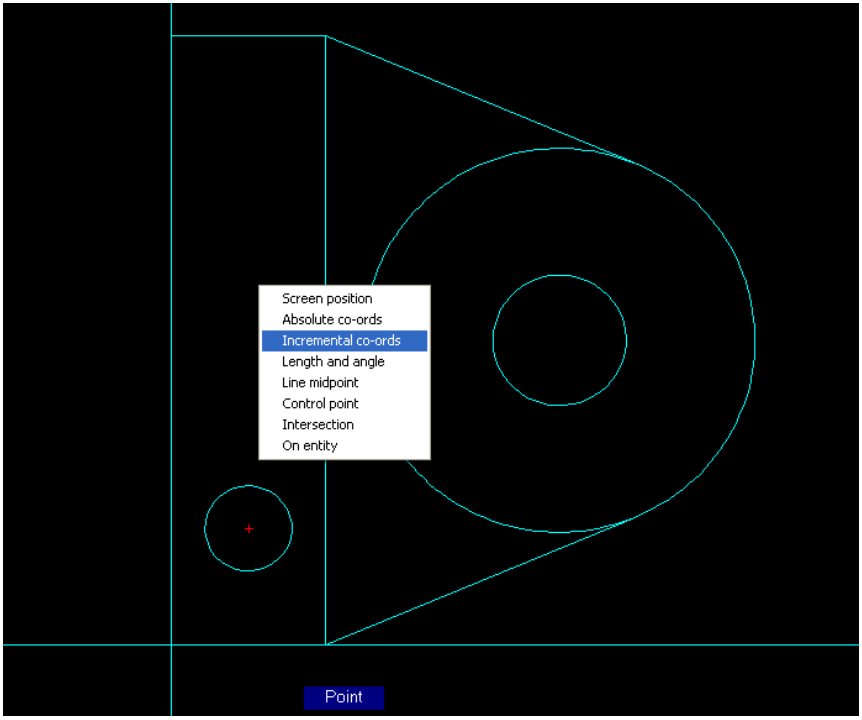
FastCAM® will ask for the radius of the circle. Since we have the diameter, we can simply enter the diameter followed by the letter "d" as shown below and click 'Enter'.



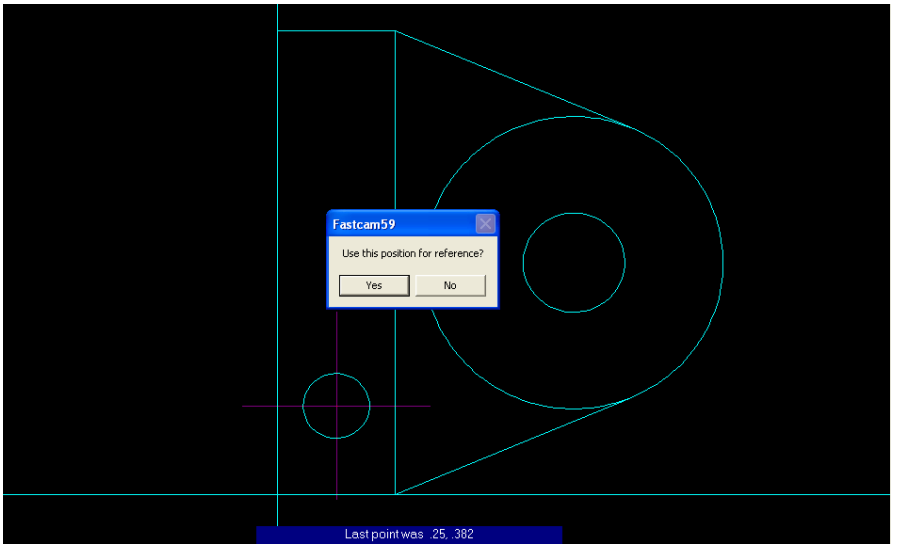
(After you enter the diameter, you may have to right click and select absolute coordinates.) We can then enter the absolute coordinates of the lower internal circle based upon our scaled drawing.



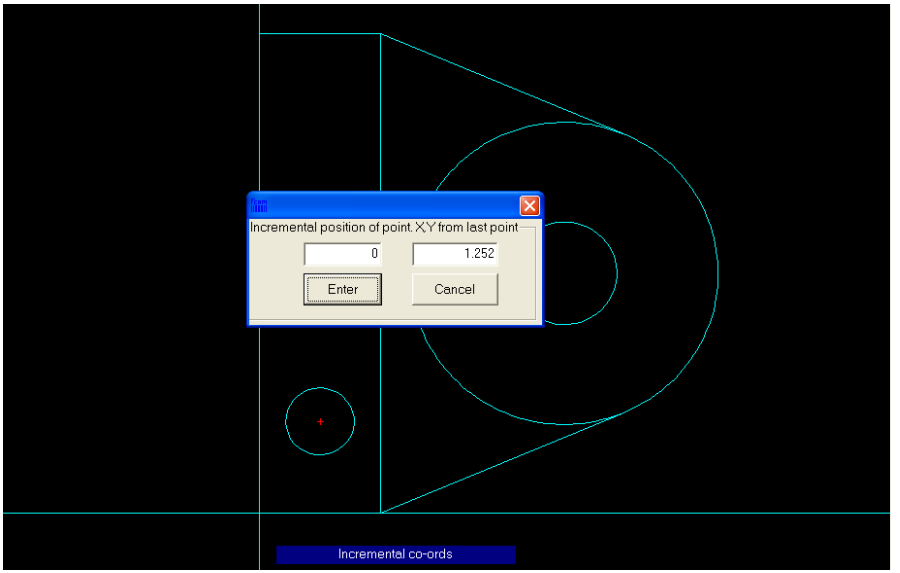
Many drawing functions in FastCAM® are repetitive, and the Circle function is one of them. Once we have drawn the first FastCAM® prompts us for another set of Absolute Coordinates for the next circle location. In this example it is easiest to use Incremental Coordinates, based on the drawing supplied. To do this, right click once and choose to use incremental coordinates.



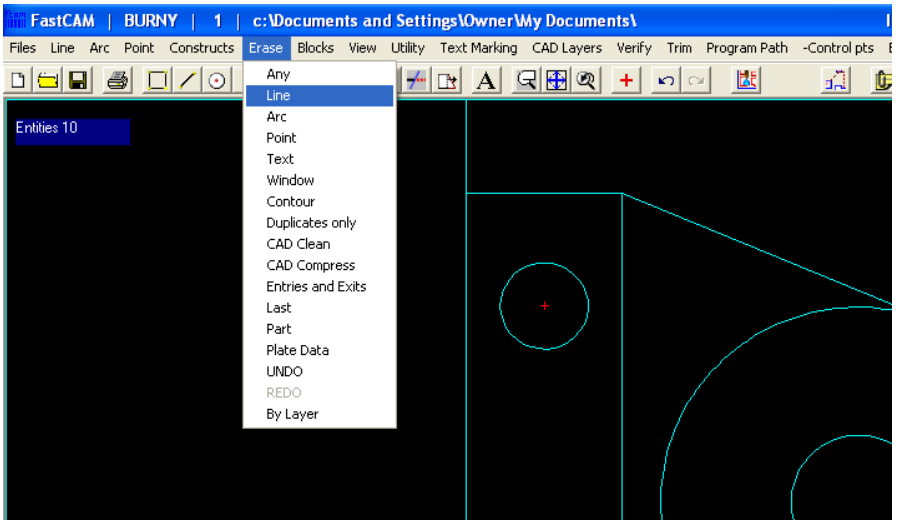
FastCAM® will ask if you want to use your previous point as your new reference point. Select yes, and enter coordinates based on that the point selected is now your reference of (0,0).



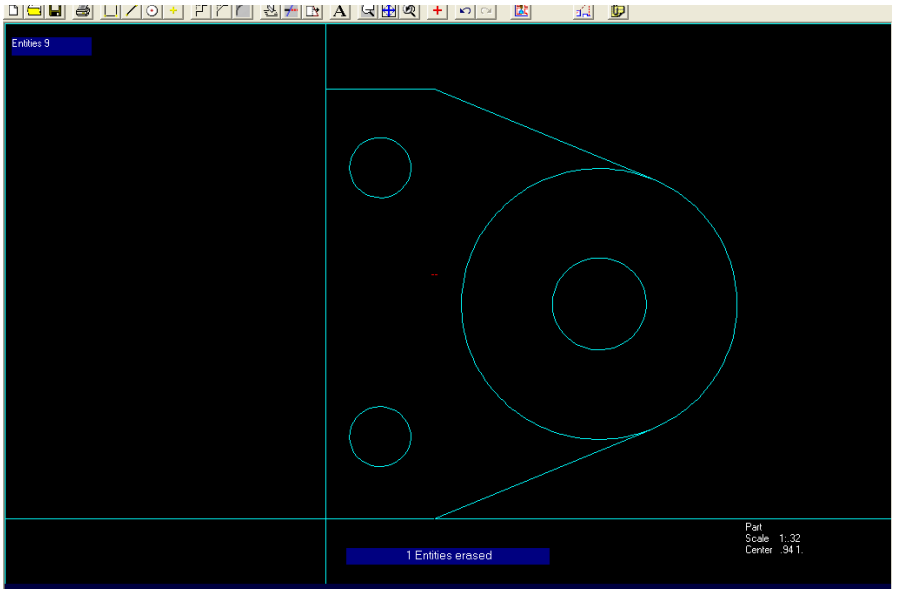
Now we need only the distance between the two circles, or the change in y value.



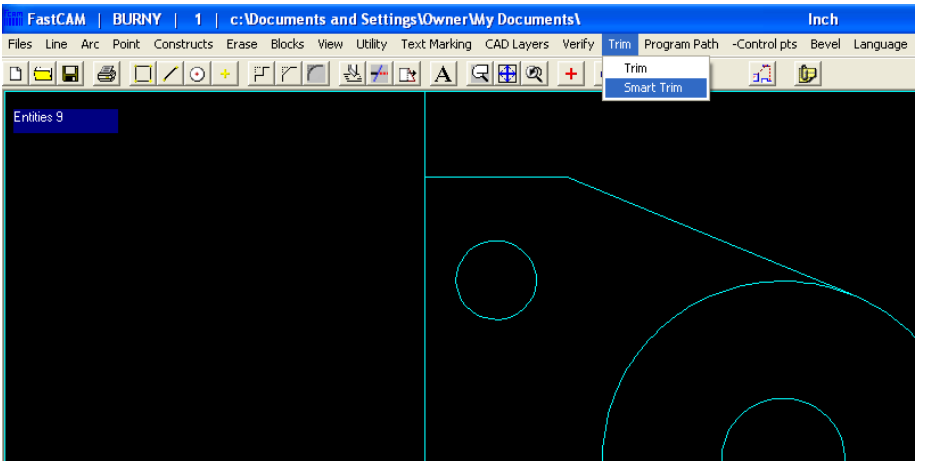
We now have a completed drawing, but need to erase some internal lines and arcs that are not in our final drawing. To erase a line which makes up part of the rectangle, go up to the Erase menu and choose Line.



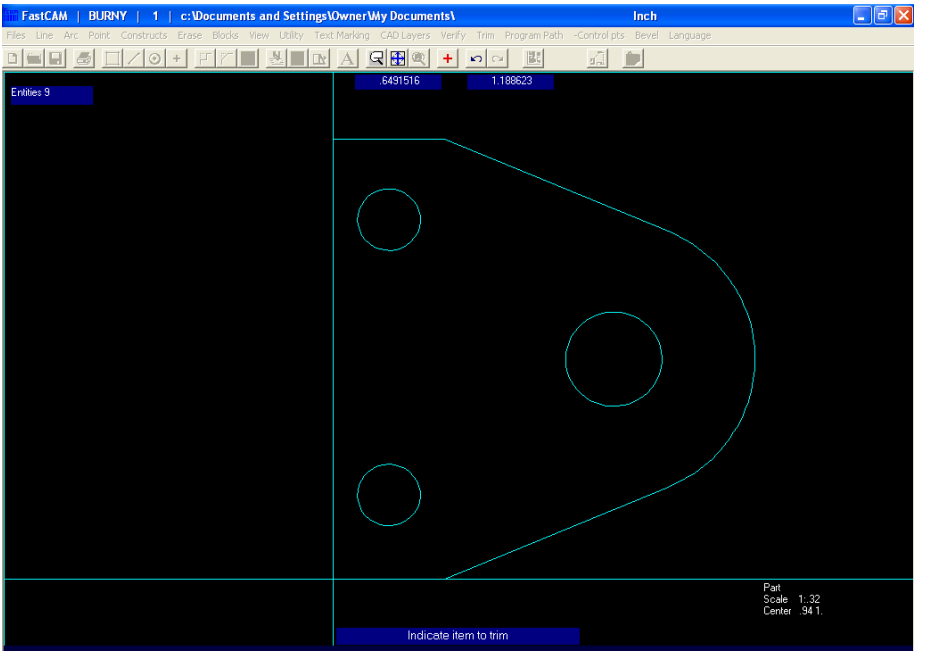
Left click on the line you wish to erase once, and then right click on your drawing to fully erase this entity.



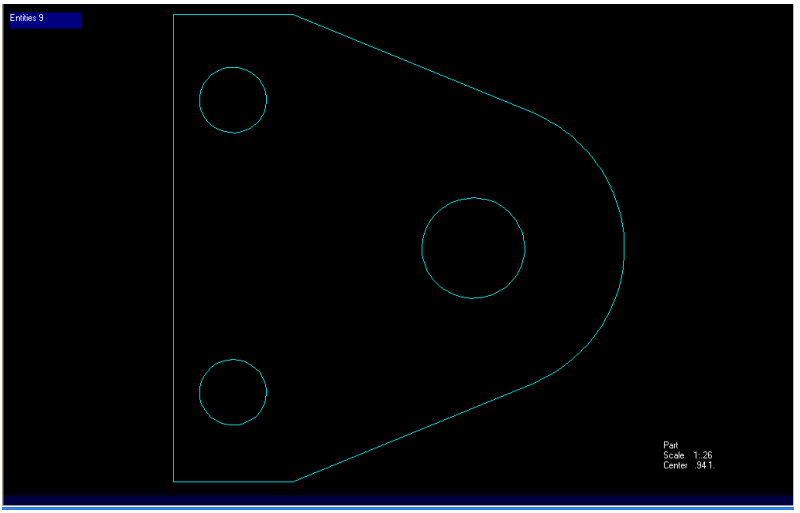
Now we can eliminate the last internal arc that is not part of the final drawing. Go under the trim menu, and select Smart Trim.



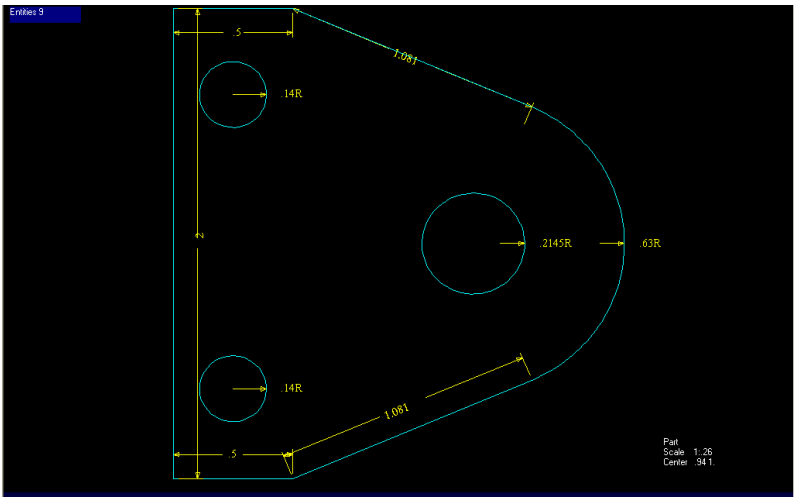
Select the section of the circle that you wish to trim by clicking on the left side of the large circle of the ring that you want to trim. The unwanted arc should be removed.



Now return to the View menu and uncheck the display axes box to remove them from your drawing. You will then see your completed WIDGET drawing.



Finally, there are a number of ways to verify the scale of your drawing. The quickest way is to go under the View menu, choose Change display, and check the box next to Auto Dimension. Then click okay to view the dimensions of your part drawing.



We can see our part meets the dimensions of our scaled part drawing. We can be confident that we have created a part with FastCAM® that is identical to our scaled drawing.

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