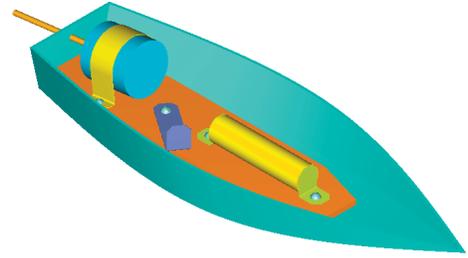


Chapter 24b BOAT SOLID Part 2

A. Open Boat Solid File.

Step 1. Open your **boat solid** file.



B. Rotate Hull.

Step 1. Change to the Side View. Use the green  or **ALT-6 S**. Hold down ALT and press 6. Key-in S.
Use  to fit drawing on screen.

Step 2. MAIN MENU.

Step 3. Xform.

Step 4. Rotate.

Step 5. Click the hull solid.

Step 6. Done.

Step 7. Key in **1.5, 0** and press ENTER.

Step 8. Set: **Move**.
180 for Rotation Angle and click OK.

Step 9. Use  to fit the drawing on screen.

Step 10. Click the Clear Screen Colors Tool .

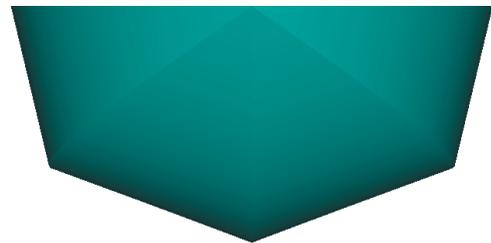


Fig. 1

C. Create Base Rectangle.

Step 1. Change to the Isometric View. Use the green  or **ALT-6 I**.

Step 2. Draw the base a different color. Change the color to **tangerine**. Click the color swatch in the Secondary Menu. Click the 16/256 Button. Click tangerine, number 94 and click OK.

Step 3. Change the depth of your drawing. Click the Z Button  from the Secondary Menu (bottom of the menu) and key-in **.9** and press ENTER. (**ALT-0**)

Step 4. MAIN MENU.

Step 5. Create.

Step 6. Rectangle.

Step 7. 1 Point.

- Step 8. Key-in **6** for Width and **1.4** for Height.
- Step 9. For the Placement Point, click the bottom left gray rectangle and click OK.
- Step 10. Key-in **.05**, **.8** and press ENTER, **Fig. 2**.

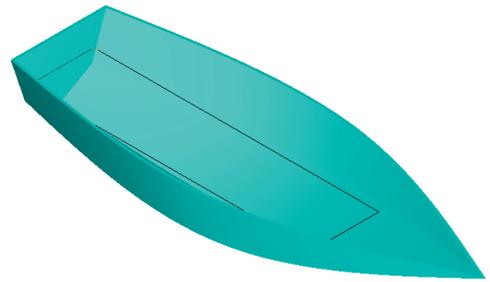


Fig. 2

D. Extrude Base Solid.

- Step 1. MAIN MENU.
- Step 2. Solids.
- Step 3. Extrude.
- Step 4. Chain.
- Step 5. Click a line of the rectangle.
- Step 6. Done.
- Step 7. The direction arrow the chain should **point down**, **Fig. 3**. If the arrow points in the wrong direction, click Reverse It.
- Step 8. Done.
- Step 9. Set: Distance = **.4** and click OK, **Fig. 4**.

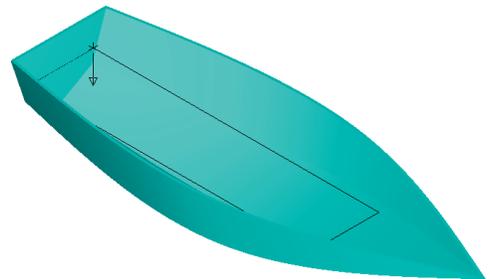


Fig. 3

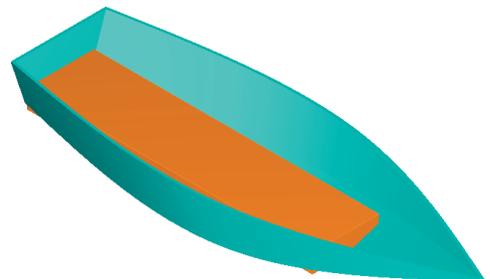


Fig. 4

E. Chamfer Base Solid.

- Step 1. Turn off the shading, use **ALT-S**.
- Step 2. MAIN MENU.
- Step 3. Solids.
- Step 4. Chamfer.
- Step 5. 2 Distances.
- Step 6. Click Edges to **Y** and others N, **Fig. 5**.
- Step 7. Use Dynamic View  to swing the around to view the front, **Fig. 6**.
- Step 8. Click the bottom front edge, **Fig. 6**. The front face should highlight red. If it does not, click Other.

Pick Solid Entity:	
FromBack	N
Edges	Y
Faces	N
Solids	N
Verify	N

Fig. 5

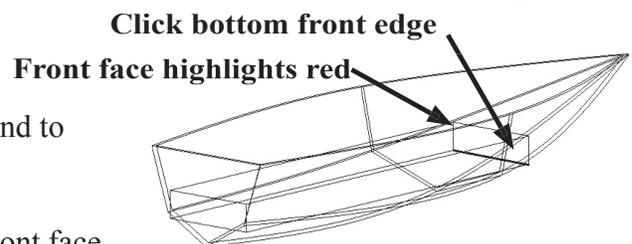


Fig. 6

Step 9. Done.

Step 10. Done.

Step 11. Set: Distance 1 = .2
Distance 2 = 1 and
click OK, **Fig. 7 and 8.**

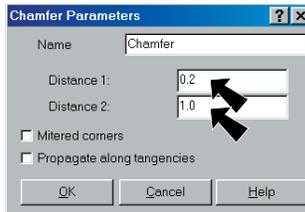


Fig. 7

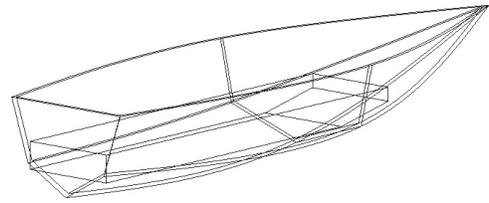


Fig. 8

Step 12. 2 Distances.

Step 13. Click the bottom back edge, **Fig. 9.** The back face should highlight red. If it does not, click Other.

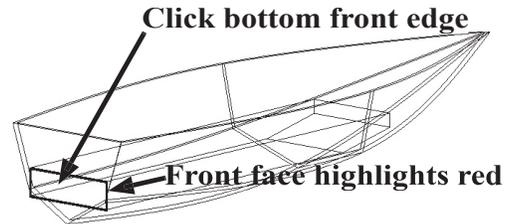


Fig. 9

Step 14. Done.

Step 15. Done.

Step 16. Click OK to use the same distances .2 and 1, **Fig. 10.**

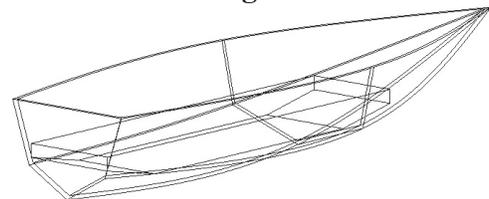


Fig. 10

F. Create Motor Geometry.

Step 1. Change to the Side View. Use the green  or **ALT-6 S.** Hold down ALT and press 6. Key-in S.

Step 2. Draw the motor a different color. Change the color to **blue.** Click the color swatch in the Secondary Menu. Click blue, number 75 and click OK.

Step 3. Change the depth of your drawing. Click the Z Button  from the Secondary Menu (bottom of the menu) and key-in **1.8** and press ENTER. (**ALT-0**)

Step 4. MAIN MENU.

Step 5. Create.

Step 6. Arc.

Step 7. Circle Point and Diameter.

Step 8. Key-in **1** for diameter and press ENTER.

Step 9. Key-in **1.5, 1.4** and press ENTER, **Fig. 11.**

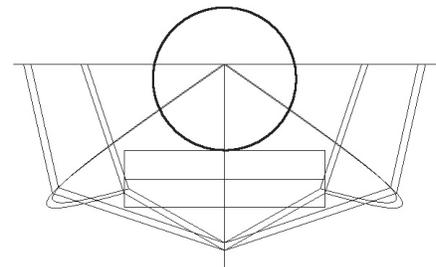


Fig. 11

G. Extrude Motor Solid.

Step 1. Change to the Isometric View. Use the green  or ALT-6 I. Hold down ALT and press 6. Key-in I.

Step 2. MAIN MENU.

Step 3. Solids.

Step 4. Extrude.

Step 5. Single.

Step 6. Click the motor circle.

Step 7. Done.

Step 8. The direction arrow the chain should **point back**, **Fig. 12**. If the arrow points in the wrong direction, click Reverse It.

Step 9. Done.

Step 10. Set: Distance = 1 and click OK, **Fig. 13**.

Step 11. Turn on the shading, use ALT-S.

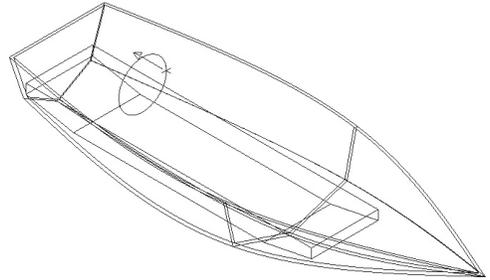


Fig. 12

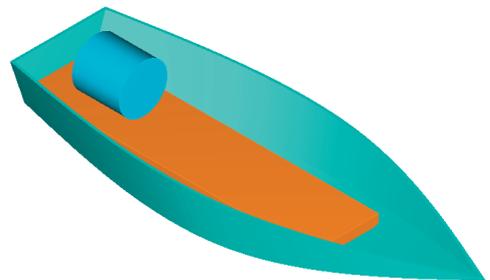
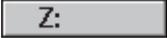


Fig. 13

H. Create Battery Geometry.

Step 1. Change to the Side View. Use the green  or ALT-6 S. Hold down ALT and press 6. Key-in S.

Step 2. Draw the battery a different color. Change the color to **yellow**. Click the color swatch in the Secondary Menu. Click yellow, number 14 and click OK.

Step 3. Change the depth of your drawing. Click the Z Button  from the Secondary Menu (bottom of the menu) and key-in 5.4 and press ENTER. (ALT-0)

Step 4. MAIN MENU.

Step 5. Create.

Step 6. Arc.

Step 7. Circle Point and Diameter.

Step 8. Key-in .5 for diameter and press ENTER.

Step 9. Key-in 1.5, 1.15 and press ENTER, **Fig. 14**.

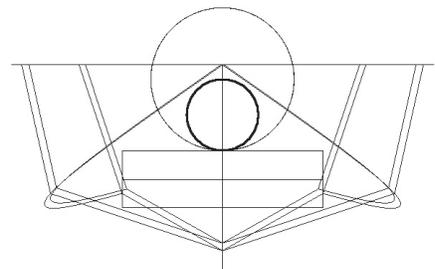


Fig. 14

I. Extrude Battery Solid.

Step 1. Change to the Isometric View. Use the green  or ALT-6 I. Hold down ALT and press 6. Key-in I.

Step 2. MAIN MENU.

Step 3. Solids.

Step 4. Extrude.

Step 5. Single.

Step 6. Click the battery circle.

Step 7. Done.

Step 8. The direction arrow the chain should **point back**, **Fig. 15**. If the arrow points in the wrong direction, click Reverse It.

Step 9. Done.

Step 10. Set: Distance = 2 and click OK, **Fig. 16**.

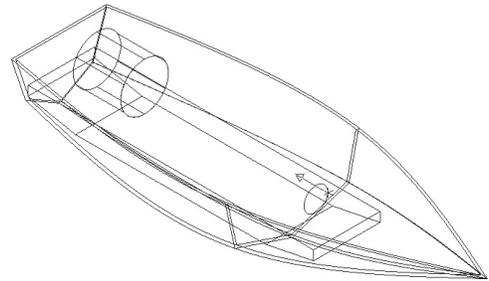


Fig. 15

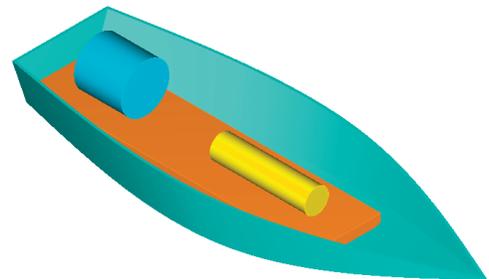


Fig. 16

J. Create Propeller Shaft Geometry.

Step 1. Change to the Side View. Use the green  or ALT-6 S. Hold down ALT and press 6. Key-in S.

Step 2. Draw the propeller shaft a different color. Change the color to **tan**. Click the color swatch in the Secondary Menu. Click brown, number 55 and click OK.

Step 3. Change the depth of your drawing. Click the Z Button  from the Secondary Menu (bottom of the menu) and key-in **.8** and press ENTER. (**ALT-0**)

Step 4. MAIN MENU.

Step 5. Create.

Step 6. Arc.

Step 7. Circle Point and Diameter.

Step 8. Key-in **.1** for diameter and press ENTER.

Step 9. Key-in **1.5, 1.4** and press ENTER, **Fig. 17**.

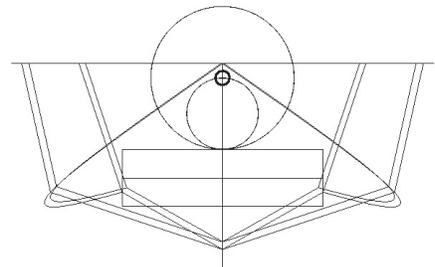


Fig. 17

K. Extrude Propeller Shaft Solid.

Step 1. Change to the Isometric View. Use the green  or ALT-6 I. Hold down ALT and press 6. Key-in I.

Step 2. MAIN MENU.

Step 3. Solids.

Step 4. Extrude.

Step 5. Single.

Step 6. Click the propeller shaft circle.

Step 7. Done.

Step 8. The direction arrow the chain should **point back**, **Fig. 18**. If the arrow points in the wrong direction, click Reverse It.

Step 9. Done.

Step 10. Set: Distance = 2 and click OK, **Fig. 19**.

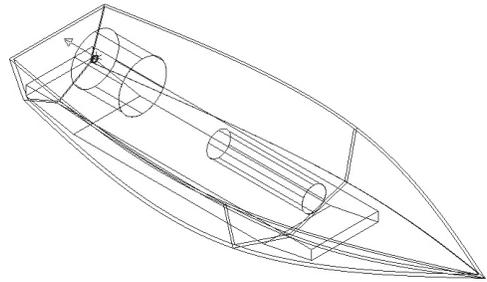


Fig. 18

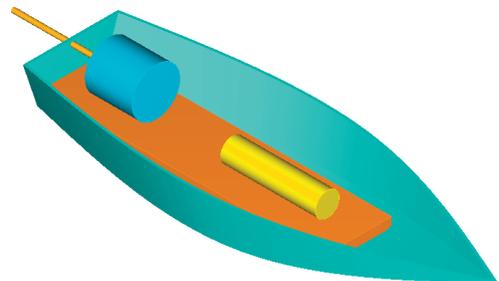
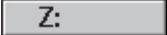


Fig. 19

L. Create Lines For L-Bracket.

Step 1. Change the Construction Plane to front view. Use the blue Cplane-Front  (ALT-5 F).

Step 2. Draw the L-brackets a different color. Change the color to **green**. Click the color swatch in the Secondary Menu. Click green, number 26 and click OK.

Step 3. Change the depth of your drawing. Click the Z Button  from the Secondary Menu and key-in **-1.3** and press ENTER. (ALT-0)

Step 4. MAIN MENU.

Step 5. Create.

Step 6. Line.

Step 7. Endpoints.

Step 8. Key-in **3.4, 1.4** and press ENTER and key-in **3.4, .9** and press ENTER.

Step 9. Click Last.

Step 10. Key-in **3, .9** and press ENTER, **Fig. 20**.

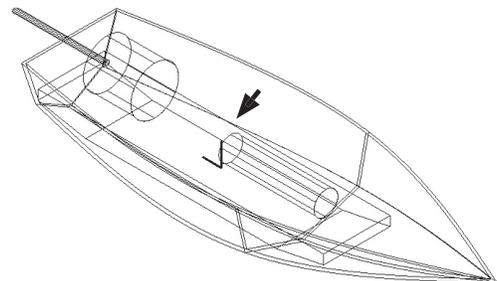


Fig. 20

M. Fillet.

Step 1. Zoom-in on the L-bracket. Use **F1** and make a selection window around the L-bracket, **Fig. 21**.

Step 2. Hide all entities except the L-bracket lines. Use **Alt-E**, then click the two lines of the L-bracket, **Fig. 22** and click Done.

Step 3. MAIN MENU.

Step 4. Create.

Step 5. Fillet.

Step 6. Radius.

Step 7. Key-in **.03** for the radius and press ENTER.

Step 8. Click Position 1 and Position 2, **Fig. 23**.

Step 9. Use  or **F3** to repaint the screen.

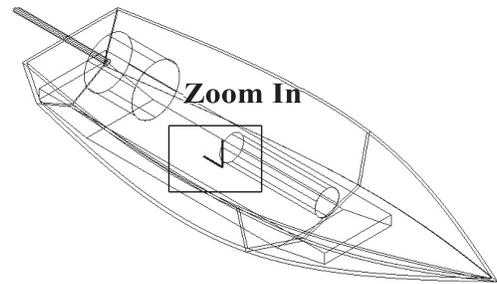


Fig. 21



Fig. 22

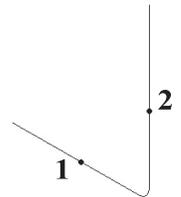


Fig. 23

N. Offset Contour.

Step 1. MAIN MENU.

Step 2. Xform.

Step 3. Offset Contour.

Step 4. Chain.

Step 5. Click a line of the L-bracket.

Step 6. Done.

Step 7. Set: Distance = **.01** and click OK, **Fig. 24**.and **Fig. 25**.

Step 8. Click the Clear Screen Colors Tool .

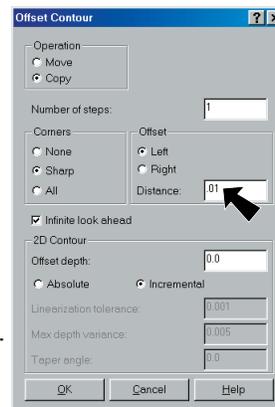


Fig. 24



Fig. 25

O. Draw Connecting Lines.

Step 1. MAIN MENU.

Step 2. Create.

Step 3. Line.

Step 4. Endpoints.

Step 5. Endpoints (again). Endpoints will perform a search and locate the exact end of the line you are connecting to.

Step 6. Draw lines between the ends of the offset lines. Press E key to select Endpoints before your click to draw the line. **Remember to press the E key first** then click the end of the line. Draw both lines, **Fig. 26**.

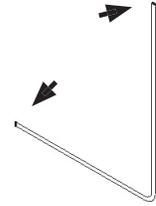


Fig. 26

P. Extrude L-Bracket Solid.

Step 1. MAIN MENU.

Step 2. Solids.

Step 3. Extrude.

Step 4. Chain.

Step 5. Click a line of the L-bracket.

Step 6. Done.

Step 7. The direction arrow the chain should **point to the right**, **Fig.27**. If the arrow points in the wrong direction, click Reverse It.

Step 8. Done.

Step 9. Set: Distance = **.4** and click OK.

Step 10. Turn on the shading, use **ALT-S**, **Fig. 28**.

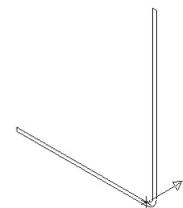


Fig. 27

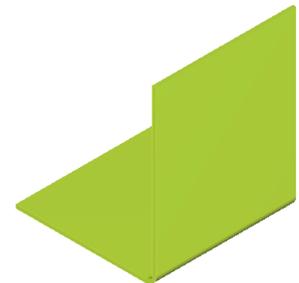


Fig. 28

Q. Chamfer Corners.

Step 1. MAIN MENU.

Step 2. Solids.

Step 3. Chamfer.

Step 4. 1 Distance.

Step 5. Click Edges to **Y** and others **N**, **Fig. 29**.

Step 6. Zoom-in on the corner of the L-bracket. Use **F1** and make a selection window around the corner, **Fig. 30**.

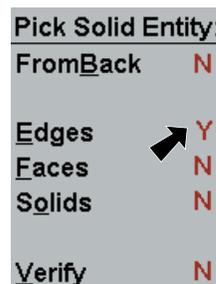


Fig. 29

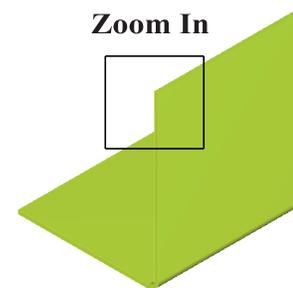


Fig. 30

Step 7. Click the top corner edge, **Fig. 31**.

Step 8. Done.

Step 9. Set Distance **.1** and click OK, **Fig. 32** and **Fig. 33**.

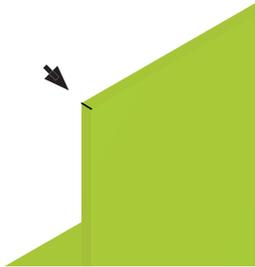


Fig. 31

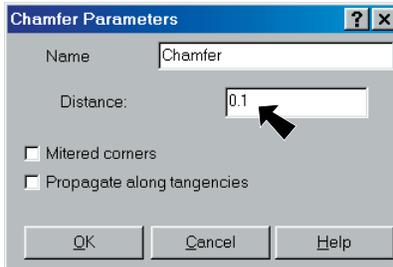


Fig. 32



Fig. 33

Step 10. Use **Alt-F1** to zoom out and **F1** to zoom-in on the other top corner, **Fig. 34**.

Step 11. 1 Distance.

Step 12. Click the other corner edge, **Fig. 34**.

Step 13. Done.

Step 14. Click OK to use **.1** for Distance, **Fig. 35**.



Fig. 34



Fig. 35

Step 15. Zoom out  and Dynamic View  to swing the around to view the bottom corners, **Fig. 36**.

Step 16. Repeat the chamfering on the bottom corners, **Fig. 37**.

Step 17. Use **Alt-F1** to fit the drawing on the screen and save **Alt-A**.

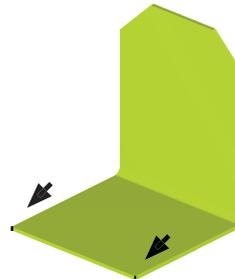


Fig. 36

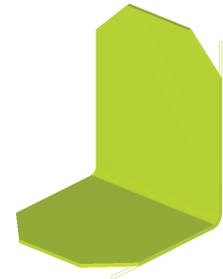


Fig. 37

R. Mirror Copy L-Bracket.

Step 1. Change to the Top View. Use the green  or **ALT-6 T**. Hold down ALT and press 6. Key-in T.

Step 2. Use  to fit the drawing on screen.

Step 3. MAIN MENU.

Step 4. Xform.

Step 5. Mirror.

Step 6. Click the L-bracket solid, **Fig. 38**.



Fig. 38

Step 7. Done.

Step 8. 2 Points.

Step 9. Key-in **4.4, 1.8** and press ENTER and **4.4, 1.2** and press ENTER, **Fig. 39**.

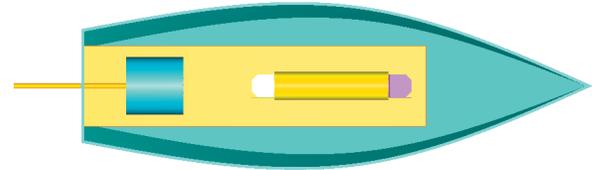


Fig. 39

Step 10. Click Copy and OK.

Step 11. Click the Clear Screen Colors Tool .

S. Merge Motor Mount.

Step 1. Change to the Isometric View. Use the green  or **ALT-6 I**. Hold down ALT and press 6. Key-in I.

Step 2. MAIN MENU.

Step 3. File.

Step 4. Merge.

Step 5. Click your Motor Mount file and click Open, **Fig. 40**.

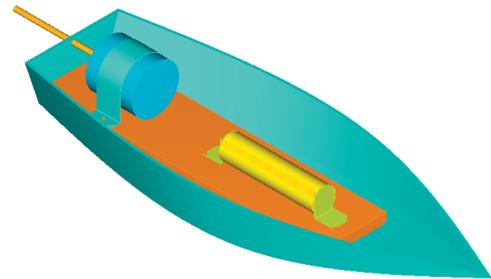


Fig. 40

T. Copy L-Bracket For Switch.

Step 1. Zoom-in on the corner of the back L-bracket. Use **F1** and make a selection window around the back L-bracket, **Fig. 41**.

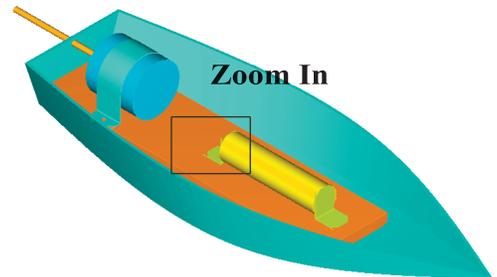


Fig. 41

Step 2. Turn off the shading, use **ALT-S**.

Step 3. MAIN MENU.

Step 4. Xform.

Step 5. Translate.

Step 6. Chain.

Step 7. Click L-bracket original geometry (not the solid), **Fig. 42**.

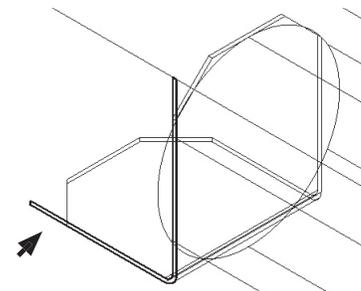


Fig. 42

Step 8. Done.

Step 9. Done.

Step 10. Rectangle.

Step 11. Key-in **X -.07** and press ENTER.

Step 12. Click Copy and click OK, **Fig. 43**.

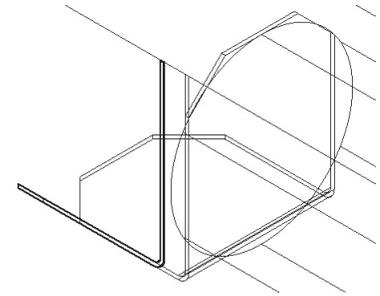


Fig. 42

U. Hide All But Copied L-Bracket.

Step 1. Hide all entities except the copied L-bracket. Use **Alt-E**.

Step 2. Chain.

Step 3. Click any line of the copied L-bracket, **Fig.43**.

Step 4. Done.

Step 5. Done. Everything except the copied L-bracket will be hidden.

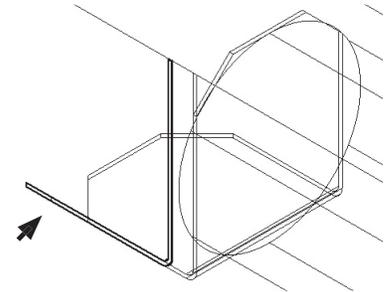


Fig. 43

V. Extend L-Bracket Base.

Step 1. MAIN MENU.

Step 2. Modify.

Step 3. Extend.

Step 4. Length.

Step 5. Key-in **.93** and press ENTER.

Step 6. Click Position 1 on the L-bracket, **Fig. 44**.

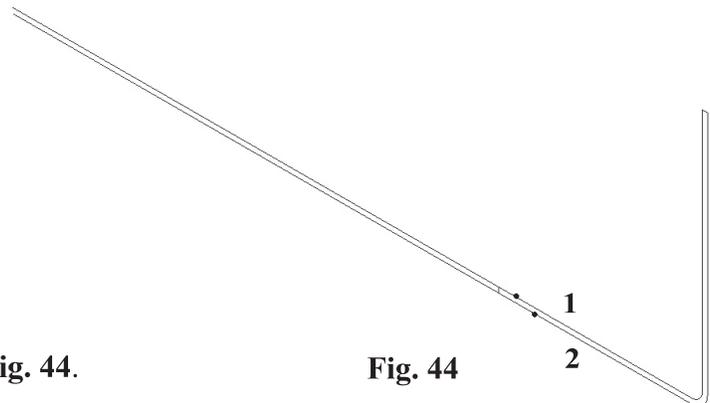


Fig. 44

Step 7. Click Position 2 on the L-bracket, **Fig. 44**. Use **F3** repaint if the line disappears.

Step 8. Use **Alt-F1** or  to fit the drawing on screen.

W. Draw Connecting Line.

Step 1. Change the Construction Plane to front view. Use the **blue Cplane-Front**  (**ALT-5 F**).

Step 2. MAIN MENU.

Step 3. Create.

Step 4. Line.

Step 5. Endpoints.

Step 6. Endpoints (again). Endpoints will preform a search and locate the exact end of the line you are connecting to.

Step 7. Draw lines between the ends of the extended lines. Press E key to select Endpoints before your click to draw the line. **Remember to press the E key first** then click the end of the line, **Fig. 45**.

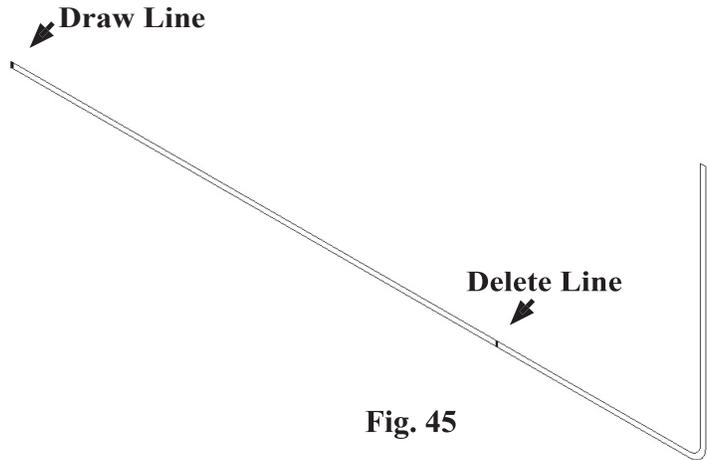


Fig. 45

Step 8. Delete the short end line of the old L-bracket, **Fig. 45**. Use F5.

X. Extrude Switch Solid.

Step 1. MAIN MENU.

Step 2. Solids.

Step 3. Extrude.

Step 4. Chain.

Step 5. Click a line of the switch.

Step 6. Done.

Step 7. The direction arrow the chain should **point to the right**, **Fig. 46**. If the arrow points in the wrong direction, click Reverse It.

Step 8. Done.

Step 9. Set: Distance = **.4** and click OK.

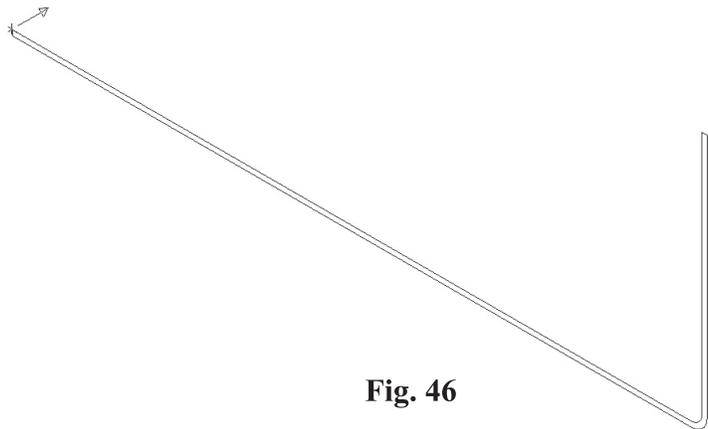


Fig. 46

Y. Chamfer Switch Corners.

Step 1. MAIN MENU.

Step 2. Solids.

Step 3. Chamfer.

Step 4. 1 Distance.

Step 5. Click Edges to **Y** and others N, **Fig. 47**.

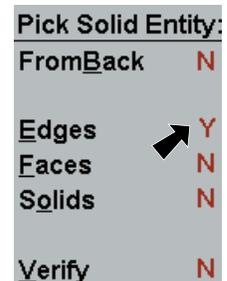


Fig. 47

Step 6. Zoom-in on the corner of the switch. Use **F1** and make a selection window around the corner.

Step 7. Click a corner edge, **Fig. 48**.

Step 8. Done.

Step 9. Set Distance **.1** and click OK.

Step 10. Repeat chamfering all corners, **Fig. 49**.

Step 11. Turn on the shading, use **ALT-S**.

Step 12. Unhide the other parts, use **ALT-E**.

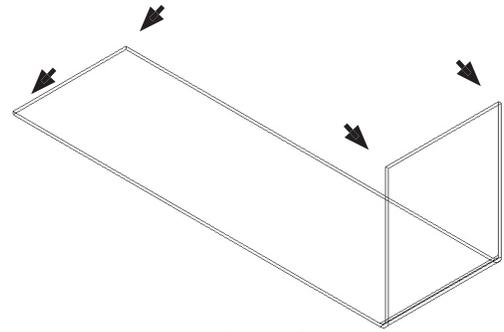


Fig. 48

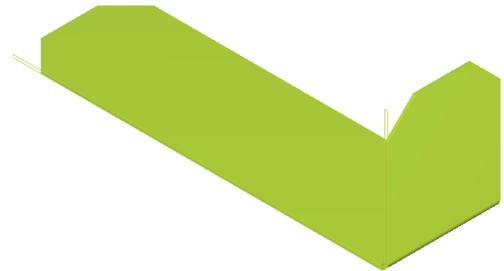


Fig. 49

Z. Rotate Switch.

Step 1. Change to the Top View. Use the green  or **ALT-6 T**. Hold down ALT and press 6. Key-in T.

Step 2. MAIN MENU.

Step 3. Xform.

Step 4. Rotate.

Step 5. Click the switch solid, **Fig. 50**.

Step 6. Done.

Step 7. Key-in **2.2, 1.5** and press ENTER.

Step 8. Set: **Move**.
-30 for Rotation Angle and click OK, **Fig. 51**.

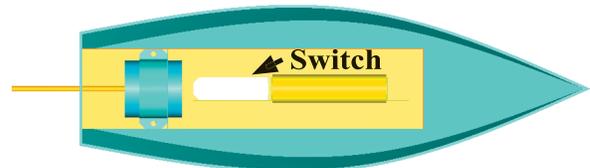


Fig. 50

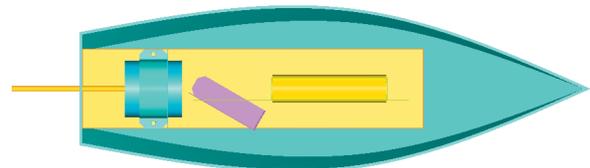


Fig. 51

Step 9. Click the Clear Screen Colors Tool .

AA. Create Lines For Screw Head.

Step 1. Change to the Isometric View. Use the green  or **ALT-6 I**.

Step 2. Change the Construction Plane to front view. Use the **blue Cplane-Front**  (**ALT-5 F**).

Step 3. Zoom-in on the back end of the switch. Use **F1** and make a selection window around the back end of the switch, **Fig. 52**.

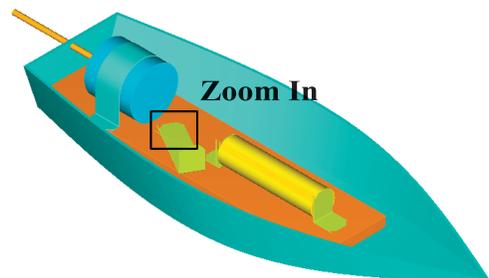


Fig. 52

- Step 4. Draw the screw head a different color. Change the color to **blue-gray**. Click the color swatch in the Secondary Menu. Key-in **64** for Current Color and click OK.
- Step 5. Change the depth of your drawing. Click the Z Button  from the Secondary Menu and key-in **-1.5** and press ENTER. (**ALT-0**)
- Step 6. Turn off the shading, use **ALT-S**.
- Step 7. MAIN MENU.
- Step 8. Create.
- Step 9. Rectangle.
- Step 10. 1 Point.
- Step 11. Key-in **.085** for Width and **.053** for Height.
- Step 12. For the Placement Point, click the bottom left gray rectangle and click OK.
- Step 13. Key-in **2.2, .91** and press ENTER, **Fig. 53**.

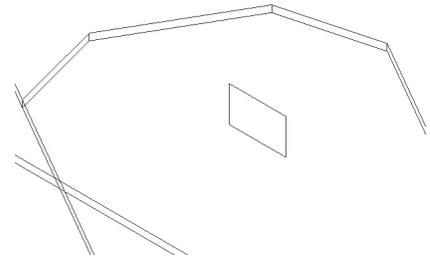


Fig. 53

BB. Fillet.

- Step 1. MAIN MENU.
- Step 2. Create.
- Step 3. Fillet.
- Step 4. Radius.
- Step 5. Key-in **.032** for the radius and press ENTER.
- Step 6. Click Position 1 and Position 2, **Fig. 54**. Use **F3** to repaint the screen.

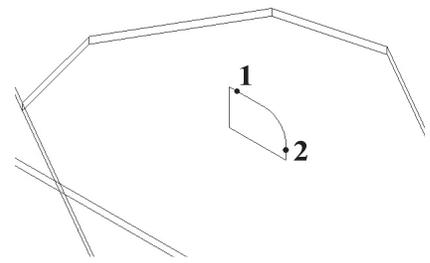


Fig. 54

CC. Create Rectangle For Screw Slot.

- Step 1. Change the Construction Plane to Top view. Use the **blue Cplane-Top**  (**ALT-5 T**).
- Step 2. Change the depth of your drawing. Click the Z Button  from the Secondary Menu and key-in **.93** and press ENTER. (**ALT-0**)
- Step 3. MAIN MENU.
- Step 4. Create.
- Step 5. Rectangle.

Step 6. 1 Point.

Step 7. Key-in **.172** for Width and **.032** for Height.

Step 8. For the Placement Point, click the bottom left gray rectangle and click OK.

Step 9. Key-in **2.114, 1.484** and press ENTER, **Fig. 55**.

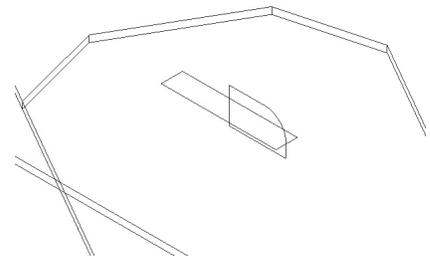


Fig. 55

DD. Revolve Screw Head.

Step 1. MAIN MENU.

Step 2. Solids.

Step 3. Revolve.

Step 4. Chain.

Step 5. Click the geometry that includes the fillet, **Fig.56**.

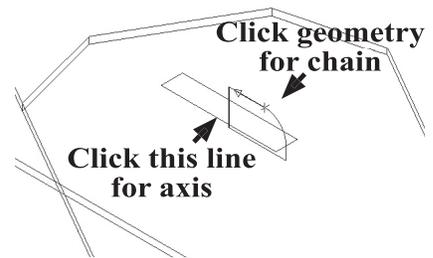


Fig. 56

Step 6. Done.

Step 7. Click the vertical line center line, **Fig.56**.

Step 8. Done. To accept the rotation direction.

Step 9. Set: End Angle = **360** and click OK, **Fig.57**.

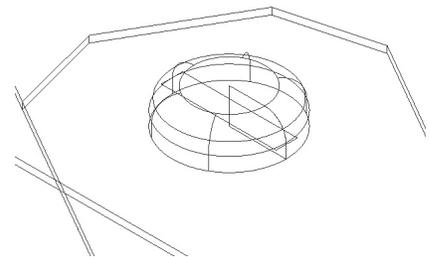


Fig. 57

EE. Cut Out Screw Slot.

Step 1. MAIN MENU.

Step 2. Solids.

Step 3. Extrude.

Step 4. Chain.

Step 5. Click a line of the thin rectangle, **Fig.58**.

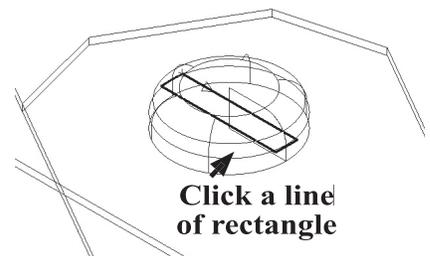


Fig. 58

Step 6. Done.

Step 7. The direction arrow the chain should **point up**, **Fig.59**. If the arrow points in the wrong direction, click Reverse It.

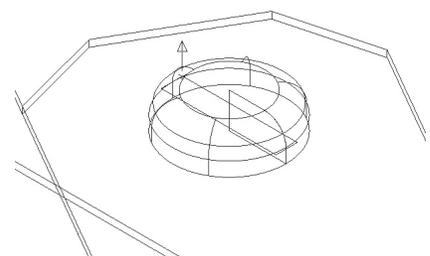


Fig. 59

Step 8. Done.

Step 9. Set: **Cut Body**.
Distance = .1 and click OK, **Fig. 60**.

Step 10. Click the screw head, **Fig. 61**.

Step 11. Turn on the shading, use **ALT-S**, **Fig. 62**.

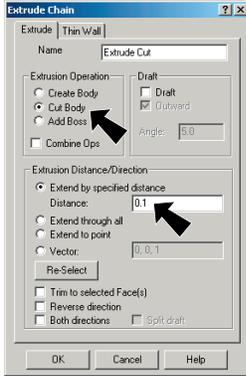


Fig. 60

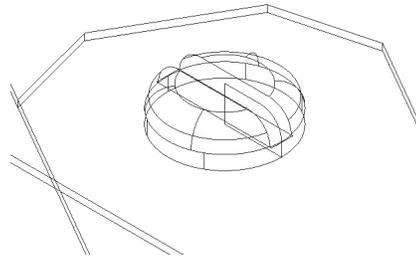


Fig. 61

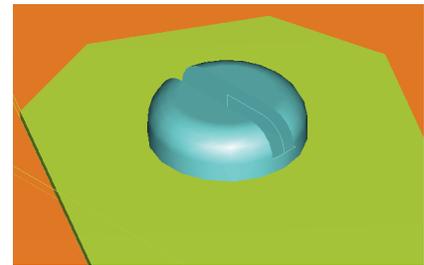


Fig. 62

FF. Copy Screw.

Step 1. Change to the Top View. Use the green  or **ALT-6 T**.

Step 2. Zoom-in on the screw head. Use **F1** and make a selection window around the screw head, **Fig. 63**.

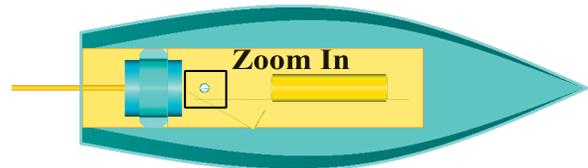


Fig. 63

Step 3. Turn off the shading, use **ALT-S**.

Step 4. MAIN MENU.

Step 5. Xform.

Step 6. Translate.

Step 7. Click the screw head solid, **Fig. 64**.

Step 8. Done.

Step 9. Between points.

Step 10. Click the center of the screw head, **Fig. 64**.

Step 11. Use **Alt-F1** or  to fit the drawing on screen.

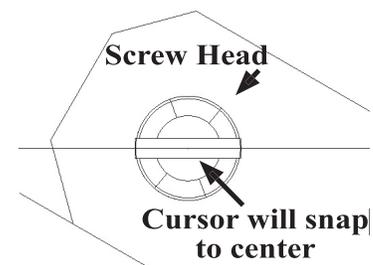


Fig. 64

Step 12. Key-in **3.2, 1.5** and press ENTER (**back L-bracket**).

Step 13. Click Copy and OK, **Fig. 65**.

Step 14. Result.

Step 15. Done.

Step 16. Between points.

Step 17. Last.

Step 18. Key-in **5.6, 1.5** and press ENTER (**front L-bracket**).

Step 19. Click Copy and OK, **Fig. 66**.

Step 20. Result.

Step 21. Done.

Step 22. Between points.

Step 23. Last.

Step 24. Key-in **1.3, 2.11** and press ENTER (**left side motormount**).

Step 25. Click Copy and OK, **Fig. 67**.

Step 26. Result.

Step 27. Done.

Step 28. Between points.

Step 29. Last.

Step 30. Key-in **1.3, .89** and press ENTER (**right side motormount**).

Step 31. Click Copy and OK, **Fig. 68**.

Step 32. Change to the Isometric View. Use the green  or ALT-6 I.

Step 33. Turn on the shading, use ALT-S.

Step 34. Save. Use Alt-A.

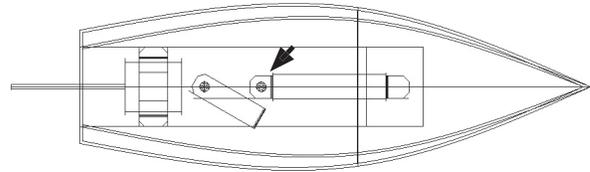


Fig. 65

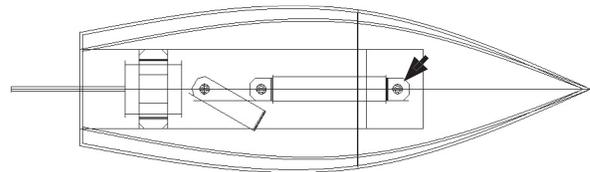


Fig. 66

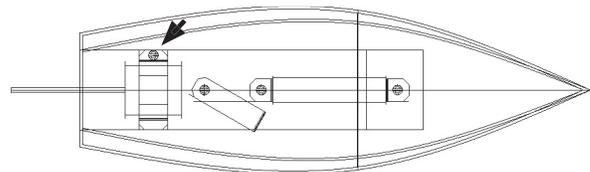


Fig. 67

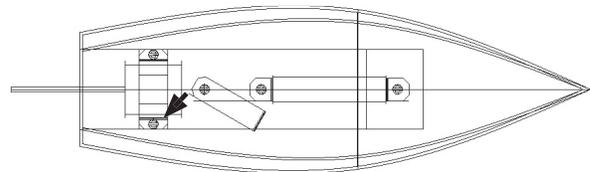


Fig. 68