

# PROJECT 3: CARRIAGE CLOCK

**BEFORE STARTING** this project read the instructions for the Practical Riveting/Bending/Rolling (RBR) tool, the Practical Punch/Shear tool, AND the MK 1/2 Scroll Former. The design project does not involve any Twists but for those with the Practical Twisting tool, we have shown some development ideas where twists can be incorporated. Read these instructions together with the accompanying Design Sheet before commencing the project.

Note that it may prove difficult to replicate this design exactly on the Master Punch/Shear, Master RBR and MK2/2H or MK2/3 Scroll Formers, with a little more thought similar design should be achievable. In particular, the design might be needed to be modified to allow for the larger scroll sizes of the Mk 2 series scroll formers.

- 1 Take the two 920mm (3ft) length of 20mm x 3mm (3/4" x 1/8") steel strips and before cutting or bending them it is recommended that you use a cloth or abrasive paper to remove any excess oil, grease or scale from the strips. Then repeat this for the two 920mm (3ft) lengths of 10mm x 1.6mm (3/8" x 16G).
- 2 Starting with the 20mm x 3mm (3/4" x 1/8") steel strips, mark out on each of the two strips a length of 490mm (19 1/2") using a fine tip marker pen or pencil. Use the Punch/Shear tool to cut two bars at the marks made. For a neater finish you can trim the corners off each end of the bar. This will be used to make the front and back outer frames (see Component 1 on the attached Design Sheet)
- 3 Then with the 10mm x 1.6mm (3/8" x 16G) steel strips, mark out on the first strip two lengths of 300mm (12") and one length of 230mm (8 5/8") using a fine tip marker pen or pencil. Use the Punch/Shear tool to cut three bars at the marks made. For a neater finish you can trim the corners off each end of the bar. The two 300mm bars will be used to make two Component 2's (the Inner Frame and Carrying Handles) and Component 4 (the Clock Insert Holding Ring on the attached Design Sheet)
- 4 From the second length, mark out two lengths each of 280mm (11 1/4") and two lengths of 75mm (3") using a fine tip marker pen or pencil. Again use the Punch/Shear tool to cut these four bars at the marks made and trim the corners. The two 280mm pieces will be used to make two component 3's (Inner Frame in-fill scrolls) and the two 75mm bars will be used to make two component 5's (Joining Strips) on the attached Design Sheet.
- 5 On all the cut components from Steps 2, 3 & 4, use a fine tip marker pen or pencil, mark all the hole positions H1 to H5, all the scroll end positions S1 and S2 and the Bending Points B1 at the measured points on the attached Design Sheet. (Note - if the line for a bending point or a scroll end position is dotted remember to make the mark on the rear face of the bar.
- 6 Then place the end of Component 2 with the S1 mark into the centre of the Mk 1/2 Scroll Former and form a scroll in such a way that the S1 mark on the face of the bar will make contact with the scroll former's segment to signify when the scroll is formed. Repeat this with the other Component 2.
- 7 Then place the end of Component 3 with the S1 mark into the centre of the Mk 1/2 Scroll Former and form a scroll in such a way that the S1 mark on the face of the bar will make contact with the scroll former's segment to signify when the scroll is formed. Then place the other end of this component back into the centre of the Mk 1/2 Scroll Former but with reverse face with the S2 Mark being on the inside of the scroll. Form the scroll until the S2 mark touches the scroll formers segment. Repeat this with the other Component 3.
- 8 Next, with a spare piece of steel set up the Riveting/Bending/Rolling tool to bend an angle of 90 Degrees - as shown in Template 1. Take care to set this angle

carefully as it is important when bending all B1 bends on all the components in the clock.

- 9 With the angle set correctly place, place component 2 into the Riveting/Bending/Rolling Tool and bend at position B1 nearest the scroll and then bend at the other position B1 but on the opposite side of the bar so that you have a component as shown in Diagram 2. Then repeat for the corresponding component 2.
  - 10 With the angle still set at 90 degrees, place component 1 into the Riveting/Bending/Rolling tool and bend at the four positions marked B1 to get the shape shown in Diagram 1. Repeat this on the other corresponding component 1.
  - 11 With the angle still set at 90 degrees, place component 4 into the Riveting/Bending/Rolling tool and bend at position B1.
  - 12 Next set up the Riveting/Bending/Rolling tool to roll a circle by removing the riveting posts and fixing the Winding Handle into position. Then take component 4 and roll a circle from the right angle bend along the longer section bend until the end of the bar slightly overlaps the right angle bend as shown in diagram 4. Test the spring of the formed circle's ability to grip the clock insert and either form a slightly tighter scroll if loose or open out the circle slightly if too tight.
  - 13 Then on a flat surface layout the two component 2's, the two component 3's and component 4 as shown in Diagram 5. Make sure the top scrolls of each component 3 touch the inner frame (component 2) at hole position H4. Mark the points on the edge of the bars at the points where the components touch so that holes can be later punched and the metalwork riveted together.
  - 14 Next adjust the platform on the Punch/Shear tool so that it is ready to punch holes in 10mm x 1.6mm (3/8" x 16 Gauge) steel. Take a small piece of spare material in this size and punch a sample hole. The hole should be on the centre line as shown in the picture below. If not adjust the punching platform height with the allen key provided on the adjustment bolt, either up or down (as necessary). Move the sample piece of bar and punch another hole to test if alignment is correct. When you have got the hole central tighten up the adjustment bolt.
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- 15 Now take each Component 2 and punch holes H3, H4 and H5 and also the point where the two scrolls meet at the top as marked in Step 13.
  - 16 Next take each Component 3 and punch holes at the points marked in step 13. This should be the point where the scroll touched H4 on Component 2 and also the point where the two bottom scrolls of each component 3 come into contact.
  - 17 Next take Component 4 and punch hole H6 and finally take both Component 5's and punch holes H2 and H5.

Continued Overleaf

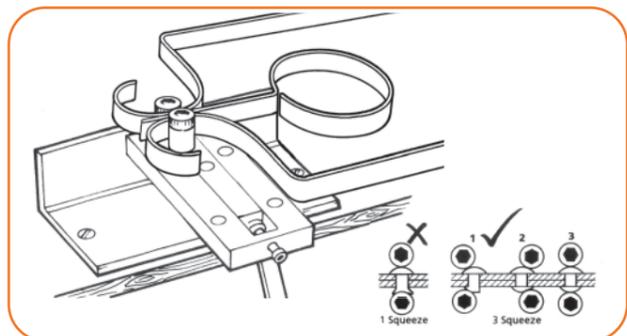
J&C WOOD



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Starter Pack 2  
PROJECT 3:  
CARRIAGE CLOCK

**18** Then set up the Riveting/Bending/Rolling Tool for riveting by ensuring the two rivet posts are fitted and the Winding Handle (for rolling) is removed. Start by taking one component 2 and one component 5 and placing a 6mm x 3mm (1/4" x 1/8") rivet through holes H5 in both these components. Use the tool to rivet the two pieces of metal together (as shown in the diagram below). Repeat this for the remaining pair of component 2 and 5. - Note after riveting you will have to straighten Component 5 by hand so it is at right angles to component 2.



**19** Next use the 8mm x 3mm (5/16" x 1/8") Nuts and bolts to assemble the frame together as shown in diagram 5. When this is done, go round each joint in turn and replace the nut & bolt with a 6mm x 3mm (1/4" x 1/8") and rivet the joint with the tool. This should complete the construction of the inner frame.

**20** Then just as in step 14 adjust the platform on the Punch/Shear tool so that it is ready to punch holes in the centre of 20mm x 3mm (3/4" x 1/8") steel. When you have got the hole central tighten up the platforms adjustment bolt.

**21** With the Punch and Shear tool set, take each component 1 and punch holes H1 and H2.

**22** Then take the base plate supplied and mark out the holes H1 and H3. Before punching check the marked

holes H3 match up with the inner frame (Component 2) H3 holes. Similarly, check that the four H1 holes in the two component 1's match the H1 hole positions marked on the base plate. Make any adjustments accordingly and punch these adjusted H1 and H3 holes in the base plate.

**23** Assemble the inner frame and and outer frames to the base plate as shown in diagram 6 using the 8mm x 3mm (5/16" x 1/8") Nuts and bolts to check hole alignments and make any adjustments by re-punching any mis-aligned holes.

**24** When this is done, go round each joint in turn and replace the nut & bolt with a 8mm x 3mm (5/16" x 1/8") and rivet the joint with the tool. This should complete the construction of the project.

**24** And that is your carriage clock completed. Once the project is painted, simply attach the four rubber bumper feet to the underside of the base plate to protect surfaces from getting scratched. Finally, affix the clock insert to the sprung ring in component 4.

We hope that these these Starter Projects have helped you teach you the basics of using Metalcraft tools to make simple practical and decorative metalwork.

The finished clock can be painted in a wide variety of finishes (smooth, satin, hammer and metallic) either by aerosol or by brush application. Powder coating and plastic dip finishes can also be applied but these type of finishes are more for commercial/industrial scale finishing.

However, even with aerosol or paint finish you can make your finished item look professional. In this case we used paints from the Plasti-kote and Hammerite ranges - available from most DIY and Painting/Decorating outlets. For best results, always follow instructions on the tin and make sure the metal is free of all scale, dirt, grease or rust.

In the section on the opposite page, we show how you can use you imagination and go on to make other types of clock with components available from Metalcraft.



Same design but with a Square Clock insert

## Development Of Carriage Clock Idea



Alternatively, you can make a simple wall clock again using the same ready made clock insert as we used in this project. Here we have gone for an ornate style with lots of scrollwork.



For those with tools from our Master or XL ranges, shapes can be welded and more modern looking clocks can be produced as shown with this example.

Once you have made the unique Carriage clock in the project you can adapt the idea to make a much wider variation of clocks by using our other clock kit components. This one uses one of our special pendulum clock movements, plus clock hands and a chapter ring clock dial and clock face plate.



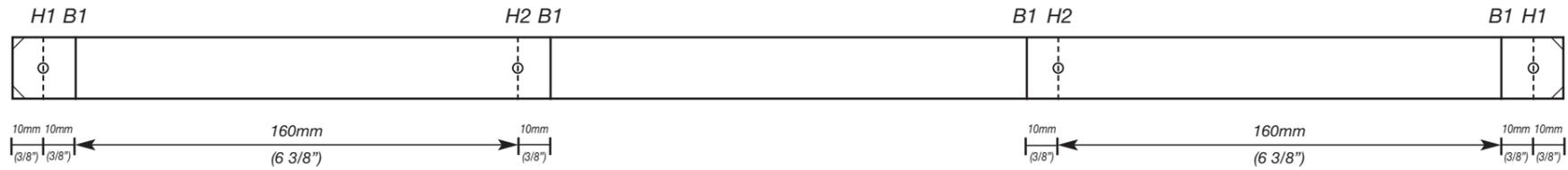
Clocks can be complex or as simple as you want to make them. This example takes some flat bar rolled into a curvy shape on our XL5+ Power bender.



Using similar components, this wall clock was created with the Practical tool range and uses scrolls as a striking in-fill pattern.



# Starter Pack 2 PROJECT 3: CARRIAGE CLOCK - DESIGN SHEET



Component 1 - Outer Frame (x 2)

Overall Length:  
490mm (19 1/2")

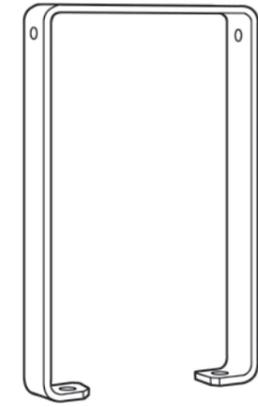
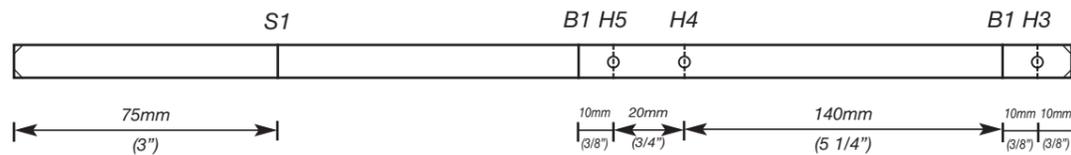


DIAGRAM No. 1



Component 2 - Inner Frame & Carrying Handle (x 2)

Overall Length:  
300mm (12")

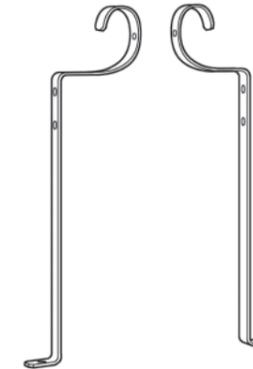
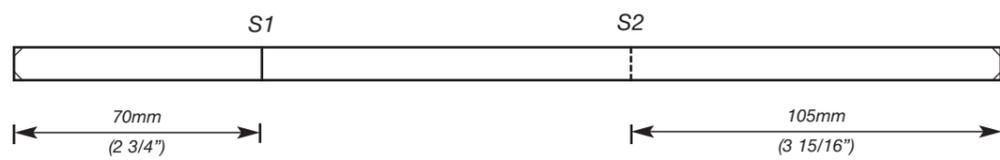


DIAGRAM No. 2

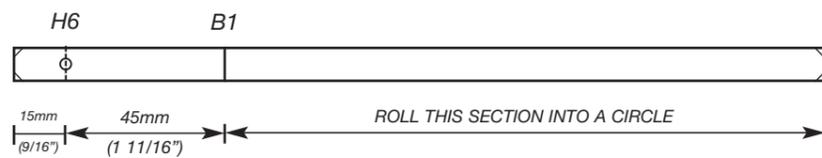


Component 3 - Inner Frame In-fill Scroll (x 2)

Overall Length:  
280mm (11 1/4")



DIAGRAM No. 3

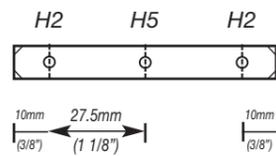


Component 4 - Clock Insert Holding Ring

Overall Length:  
230mm (8 5/8")



DIAGRAM No. 4



Component 5 - Joining Strip (x 2)

Overall Length:  
75mm (3")



Component 6 - Base Plate

## List of Materials Required:

- 2 x 920mm (3ft) Length of 20mm x 3mm ( $\frac{3}{4}$ " x  $\frac{1}{8}$ ") Steel Strip [Re-Order Ref: MC039]
- 2 x 920mm (3ft) Length of 10mm x 1.6mm ( $\frac{3}{8}$ " x 16G) Steel Strip [Re-Order Ref: MC031]
- 6 x 6mm x 3mm Rivets ( $\frac{1}{4}$ " x  $\frac{1}{8}$ ") [Re-Order Ref: MC050L]
- 10 x 8mm x 3mm Rivets ( $\frac{5}{16}$ " x  $\frac{1}{8}$ ") [Re-Order Ref: MC051L]
- 15 x 8mm x 3mm Nuts & Bolts ( $\frac{1}{3}$ " x  $\frac{1}{8}$ ") [Re-Order Ref: MC059L]
- 4 x Small Rubber Bumper Feet [Re-Order Ref: MC1274]
- 1 x Small Classic Base Plate [Re-Order Ref: MC1255]
- 1 x Clock Insert [Re-Order Ref: MC1353W supplied in kit (or MC1353G)]

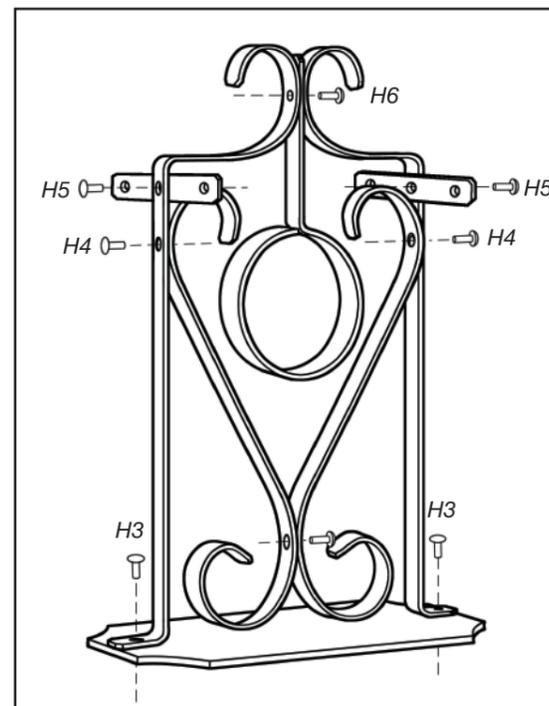


DIAGRAM No. 5

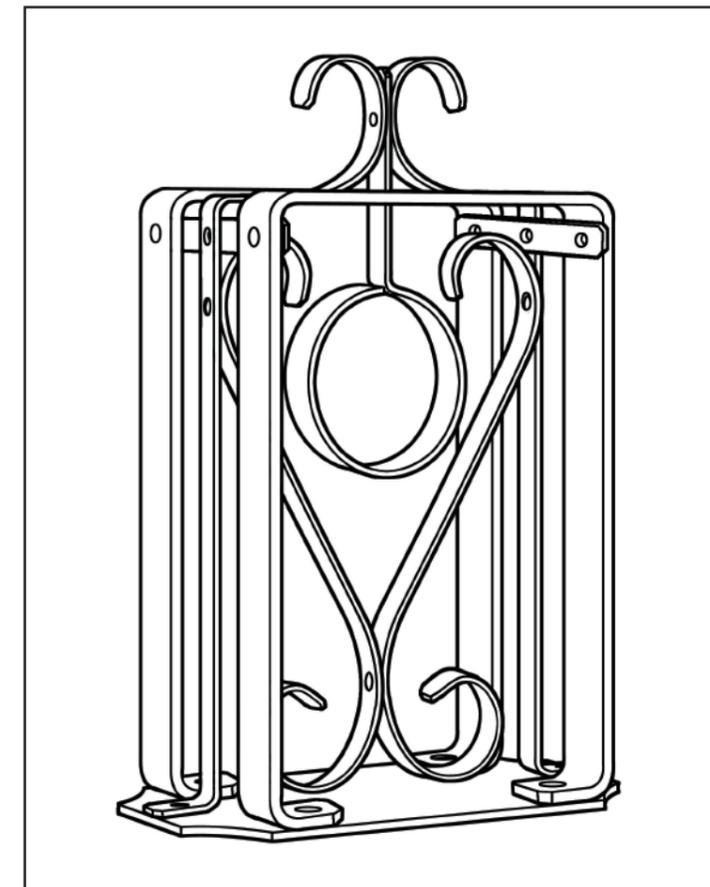


DIAGRAM No. 6

TEMPLATE No. 1

90 degrees