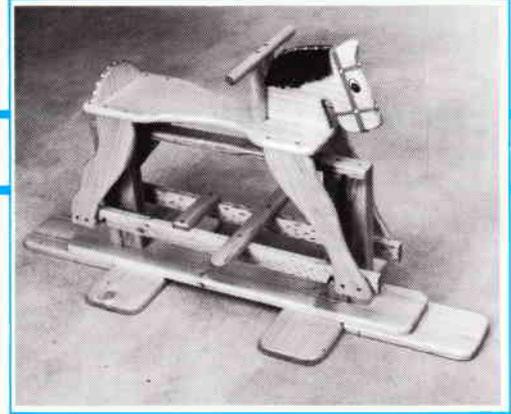


Rocking Horse

Constructed by
 Neil Alexander

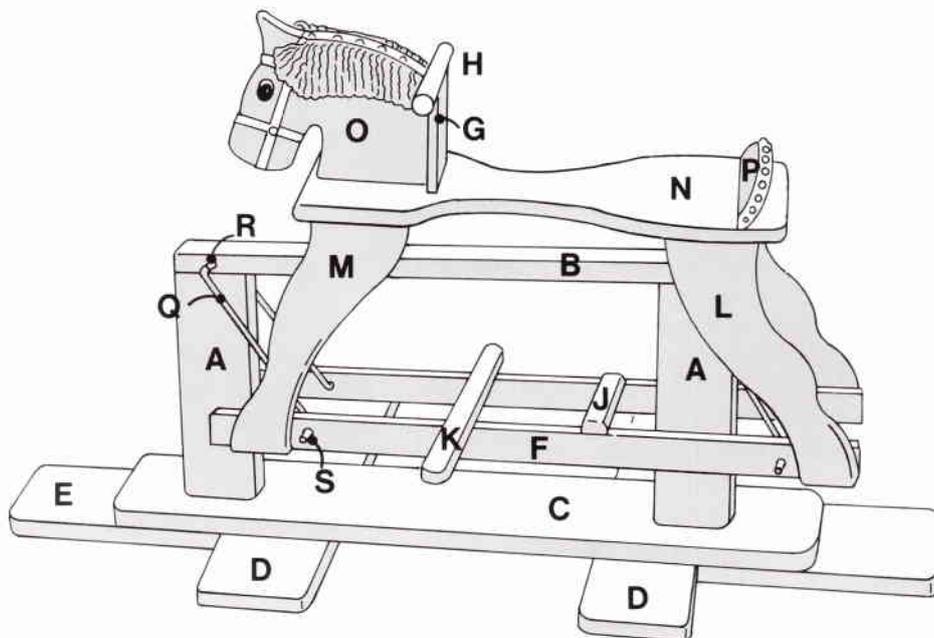


This delightful rocking horse should provide hours of fun for children between the ages of eighteen months and four years. The shaping of the curved components is done by using a jigsaw mounted in the Triton Router and Jigsaw Table. Your power saw mounted in your Workcentre is also needed, and a router and rounding-over bit will make easy work of the routing of the various edges.

Component Specifications *All dimensions are in mm.*

Part	Description	Quantity	Width	Thickness	Length	Part	Description	Quantity	Width	Thickness	Length
A	Upright	2	90 x	45 x	300	K	Footrest/Frontstop	1	42 x	19 x	340
B	Top cross-piece	1	45 x	20 x	640	L	Rear leg	2			
C	Upper base	1	140 x	19 x	850	M	Front leg	2			
D	Base cross piece	2	140 x	19 x	400	N	Seat	1	190 x	19 *	
E	Base end piece	2	140 x	19 x	270	O	Head	1			
F	Lower rail	2	42 x	19 x	730	P	Saddleback	1			
G	Handle support	1	90 x	19 x	130	Q	Bracket	2	6mm dia. steel rod		575
H	Handle	1	25 dia. dowel	x	250	R	Upper bush	2	6mm internal dia. tube		45
J	Rear stop piece	1	42 x	19 x	140	S	Lower bush	4	6mm internal dia. tube		20

*All are cut from the 190 x 19 stock using the jig-saw after marking out from patterns.



Tool Requirements

- ESSENTIAL** Triton Workcentre and your power saw, Router and Jigsaw Table, jigsaw, pencil, measuring tape, electric drill with 3/32", 7/64", 1/8", 5/32", 3/16", 7/32", 19/64" and 19mm drill bits, countersink bit, screwdriver, hammer, Triton Sanding Disc or similar, woodfile or spokeshave, fine grade sandpaper. For bending the steel rod: Hacksaw, machine vice.
- USEFUL** Router with 3/8" (9mm) rounding-over bit, belt sander, double-sided tape (3M Scotchbrand No. 410... available from most Artist's Supplies).
 For bending the steel rod: "Handi-colt" or similar oxy-acetylene system.

Construction Details

Material Shopping List

1. WOOD Any furniture grade material will do, as long as it is straight and free of defects. Radiata Pine is economical and easy to work.

Shop for:-

90 x 45 — 1 @ 0.6m

45 x 42 — 1 @ 0.9m

42 x 19 — 1 @ 2.1m

140 x 19 — 1 @ 2.4m

190 x 19 — 1 @ 1.8m

and hardwood dowel: **25mm diameter dowel**
1 @ 250mm.

2. METAL (For the brackets **Q**)

6mm diameter steel rod — 1 @ 1.2m

6mm internal diameter tube* — 1 @ 0.2m

*Ask your hardware store for chrome-plated "gym rod" — used for children's callisthenics.

(We suggest that you buy some extra steel rod to practice on).

3. FASTENING

* 17 x 40mm 8G brass screws

* 8 x 30mm 8G brass screws

* 2 x 50mm 10G brass screws

* 8 x 60mm 12G brass screws

* 16 x 30mm bullet head nails

Also PVA or equivalent wood glue.

4. MISCELLANEOUS (Optional)

2 plastic eyes, available at craft shops; 17 brass or gold coloured upholstery tacks; multi-ply wool cut to 100mm lengths; 12mm wide strip of soft leather, approximately one metre long. (As an alternative to making these "trim" items, you can paint on the eyes, mane, bridle etc. between coats of finish).

5. FINISHING

Two coats of satin polyurethane were used to protect the timber.

After the patterns from **Figure 1** have been transferred to full scale drawings, cut out each shape with a pair of scissors. Arrange these on the 190 x 19 x 1800mm stock and mark them out. To lessen waste, the front and rear legs can be arranged side by side. Place the patterns of the saddleback piece **P** and the horse's head **O** with their straight lines running along the straight bottom edge of the stock.

Mark out the positions of the holes at the same time (**S1**, **S2** and the 19mm hole). Bore the 19mm hole in the hollow of the throat (of the horse's head) at this stage.

With your Workcentre in the tablesaw mode, rip the 45 x 42mm material down to 45 x 20mm. Convert to the crosscut mode and cut components **A** to **F** and **J**, **K** and **H** to length, using the component specifications as a guide.

Crosscut both ends of seat **N**, the rear of the head **O** and the length of the handle support **G**. Then rip the handle support down to 90mm wide.

General Points

1. The most difficult part of the construction is the bending of the metal rods which form the brackets **Q**. These metal brackets must be bent symmetrically, and at the correct distances and angles; an appropriate heat source such as an oxy-acetylene torch facilitates this operation. You may wish to find a metal workshop that will do this for you. (Don't forget that the central bush **R** must be fitted during the bending process, and cannot be fitted later).

2. To obtain full size patterns from **Figure 1**, you will need a sheet of paper 700 x 550mm. Draw a grid of 25mm x 25mm squares onto your paper (28 squares by 22 squares). Transpose the intersections of the pattern and its grid lines from **Figure 1** onto your full size drawings, and then join these points together to obtain your full size pattern.

Figure 3.

3 Use a jar top or similar (approximately 50mm in diameter) to mark out a radius on each corner of the upper base piece and the base cross pieces (components **C** and **D**). On the base end pieces **E** mark the same radius on the corners of one end only.

Fit your jigsaw into the Router and Jigsaw Table and cut out all the components marked out in Step 1.

Also cut round the corners marked out on components **C**, **D** and **E**. If the rounding is too difficult to do in one cut, make a series of cuts at different angles.

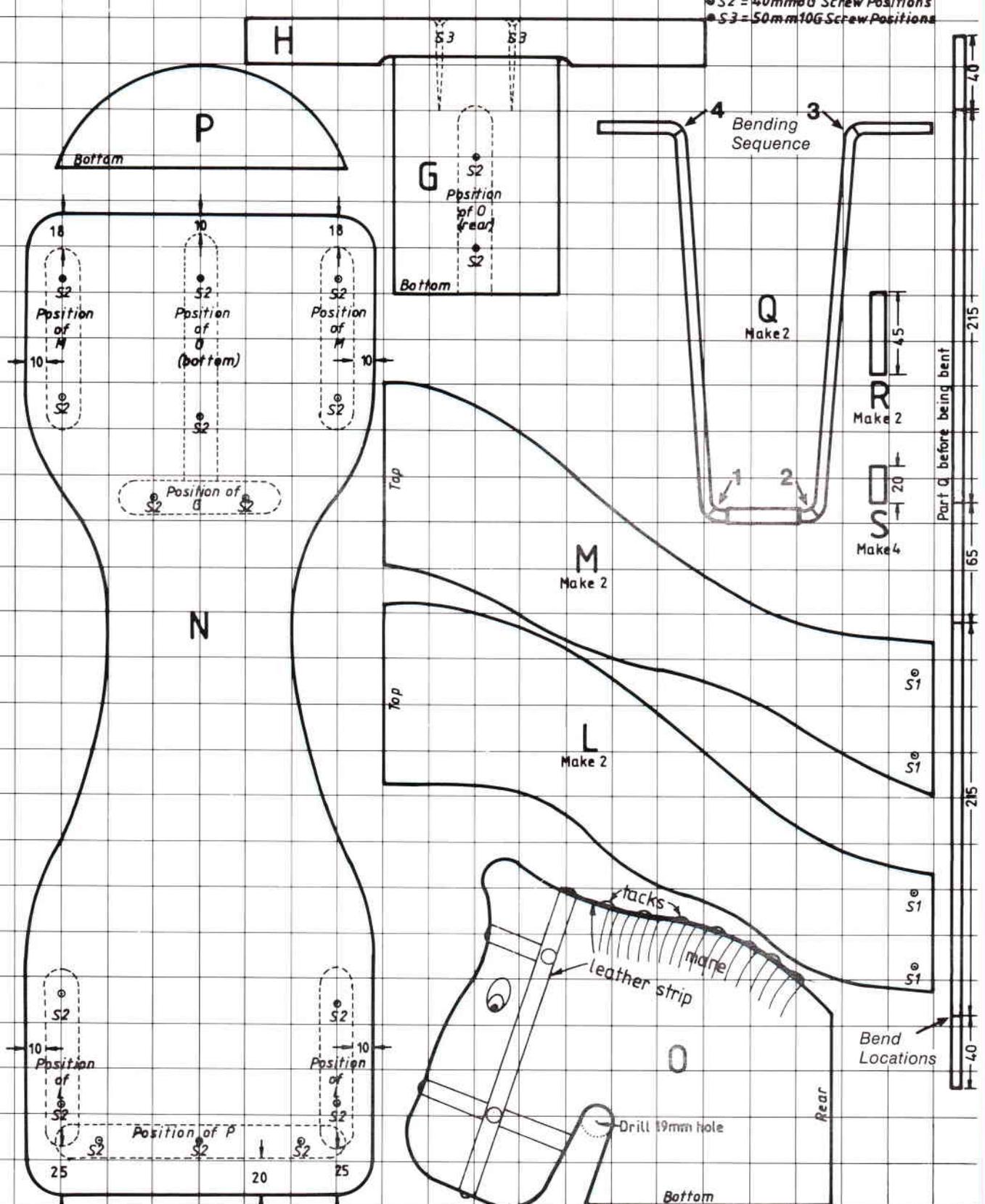
Note: When cutting with a jigsaw, it is difficult to cut exactly on the line. Cut just to the outside of the line and finish off shaping by hand later. Also, the pattern is just a guide, so if you stray off slightly, or inside the line, it does not matter greatly, as long as the finished shape is smooth and pleasing to the eye.

You should now have 13 pieces cut for the horse, and 8 pieces cut for the stand.

4 Apply two strips of the double-sided tape to one front leg and then join the other front leg to it by carefully aligning both pieces and pressing firmly together. Repeat with the rear legs. In this way, both sets of legs can be shaped as one, making each set identical.

Fit the Triton Sanding Disc to your power saw set up in the table saw mode. First square the ends (top and bottoms) of the legs, and then carefully sand the convex (outward facing) curves.

- S1 = 30mm ØG Screw Positions
- S2 = 40mm ØG Screw Positions
- S3 = 50mm Ø10G Screw Positions



SCALE=1:3 All measurements are in millimetres. One grid square = 25mm x 25mm.

 Areas to be rounded over with a router or hand finished with a file or sandpaper.

FIGURE 1

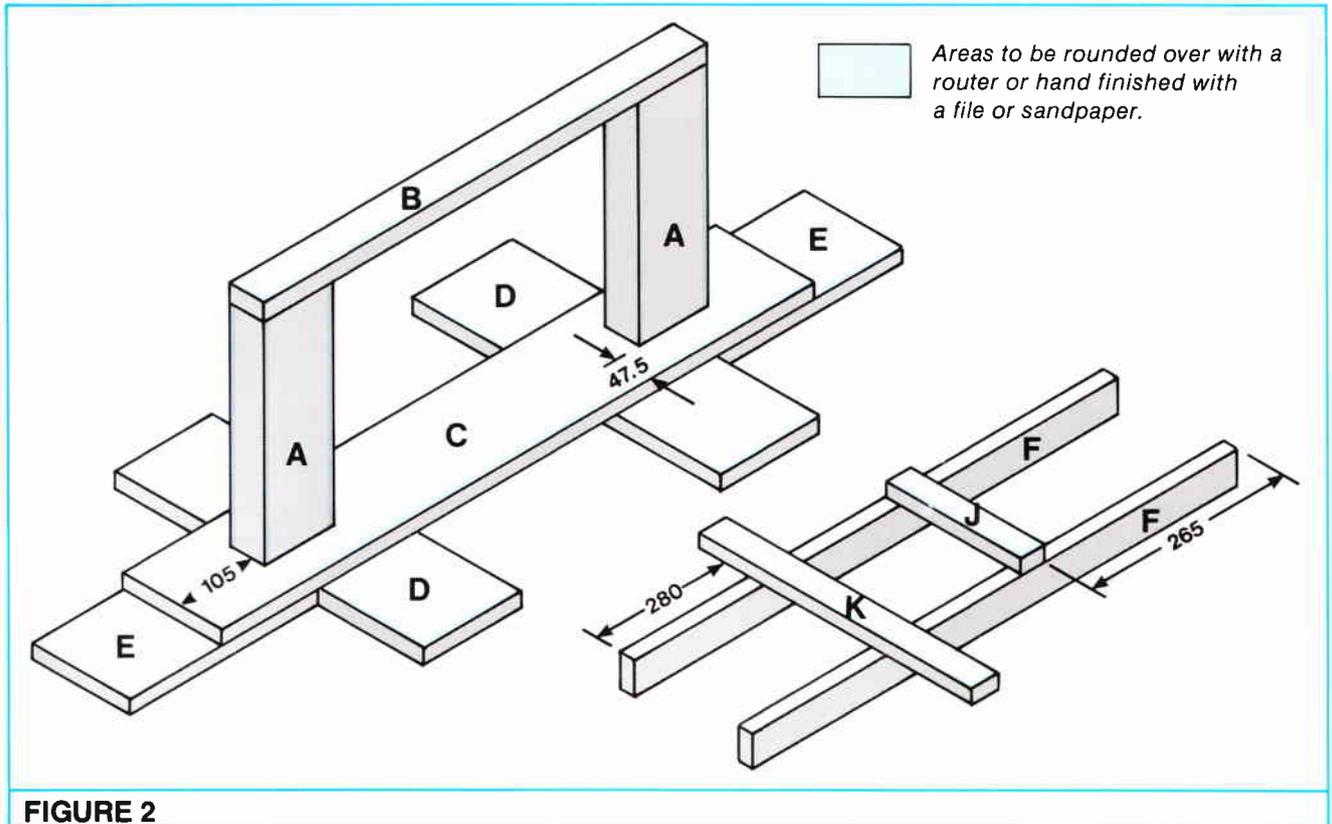


FIGURE 2

Round off all the corners and/or smooth out the curves on the seat, head, saddleback, and the base pieces, components **N, O, P, C, D** and **E**.

All internal (concave) curves can be finished either by hand, using a wood file, or a spokeshave, or by using a belt sander, with care. **Figure 4**. When the shaping is completed, separate both sets of legs and remove the tape.

5 If you have a router and a rounding-over bit (3/8" or 9mm), fit this into your Router and Jigsaw Table and set up in the shaper table mode.

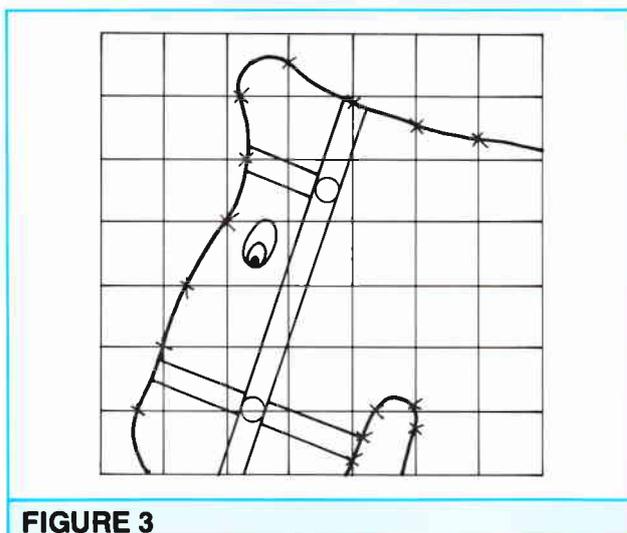


FIGURE 3

Round over both sides of the legs, seat, head, handle support and the sides of the uprights, components **L, M, N, O, G** and **A**. Don't round over any edges that butt up to other components, for example, the tops and bottoms of the uprights **A**, the tops/bottoms of the legs **L, M** etc.

Round over the top face edges only of parts **B, C, D, E, J** and **K**.

Figures 1 and **2** show all the edges to be rounded over. This may be done by hand if you do not have a router.

6 You can also use a router in the shaper table mode to cut the required flat section into the dowel for the handle **H**.

Use masking tape to attach the dowel to a piece of 19mm scrap timber. Masking tape should be applied to both sides of the dowel and timber interface to securely hold the dowel. Measure 77mm in from each end and mark. Now using a straight cutter in the router, cut a flat section between the two marks until you have a 19mm wide flat area that will sit on top of the handle support **G**. (as in **Figure 1**) **Figure 5** displays the procedure. You can also do this by hand, using a handsaw and chisel.

This completes the cutting of the timber. Putty all open knot holes or crevices and hand sand all your pieces with fine sandpaper.

Construction Details



FIGURE 4

7 Assembling the Horse.

Partial assembly can begin, starting with attachment of the legs **M**, **L** to the seat **N**. Note from **Figure 1** where the legs butt onto the seat; mark out these positions, and drill $3/32''$ pilot holes for the screws through the seat and into the legs (the screw hole positions should have been marked out during Step 1). Drill the seat holes out to $5/32''$, countersink, and then glue and screw the legs onto the seat with 40mm/8G screws (two per leg). Do not overtighten the screws as they are in end grain. Fit the saddleback **P**, the handle support **G**, the handle **H** and the head **O** in turn, using the same method. The handle is fitted using two 50mm/10G screws.

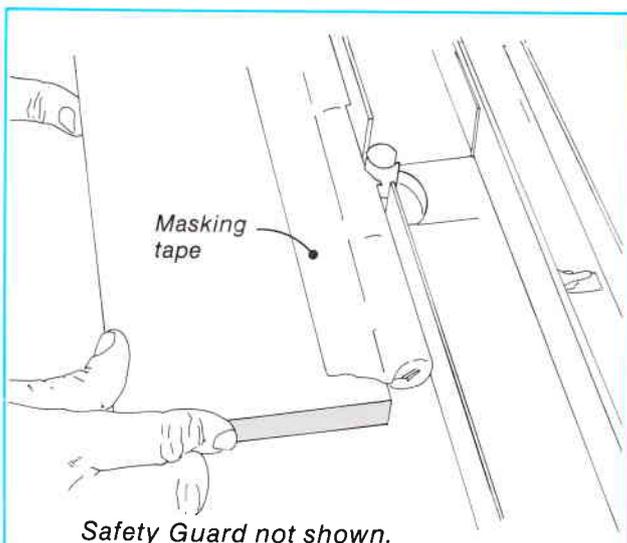


FIGURE 5

8 Fit the lower rails **F** to the inside of each leg, using two 30mm/8G screws per leg – but do not glue yet, as these must be dismantled later. The best way to do this is to stand the horse on a flat surface and then sit the rails inside and against the legs to ensure correct alignment.

Measure 265mm from the rear of each rail and mark. Fit the rear stop piece **J** using two 40mm/8G screws; the ends should be flush with the outside faces of the rails.

Measure and mark 280mm from the front end of each rail, and fit the footrest **K**, using two 40mm/8G screws. The ends overhang 100mm either side from the outside faces of each rail. **Do not glue** either **J** or **K** at this stage – they will have to be dismantled later.

9 Assembling the stand.

Fit **C**, **D**, and **E** together as in **Figure 2**, gluing and nailing from underneath using 30mm brads, four nails per piece. Don't nail too close to the edge.

Fit the top cross-piece **B** onto the uprights **A**, using four 60mm/12G screws (two per upright). Do not glue yet. Drill a $19/64''$ hole centrally through the **join** of the bottom face of **B** with the end section of **A**. It is advisable to use a drill press or stand if one is available – if not, drill the holes as squarely as possible. (**Figure 6**)

Now fit the upper part of the stand to its base (i.e. **A** and **B** fitted to **C**, **D** and **E**), by standing the upper part onto the lower part, overhanging the stand over the edge of your worktable and drilling from underneath. Four 60mm/12G screws are used here. The uprights **A** are 105mm in from the ends of parts **C**, and central on **C**.

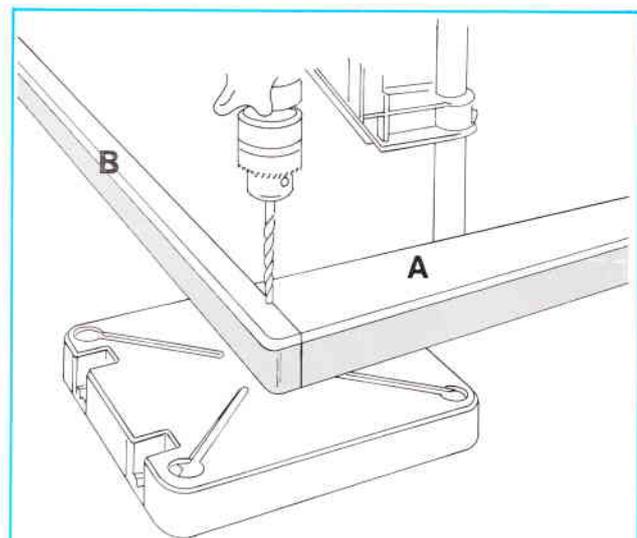


FIGURE 6

Construction Details

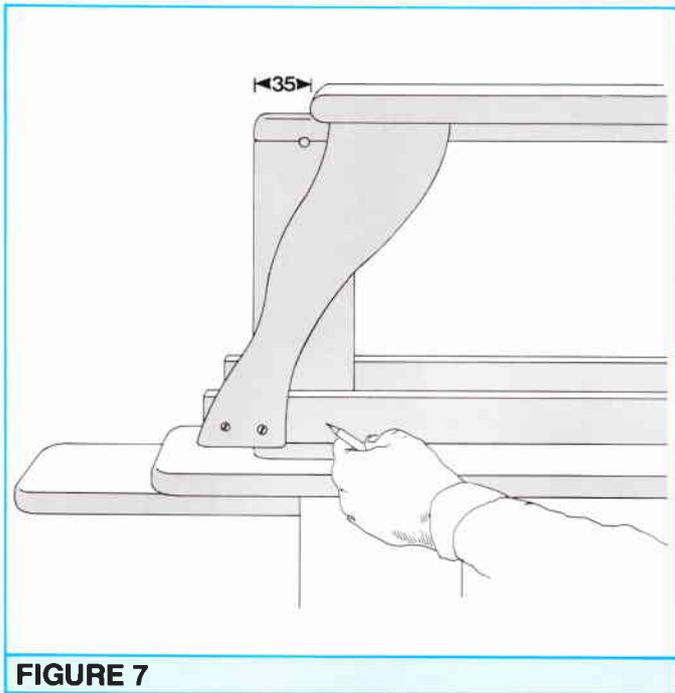


FIGURE 7

10 Unscrew the front and rear stop pieces **J**, **K** from the lower rails **F**, sit the horse over the top of the stand so that it is evenly positioned. (The back edge of the seat **N** should be about 35mm in from the back edge of the rear upright **A**, **Figure 7**.) Mark the hole position for the bushes in the lower rails. These holes should be directly below the 19/64" holes previously drilled in the join of **A** and **B**. (**Figure 7**). Mark the positions of the lower rails against each leg for correct re-positioning later, and then remove the lower rails from the legs. Drill a 19/64" hole squarely in each of the four marked positions in the lower rails.

11 **Bending the Brackets.** Cut two lengths of 6mm diameter steel rod **Q** to 575mm and mark out the positions for bending with a marking pen. The straight length is shown in **Figure 1**, with the positions of each bend marked. The sequence of bending is shown on the drawing of the completed bracket.

Cut two lengths of the tube to 45mm for **R** and four lengths to 20mm – **S**. Clean up all the ends of the rods and tubes, removing any burrs.

Place one of the rods into a machine vice at "Position 1", with the edge of the jaws right on your marked position. Carefully bend it to the correct angle.

Slide the bush **R** onto the rod and into position. Place the rod back into the vice and proceed to bend it at "Position 2". Bend the lower parts of the bracket last at "Positions 3 and 4". **Figure 8**.

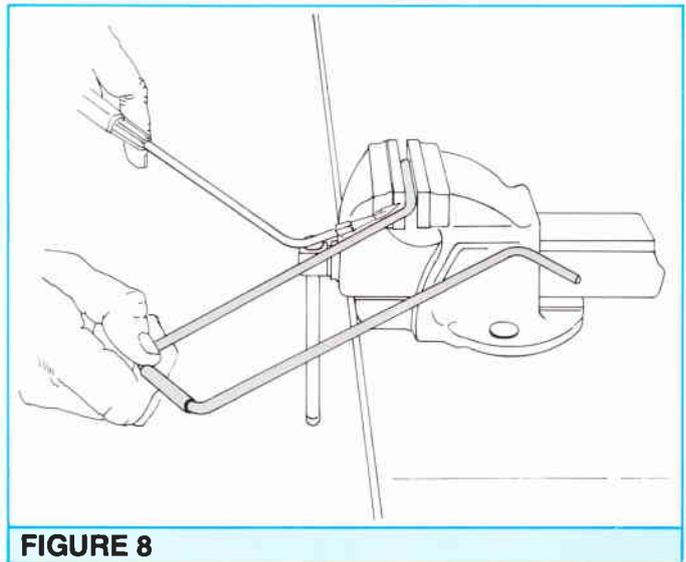


FIGURE 8

Try to keep the shape of the bracket as close as possible to that in **Figure 1**. The use of a small oxy-acetylene torch (most L.P. gas torches are not hot enough) helps in achieving tight, sharp bends. Repeat the above procedures for the second bracket. It is important that the bushes **R** move freely on the brackets to allow the horse to swing smoothly.

Tap each of the 20mm long bushes **S** into the holes in the lower rails **F**. This is a tight fit, so take care not to damage the ends of the bushes with your hammer.

12 Unfasten the four 60mm/12G screws to separate **B** from **A**, and place each bracket into the half-hole in part **A** locating the bush **R** evenly in each hole. Replace **B**. Fit the lower rails **F** onto the brackets, locating the ends of the brackets into the bushes in the rails. Re-attach the lower rails to the legs in their correct locations, and glue and screw them together. Replace the footrest and stop **J** and **K** also.

The rocking horse should swing freely back and forth with the footrest and rear stop limiting the travel of the horse.

13 The addition of the eyes, mane and bridle to the head and a decorative strip of the leather secured with upholstery tacks on the saddleback **P** provide the finishing details. Alternatively, you can paint these features on, between coats of polyurethane.

These features are only limited by your artistic imagination.

When the rocking horse is finished it should delight children with its up-down/forwards-backwards motion.