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The wooden base constructed for the clock. It is constructed from veneered plywood and hardwood mouldings.



A drawer to the front houses the dry cells which supply power to the Archimedes screw drive motor.

# A FERRIS WHEEL CLOCK

**Richard Stephen**

concludes this series of articles with a description of the base.

●Part XIII continued from page 155 (M.E. 4188, 7 February 2003)

**F**igure 50 shows the base I made for my clock. The carcass was made of 10mm birch faced marine plywood covered with rosewood veneer. The mouldings around the base were also covered with veneer. The only solid rosewood used in the base was the edging around the top. The base could be made from solid timber rather than using veneer on plywood but I would not recommend this since it will make the job a lot more difficult, particularly when it comes to making the mouldings. Don't be put off by the thought of veneering; it really is much easier than you may imagine and you can choose from a huge range of lovely veneers. Frankly, I find wallpapering is a lot more difficult! When choosing the veneer,

be sure you can obtain sufficient solid timber to match for the edging around the top.

It may be that some readers do not have a great range of woodworking tools. Although I have done a lot of woodworking in the past, and still have all the tools, I used very few of them when I made the base for this clock; in fact I only used a chisel and a small plane. Most of the work was done on my milling machine using end mills and a slitting saw. All the mitres were cut by milling with an end mill; by which means it is so easy to cut mitres which are absolutely true.

The following materials will be required:

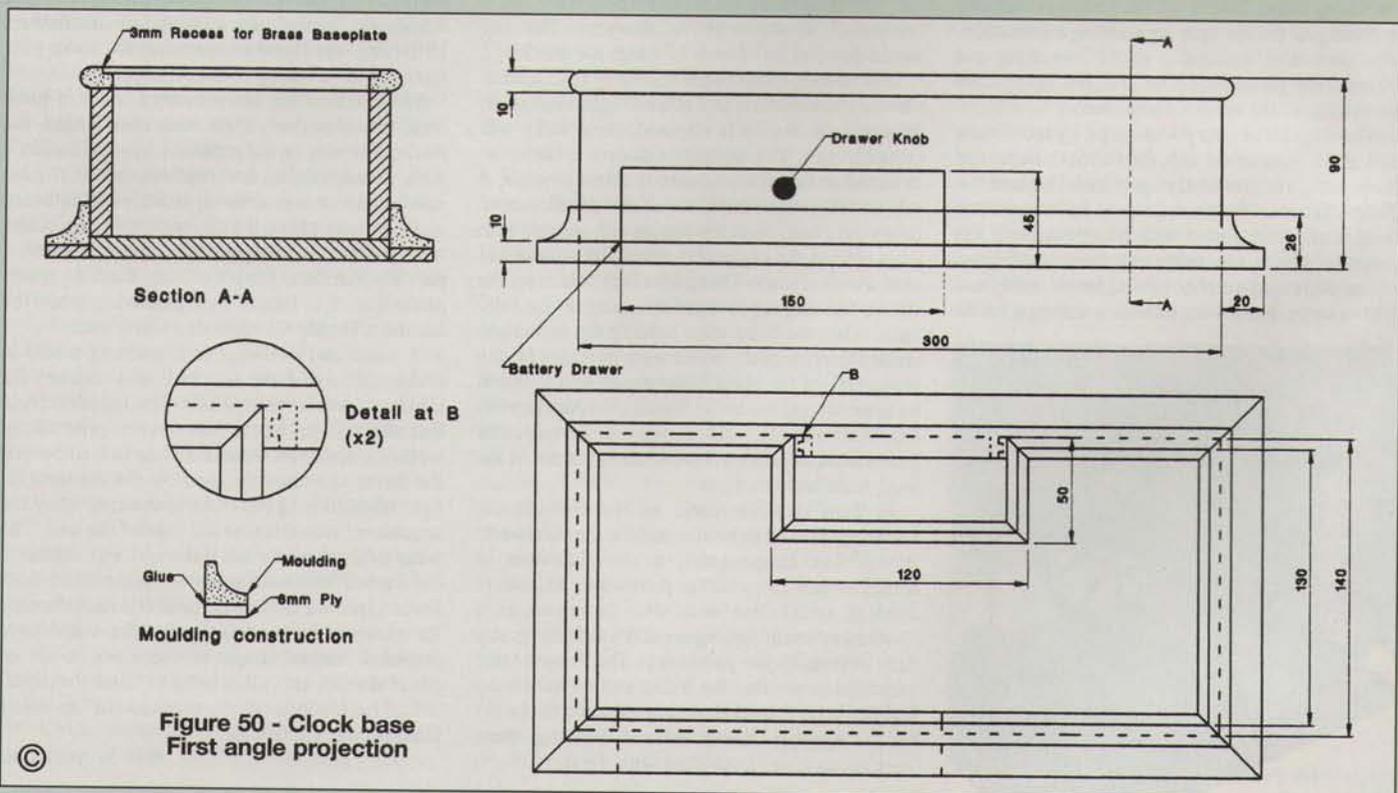
- 1: 1 piece 300 x 500mm of 10mm birch faced marine ply.
- 2: 1 piece 100 x 300mm of 6mm birch faced ply.
- 3: 1 sheet 300 x 1000mm of veneer.
- 4: 1 roll of veneering tape, (old fashioned brown paper adhesive tape).
- 5: 1 200mm length of 10 x 20mm solid wood for the top edging to match the veneer.
- 6: 1 sheet of 'iron on' veneer glue sheet.

- 7: 1 small bottle of aliphatic pva wood glue.
- 8: 1 length of 20 x 20mm concave moulding.
- 9: 1 small box of 20mm long panel pins.

## Suppliers

**Birch faced plywood** is generally available in small quantities from most good model shops. The thickest which I was able to obtain was 6mm so I glued two pieces together to get the 12mm I required. Please note that if you have to follow suit and end up with 12mm ply, the dimensions shown on the drawing (fig 50) are for a base made with 10mm material. Model shops also supply aliphatic pva adhesive which seems not to be generally available from the average DIY store. Aliphatic pva glue is superior to the ordinary variety in that it sets hard and can be easily sanded.

**Veneers** in a very wide variety of exotic woods are available from Art Veneers Co. Ltd., Chiswick Avenue Industrial Estate, Mildenhall, Suffolk IP28 7AY; tel: 01638-712550. Readers may wish





to visit the comprehensive and informative Art Veneers Co. website at [www.artveneers.co.uk](http://www.artveneers.co.uk) For suppliers outside the UK the Internet should provide other suppliers. Art Veneers Co. Ltd. can also supply glue sheet and veneering tape.

**Suitable mouldings** are available from most good DIY stores. If you can get it, the best mouldings are machined in Ramin which is quite hard, straight grained and easy to work.

A cover for the clock is essential. In my opinion these are items that are best purchased. Recently, I had a Perspex cover made by Engineering and Design Plastics, 84 High Street, Cherry Hinton, Cambridge; tel: 01223-249431. The cover was superb and the price very reasonable. I can recommend them.

### Constructing the base

The dimensions of the base are shown in fig 50. Cut the sides and the base from your piece of 10mm birch plywood. Make sure that the sides and edges are all absolutely square. The sides will be glued and pinned but before doing so, drill holes for the pins just a fraction smaller than the diameter of the panel pins you aim to use.

Prime the edges to be joined with a small amount of glue and allow it to dry. I find the glue straight from the container is generally a bit too thick and add a little water to thin it down to the consistency of pouring cream. Glue and pin the sides together checking that all the corners are square. When the glue has set, pin and glue the sides to the base and allow to dry thoroughly.

Using a suitable punch, the heads of the pins must be hammered at least 3mm below the surface of the ply. If this is not done, the heads of the pins may rust at some time and this rust will eventually stain the veneer to spoil the base. The holes left after punching are filled by gluing in lengths of wooden cocktail sticks. When the glue is quite dry the sides of the base must be sanded absolutely flat and smooth.

### Applying the veneer

Applying veneer using glue sheet is extremely easy. You will need to borrow a household iron; if you have an old one about the place, I suggest you avoid domestic strife by using this. If not, you can assure the 'powers that be' that it will come to no harm.

Begin with the two sides of the base. Cut a piece of glue sheet just a little larger than the side to be veneered. Wipe the surface of the side with a damp sponge and place the glue sheet, glue side



**Top:** The sandpaper file was made from a scrap length of Perspex.

**Left:** The mitres at the corners were cut using the milling machine and an end mill.

**Right:** The recess provided for the pendulum with its cover removed.

down, on the surface. Run over the paper backing with a warm iron until the glue adheres to the surface and then peel off the backing paper. The iron should be hot enough to just melt the glue.

Using a sharp craft knife and a steel rule, cut off a piece of veneer just a fraction larger than the side. Damp both sides of the veneer with the sponge. Iron on to the base in the same way as the glue sheet. Don't worry at this stage if the veneer lifts a bit on any of the edges. Veneer the other side and allow the veneer to cool. Wherever the veneer has lifted, poke in a little pva glue using a thin strip of scrap veneer and hold it in place with a piece of veneering tape. When the glue has set the tape can be easily removed by wetting with a damp sponge.

The edges of the veneer must now be rubbed down flush with the front and back. A sandpaper file is a useful tool for this job; I made mine from a 300mm long scrap of 8mm Perspex 40mm wide with one end shaped to form a handle. Strips of 120 grit aluminium oxide paper are stuck to the surface with double sided adhesive tape. When sanding the edges of the veneer, always sand towards the base, never away from it.

Complete the veneering of the sides of the base. You may not find it easy to get the iron into the recess for the pendulum at the back of the base; I used a length of 25 x 6mm thick brass previously heated with a blowtorch.

The solid wood edging can now be glued around the top of the base. I cut the mitres on the milling machine using an end mill, always working the wood with the grain, never against it. The advantage of cutting mitres with the mill is it is easy to shave off a 'smidgen' for a perfect fit.

Begin by cutting the mitres and gluing on the front edging strip. Work your way around the top, fitting and gluing in each piece individually. You may have to adjust the angle of the mitre slightly. The edges of the opening in the front for the battery tray can also be veneered now.

The mouldings fitted around the bottom are made next. Cut off two lengths of the moulding for the front and back with a little to spare, and two lengths for the sides. The moulding as purchased is not quite tall enough and an extra piece had to be added. Cut strips of 6mm ply and glue these to one side of the moulding as shown in fig 50. Before veneering the mouldings check that the cross-sectional dimensions of all four pieces are the same and that all the edges to which the veneer is glued are absolutely flat.

Begin by veneering the concave surface. Find a piece of bar with the same radius of curvature as the concave surface of the moulding and as long as the piece of moulding. Cut off a piece of veneer wide enough to cover the concave surface with a little to spare. Cover the length of bar with cling film. Apply glue to the concave surface of the moulding. Dampen both sides of the veneer with water. Assuming domestic approval, put the piece of veneer in the microwave for 20 seconds



at full power. While it is hot, the veneer will be quite pliable and bend easily around the concave surface without splitting. Using the length of bar as a former, bind string around the bar and the moulding to keep the veneer in place. Set aside for a couple of hours until the glue has set.

Veneer the concave surfaces of the rest of the lengths of moulding. Sandpaper the edges of the veneer flush with the remaining edges to be veneered. I used glue rather than glue sheet to attach the veneer to the edges of the moulding and a length of flat wood covered with cling film and bound with string to hold the veneer in place while the glue set.

Before gluing the mouldings around the bottom of the base, sandpaper the surface of the mouldings, finishing with flour paper. Cut off a length of moulding for the front of the battery tray and put it to one side. Start gluing the moulding around the base with the piece to the right of the battery tray opening. Cut off one end square and sandpaper it smooth. Size the end grain with glue and allow to dry. It may be necessary to repeat the sizing to get a suitable surface on which to glue the veneer. Glue a piece of veneer on the sized end, sandpaper the edges flush and finish sand the surface. Cut the mitre with a milling cutter and glue the moulding in place. If the two surfaces in contact are smooth and perfectly flat, the glue will grip adequately to hold the moulding in place until the glue dries. Fit and attach the rest of the mouldings.

The battery tray and cover for the pendulum recess are all that remain to be made. Readers should have no difficulty making and fitting either of these parts.

The final task is to cut the recess in the edging around the top of the base for the brass base plate. The recess is not essential and if cutting it poses a difficulty it may be better not to bother. I machined the recess on the milling machine with little difficulty.

Finally, attach the two brass brackets to the inside of the base. Position the brass base and mark the positions of the holes for the 3mm screws which secure the clock to the base. This completes the base except for final sanding and polishing. To polish my base I treated the veneer with several coats of sanding sealer, sanding lightly between each coat until I obtained a dead smooth surface. To obtain a final shine I used French polish.

All that remains is to fully assemble the clock and test it for several weeks before polishing all the brass parts.