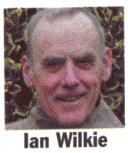
Flying high



Ian Wilkie

Ian Wilkie takes a flight of fancy and offers a simple project which could suit younger turners as few tools and only small blanks are needed to make this colourful little squadron

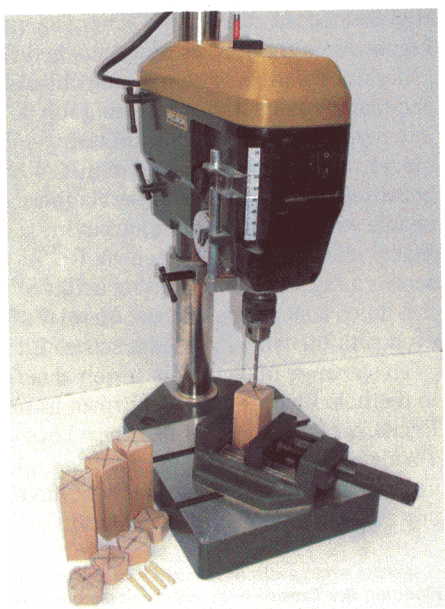
These little aircraft decorations will be popular with children and they can be displayed in several ways. I have given instructions for four aircraft, but there is no reason why you can't make as many as you have time for and ring the changes with the colours and design. This is an ideal project for a youngster to turn under supervision because there are no large pieces of intimidating timber whirling round. It illustrates careful preparation of the wood to be turned, the use of a bench drill and a small lathe, together with systems to hold wood. Only a few woodturning tools are needed and the materials, with the exception of the hardwood blanks, can be obtained from model suppliers such as Hobby's (Tel. 020 8761 4244).

Only a few miniature tools are needed for the project

Children should have no problem when it comes to cutting out the wings with a powered fretsaw, and the painting and decorating stages will be very popular. Although I have used the SIP Mini lathe, which is particularly suited to such projects, any sized lathe will do. The emphasis here is more on the method used to hold such small pieces of wood for turning.

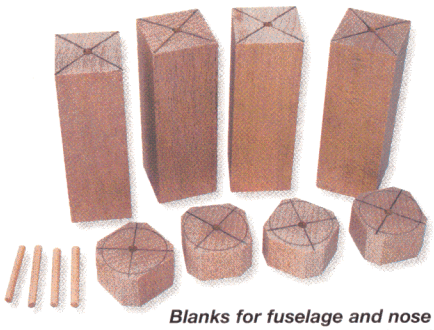
Fuselage

1 Prepare the four blanks (90 x 30 x 30mm) for the fuselage taking care to cut the ends exactly square. Don't be tempted to use a circular saw or a bandsaw to cut such small blanks - a mitre saw is a much safer option and it will cut the ends accurately. Mark the centres at each end and centre pop. Hold each blank in turn in a good quality machine vice and use a bench drill to drill one end with a 4mm diameter x 20mm deep hole. This is the correct pilot hole size for the Marlin screw chuck. If you have a thread protector/ejector, it is well worth using it. Both Record and Axminster produce such accessories.

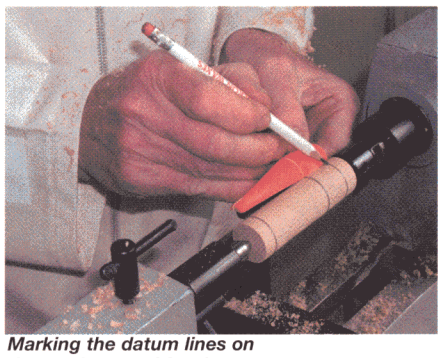


Proxxon TBH drill press and the excellent machine vice

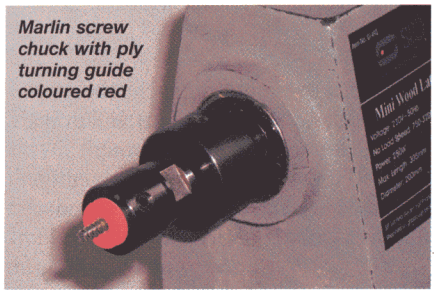
2 Fit a small revolving centre in the tailstock. The Planet Slimline is ideal for a lathe of this size because it does not get in the way. This is a reliable and accurate product which has both thrust and axial bearings.



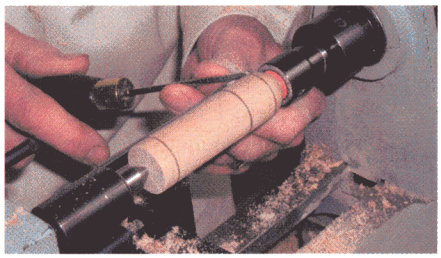
Blanks for fuselage and nose cone together with lengths of dowel



Marking the datum lines on the partly turned fuselage



Marlin screw chuck with ply turning guide coloured red



Round off front end of fuselage down to the turning guide

3 Make sure that the headstock Morse taper is clean before inserting the Marlin shank. Pass the draw bar through the outboard end of the lathe, screw on the nut and tighten. This bar will ensure that the shank cannot work loose when no tailstock support is used.

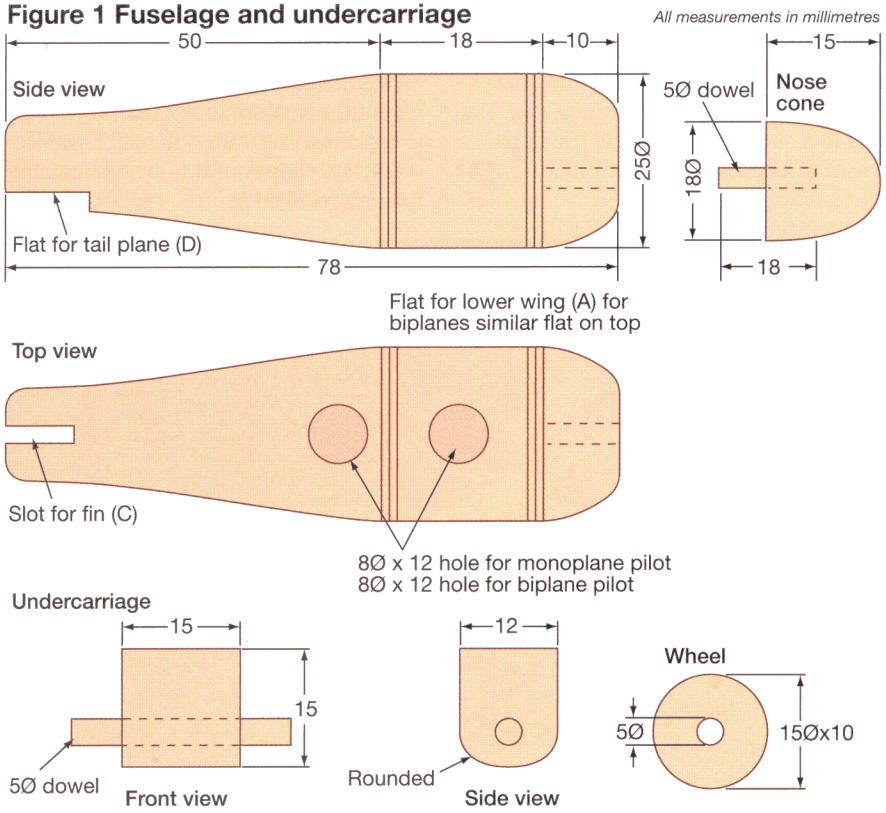
4 Make a spacer to use with the screw chuck accessory with a diameter of 18mm from 4mm thick plywood. This both protects the face of the screw chuck and acts as a turning guide for the end of the engine cowling.

5 Screw the Marlin screw chuck to the shank with the red fibre washer provided in place. Screw on the spacer and then the first blank. Bring up the tailstock support and position the short toolrest.

6 Check that the work revolves accurately and turn the blank to a diameter of 25mm with a small roughing out gouge. Turn each of the four fuselage blanks in this way.

Figure 1 Fuselage and undercarriage

All measurements in millimetres



THE MARLIN SYSTEM

Accessories for a very small lathe such as the SIP Mini lathe, which I reviewed in the August issue, need to be selected with care so that they do not put a strain on the bearings or take up too much space between centres. Regular readers will know that I often use the versatile Multistar Marlin system when turning wood for miniature projects.

Beginners may find the Marlin brochure confusing when selecting accessories for the system so here I will just concentrate on the parts I used to make the aircraft project - other items can always be added at a later date for specific tasks.

Multistar Marlin accessories used in this project

- The shank (£11.15) is available in Nos.1, 2 or 3 Morse taper sizes and is central to the system. It has a threaded nose which takes screw-on heads. A 5mm diameter stainless steel centre pin is included to fit any prong drive head accessory.

- The draw bar screws into the other end of the shank and is passed through a hollow headstock and secured with a nut to ensure that it cannot work loose.

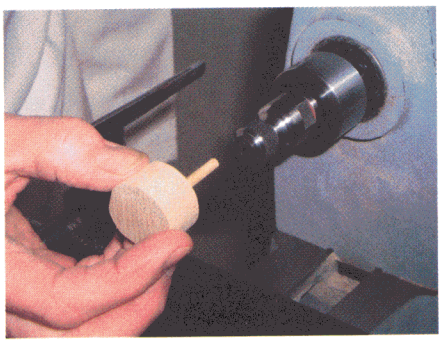
- The screw chuck (£12.93) screws directly onto the shank. The high performance replaceable Riesser screw will hold wood blanks up to 100mm diameter. I suggest that you grind the tip of the screw point off because it's extremely sharp.

- The collet chuck (£16.10) comprises a body, brass cap and a set of collets. Blanks can be held by means of an accurately prepared spigot turned to suit one of the eight glass filled polymide collets with diameters 0 to 6mm.

- The Rohm drill chuck (£12.68) has a capacity of 1.5mm to 13mm and screws onto the Morse taper shank. It is very accurate with a hardened gear ring.

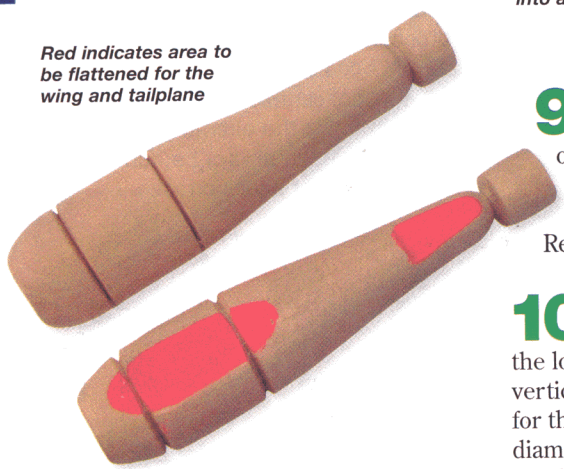
Multistar, from Hegner UK
Tel: 01323 442440

Checking the diameter with the lathe stationary



Glued in dowel can be fitted into a polymide collet

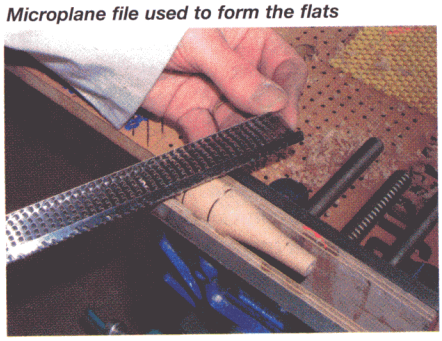
Red indicates area to be flattened for the wing and tailplane



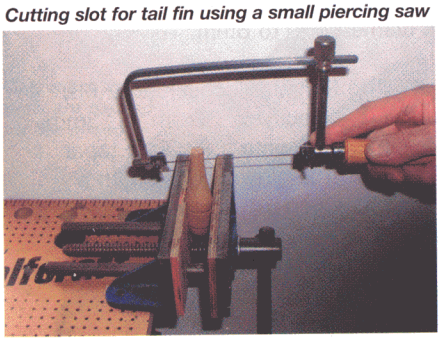
7 Remount the first blank and, using the template shown in the drawing, mark two pencil lines: the first 10mm from the nose and the second 28mm from the nose. Cut shallow V-cuts on the marked lines using the long point of a small oval skew.

8 Using the same tool, shape the engine cowling, using the spacer as a guide for the diameter, and taper the rear of the fuselage down to a diameter of 10mm.

Microplane file used to form the flats



Cutting slot for tail fin using a small piercing saw



9 Sand well, then partially part off at the tailstock end to give an overall fuselage length of 78mm.

Stop the lathe and cut through the remaining wood with a fine saw. Repeat with the other blanks.

10 Hold the body in a soft-jawed vice and file flats on the underside for the lower wing and for the tail. Cut a vertical slot 1.6mm wide x 15mm long for the upright tail fin. Then drill a 5mm diameter hole x 10mm on the underside to take a dowel to hold the aircraft on the display stand.

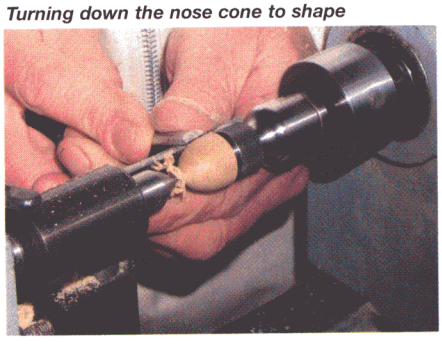
Nose cone

1 Prepare the four nose cone blanks (20 x 30 x 30mm) by marking the centre on one side, centre popping and drilling a 5mm diameter x 10mm deep hole. Insert a 30mm long x 5mm diameter dowel into each hole and glue with PVA.

2 Remove the corners of the blank with a disc sander or powered fretsaw. The intention is to reduce the strain placed on the dowel when it is held in a collet chuck during the initial stages of turning.

3 Replace the screw chuck with the collet chuck and insert a 5mm collet to hold the dowel. Bring up the tailstock for support and turn the blank to a diameter of 20mm with a small roughing out gouge.

Turning down the nose cone to shape



4 With a small oval skew, form the nose cone with an 18mm diameter at the inboard end and an overall length of 15mm.

Move the tailstock back for the final cuts and then sand absolutely smooth.

Wheels

1 Turn the wheels on a mandrel made from a 5mm bolt with a centre pop at the outer end drilled with a small centre drill so that tailstock support can be given.

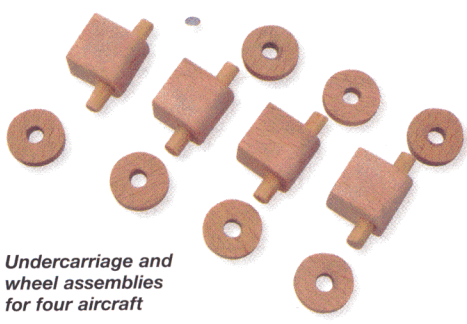
2 Mark the centre of each wheel blank (20 x 20 x 10mm) and drill a 5mm diameter hole right through. Replace the collet chuck with the drill chuck accessory, and insert the end of the mandrel in the drill chuck jaws.

Wheels mounted on mandrel and supported by a revolving centre

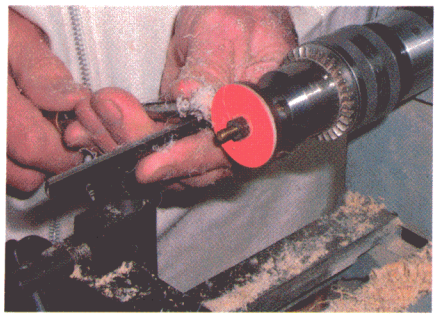
3 Prepare a plywood guide to match the diameter of the wheels and slide it onto the mandrel. Mount four wheel blanks and tighten the nut to hold them as one block. Bring up the tailstock and locate the revolving centre point in the end of the mandrel bolt. Turn the wheels to a diameter of 15mm to match the guide and then repeat for the remaining four wheel blanks.

4 Cut small blocks for the undercarriages and sand to shape. Drill a 5mm hole right through to take the wheel axles cut from short lengths of dowel and glue in position.

5 Cut little scraps of wood and glue them under the tailplane as skids.



Undercarriage and wheel assemblies for four aircraft



Acetate sheet turned to the round sandwiched between ply discs

Propellers

These are discs of clear 1mm clear acrylic intended to give the impression that the propellers are rotating. With scissors, cut four 35mm circles from a 1mm acetate sheet. Drill a 5mm hole through the centres and sandwich the pieces between two discs of ply on the wheel mandrel. You can then true up the edges.

Pilots

Turn the pilots from small blanks of hardwood held in a drill chuck with an 8mm spigot to fit into a hole drilled in the fuselage. Note that the pilot is positioned in his cockpit in front for the monoplanes and behind for the biplanes.

Wings, tailplane and fin

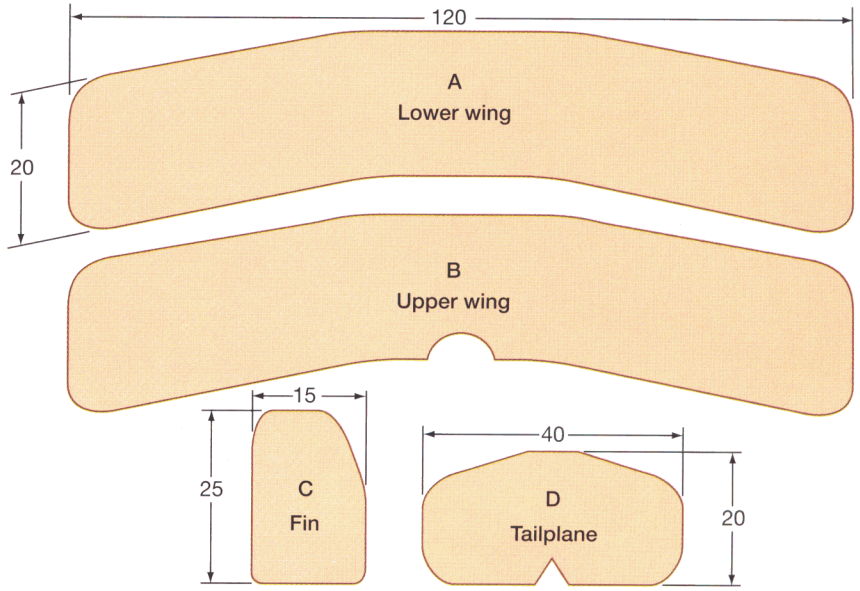
1 Sandwich together three pieces of 1.6mm birch ply and draw out the shape of the wings. The number of wings you need will depend on whether you are making monoplanes or biplanes.

2 Cut out using a powered fretsaw fitted with a No.3 blade. Separate the pieces and sand both sides and the edges with fine abrasive. If you have a small detail sander, such as the Proxxon shown in the photograph, this is ideal. A sheet of non-slip matting is sufficient to hold the parts during sanding and a detail sander can also be used for the edges.

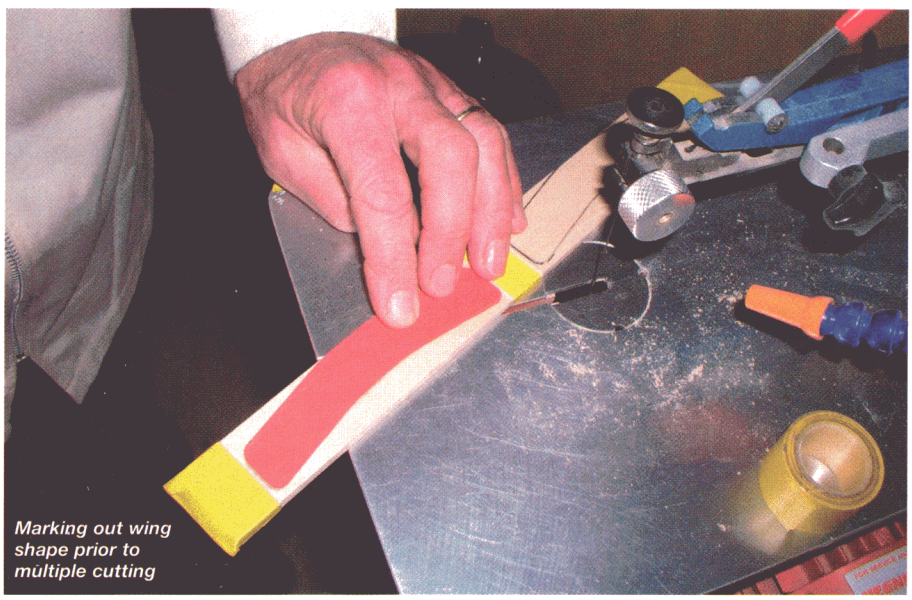
3 Cut out the tailplanes and fins in a similar manner.

Figure 2 Wings and tailplane

All measurements in millimetres



Proxxon delta sander used to remove any whiskers



Marking out wing shape prior to multiple cutting

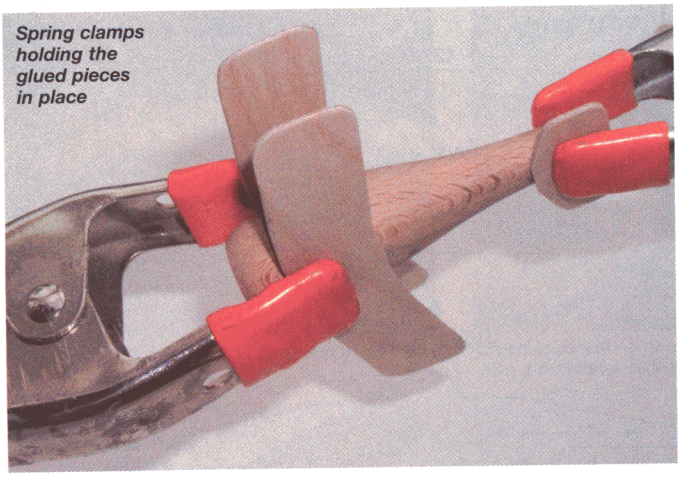
Display bases

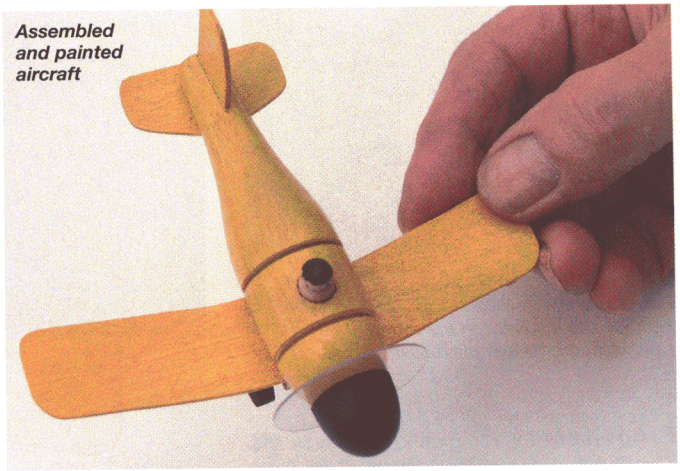
1 For a single base, mount the blank on the screw chuck, turn it to the round, and then face off. Turn a decorative moulding on the edge as required, then sand and polish well.

2 For the thicker base, shape the blank to a dome using a bowl gouge, then sand and polish.

3 Off the lathe, drill a central 5mm hole in the single base. In the case of the domed base, drill one central hole and two others at 45°.

4 Cut suitable lengths of 5mm proprietary dowel to fit into the holes in the base and into the aircraft. With bought dowels, do check carefully the diameter of your ramin dowel before you start work. It should be 5mm but it may well prove to be 4mm! It is a good idea to always drill a sample hole first to match the diameter of the dowel and make any adjustments necessary.


Spring clamps holding the glued pieces in place


Assembled and painted aircraft

Assembly

1 Glue the wings and tailplanes to the fuselage and the fin into the prepared slot. Glue the undercarriages under the wings and the skids under the tail.

2 Paint or spray the aircraft in bright colours and paint the nose cone, wheels and pilots separately.

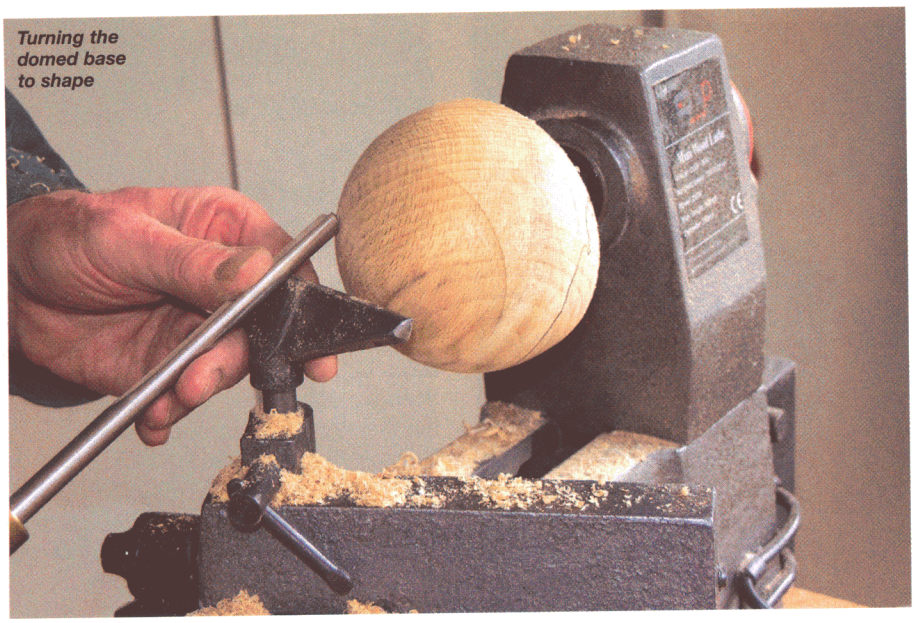

Dome base in beech and flat base in camphor wood laurel

3 Slide the propeller onto the nose cone spigot. The spigot may need a little paring to fit into the hole prepared in the fuselage; you can then glue in position.

4 Glue the wheels onto the axles and the pilot into the cockpit.

5 Add any decals or other decoration.

6 It just remains to mount the aircraft on the bases using lengths of 5mm diameter dowel.


Turning the domed base to shape