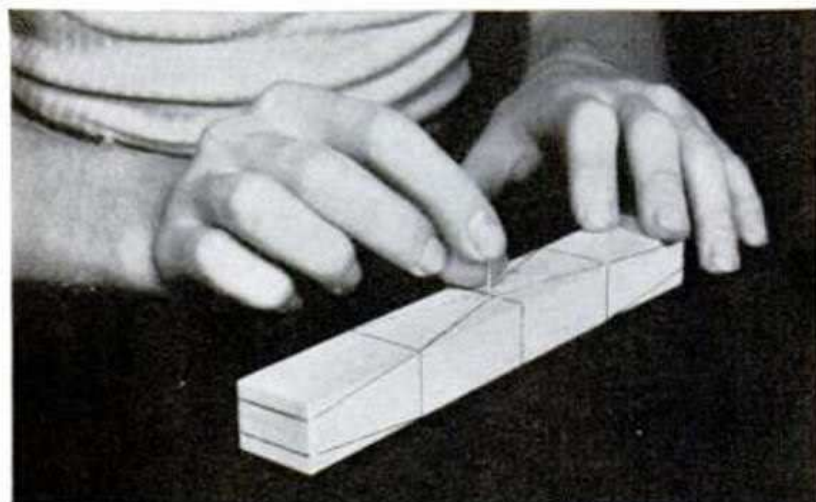
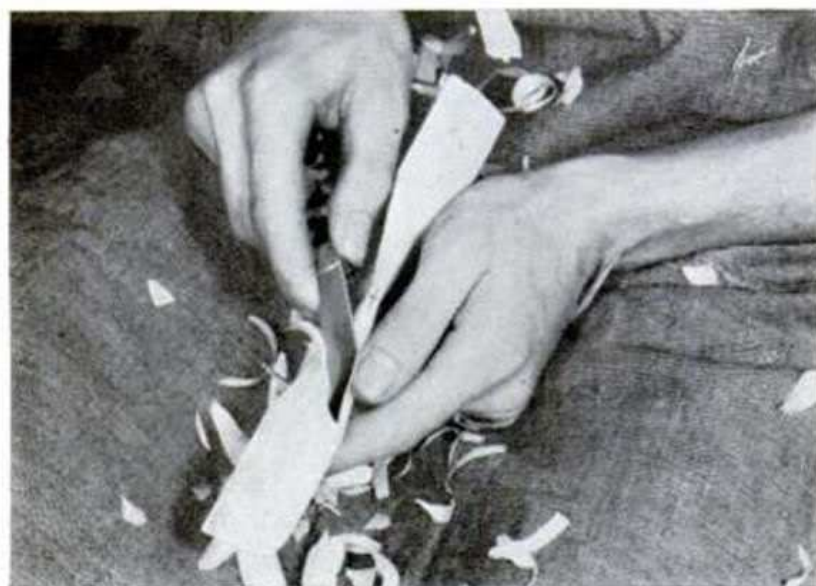


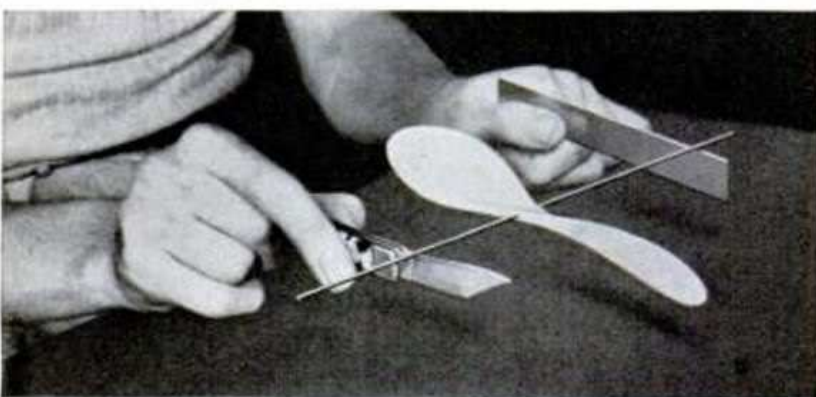
# The Trick of Carving Good Propellers



Blank marked for cutting to proportions shown in the drawings. The shaft hole must be drilled true before any carving is begun



The under camber of each blade is first carved perfectly flat, then undercut and sandpapered to a concave surface. Below, testing the propeller for balance after blades have been trimmed to shape. Sand the upper camber to produce a true airfoil section



**M**ODEL airplane meets are often won or lost by propellers. No matter how excellent the remainder of a model may be, a poor propeller dooms it to mediocre performance. To obtain maximum results from a rubber-powered model, the "prop" must be hand carved and of the proper design to convert efficiently the power of the motor into flight.

If you have been disappointed in your models, look to the propellers. The machine-cut or semifinished type usually is of too high a pitch, has insufficient blade area, and may be too thin to permit of shaping good airfoil sections. A beginner's very first hand-carved propeller may prove superior to the manufactured type.

Follow the instructions step by step. Do not try to hurry. Be sure your knife is sharp, and the balsa block straight grained and without knots.

Outline the propeller blank on the block to the dimensions given in the plans of the model in hand. Locate and pierce the shaft hole, using a drill press or a guide block of hardwood in which a true hole has been drilled. Saw out the blank exactly to the lines. The portion back of the hub may be cut out now or after carving, if plans call for a narrowed hub.

Begin by carving the under camber perfectly flat, making no attempt to form a concave surface at this time. Draw a line along this flat blade, one third of its width from the leading edge, and make a light cut along this line. Carve the narrower portion of the blade downward toward the cut. The depth of this undercutting is often shown upon the plans. It

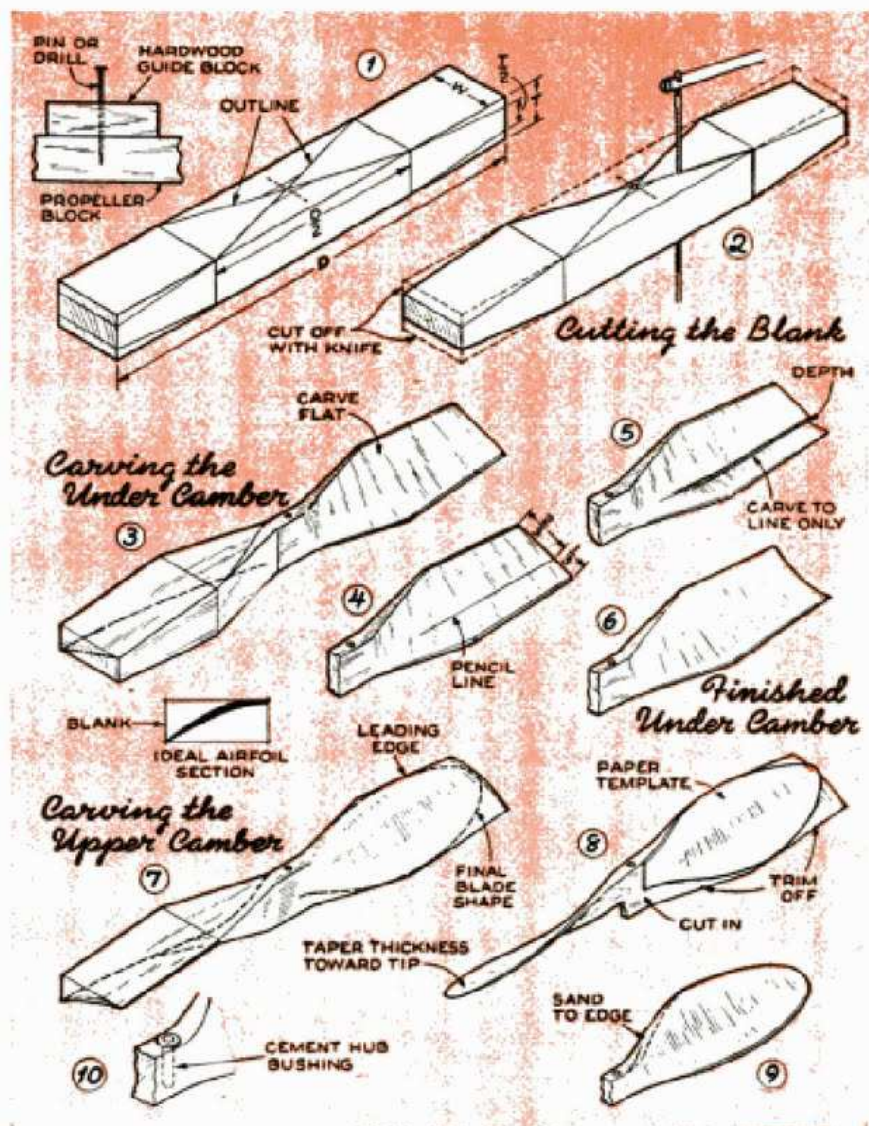
should be equal on both blades before the wider portions are carved down to complete the camber. The curve formed may be checked by sighting against a ruler laid across the blade and run from tip to hub.

Compare the two blades carefully. Rough spots are then removed by sanding lightly with 2/0 sandpaper. Meanwhile check the camber occasionally. Finish the surfaces with 6/0 or 10/0 sandpaper. This completes the work on the undersides.

In carving the upper camber, avoid heavy cuts. Note the gradual taper toward the trailing edge and the thicker, rounded leading edge in the airfoil section shown. The thickness may be judged by holding the blade against the light. Bright areas indicate thin spots, which should not be touched until the surrounding surface has been carved down. The blade thickness of propellers varies greatly according to the use for which they are intended, but should always taper toward the tips, the latter usually being sanded extremely thin.

Finish shaping the upper camber with 2/0 sandpaper. Test the balance by inserting a wire through the shaft hole. If one blade is very much heavier, examine it and sand down excessively thick portions. Make a template of the blade shape to transfer it to one blade. Cut and sandpaper this to shape; then make a paper template of it for outlining the other blade. Trim to shape, but, before going further, balance the propeller and note the heavy side, which should be finished last.

Now sandpaper the upper camber until a true airfoil section is obtained throughout the blade. The under camber should not be touched except at that portion nearest the hub. Check the balance continually while sanding. When both blades appear finished, check for thick portions and sand the upper camber of the heavier blade to balance. Occasionally one blade may be left slightly heavier to counterbalance a so-called "free-



Hubs of large propellers may be shaped when the blank is sawed out. Final hub thickness should be one half that of the propeller block

wheeler" of the type attached to one side.

Several coats of cement that has been thinned slightly with clear dope should now be applied. This doubles the strength of the blades and provides a very smooth surface when properly polished. Brush on two coats and when dry rub down with No. 360A Carborundum paper, used wet. Apply two coats more and rub down again, then one or two final coats, sanding the last with No. 400A paper. Before waxing, cement the hub bushing and freewheeler or folding hinges in place.

All propellers for rubber-powered models should fold or freewheel, assuring a longer and more stable glide when the power is exhausted. Freewheeling devices should allow propellers to turn upon the shaft with minimum friction. The hinges, hooks, wires, or other parts of such devices, which are subjected to a considerable strain during the motor run, should be well fitted and firmly cemented and bound in place.