

A Simple Banjo

Make a wooden-top 5-string

by Richard Starr

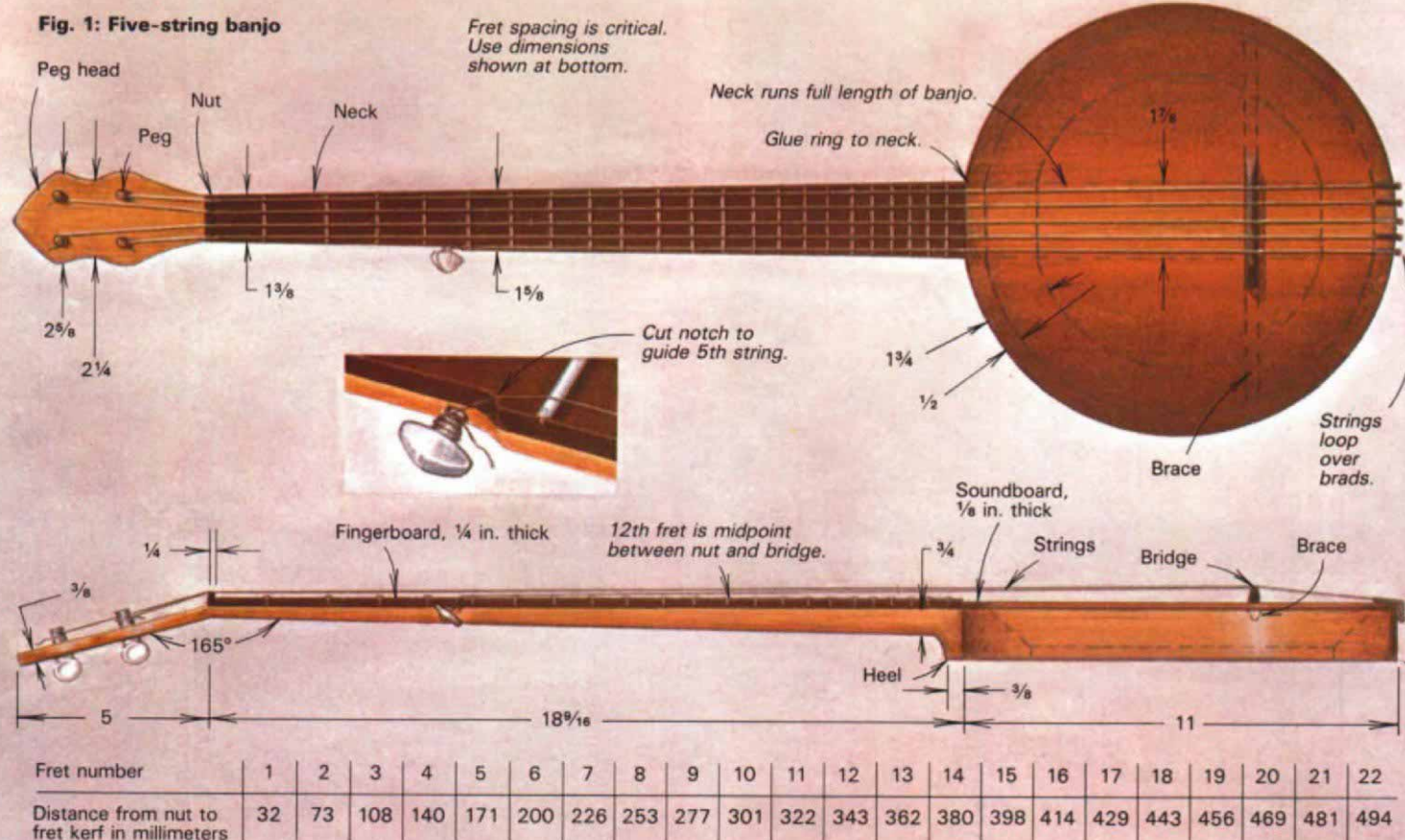
I never would have thought to design a banjo if several kids in my school shop hadn't wanted to make one (nothing seems too complicated to a 12-year old). Regular banjos have skin or plastic drum heads, but mine uses a wooden soundboard. It isn't as brilliant or quite as loud, but it has an appealing ker-chunky sound that is lovely for mountain-style clawhammer playing.

This banjo's structure couldn't be simpler. There is no fancy joinery or bolts and no bent wood. The soundboard is glued to the rim of the banjo, eliminating the need for complex and expensive tensioning hardware. To make the banjo, a bandsaw is indispensable and a power jointer speeds the work, but you can, as do my students, manage with hand planes.

Begin by drafting a full-size pattern for your instrument, both

top and side view. My students used dimensions from the book *Foxfire 3*, edited by Eliot Wigginton (published by Anchor Press/Doubleday, 245 Park Ave., New York, N.Y. 10167), but you can use the dimensions shown in figure 1, or copy an existing instrument. If you have such a model, be sure to note the following dimensions: length of the neck; width of the neck at the nut, fifth fret and where it joins the rim; height of the strings above the last fret and at the nut. Measure the positions of the frets to the nearest millimeter, using the nut end of the fingerboard as zero. You may choose to make a fretless banjo—our design fits in well with the warm, primitive, fretless style of playing.

After drafting the basic shape of your instrument, mark out the extension of the neck through the rim by drawing lines parallel





to the centerline, starting where the neck intersects the rim as shown in figure 1. This defines the width of the whole neck piece and the shape of the rim halves. Trace the neck and the rim halves onto another piece of paper and cut them out as patterns to trace on the wood.

Frame—Sturdy native hardwoods like maple, ash, cherry and hickory were used by mountain instrument makers. I made my banjo of 8/4 cherry. For the neck, choose stock a couple of inches longer than the entire banjo and a tad wider than the section of the neck that extends into the rim. If your peg head is to be wider than that dimension, add the length of a second peg head to the overall length of the neck blank. Joint one face and two edges of the stock. As you joint the second edge, bring the stock down to its finished width. If you're widening the peg head, cut the extra section off, rip it up the middle and glue the jointed edges of these two pieces to the sides of the neck.

The two C-shaped segments that form the rim are made from stock the same thickness as the neck. Joint a face and an edge, then trace the pattern with the ends of the C flush against the jointed edge. Bandsaw the C-shape and save the outer waste pieces to use later as glue caul.

Now bevel the inside edge of each rim segment. On the end of each segment, draw a line as shown in figure 2. This line establishes the 45° bevel. Use a compass to scribe a line around the inside of the rim as shown. Set the table of your bandsaw to 45° and carefully follow that line to guide your cut. Smooth the inner surfaces of the rim segments with a spokeshave and scrap-

er. This can also be done on a drum sander. The outside curve is best left rough until later.

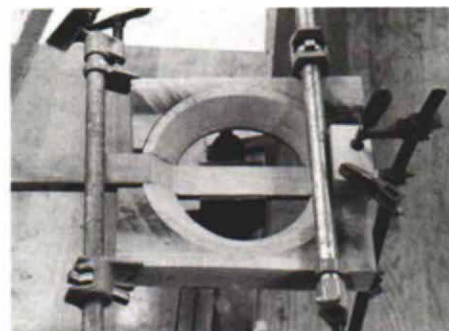
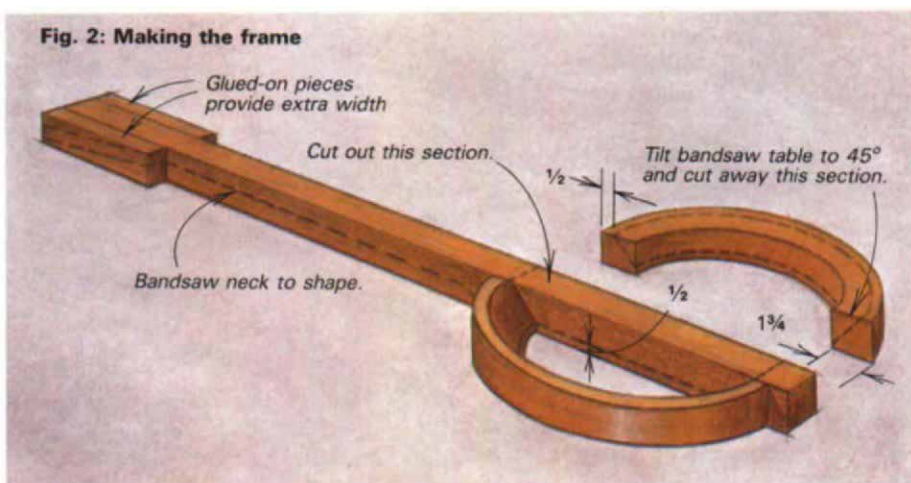
Hold one of the rim segments in place against the neck and trace a line on the neck where the bevel meets the neck. Cut out the relief section of the neck as shown in figure 2.

Bandsaw the neck and peg head to shape. Glue the rim segments to the neck as shown in the photo below. When the glue is dry, check to see that the top edge of the rim is exactly even with the face of the neck. If it's not, true it up with a hand plane. Trim the tailpiece extension of the neck flush with the rim. Plane the back surface of the rim and neck so that they're smooth and flush with each other—I planed off about 1/4 in.

Soundboard—Quartersawn spruce, cedar or redwood gives a rich, resonant sound. An easy way to get a decent soundboard is to pick through a pile of spruce or cedar clapboards at your local building-supply house. Look for annual rings that are perpendicular to the faces of the board. Cut two lengths of clapboard a couple of inches longer than the soundboard, joint the edges and glue them together to get the width you need. When the glue is dry, plane and sand the board a tad thicker than 3/8 in.

Trace the inside and outside edges of the rim on the bottom side of the soundboard. The soundboard is round, except for a flat section where it butts up against the fingerboard. Be sure that the grain of the soundboard runs parallel to the neck. Bandsaw the curved shape 1/8 in. outside the traced line, but cut right to the line on the flat section.

Cut a brace from spruce or pine as shown in figure 1 and glue



In gluing the rim segments to the neck, the scrap pieces left from bandsawing the rim become the cauls. A few clamps and small cauls at the tail end keep the parts from slipping around while the pipe clamps are being tightened.

it across the underside of the soundboard. This cross-grain brace helps resist the downward pressure of the bridge and reduces the chance of the soundboard splitting.

Now you're ready to glue the soundboard to the rim. Hold the banjo in a machine vise by the part of the neck that passes through the rim. Spread glue on the upper edge of the rim and set the soundboard in place. Be sure that the flat section of the disc is lined up where the neck joins the rim and that the soundboard overhangs the rim evenly all around.

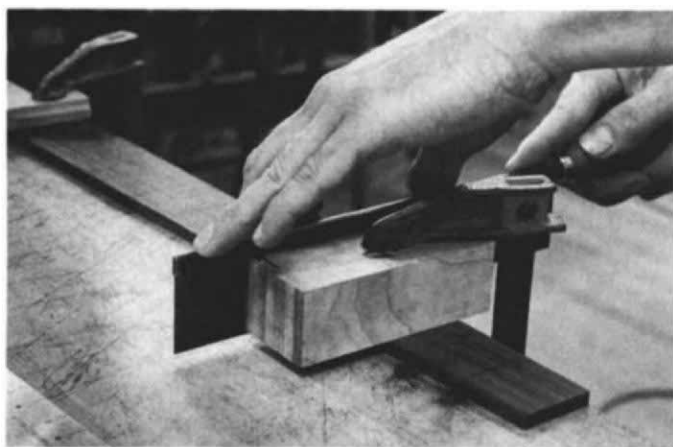
For a good glue job, it's important to apply gentle clamping pressure at every point on the rim. When the glue is dry, use the bandsaw to trim the soundboard flush with the rim.

Fingerboard—A fingerboard that contrasts in color with the neck of the banjo is appealing. Mountain folk used native woods: walnut, cherry or maple would work well. No part of the instrument receives more wear and tear, so very dense woods are best—the finest banjos have ebony or rosewood fingerboards.

Cut a piece of stock slightly wider than the neck and a couple of inches longer than its length. Joint one face and one edge, then thickness the piece to about $\frac{1}{4}$ in. Pencil a line up the center of the stock and lay out the shape of the fingerboard centered on this line. If you want frets, mark the position of each fret along the jointed edge of the stock, then use a square to project each mark across the fingerboard.

Fretwire has a T-shaped cross section and the shank of the T is jammed into a slot in the fingerboard. You'll need about 5 ft. of fretwire and a fretsaw, or a dovetail saw whose kerf gives a snug fit to your particular fretwire. If the saw cuts too wide, you can narrow the kerf by sliding a file lightly along the sides of the saw, reducing the set of the saw's teeth. Don't make the kerf too tight or the neck will bow when you hammer all the frets in. Guide the saw against a block of wood clamped to the fingerboard, as shown in the photo below. This block can also serve as a depth stop. Trim its height so that the back of the dovetail saw catches on its top edge when the cut is to depth—about $\frac{1}{16}$ in. deeper than the shank of the fret. Practice cutting frets in scrap before trying it on your fingerboard.

After you've cut all the fret slots, saw the fingerboard to shape and glue it to the neck. Be sure that the centerline of the fingerboard is true to the centerline of the neck and that the end butts up against the flat section of the soundboard. Use a scrap of



To saw the fretwire slot, guide the saw against a block of wood clamped to the fingerboard. Trim the block height so that the back of the dovetail saw catches on its top edge when the cut is about $\frac{1}{16}$ in. deeper than the shank of the fretwire.

wood roughly the size of the fingerboard as a caul to distribute the clamping pressure. Now bandsaw the sides of the neck to match the shape of the fingerboard.

Carving the neck—Carving the back of the neck is probably the fussiest job in this project. The curve in cross section must be rounded almost to the top edge of the fingerboard, while the shape along the length is almost a straight line. At the same time, the neck gets slightly wider and thicker from the nut to the rim and is faired gently into the peg head and heel. Rough out the shape with a spokeshave and refine it with a scraper or file. Sandpaper on a hard block works best for truing the surface lengthwise. A well-shaped neck is a musician's joy, so examine your work with your fingers, as well as your eyes. It's helpful to handle a completed banjo to get an idea of how a neck should feel.

Fretting—Inject a small amount of white or yellow glue in the fret's kerf and tap in a length of fretwire using a lightweight, deadblow hammer. Be sure to support the neck with a block of wood directly under the fret you're installing. Using a pair of nipping pliers, trim the overhanging ends of the fretwire. File the ends even with the fingerboard and round them slightly at the top, so no sharp edges protrude. If you file the wrong way, you'll lift the fretwire. To remove the file burrs, sand the edges of the fingerboard with 220-grit paper on a hard block. Run a long file lengthwise up and down the neck to level any high frets.

Now you can smooth the outer edge of the rim with a spokeshave and sandpaper, and finish-sand the whole instrument.

Set-up—Install tuning pegs according to the manufacturer's instructions, or make your own tapered friction pegs. To guide the fifth string over the fifth fret, we cut a simple notch in the fingerboard. You could also insert a small round-head wood screw between the fourth and fifth frets so that the head of the screw holds the string down tight on the fifth fret. Instead of a tailpiece, we used five round-head brass brads driven into undersized holes at the tail end of the instrument. These brads secure the ends of the strings. Be sure that the heads of the brads stand about $\frac{1}{32}$ in. proud to catch the string's loop. Round the edge of the soundboard slightly where the strings bear on the corner. Fashion a nut and bridge from dense hardwood, and trim their height to give the proper action (the height of the strings at the nut and last fret). The nut glues against the peg head and the end of the fingerboard. File shallow notches for each string. String the banjo and position the bridge so that the 12th fret is midway between the nut and bridge. Adjust the bridge so that holding down each string at the 12th fret produces a tone one octave higher than the open string. Move the bridge slightly closer to the nut if the octave is flat, further away if it is sharp. Don't glue the bridge to the soundboard. The tension of the strings will hold it in place.

An oil finish, wet-sanded with 400-grit wet-or-dry paper, will give you a fine-looking and serviceable musical instrument. A good book for beginners is *How to Play the 5-String Banjo* by Pete Seeger (Oak Publications, Div. of Music Sales Corp., 799 Broadway, New York, N.Y. 10003). Good playing! □

Richard Starr teaches woodworking at Richmond Middle School in Hanover, N.H., and is the author of the book Woodworking with Kids (The Taunton Press, 1982). Photos by the author. Banjo tuning pegs and strings are available from Stewart-MacDonald Mfg. Co., Box 900, Athens, Ohio 45701.

Erratum: There are two errors in the measurements for the banjo in *FWW* #53. The distance from the nut to the first fret should be 37mm instead of 32mm. The distance from the banjo ring to the peg head should be $20 \frac{1}{8}$, in. instead of $18 \frac{9}{16}$.