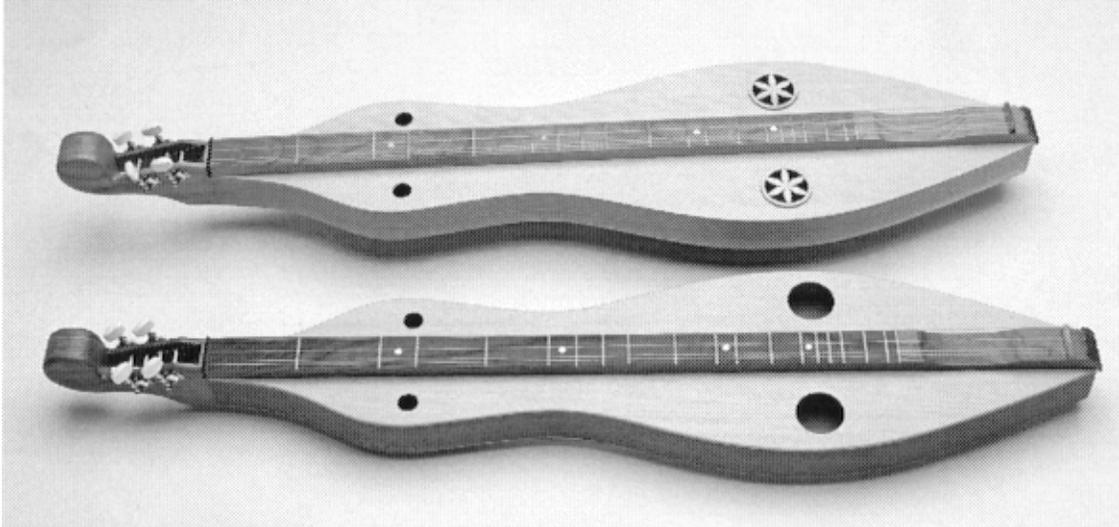


Hourglass Mountain Dulcimer kit



Musicmaker's
Kits

P.O. Box 2117
Stillwater MN 55082

651 439 9120
info@musikit.com

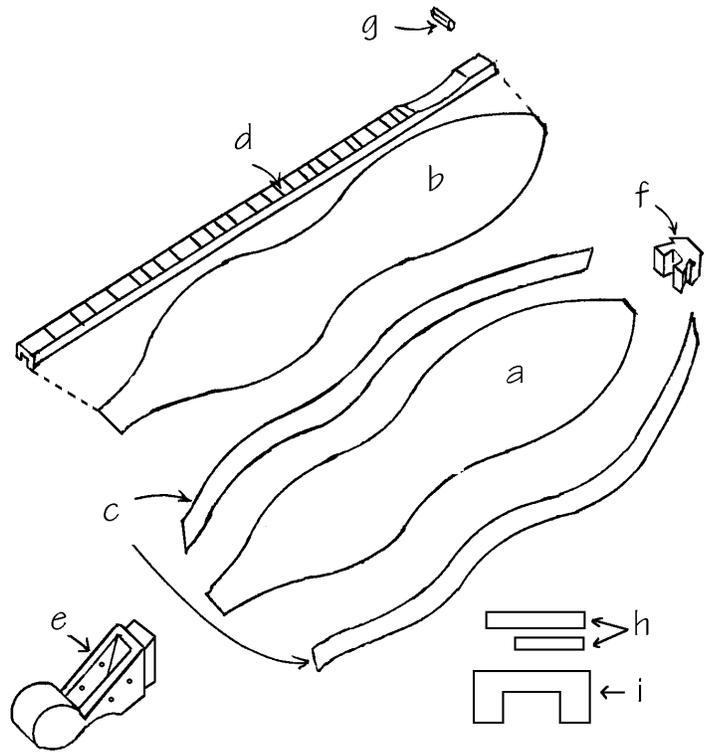
Hourglass Mountain Dulcimer

Wooden Parts:

- a) 1 Back panel (1/10" cherry/walnut laminate)
- b) 1 Soundboard (1/8" spruce veneer)
- c) 2 Sides (1/8" cherry or walnut)
- d) 1 Fretboard (cherry or walnut)
- e) 1 Scroll (cherry or walnut)
- f) 1 Tail block (cherry or walnut)

Hardware:

- 4 Geared tuners
- 8 tiny screws (for tuners)
- 1 Plastic nut (3/4" x 1-1/2")
- 4 Tail pins
- 1 Leather scrap
- 1 Flatpick
- g) 1 Bridge (padauk)
- h) 2 Spacers
- i) 1 Clamping guide
- 36" Fretwire
- 1 set of 4 dulcimer strings
- 1 set assembly instructions



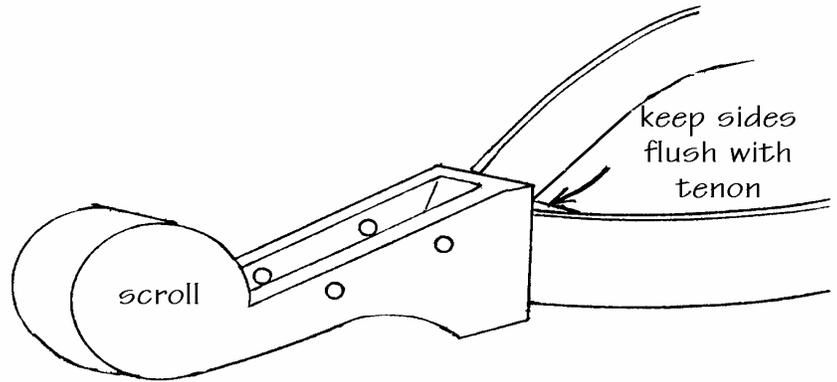
BEFORE YOU BEGIN

Please take the time to check over the parts of our kit now, to make sure everything is there. If you discover a problem, call us right away so we can rectify it quickly without causing you much delay in your project. We also suggest skimming through the entire directions before beginning, just to get an overview of the project. You may decide that you need to gather more tools or purchase a few optional decorations or accessories to enhance the finished instrument. Now is a good time to decide so you can avoid delays when you reach those steps of construction.

Assembly Instructions

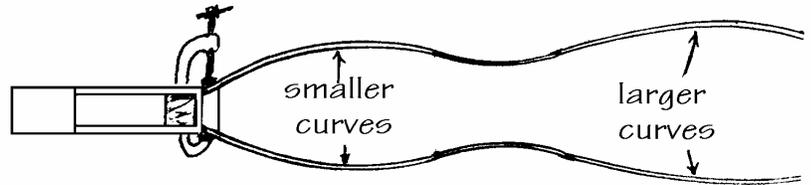
____ 1. If this is your first dulcimer project, I recommend that you write pencil notes on the wood as you check over each piece. It is very important to mark which ends of the parts are to be glued toward the SCROLL end and which toward the TAIL end of the instrument. Otherwise you may end up with a backwards dulcimer nice looking, but not as useful as it might be.

___2. Use a good woodworking glue (such as Elmer's Carpenter's Wood Glue or Titebond) to build this dulcimer. Start the assembly by gluing the SIDES to the SCROLL, being careful to position the smaller curve of the hourglass shape nearest the SCROLL, as shown.



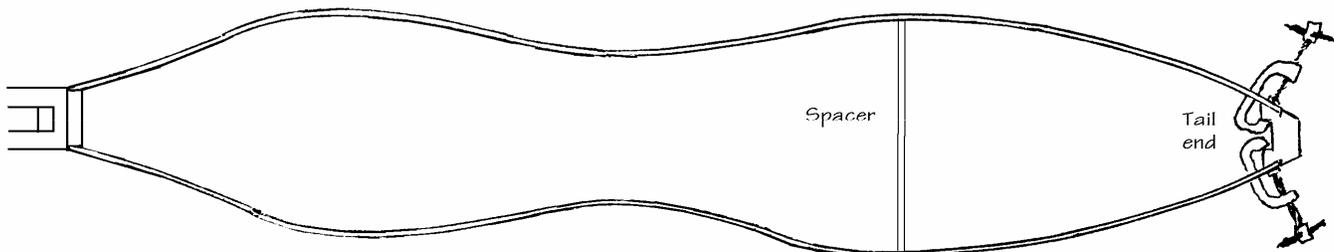
PLEASE NOTE: The SIDES are the same width as the tenon of the SCROLL and should be carefully aligned with it.

Clamp the parts together until the glue dries, at least 1/2 hour.

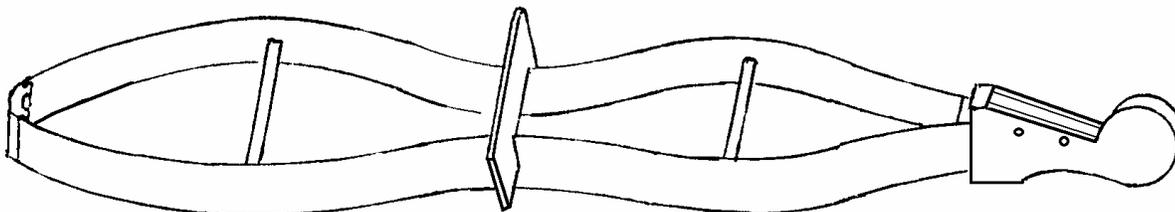


HINT: Use masking tape to hold the parts in alignment, then some sort of clamp (c-clamp, spring clamp, etc.) to squeeze the parts together firmly.

___3. Glue the other end of the sides to the tail block. this will require a bit of persuasion to bend the sides out to the proper angle. Use one of the spacer sticks provided to spread out the middle of the hourglass shape while you clamp the ends into the tail block.



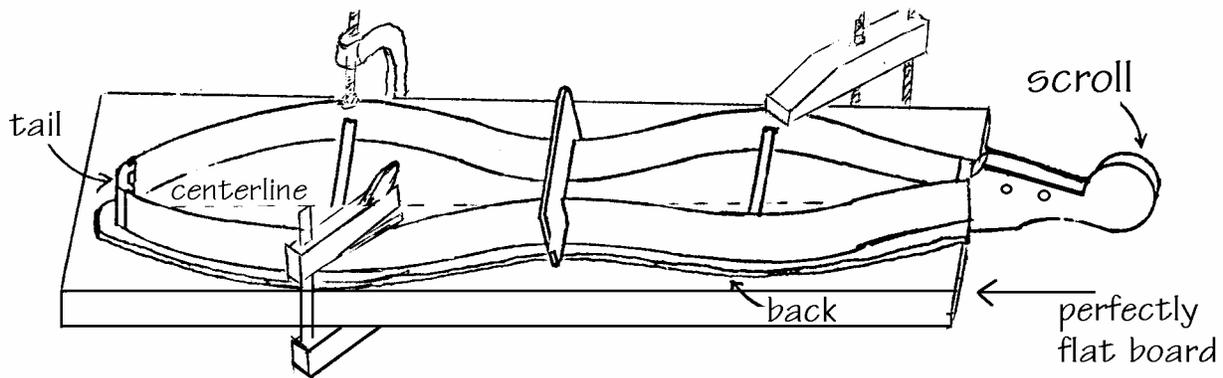
___4. Use the spacers and the clamping guide to temporarily hold the sides to the correct shape to fit the back panel.



___5. Select which face of the back panel you want to have showing out and place it on your work table with that good face aiming down against the table. Note that the back panel is the thin laminated panel with cherry or walnut on the best face, to match the sides of the instrument. Place that good surface facing down on your flat work board.

IMPORTANT: Find a perfectly flat board to clamp your instrument to as you glue it together. If the parts are not held flat when glued, you may end up with a warped or twisted instrument that will not play properly.

Draw a centerline down the length of the back. Test-fit the dulcimer frame to the back without glue, centering it on the centerline, as shown. Check to see that the sides are fairly well spaced on either side of the centerline. It is possible to assemble this kit with quite a lop sided shape, so take care to center the sides nicely.



Check to see that the back extends beyond the sides all the way around the frame, and covers the entire tailblock. A little excess overhang is fine. You may want to trace around the shape of the dulcimer on the back in that correct position with a pencil, so it will be easy to put it into place again after applying glue.

___6. Squirt a bead of glue around the entire edge of the dulcimer frame, including the TAILBLOCK. Then replace the frame on the BACK in the position marked. Use clamps or weights to hold the parts firmly down against the flat board, so that some glue squeezes out around the entire circumference of the dulcimer. Allow overnight for drying.

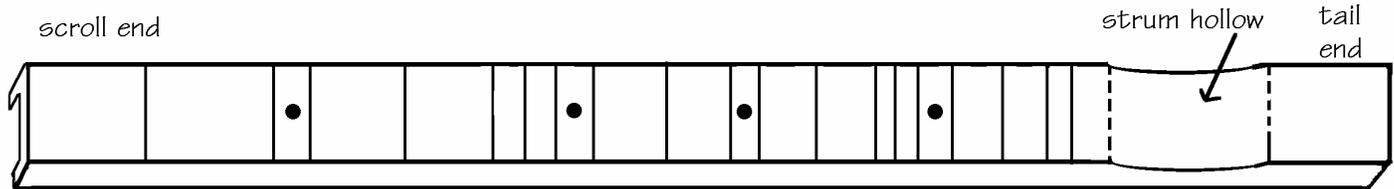
NOTE: Do not attempt to glue the SPACER scraps to the back. They will be removed and discarded after the back is glued.

___7. Even though the BACK is securely glued to the frame, you may wish to leave the SPACER scraps and the clamping guide in place until just before installing the SOUNDBOARD. This will help hold the sides in proper shape while you work on other things.

This is a good time to trim off the excess overhang of the back. You may cut it with a coping saw or bandsaw to within 1/16" of the sides, but the final trimming should be done with a rasp or course sandpaper wrapped around a piece of wood. If you happen to have a router, you can trim it very nicely with a flush-cutting bit.

8. Prepare the FRETBOARD for installing the frets. It is best to sand it with a medium (150 grit) sandpaper now, before the frets are in the way. The strum hollow will need the most work to smooth out the coarse sanding scratches in the wood.

NOTE: This would be the best time to do any decorative inlaying on the fretboard. Many dulcimer players like having small marks inlaid at certain points along the fretboard to help guide them in playing. The diagram below should give you an idea of where these marks are most commonly placed.



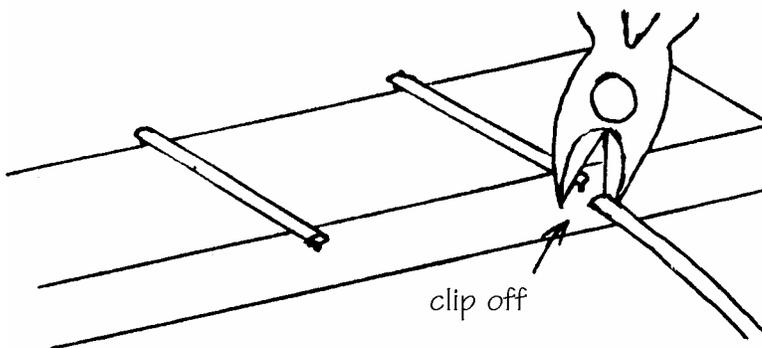
We carry some small round dots of mother-of-pearl that are easy to install by simply drilling a hole in the wood. Give us a call if you'd like to order some. You may also use wood plugs of contrasting color for this decoration. Birch or maple plugs would show up nicely against the darker color of cherry or walnut.

Be sure to sand your inlays down flush with the surface of the FRETBOARD after installing them.

9. Now you are ready to install the frets. Place your FRETBOARD on a good firm surface for this operation. A flimsy table top will not do. Better to work on a concrete floor or a cement block. Otherwise, your wood will just bounce around as you try to pound the frets into place.

Begin by placing the long length of fretwire over one of the slots cut in the fretboard, so the end hangs over the edge of the wood just 1/16" or so. Position the fretwire so that the 'tang' will be driven down in the fret slots (see diagram).

Use a hammer to lightly tap the fretwire into the slot, until the crown of the fret contacts the wood surface.

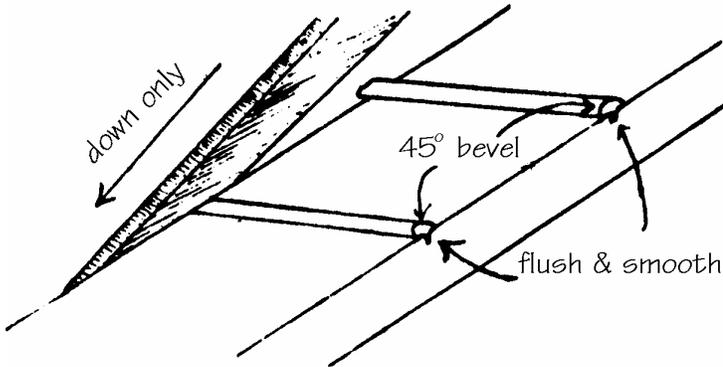


HINT: Tap one end of the wire in first, then the other end, and finally the middle. DO NOT OVERWORK THE WIRE! You should be able to install each fret with four or five taps, total.

When the fretwire is securely held by the wood, use a wire cutter to clip off the excess, as close to the wood as possible.

Proceed to the next fret slot in the same way, and so on until all frets are installed.

___10. After the frets are all installed, we like to look them over very carefully to make sure each one fits all the way down against the wood. If one fret stands higher than another, it may cause buzzing problems later when you try playing the dulcimer. Now is the time to take care of the problem. We generally find that a few good taps from the hammer are sufficient to seat any frets that are too high. But make sure you are working on a very firm surface. A bouncy table will only make this job impossible.

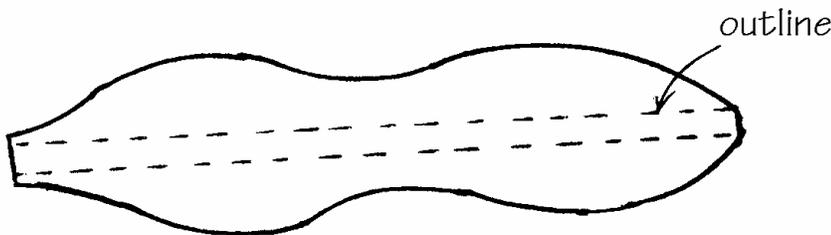


___11. File (or sand) the ragged ends of the frets down until they are smooth and flush with the sides of the FRETBOARD. If you happen to have access to a belt sander, you'll find it very helpful for this part of the project. The fretwire is soft enough metal to work very easily with a sanding belt. Be careful, however, not to gouge the edge of the fretboard!

___12. File (or sand) a 45 degree bevel at the ends of the frets, as shown, working the file in a downward motion only, to avoid lifting the frets up.

___13. Place the SOUNDBOARD on your work table with the better side facing up. Draw a centerline down the length of it. Mark the center of each end of the FRETBOARD also, so you can place it correctly on the top of the SOUNDBOARD.

___14. Place the FRETBOARD on the SOUNDBOARD and draw the outline of it lightly on the surface of the soundboard.

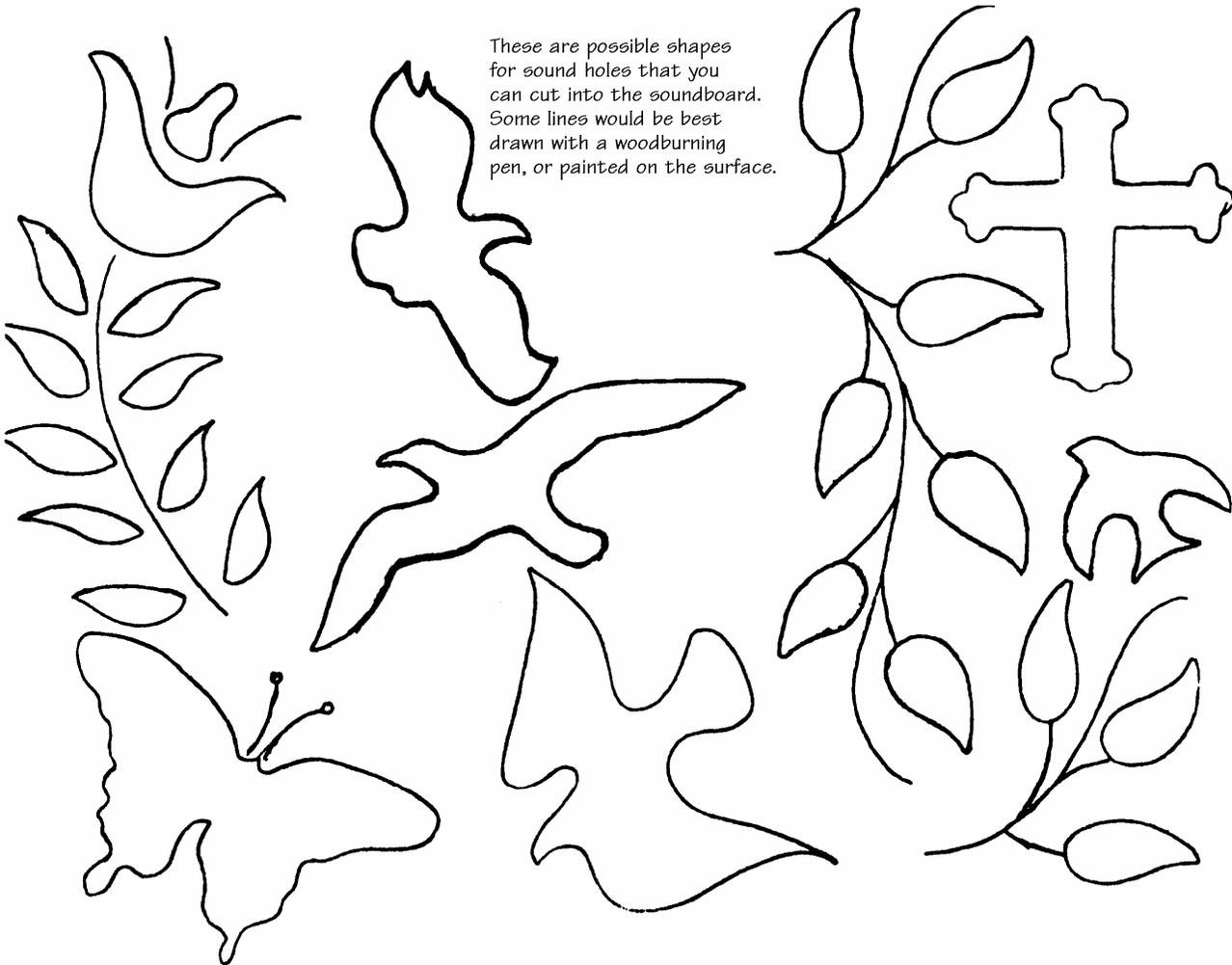


___15. Before gluing the FRETBOARD to the SOUNDBOARD, you should plan where to put some soundholes. They can be simple round drilled holes or complex shapes cut with a coping saw or jigsaw.

We usually put two matching holes in the soundboard on opposite sides of the fretboard, centered on each "bout" of the hourglass shape. The size and placement of the soundholes can be varied, and does not seem to affect the sound of the instrument. We offer several decorative rosettes (see below) that look beautiful on this instrument, and they are simple to glue over a plain round hole (1 3/4" dia).



These are possible shapes for sound holes that you can cut into the soundboard. Some lines would be best drawn with a woodburning pen, or painted on the surface.



____16. Cut the soundholes and sand them smooth now, while it is easy to reach both sides of the **SOUNDBOARD**.

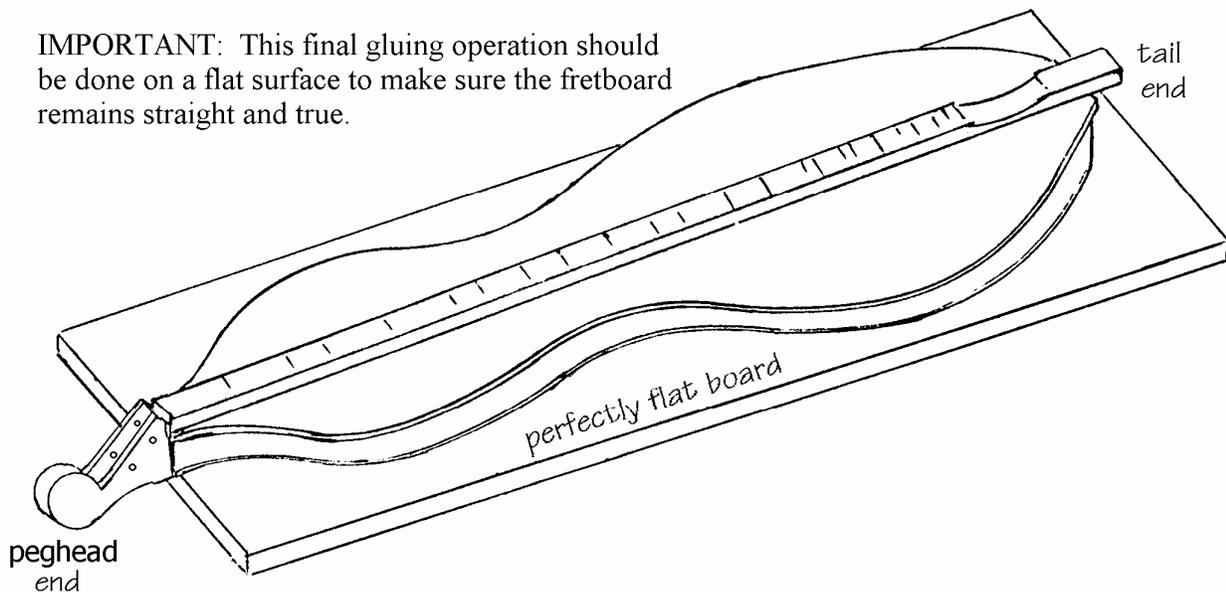
___17. Glue the FRETBOARD to the SOUNDBOARD in the position that you marked earlier. Take care to note the TAIL end from the SCROLL end. The strum hollow of the fretboard will be near the tail (large bout) of the dulcimer.

You will notice that the FRETBOARD and SOUNDBOARD may not be exactly the same length. Line them up together at the peghead end, and let the tail end be different. You will trim off the excess at the tail later.

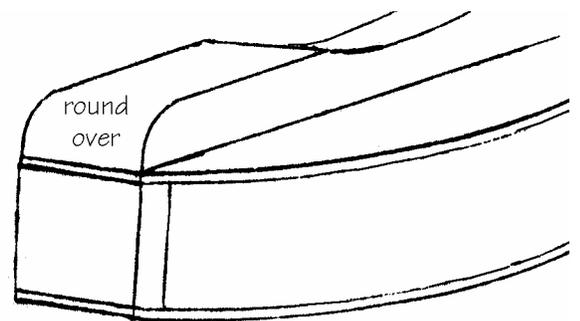
Hold the fretboard firmly to the soundboard with weights or clamps until the glue is dry.

___18. Now you can glue the SOUNDBOARD to the dulcimer body, taking care to orient it correctly so that the strum hollow of the FRETBOARD is nearest the TAIL end. Use clamps or weights to hold the parts firmly together until dry.

IMPORTANT: This final gluing operation should be done on a flat surface to make sure the fretboard remains straight and true.



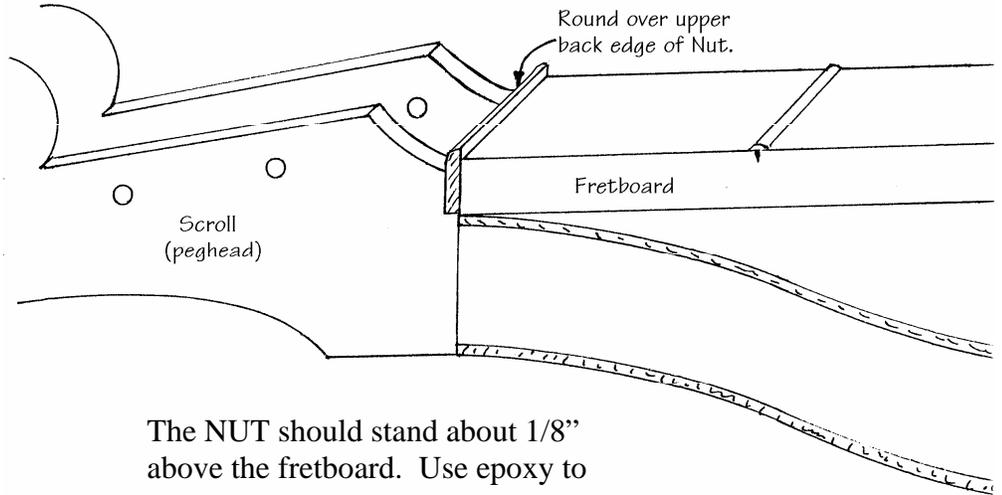
When dry, trim the SOUNDBOARD flush with the sides, and cut off the excess FRETBOARD at the tail end. We like to round over the tail end of the FRETBOARD, as shown.



___19. The last item to glue into place is the NUT, which is not a piece of metal hardware that screws onto a bolt, but a small piece of black plastic that holds the strings at the peg head end of the fretboard. We like to trim it to size and round over one edge before gluing it into place, although you may find it easier to fasten it to the instrument and then work down the excess with a file or sanding block.

VOILA! You are done with the gluing. All that remains is the finishing process.

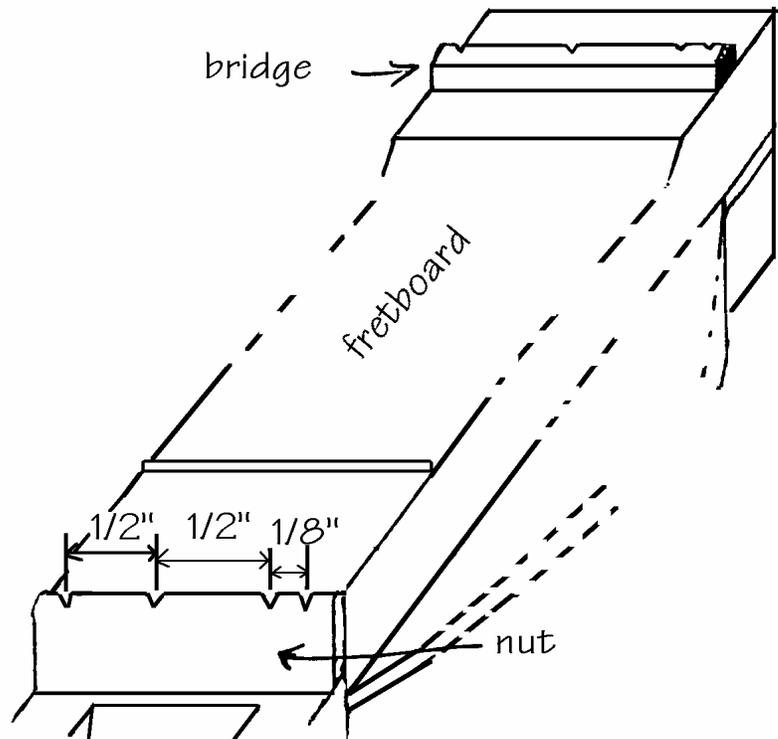
20. Start by sanding the entire instrument to clean up any glue residue and to lightly round over any sharp edges. A medium (150 grit) sandpaper should do well for this operation. Follow with fine (220 grit) sandpaper to smooth everything off.



The NUT should stand about 1/8" above the fretboard. Use epoxy to glue it in place.

21. One small wooden part remains: the BRIDGE. This is not glued in place, but just held down by the strings, so you can "fine tune" the dulcimer by moving the bridge as necessary. Trim the bridge to the proper length to fit across the width of the fretboard. Then sand it smooth to prepare it for finishing.

22. This would be a good time to file some notches in the NUT and BRIDGE to hold the strings at the correct spacing. The notches should be very shallow for now -- just enough to keep the strings from sliding sideways. Later on, you may file them a little deeper in order to adjust the height of the strings above the frets.



NOTE: The illustration shows the proper notch placement for standard right-hand playing. If you wish to make this a left-hand instrument, simply reverse the order of these instructions.

23. Now you are ready to apply a finish. Here are a few choices:

STAIN -- STAINS are coloring agents and should only be used if you dislike the natural color of the wood. We usually do not apply stains to our projects, especially when they are made with naturally beautiful hardwoods such as cherry or walnut. These woods look very nice with just a clear finish. But, if you want to color the wood differently, your staining should be accomplished before applying a surface finish such as oil, varnish, or lacquer. We like ANILINE DYES for darkening the wood without obscuring the grain. Our 3-color powdered dyes (code *FINI-40*) can be mixed with denatured alcohol to the desired shade. The advantage of these dyes are quick drying time, deep colors, even penetration, and the opportunity to create a "sunburst" shading effect.

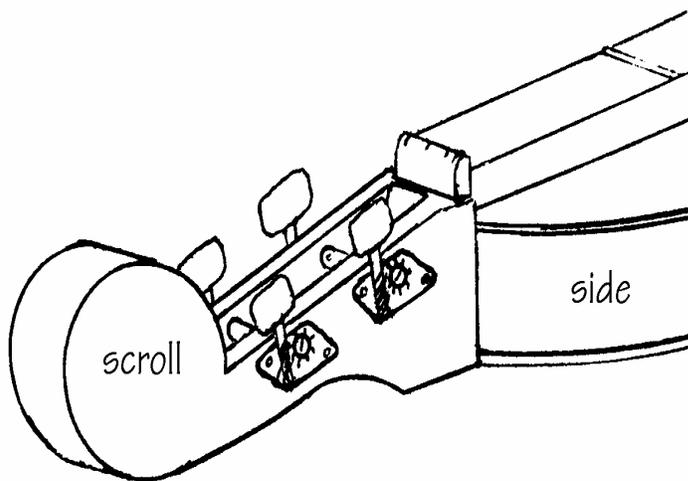
OIL -- An oil finish will give your wood a low luster appearance, bringing out the natural color of the grain, but it tends to soak into the wood and appear dry and "thirsty" after a while. The principal advantage of an oil finish is that it can be applied and wiped dry immediately, so you can proceed to installing hardware (and strings) right away. The disadvantages of oil are that it usually does not give much surface protection or sheen, although there are some brands that include waxes and/or varnishes to give more surface build-up and luster.

VARNISH -- Any regular varnish will work fine on this project, but we recommend our wipe-on polyurethane called MUSICMAKER'S INSTRUMENT FINISH. Our complete finishing kit (code *FINI-20*) includes detailed instructions, sandpaper sheets, tack cloth, foam applicator, and lint-free wiping cloth, along with a 1/2 pint can of semi-gloss polyurethane varnish. The advantages of finish are its simple application, durability, and deep, soft luster. It also works well for protecting Heat Transfer decorations.

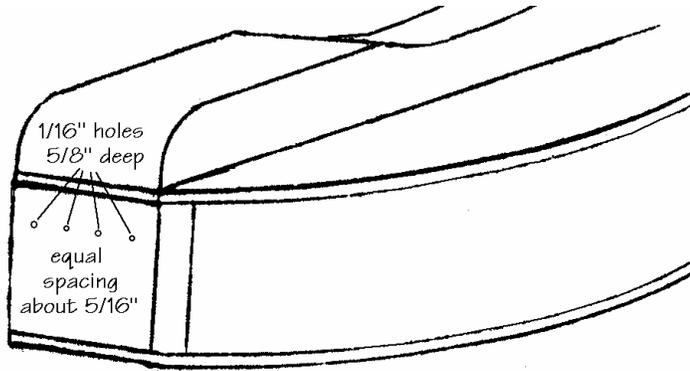
LACQUER -- Many professional instrument makers still use lacquer for their finish. The most readily available lacquer is called Deft Clear Wood Finish. It is best to purchase a can of liquid to brush on as a sealer coat first, and then use an aerosol can of the same product to spray on the final coats. The advantage of this finish is its quick drying time, but the disadvantage is the strong odor of the toxic lacquer fumes. CAUTION: Lacquer finish will not work over Heat Transfer decorations -- it dissolves the toner.

HINT: If you plan to use a varnish or lacquer, then we recommend you cover the top of the fretboard with masking tape before applying your finish. The reason for this is that some surface finishes can become sticky after a while from the perspiration of your fingers as you play. Once the finish is dry, then you can remove the tape and apply a light coat of oil to the top of the fretboard.

24. Position the geared tuners in the SCROLL, as shown, noting that there are two "left-hand" tuners and two "right-hand" ones. Use a nail or awl to punch the location of the screws in the side of the SCROLL.



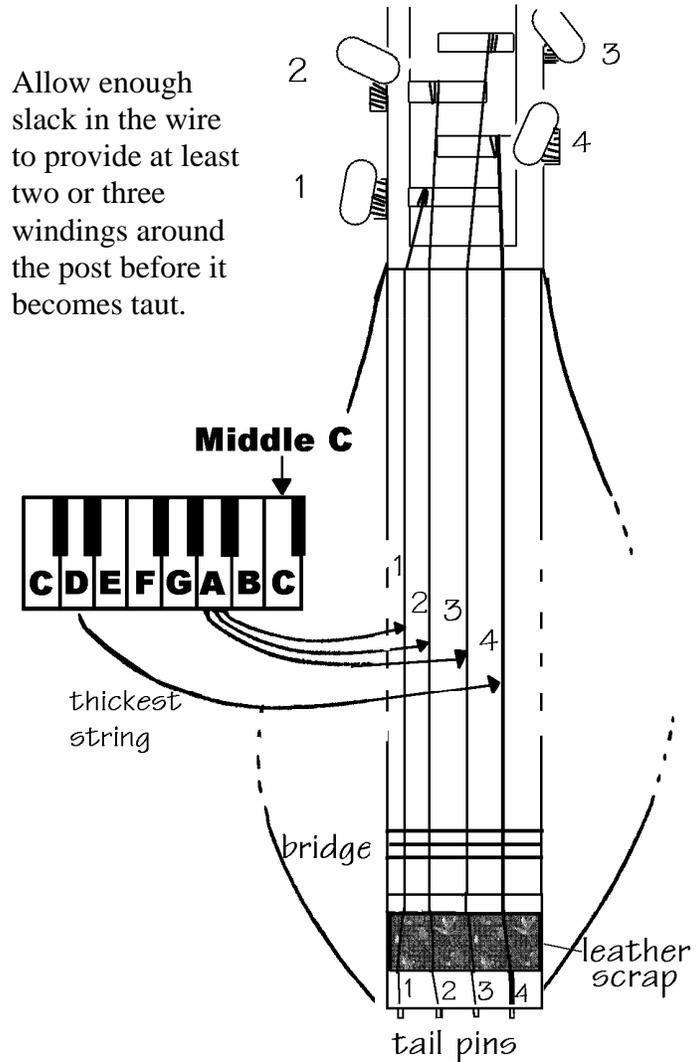
25. Drill shallow starting holes in the peg head for the tiny screws that will hold the tuning gears in place, using a 1/16" bit, then install the gear tuners, using the tiny screws provided.



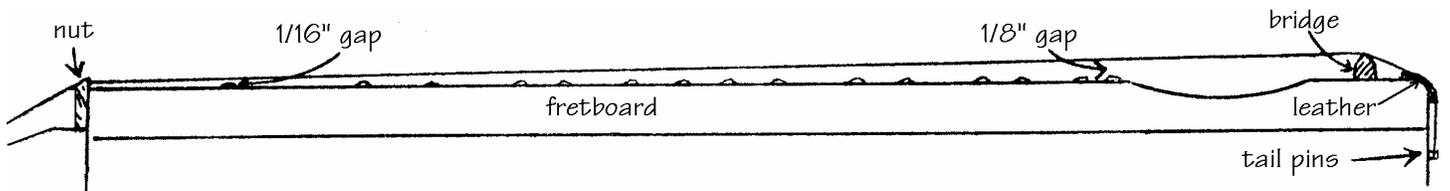
26. Use the same 1/16" drill bit to put four small holes in the TAILPIECE, as shown, for the TAIL PINS.

Pound the tail pins into place, leaving about 1/8" above the surface of the wood.

27. Now you can install the strings! Attach each string to the dulcimer by slipping the looped end over the correct tail pin, and poking the other end through the hole in the appropriate geared tuner, as shown.



HINT: Use the LEATHER SCRAP for protecting the end of the FRETBOARD from being dented by the strings as they stretch over the end of the dulcimer.



When the first string is installed, slip the BRIDGE into place. The top of the bridge should be about 31 1/2" from the NUT (you can make further adjustments later).

Tune the strings to the notes shown for starters. There are many different tunings possible for this instrument, but this major tuning (Ionian mode) is the most commonly used worth beginning instruction books.

____28. Once the strings are installed, check their height above the frets to make sure they will be easy to play. The ideal string height would be about 1/16" above the first fret (near the SCROLL), and about 1/8" above the 17th fret (nearest the strum hollow). We recommend adjusting the height at the NUT first. Use a file to cut the notches deeper in the NUT to lower the strings, being careful not to cut too deeply, as it is difficult to raise the strings higher again.

The string height at the 17th fret is easier to adjust. You can raise it by adding a shim under the bridge, or lower it by sanding the bridge a little shorter or filing the notches a little deeper. Be careful not to lower the strings too much, or the strings will tend to buzz and rattle against the frets when you play.

____29. Fine adjustments can be made in the placement of the BRIDGE to make sure the dulcimer plays perfectly in tune. The measurement given earlier (31 1/2") should be very close to the exact placement, but some variations may occur depending upon final string height and string thickness.

The technique for finding the exact location of the bridge requires a good musical ear or an electronic tuner. Test the accuracy of the octave note by plucking a string with one hand while pressing it to the 8th space from the nut with the other hand. That note should sound exactly one octave above the same string when plucked in the "open" position (vibrating at full length).

If the octave note is a little too high (sharp), then slide the bridge a little toward the tail of the instrument. If the octave sounds too low (flat) compared to the open string, then slide the bridge toward the strum hollow. Make adjustments until you find the correct placement, then mark that location on the fretboard with a pencil in case the bridge gets bumped out of position in the future.

CONGRATULATIONS! You have successfully completed making a mountain dulcimer that should give you many years of musical satisfaction. We hope you have enjoyed the project.

MUSICMAKER'S KITS INC

P.O. BOX 2117
STILLWATER, MN 55082

(651) 439-9120 info@musikit.com
www.harppkit.com