Riverboat Banjo

Musicmaker's Kits Inc.

(One block north of Hwy 36 & behind Joseph's Restaurant)

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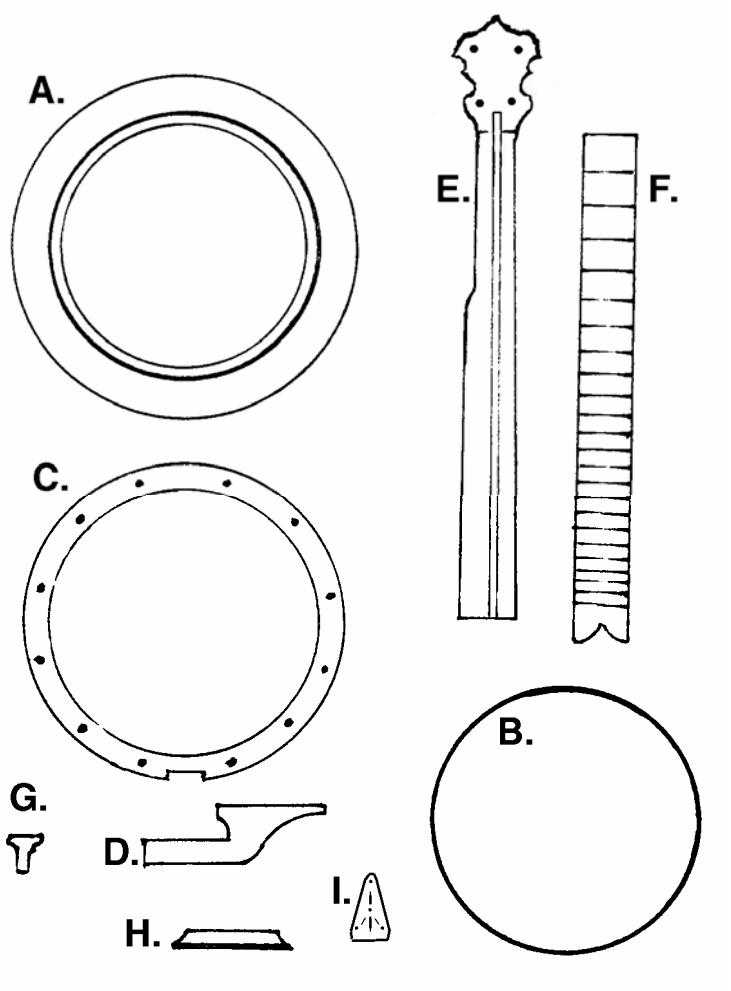
RIVERBOAT BANJO

Wooden Parts List:

A -- Main Body (cherry)
B -- Tone Ring (spruce or steel)
C -- Tension Ring (lam. maple)
D -- Tang (cherry)
E -- Neck (cherry)
F -- Fretboard (padauk)
G -- Tailpiece (padauk)
H -- Bridge (padauk)
I -- Truss Cover

Hardware:
4 Planetary Geared tuners
1 Geared 5th Peg
1 Slotted Screw for 5th string
1 Black Plastic Nut
5 Small Brads
13 Oval Head Screws (#10 X 2")
1 Truss Rod (installed in neck)
1 Allen Wrench for truss rod, 1/8"
1 Set of 5 Strings (ball-end)
48" Fretwire
Plastic Banjo Head, 11" diameter

1 Set Assembly Instructions



RECOMMENDED GLUE

There are only a few gluing steps for this banjo kit. We recommend using a good woodworking adhesive, such as Elmer's Carpenter's Wood Glue or Titebond Wood glue for all wood parts. You'll also need a little epoxy or superglue for the plastic nut material. Please do not attempt to assemble this banjo with hot melt glue!

_____**1.** Please check all parts of your kit right away to make sure everything is satisfactory. Don't hesitate to call us if something is missing or damaged, so we can correct the error without delaying your progress too much. Please also glance at the list of **ACCESSORIES** at the end of these instructions to see if there are any optional items you might like to add to your project as you build.

_____**2.** We have shaped the **NECK** of this banjo to a rather generous width. If you prefer a narrower profile, or have another banjo that you like, you may trim this one to match it. Do that rough shaping before proceeding with assembly.

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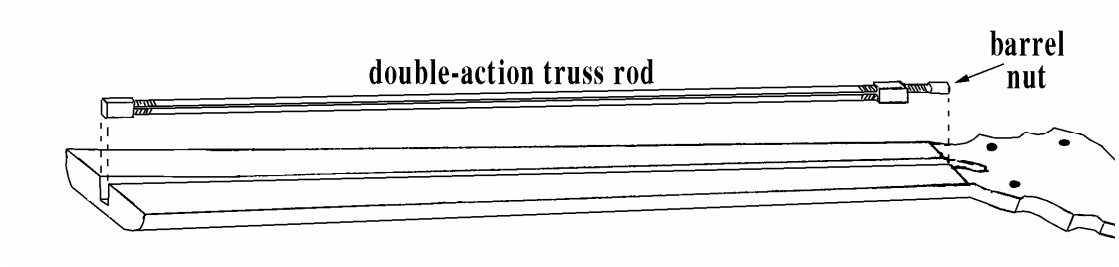
THE TRUSS ROD

_____**3.** Place the **TRUSS ROD** in the slotted neck with the barrel nut on top near the **PEGHEAD**, as shown.

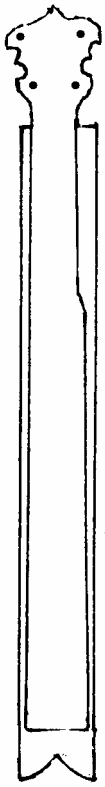


The TRUSS ROD should be snug in the slot and flush with the top surface of the NECK. If any part of it stands above the wood, you'll have trouble gluing the **FRETBOARD** on top. Make sure the barrel nut is only finger-tight at this point so the rods remain straight.

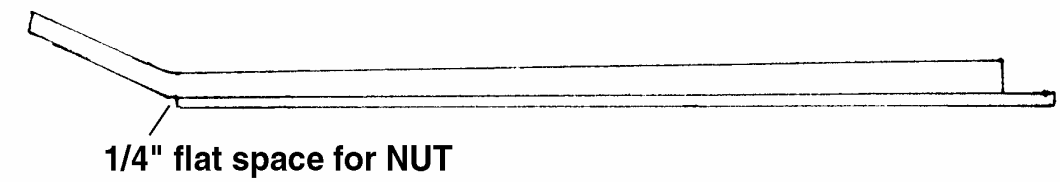
POINT OF INTEREST

The double-action **TRUSS ROD** is a self-contained adjustable reinforcement mechanism for helping you keep the **NECK** of the instrument straight. You can test its operation by tightening the barrel nut with the Allen wrench provided. As you turn the nut one way, the bar will hump up in the middle, and as you turn the nut the other direction, the ends will rise. Once this bar is sealed firmly in the neck, you will be able to adjust the barrel nut to actually bend the wood of the neck as desired. Though you may never need to make adjustments, it is comforting to know that you have the capability of doing so in the future.

THE FRETBOARD



_____**4.** The **FRETBOARD** must be trimmed to match the shape of the **NECK**. Place the two parts together facing down on your work table, centering the **NECK** on the **FRETBOARD**, as shown. Use a pencil to trace the shape of the **NECK** on the backside of the **FRETBOARD**.



Note that the wider end of the **FRETBOARD** will extend a little beyond the bottom of the **NECK**.

_____**5.** Use a band saw or coping saw to trim the **FRETBOARD** close to the lines drawn on the back side. Leave the **FRETBOARD** slightly oversize until you have glued it to the **NECK**.

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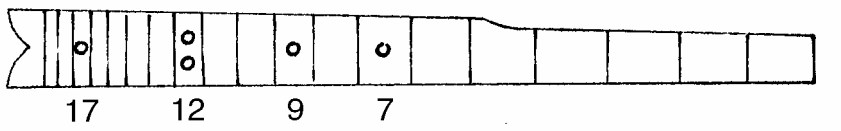
_____**6. (OPTIONAL)** You may wish to inlay some marking dots at certain positions on the **FRETBOARD** to make the instrument easy to play. We offer mother-of-pearl dots as an option for this purpose. They are attractive and simple to install with an electric hand drill and a sharp **¼"** bit. Here are the positions we usually mark:



Mark the center of each space in pencil, then use an awl or sharp nail to punch a depression at each point to help guide your drill. Use a sharp (new) **¼"** drill bit to bore shallow holes for the dots. The depth of the holes is not too critical, as you will see next.

Mix up some 5-minute epoxy, or Superglue, and put some into one hole, nearly filling the cavity. Push a pearl dot into the hole, allowing some of the glue to squeeze up around the dot. You may be able to push the dot down flush with the wood surface, but that is not necessary. The pearl material can "float" in the glu**e.**

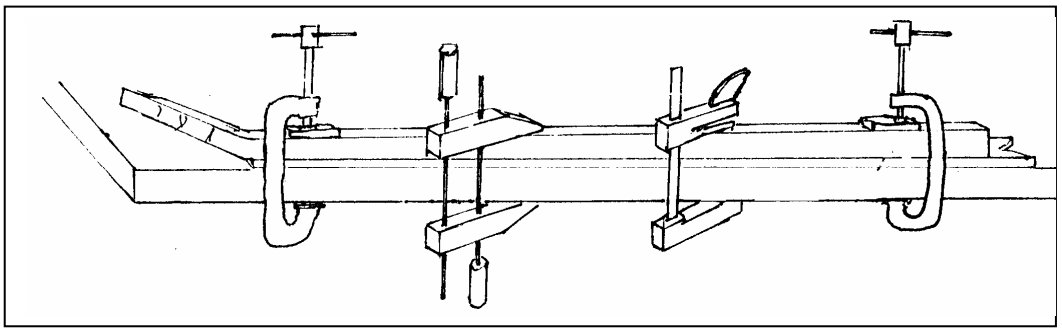
When dry, sand the pearl dots flush with the surface of the **FRETBOARD.**

_____**7.** Prepare to glue the **FRETBOARD** to the **NECK** as follows:

a) Gather at least three clamps – nearly any kind will do: c-clamps, cam clamps, hand screw clamps, etc.

b) Clear a space along the edge of a sturdy **FLAT TABLE.** It is important to clamp your banjo **NECK AGAINST A FLAT SURFACE**. If you have no good table, then prepare a thick piece of scrap wood about **2" X 4" X 18"** with one perfectly flat surface.

c) Apply glue to the mating surfaces and clamp the parts together so that some glue squeezes out along the edges. If you see open gaps in the seam, you need to apply more pressure.



CAUTION: If your clamps have no padding on the jaws, slip a scrap of wood between the clamp and the banjo NECK to prevent denting the instrument.

_____**8.** When dry, sand the edges of the **FRETBOARD** down flush with the **NECK**.

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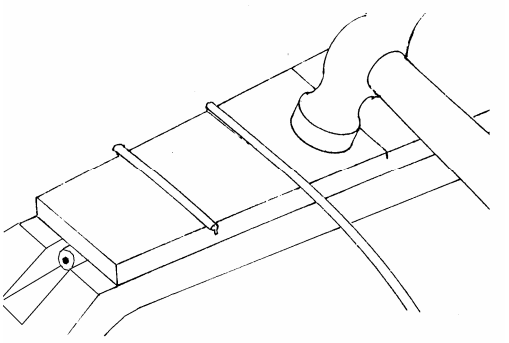
INSTALLING THE FRETS



_____**9.** Place the banjo **NECK** 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 (put a scrap of hardwood under the **NECK** to prevent scratching the banjo). Otherwise your wood will just bounce around as you try to pound the frets into place.

a) Begin by placing the long length of **FRETWIRE** over one of the slots in the **FRET-BOARD**, so the end hangs over the edge of the wood just **1/16"** or so.

b) Position the **FRETWIRE** so the "tang" will be driven down into the fret slots.

c) Use a hammer to lightly tap the **FRETWIRE** into the slot, until the "crown" of the fret contacts the wood surface.

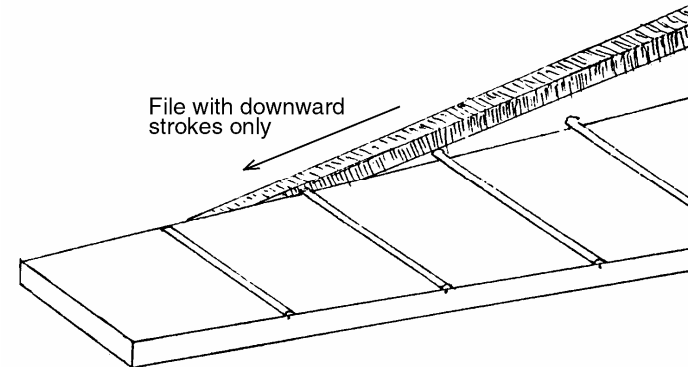
d) When the frets are securely installed, use a wire cutter to clip off the excess, as close to the wood as possible. Check over the frets carefully to make sure each one sits all the way down against the wood. If one fret stands higher than its neighbor, it may cause buzzing problems when you play the instrument.

HINT: Tap the wire into one side of the FRETBOARD first, then the other side. This aligns the entire length of the fret with the slot. Then a few taps toward the middle should finish seating it. DO NOT pound too much in the middle, or the ends will begin to curl back up. If this happens, use a knife or chisel to pry the wire out carefully. Bend the wire to its original curve, and start over again. Use the curvature of this wire to your advantage to help hold the ends of the wire down.

IF YOU HAVE TROUBLE INSTALLING THE FRETS, don't despair! Some experts prefer to glue the frets in place using 5-minute epoxy. This can be especially helpful if you have overworked the wire or enlarged the slot so it no longer holds the wire firmly. Use a clamp and a wood block to hold the errant fret in place while the epoxy sets. Then clean off excess adhesive with a sharp knife or chisel.

_____**10.** File (or sand) the ragged ends of the frets down until they are smooth and flush with the sides of the **FRETBOARD**. If you have access to a belt sander, you'll find this to be a quick and simple job. The **FRETWIRE** is soft metal that can easily be sanded.

_____**11.** File (or sand) a **45 degree** bevel at the ends of the frets, as shown, work the file in a downward motion only, to avoid lifting the frets up.



_____**12.** Now is a good time to "level" the tops of all the frets. Use a large flat mill file, resting it on the **FRETBOARD**, to wear down any frets that are too high. Check your progress frequently to see which frets are being cut and which ones are not.
As soon as each fret has been scratched lightly by the file, you may consider them all to be level.

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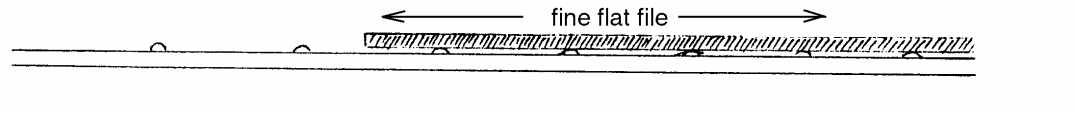
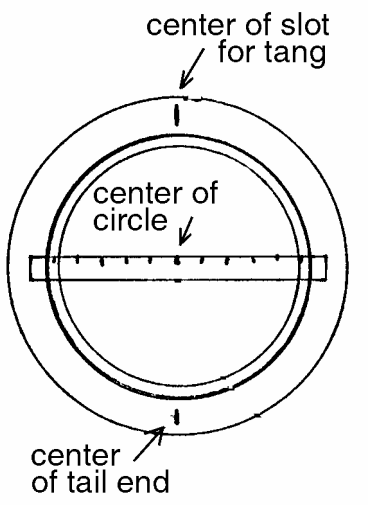


PREPARING THE MAIN BODY

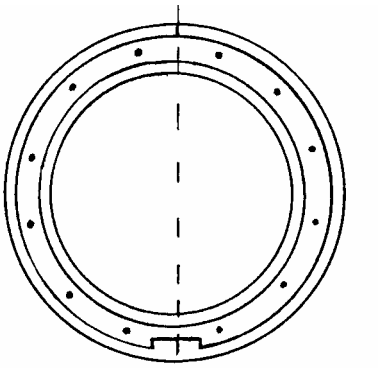


_____**13.** Draw a centerline on the top of the **MAIN BODY,** as follows:

- **a)** Find the center of the slot for the **TANG.** Use a square to extend a line up to the top surface.
- **b)** Lay a ruler across the middle of the opening to find the center of the circle.
- **c)** Place a straight-edge across the **MAIN BODY**, perpendicular to the first ruler, aligning the center of the notch with the center of the circle, and mark the tail end of the main body, as shown.

_____**14.** Carefully center the **TENSION RING** (with 12 holes drilled through it) on the **MAIN BODY**, centering it on the lines just drawn.

Notice that the notch in the TENSION RING is on the opposite side from the slot for the TANG.



_____**15.** When satisfied with the alignment, clamp the **TENSION RING** to the **MAIN BODY** to hold it steady as you mark the position of each screw hole.

Use an awl or sharp nail to punch-mark the locations of all 12 holes to be drilled in the **MAIN BODY**.

_____**16.** Remove the **TENSION RING** and use a **1/8"** drill bit to bore pilot holes for the 12 screws, about **1-1/2"** deep.

_____**17.** We have enclosed one extra screw in the kit to use for tapping these holes. Drive that screw into and out of each hole once, just to make it easier to install the **TENSION RING** later. This way, you'll only mar one screw head with your screwdriver – the others will be easy to install without marring.

_____**18. (OPTIONAL)** If you would like to stain or paint the **TENSION RING** a contrasting color as we do, we recommend the following procedure:

- **a)** Wipe wood filler around the outside edge of the **TENSION RING** to fill any cracks or gaps in the laminations. We use a product called "Plastic Wood" (natural color) from the local hardware.
- **b)** Use medium **(150 grit)** sandpaper to sand the **TENSION RING** to make it smooth.
- **c)** Use masking tape to cover the notch where the **TAILPIECE** will be glued later.

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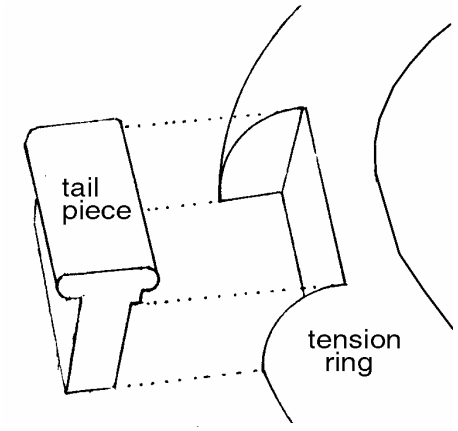
d) Stain or paint the **TENSION RING**, as desired. We like the appearance of a dark walnut stain for this part.

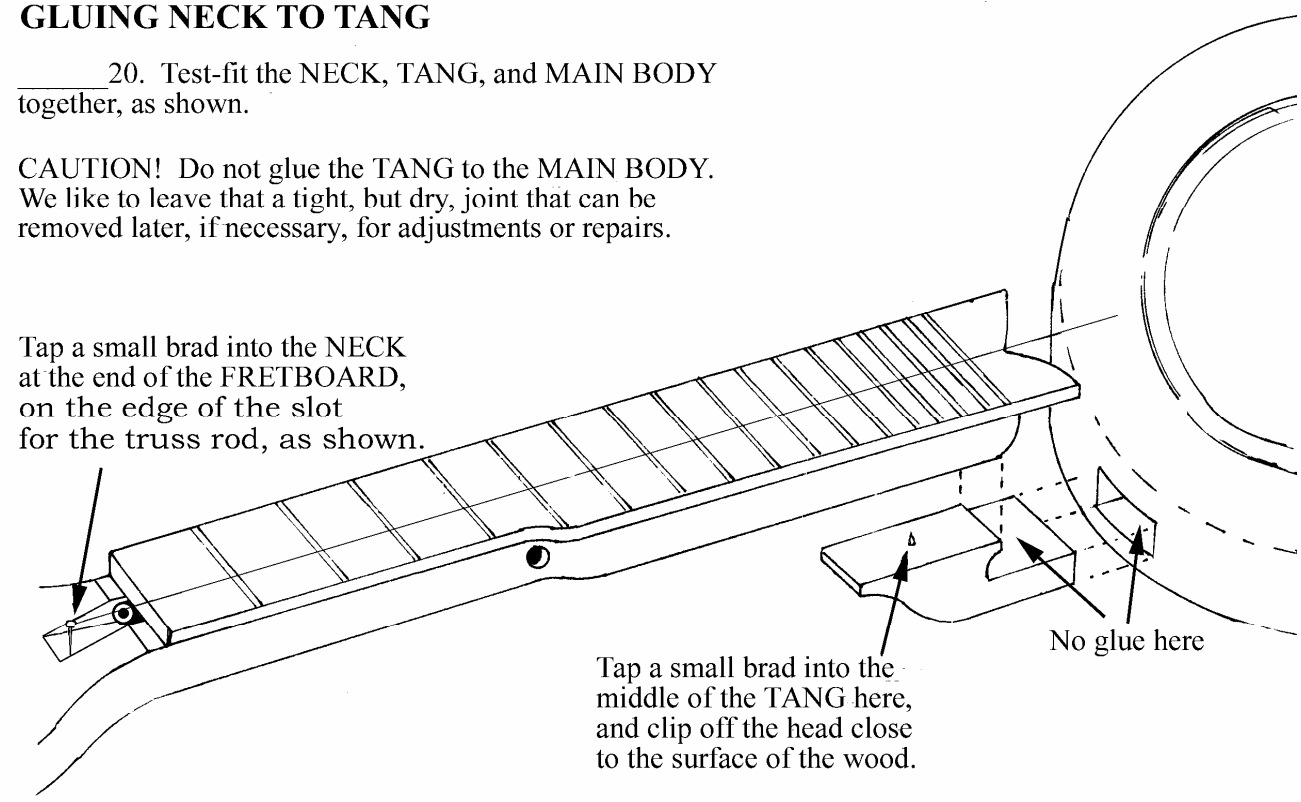


_____**19.** Now you can remove the masking tape and glue the **TAILPIECE** to the **TENSION RING**, as shown.

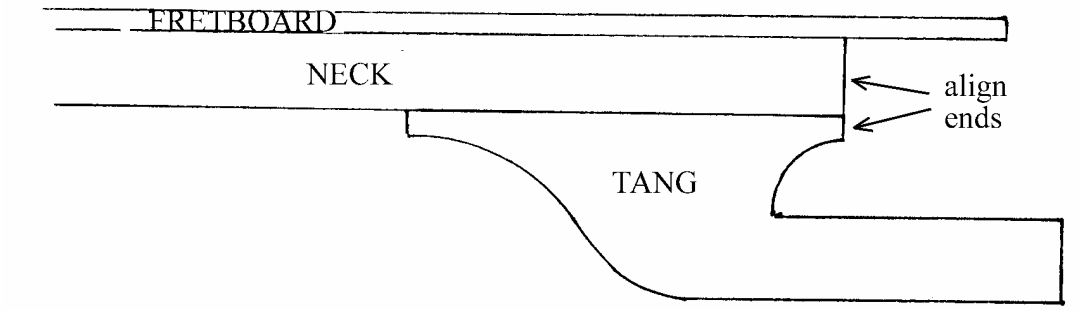
GLUING NECK TO TANG

_____20. Test-fit the NECK, TANG, and MAIN BODY together, as shown.

CAUTION! Do not glue the TANG to the MAIN BODY. We like to leave that a tight, but dry, joint that can be removed later, if necessary, for adjustments or repairs.



_____**21.** Carefully position the **NECK** on the **TANG**, aligning the ends as shown, and press the parts together so the small brad pricks into the back of the **NECK**. Use a clamp to hold these parts together dry for now **– NO GLUE YET!**



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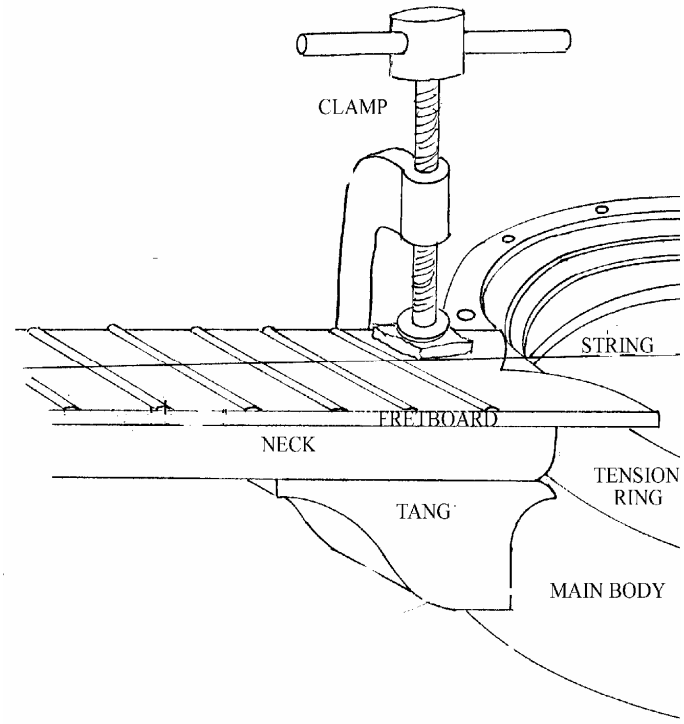
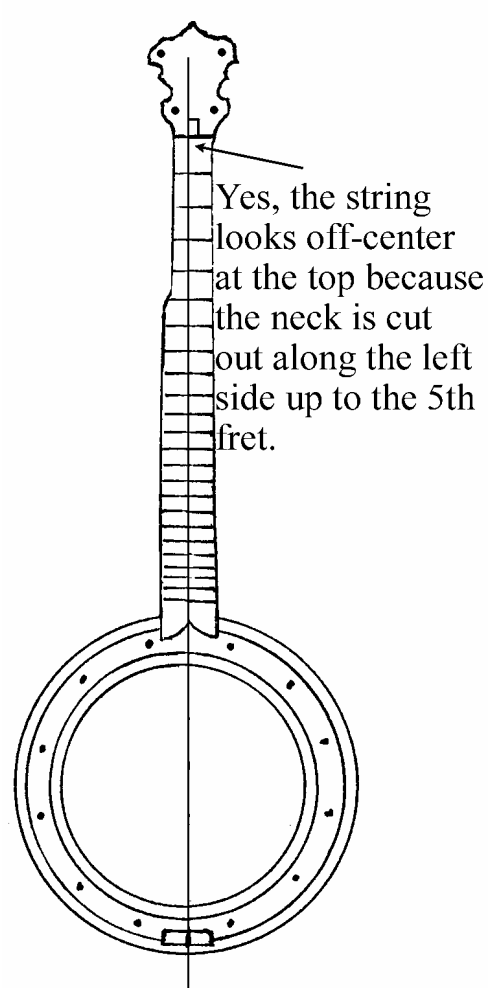
_____**22.** Align the banjo **NECK** as follows:

a) Insert the **NECK** and **TANG** all the way into the **MAIN BODY** of the banjo.





b) Tie a piece of thread (or use one of the banjo strings included in the kit) to the middle hole in the **TAILPIECE.**

c) Stretch the string to the brad at the other end of the **FRETBOARD** and check to see if the string lines up with the **"V"** cut at the wider end of the **FRETBOARD.**

d) If the string is off-center at the base of the **FRETBOARD**, rotate the **NECK** until the string hangs above the center of the **"V"**.

e) Un-clamp the parts, spread glue on the top of the **TANG**, and clamp the parts together again, using the string to help you achieve proper alignment. Add a second clamp when the parts are properly centered.

_____**23.** It is best to accomplish the final sanding and shaping of the **NECK** now. Remove it form the **MAIN BODY** for easy handling, and sand the entire length, checking it frequently by sliding your left hand along it as though you were playing. Look especially for rough spots, machining marks, and excess glue along seams.

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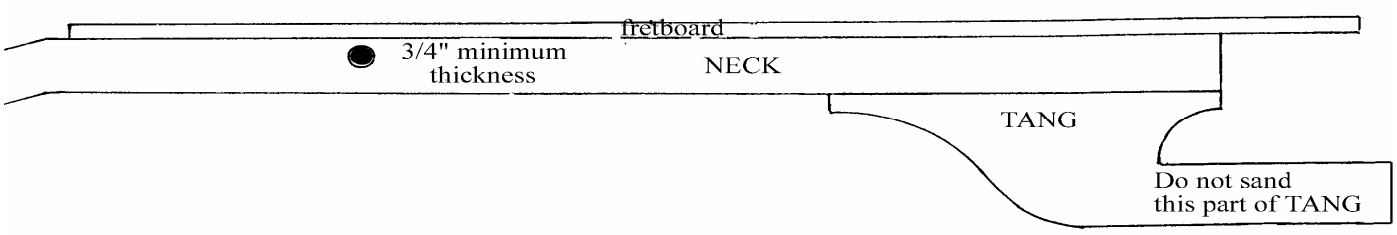
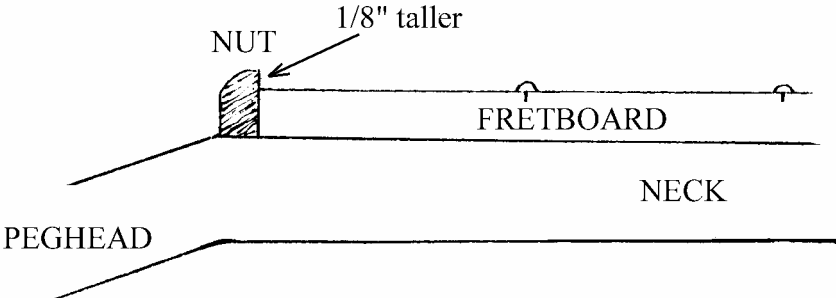


You still have an opportunity here to trim the **NECK** thinner or narrower to fit your grip. Don't be shy here. We've made these parts generous in size to accommodate the largest hands, but you might enjoy your banjo much more if you carve the back of the **NECK** quite dramatically. Just be careful not to reduce the overall thickness of the **NECK/FRETBOARD** assembly below ¾", or you may expose the **TRUSS ROD**.

_____**24.** Test-fit the plastic **NUT** to the end of the **FRETBOARD**. We use a disk sander or belt sander to trim the length and round over one edge of the **NUT**, as shown, so it fits nicely at the end of the **FRETBOARD**.

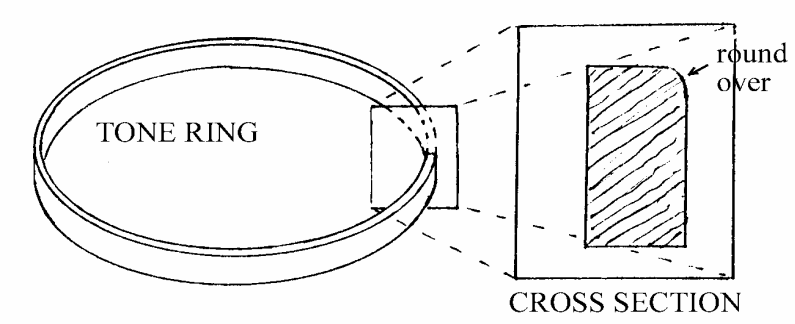
The **NUT** should stand about **1/8"** higher than the **FRETBOARD**

When trimmed to size, glue the **NUT** in place at the end of the **FRETBOARD** with epoxy or superglue.

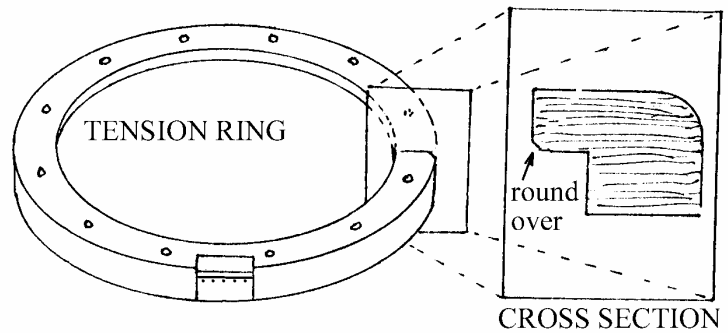


FINAL SANDING AND FINISHING

_____**25.** If you have a wooden **TONE RING**, it should be rounded over on the outer top edge so it does not damage the **PLASTIC HEAD**. Sand this edge to remove roughness and sharpness.



_____**26.** Round over the inner edge of the **TENSION RING**, as shown, to remove roughness and sharpness so it does not damage the **PLASTIC HEAD**.



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_____**27.** Sand the entire instrument with fine (180 grit) sandpaper to prepare for finishing. The goal here is to remove any scratches left by coarser sanding or machining, and to round over any sharp corners so the wood feels smooth in your hands. One sign of good woodworking is nicely rounded corners – they look and feel more finished than sharp edges.

_____**28.** Apply the finish of your choice. Don't forget to apply finish to the wooden **TRUSS ROD COVER** too. It is reversible, so you may want to finish both sides and then decide later which color of wood (walnut or cherry) you want to show outward. Here are a few suggestions for finishing:

Mask off the top playing surface of the **FRETBOARD** with masking tape. It is best to avoid putting varnish or lacquer on this playing surface. After finishing the rest of the instrument, you can remove the masking tape and lightly oil the **FRETBOARD** with linseed oil.

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.

OIL -- An oil finish will give your wood a low luster appearance, bringing out the natural color of the grain. 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. We use boiled linseed oil on the playing surface of the fingerboard.

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 includes detailed instructions, sandpaper sheets, foam applicator, and a 1/2 pint can of satin gel, wipe-on urethane 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.

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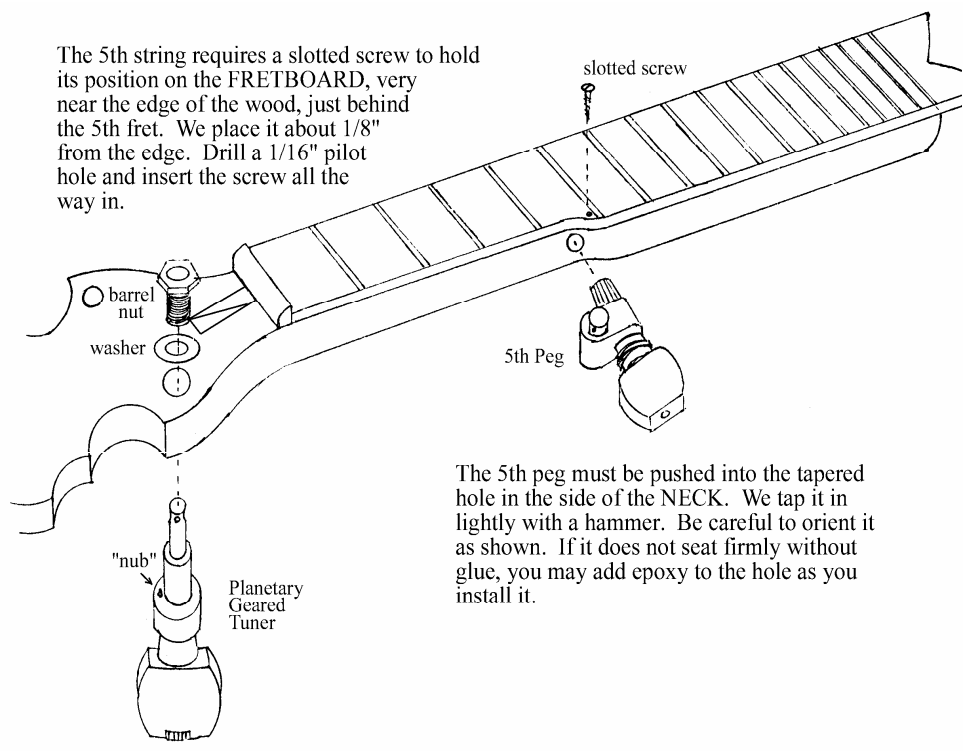
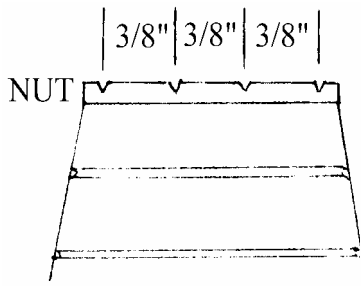
INSTALLING HARDWARE

_____**29.** Once the finish is dry, you may install the tuning gears. The four on the **PEGHEAD** are very simple. Just push them through from the underside and tighten the barrel nuts and washers on the top side until snug. Note the small "nub" on each tuner that pushes into the wood to prevent the entire tuner from rotating.



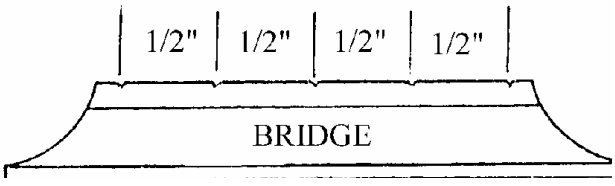
_____**30.** Install the **5th** peg and the slotted screw for the **5th** string as shown on the diagram.

_____**31.** Use a triangular file to make four notches in the plastic **NUT** to hold the strings at the proper spacing, as shown. If you trimmed your banjo narrower than our pattern, then just space the strings equally, leaving about **1/8"** margin at each side.



The bottom of each notch should be about **1/16"** above the surface of the **NECK**.

_____**32.** Use the same file to cut very shallow notches in the **BRIDGE**, as shown.



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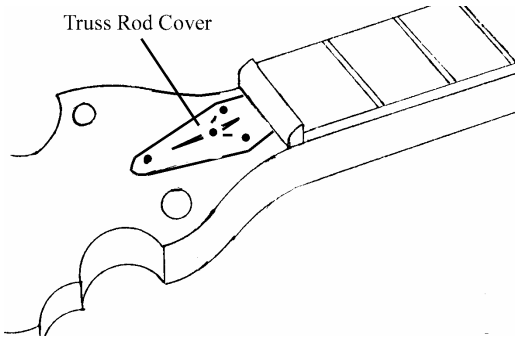
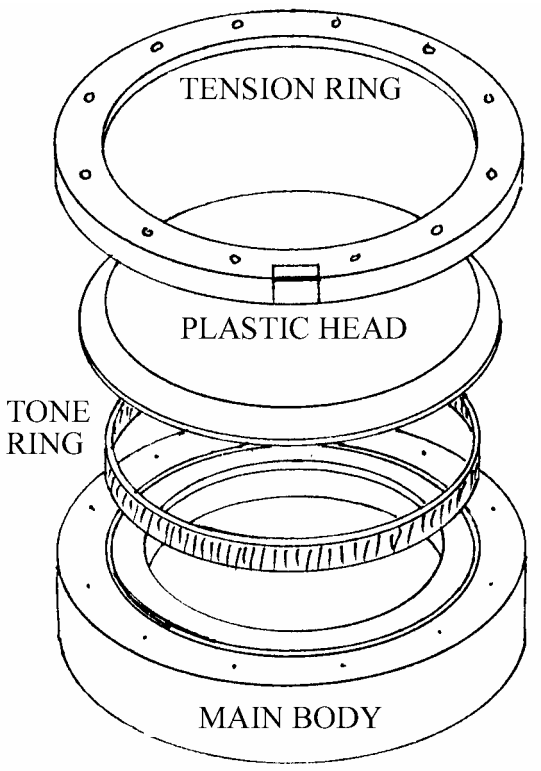


_____**33.** Install the **TRUSS ROD COVER** to the **PEGHEAD**, as shown, using three small screws. Drill **1/16"** pilot holes to make it easy to install the screws.

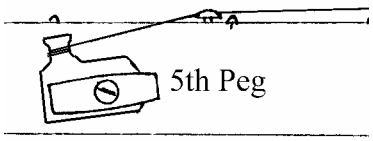
NOTE: The **TRUSS ROD COVER** is reversible, with cherry on one side and walnut on the other. You may choose which wood to show outward, to either blend with the **PEGHEAD** or contrast with it.

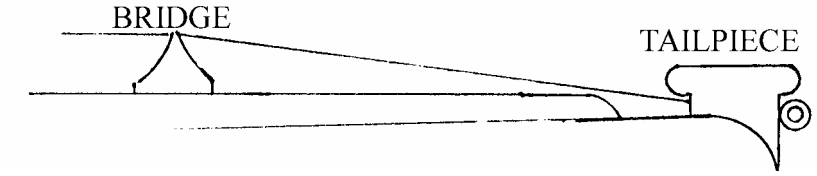
_____**33.** Place the **TONE RING, PLASTIC BANJO HEAD**, and **TENSION RING** into position and screw them down until the head becomes tight like a drum skin. You may adjust the tension by tightening or loosening the screws. Don't be shy about tightening the plastic head. It should be very tight. If the head does not draw up as tightly as you like, remove the parts and place thin shims under the **TONE RING**. This will lift the head slightly higher, causing more tension as the screws are tightened.



_____**34.** Install the strings according to the diagram below. The **TAILPIECE** is designed for ball-end strings. If you happen to purchase loop-end strings, you may slide a short rod or nail through the loops at the back of the **TAILPIECE**.

The two lightest strings go on either side of the instrument, one to the **5th** peg and the other to the **1st** gear on the **PEGHEAD**. These wires are so fine that you should thread them through the peg holes twice to make sure they don't slip when tightened.





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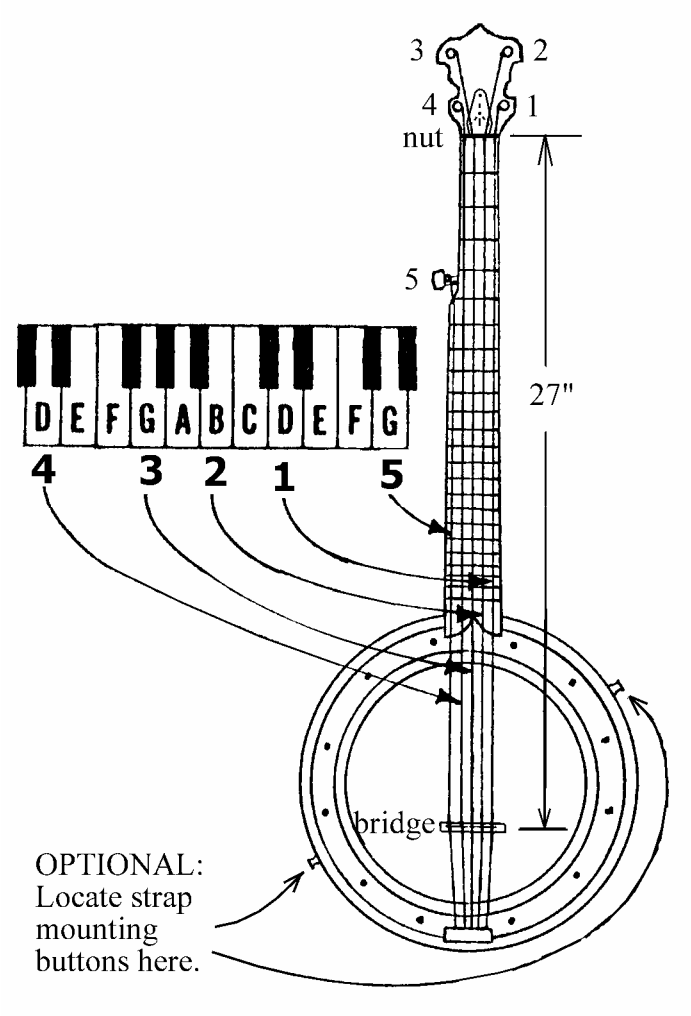
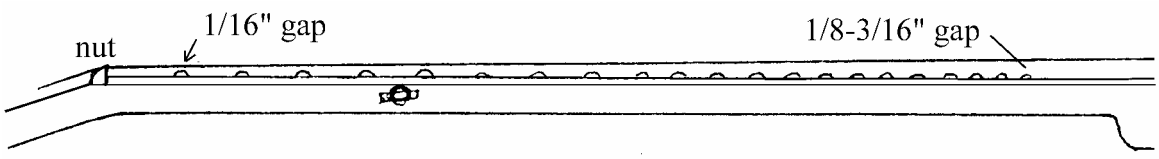


BEFORE TIGHTENING THESE FIRST STRINGS, place the **BRIDGE** on the plastic head, about **27"** from the **NUT**. The **BRIDGE** will be held in place by the strings, but you'll be able to slide it around to adjust intonation after you install all the strings.

The heaviest wire has a soft metal wrapped around a steel core. This is string **#4**, tuned to the lowest note.

The remaining two wires may be difficult to tell apart. The lighter one goes to gear **#2** and the heavier to **#3**.

_____**35.** Tighten the strings a little a first to check how high they hang over the frets. Achieving the proper string height is very important to making your banjo play easily. The ideal position is about **1/6"** (or less) above the first fret (near the **NUT**) and about **1/8 - 3/16"** above the last fret near the **MAIN BODY**.



At the first fret (near the **NUT**) you can lower the string height by filing deeper notches in the **NUT**, or you can raise the strings by removing the **NUT** and gluing a thin shim of wood veneer under it.

At the last fret (near the **MAIN BODY**) you can lower the strings by filing deeper notch in the BRIDGE or sanding the underside of the **BRIDGE**, or you can raise them by switching to a taller **BRIDE** or by gluing a thin veneer under the **BRIDGE**.

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TROUBLESHOOTING HINTS

Tune up your banjo to the notes shown to see how it plays. If you have any strings that buzz or rattle, look for the following problems:

a) Sight down the length of the **FRETBOARD** to see if it is still flat. If it is bowed significantly, you may need to adjust the **TRUSS ROD**. Tightening the **TRUSS ROD** adjustment nut, with the Allen wrench supplied, pulls the **PEGHEAD** backwards and pushes up the middle of the neck. Loosening the **TRUSS ROD** simply allows the string tension to pull the **PEGHEAD** forward. This type of adjustment should be necessary only rarely, if ever.

b) If the **FRETBOARD** is flat and a string buzzes when plucked in the open position, it may be making contact with the first fret (nearest the **NUT**). You may need to shim up the **NUT** to raise the strings a little higher. If the string is not buzzing against the first fret, it might be vibrating against the sides of the notch in the **NUT**. It is best to angle the notches down toward the **PEGHEAD** so the strings make firm contact at the front edge of the **NUT**.

c) If a string buzzes at just one or two positions (**FRETS**) along the neck, or if you discover that two or three frets all give the same pitch, then look for a fret that stands higher than its neighbors. You will either need to tap that fret back down to its proper depth, or else use a long flat file to level of the tops of the frets.

d) If a string rattles or buzzes at several positions (frets) along the neck, then the **BRIDGE** is too low. Check to see if the plastic head is sagging. If so, you will want to tighten it up (***see step # 33***). We usually provide two **BRIDGES** of different heights with the kit. If the taller one is not tall enough, you may still shim the **TONE RING** higher by adding thin strips of veneer underneath.

CONGRATULATIONS! We hope you have enjoyed this project and that you get many years of musical pleasure from playing the finished instrument.

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