



MOUNTAIN BANJO KIT

Assembly Instructions

Updated April 2019



WOOD PARTS

- a) Main Body
- b) Back Ring
- c) Neck w/peghead
- d) Fretboard

HARDWARE

- 1 Textured Plastic Skin Head
- 1 Wood Tone Ring
- 1 Set of 5 Banjo Strings, Loop-end
- 7 Pearl Marking Dots, 1/4" dia.
- 48" Fretwire
- 4 Planetary Banjo Tuners (straight)
- 1 Tuner for 5th String
- 1 Blackwood Nut
- 1 Needle File
- 1 Bridge, 5/8"
- 1 Slotted Screw for 5th String
- 5 Escutcheon Tail Pins
- 3 Drill bits, 1/16", 1/4", & 3/8"
- 3 Tiny Nails
- 1 Leather Scrap, 3/4" X 1-1/2"
- 9 Wood Screws, #8 X 1-1/2"
- 7 Hex Drive Cap Screws, #10-24 X 3/4"
- 1 Hex Drive Cap Screw, #10-24 X 1-1/4"
- 1 Washer, #8
- 8 T-Nuts, #10-24 (installed in Back Ring)
- 1 Allen Wrench, 5/32"
- 1 Hardwood Driving Block
- 1 Double-Action Truss Rod, 18"
- 1 Truss Rod Cover w/3 screws
- 1 Assembly Instructions

BEFORE YOU BEGIN

___A. Inventory and inspect all your parts careful. If anything is missing or defective, please call or email right away.

651-439-9120
INFO@HARPKIT.COM

___B. It is a good idea to read through the entire assembly instructions before you start, just to get an overview of the project.

A NOTE ABOUT GLUE

We strongly recommend that you use a common woodworking glue like Elmer's Carpenter's Wood Glue or Titebond because they hold the parts more securely than most other adhesives, and they are inexpensive and easy to use. **DO NOT** assemble the wood parts of this project with 5-minute epoxy or super-glue or hot melt glue. The yellow colored Elmer's or Titebond is best.



When gluing parts together, be sure to put enough glue on the joint to wet the entire surfaces to be joined. A good sign of proper gluing is that a little excess will squeeze out around the joint when clamping pressure is applied. Too little glue may cause the parts to separate later, whereas too much glue makes things messy. Always keep a damp rag handy for quick cleanup, as necessary. It is especially helpful to keep your fingers clean while gluing, because gluey fingerprints have the embarrassing tendency to appear on the finished product in prominent places.

ASSEMBLY INSTRUCTIONS

INSTALL MARKING DOTS (OPTIONAL)

___1. Find the center point at each end of the tapered fretboard and draw a straight line down the front face to use as your centerline for locating the marking dots. (fig. 1)

A typical banjo would have marking dots before frets 3, 5, 7, 10, 12, and 17. (fig.1)

Make a punch mark on your center line between the frets to mark the location of the marking dots. Use a sharp (new) 1/4" drill bit to bore shallow holes where you made your punch marks. (fig. 2)

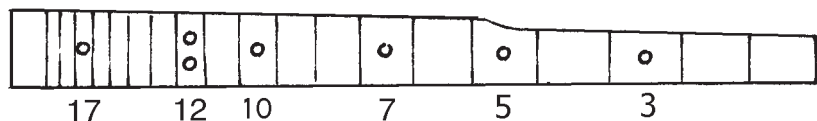


FIG. 1

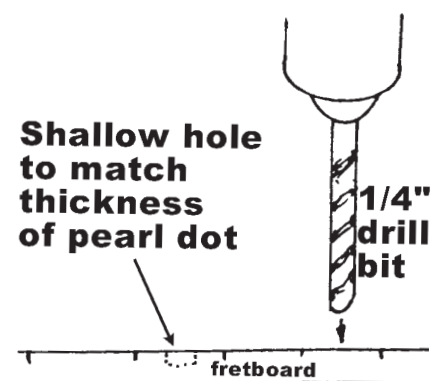


FIG. 2

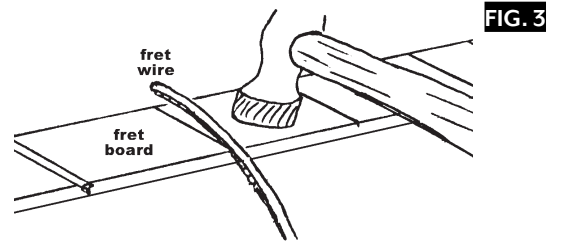


If you want to install any marking dots on a FRETLESS fingerboard, you'll want to install them exactly where the fret would be. Use our free FRET CALCULATOR online and use 25.4" (or 645mm) as the scale length - www.harppkit.com/fret-calculator

- ___2. Use 5-minute epoxy or medium Superglue to glue the pearl dots into the wood. Press them down until flush if the hole is deep enough. If not, you can sand them flush after the glue dries. Start with 100 grit sandpaper, and finish off with about 180 grit, using a flat sanding block to keep the playing surface flat. Be sure to sand off any excess glue residue too.

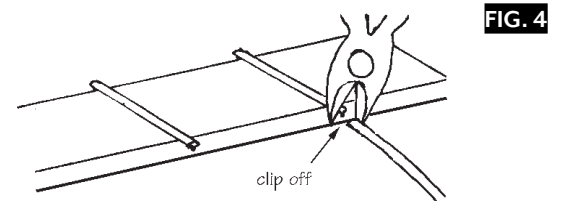
INSTALLING THE FRETS

- ___3. If you have a fretted banjo kit, you can install the frets now, before gluing the fretboard in place. You'll want your fretboard on sturdy, solid workbench.

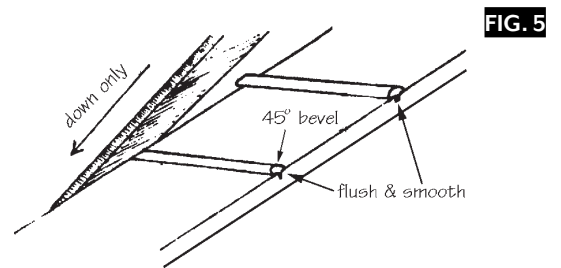


Hold the end of wire over the slot in the fretboard, so the end hangs over the edge of the wood just 1/16" or so. Position the fretwire so that the 'tang' will be driven down in the fret slots (fig. 3).

Use a hammer to lightly tap the fretwire into the slot, until the crown of the fret contacts the wood surface. Your fretwire may be slightly curved, but it will straighten as you tap it in.



Clip off the excess wire close to the edges. Then use a flat mill file to file the ends flush and smooth with the wood. A belt sander also works well for smoothing the ends of the fretwire -- it is soft metal, so it sands nicely on a power sander.



Then angle the file (or sander) to put a 45 degree bevel on each end. Be sure to file with downward motions only, lest you lift a fret back out of its slot.

SHAPING THE PEGHEAD

- ___4. The peghead can be shaped to suit your taste. This is a nice opportunity to customize the instrument and make it fancy. You'll find a few templates adapted from some tradition designs on page 15. You can use one these, draw your own, or look for more inspiration on the internet.



When shaping the peghead, be sure to keep enough room to install the tuners and the truss rod cover.

INSTALL THE TRUSS ROD

- ___5. Install the double-action truss rod into the slot of the neck, as shown. (fig. 6) **Be sure to orient the barrel nut toward the peghead, and down against the bottom of the slot!**

Press the truss rod into the slot until it is firmly seated.

Note that the truss rod works both directions, depending on which way you turn the nut. One way will put a hump in the middle and the other way will bend the ends upward. This allows you to correct for either type of curve in the neck after the instrument is assembled.



FIG. 6

INSTALL THE FRETBOARD

- ___6. Prepare for installing the fretboard by test-fitting it dry to see how it will be oriented on the neck. Leave room near the peghead for the blackwood “nut” to stand on the flat surface, just before the taper of the peghead, as shown here. The fretboard will butt up against the nut, and the purpose of the nut will be to hold the strings at the correct spacing and height above the frets.



FIG. 7

Use a pencil to mark where the fretboard should end next to the nut. (fig. 7)

- ___7. Before gluing the fretboard in place, it really helps to install a couple of tiny “burrs” into the neck to help prevent the fretboard from sliding out of position as you apply clamping pressure. Find the tiny nails in the hardware pack and tap one near the peghead and the other near the heel of the neck. (figs. 8 and 9) No need to drive them very deep.

Clip each nail close to the wood surface, leaving a small sharp burr sticking up. (fig. 10)

Position the fretboard carefully on the neck and press it down against the burr at each end so the underside of the fretboard becomes dented by the burrs.



FIG. 8

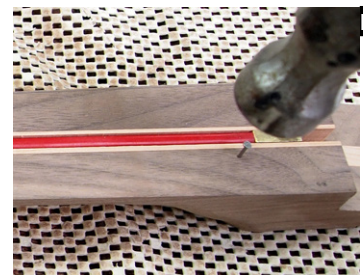


FIG. 9



FIG. 10

- 8. Gather a few clamps, a flat scrapwood clamping block, and some padding material. (fig. 11) The type of clamp doesn't matter so much (spring clamps, c-clamps, cam clamps, etc.) Just don't rely on weights to do the job because you cannot adjust pressure where you need it with weights.

For padding, we use strips of heavy foam rubber from an old floor mat, but you can cut strips of leather, terrycloth toweling, or carpet pad instead.



Make a dry run first, without glue, just to set the clamps to the right gap for each position, and to make sure the fretboard can be quickly re-positioned after the glue is applied.



FIG. 11

- 9. When satisfied with your system, spread glue on the top of the neck and place the fretboard on it, making sure the burrs fall into the divots made earlier. Clamp the whole length of the fretboard, making sure a little glue squeezes out along the entire length on both sides.

You don't want to have any gaps between the fretboard and neck. Use a wet towel to clean up excess glue before it dries. (fig. 12)



FIG. 12

- 10. When the fretboard is dry, remove the clamps and begin shaping the back of the neck to suit your grip. We have only done basic rounding for you. When we finish off this banjo, we like to alter the profile as shown at right. Do this with coarse sanding blocks, rasps, and/or scrapers until you are happy with the shape. Be careful to keep the overall thickness at least 1", including the fretboard. (fig. 13)

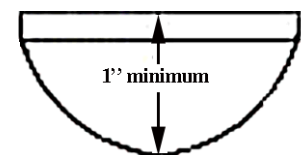


FIG. 13



CAUTION: Don't sand the tang at the end of the neck. That has been carefully fitted to the hole in the body already, so it should not need sanding.

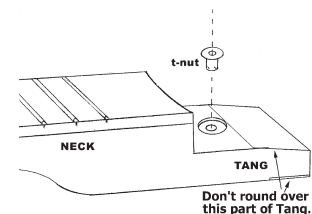


FIG. 14

The wide end of your fretboard is square, and it may extend a little beyond the supporting part of the neck. This is fine, as it will not interfere with the body, but you may sand a curve to match the end of the neck if you wish. You may also scallop the topside to give more strumming space under the strings at that end. You'll need a drum sander for those curves.

DRILL THE FOUR HOLES FOR THE TUNING MACHINES

- ___11. Use the same pattern that you used for cutting the peghead shape to mark the location of the tuning machines on the peghead. Use the 1/16" bit to drill a guide hole. **Be sure to drill these holes perpendicular to the peghead.**

Now use the 3/8" bit to drill out the holes to the correct size but PLEASE - **take care to test the hole size in a piece of scrap wood first.** Our tuner stock can vary and may require a different size bit.

Using a wood backing underneath the peghead will help prevent tearout.

If you went off the deep end and designed something wild and crazy, then we suggest making a paper outline of it and drawing the string lines up from the nut to see where you want to place the tuning pegs.

FINAL SANDING

- ___12. Now you are ready for final sanding. Take your time to scrub out machining marks and remove glue residue from all the areas that will be visible on the finished instrument. Use 60 or 80 grit sandpaper for heavy shaping, but then switch to 100 or 120 grit to smooth the surfaces more, and then move to 180 grit for finer smoothing. This will prepare the instrument for finishing. A random orbital sander will hasten this process dramatically!



NOTE: It is smart to keep the back ring screwed to the main body while sanding, so you smooth and shape the outside of those parts equally.

OPTIONAL: If you want to decorate the body of your banjo, this would be a good time to do that work. Some people enjoy carving solid wood like this, and others like decorating with a woodburning tool. Another nice option is to install inlay around the body. If you want to add painted decorations, we recommend sealing the wood with one clear coat first, then sand it smooth before applying the decorative paints. Further clear coats will seal in the decorations.

GENERAL FINISHING GUIDELINES



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, or just leave it unfinished (that wood has natural oils for protection).

STAINS or DYES -- These are coloring agents and should only be used if you want to change 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 best with a clear finish. But, if you want to color the wood, your staining should be accomplished before applying a surface finish such as oil, varnish, or lacquer.

OIL or WAX -- Oil finishes 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 awhile. Some people are fond of a beeswax finish for a natural look, but it can show water spots if it gets wet, so you may end up needing to re-wax or touch up the surface in the future.

POLYURETHANE VARNISH -- Any regular varnish will work fine on this project, but we think a wipe-on polyurethane is the easiest to apply because it does not drip or sag -- just wipe on a thin coat and wipe off the excess. The advantages of this finish are its simple application, minimal odor, good durability, and deep, soft luster.

LACQUER -- Many professional instrument makers 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.



SUGGESTION: As you are applying the first coat of finish, watch carefully for glue residue that prevents the finish from penetrating the wood. Take the time to sand or scrape the glue off, before proceeding further with the finish. Scraping a sharp chisel across the area usually does the trick without adding deep scratches in the surface. Yes, this can get messy, but you’ll be glad you took the time to do it. Nothing looks more amateurish than a woodworking project with glue spots still showing.

FINAL ASSEMBLY AND STRINGING

When the finish is dry, you can begin assembling the parts with the hardware provided. First thing is to make sure the t-nuts are installed in the tang of the neck and inside the body.

We should have already installed a t-nut in the tang of the neck (fig 14, pg 5). If it is not there yet, then press it in carefully (don’t pound with a hammer) so as not to crack the wood.

Then you’ll need to unscrew the back ring from the body to check for seven t-nuts inside there. Install them carefully by pressing them in against a flat table so as not to crack the wood. (fig 15) A drill press (turned off) works great as a pressing tool.

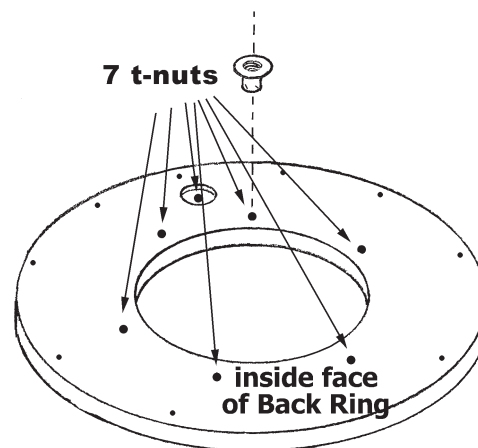


FIG. 15



SUGGESTION: Sometimes the threads get a little misshapen on the t-nuts, making it hard to start the cap-screws into them. It is helpful to take a moment now to drive a cap-screw through each t-nut from the inside of the back ring, just to clear out any burrs or straighten the threads. Then you’ll have an easier time with the cap screws later. Don’t leave the screw in the t-nut though. Just thread it in and back out again to clear the threads.

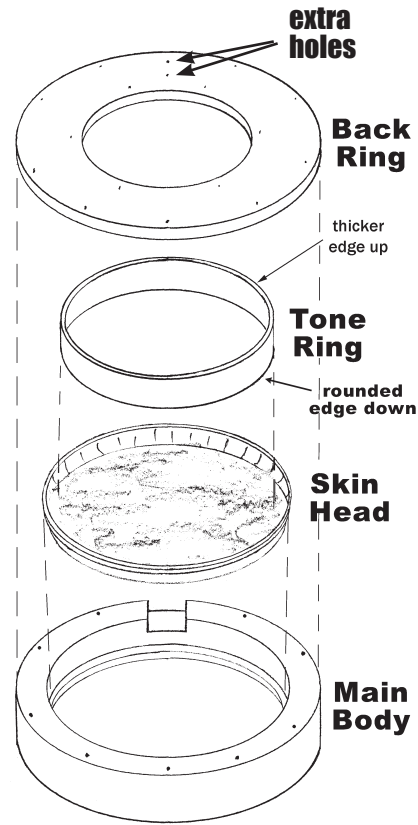
- 14. Now you can assemble the body with the skin head and tone ring as shown at right, using the nine wood screws provided (No glue).

IMPORTANT: Take care to orient the parts correctly! (fig. 16) The two extra holes in one part of the back ring should be centered over the large slot in the main body. Also, the label on the skin head looks best when centered under the strings.

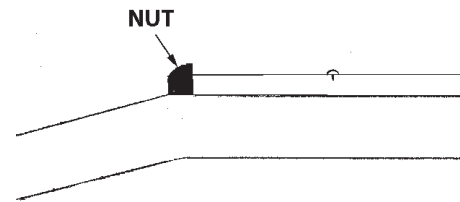
Notice that the tone ring has a rounded edge that should push against the inside of the skin head as the wider flat edge is pressed downward by six socket-head screws for applying tension to the skin head.

We don't glue the back ring in place because we figure someone will eventually need to take the banjo apart for cleaning, refinishing or repair in the future.

Use the 5/32" allen wrench to install 7 cap screws into the back of the body so they press evenly on the tone ring. You can tighten these screws equal amounts to add tension to the skin head. We like it when thumb pressure on the front of the skin head can only push it down about 1/8" or so.



- 15. Fit the blackwood nut against the narrow end of the fretboard and shape it down to match the illustration here. (fig. 17) It should stand at least 1/16" above the surface of the fretboard, and the top can be sloped downward toward the peghead for easier filing of string notches.



This wood sands very nicely if you lay your sandpaper on the table and rub the wood across the paper to achieve the size and shape you need. Once you have it fitting properly, polish it up with fine sandpaper (400-600 grit).

Then use Superglue or 5-minute epoxy to glue the nut in place, taking care to center it so one end does not poke out beyond the edge of the neck (that would be uncomfortable when you play).

- 16. Install the 5th peg into the hole in the side of the neck, as shown. (fig. 18) Use your fingers to get it started, and take a look from the side view to make sure the post is turned a little off vertical to make it easy to wind the string on it at the angle from the top of the fretboard.



NOTE: Some of the 5th pegs are too small to seat securely in the hole without help. If this is the case, you'll want to epoxy the 5th Peg in place.

Remove the white button and nylon washer from the tuner so you can slide the hardwood driving block over the shaft. (fig. 19) Tip the neck on edge and move to the corner of your work table so you can tap the 5th gear down into the hole. Be sure to pad the underside of the neck -- the small leather scrap included with the kit works well for that.



FIG. 19

- ___17. Re-assemble the peg with the nylon washer, the plastic button, and the screw. (fig. 19)

The more you tighten the screw, the harder it will be to turn the button for tuning.

- ___18. Install the 4 straight gears using a crescent wrench or nut driver, as shown here. The washer and threaded sleeve go down through the top of the peghead to engage the main body of the gear. (fig. 21)

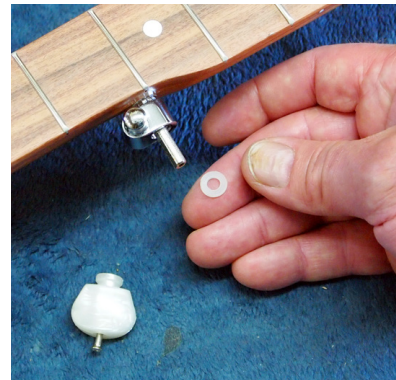


FIG. 20

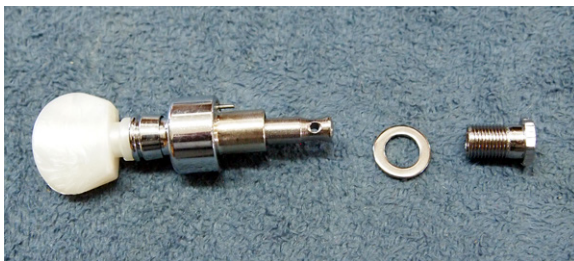


FIG. 21

- ___19. Install the truss rod cover with the small black screws provided. Use a 1/16" drill bit to drill pilot holes for the screws. (fig. 22)

You'll need a #1 Phillips screwdriver for those tiny screws. (fig. 23)



FIG. 22

Something you almost never hear -

"Say, isn't that the banjo player's Porshe parked outside?"



FIG. 23

INSTALL THE NECK

20. Now you can install the neck into the body. It should be a tight fit. There are 2 cap screws left in your kit -- one longer than the other. The long one needs the washer. Screw that one into the hole closest to the top edge of the body and into the hole in the tang. (fig. 24) It should thread itself into the t-nut in the tang, but you may need to wiggle the neck a little to get it started.

Screw the last short cap screw into the lower hole until it contacts the metal plate on the tang. This will be used for tilting the neck forward and back, but the upper screw must be loosened before you can make that sort of adjustment.

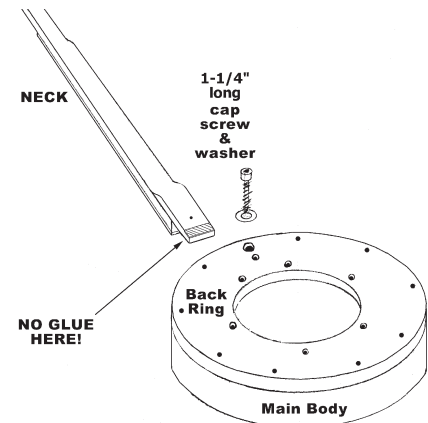


FIG. 24

21. Find the center of the fretboard at each end, as shown in diagram. (fig. 25) Put masking tape on the wood for marking these centers. Notice that the line between these two centers will be off-center in the middle of the fretboard, but that's OK. We are allowing room for the short 5th string.

22. Lay a long straight-edge between these two center points and down to the bottom of the body. Mark where the line ends at the bottom, and extend it over the edge and down an inch or so on the side of the body. Use a ruler to draw a perpendicular line on the side of the body, and to mark 5 points spaced about 1/4" apart, two marks on either side of the center point, as shown in drawing. (fig. 25)

Punch into the wood with an awl at each point, and use the 1/16" drill bit to drill pilot holes for the tail pins. No special angle is required -- just drill straight into the thick wood to a depth of about 1/2".

Then you can remove the tape and use a hammer to tap the tail pins in so the heads are about 1/8" above the surface of the wood.

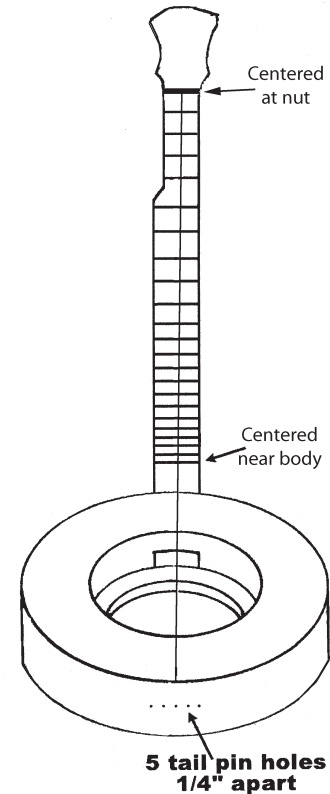


FIG. 25

INSTALL THE STRINGS

22. We have included a needle file in the kit for filing narrow grooves in the nut to hold four of the strings. Space the strings roughly 5/16" apart, and make the grooves very shallow at first. Work the file at angles to ease the string over the top of the nut. (fig. 26)

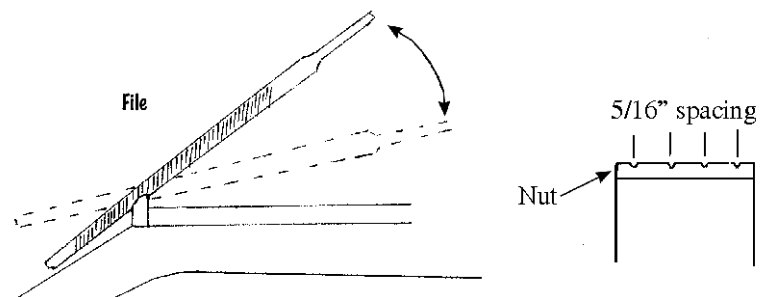


FIG. 26

—23. We include a leather scrap to protect the body of the banjo from being scratched by the strings as they pass over the bottom edge. Use masking tape to hold the leather in place as you install the strings.

Hook the looped end of the string #4 onto the 2nd tailpin from the left and hold it up to the lower left peg on the peghead. See fig. 28 to see how the strings are numbered.

Before you start winding the string on the peg, pull the string past the peg and clip it off about 3" beyond peg. That is the amount of excess that needs to get wrapped around the post of the tuning peg.

Pull the string back until the clipped end just pokes through the hole in the peg. Start turning the peg as you hold the string so it winds around the peg until it becomes taut -- but not too tight! Be cautious about over-tightening the strings. You don't want to break one this quickly....



NOTE: Strings should wind toward the center of the peghead. (fig. 28)

—24. You will probably need to make some adjustments at the back of the banjo to get this first string to hang properly above the fretboard:

Use the 5/32" Allen wrench to loosen the long screw at the top of the body (in back) by just one turn or so. Then switch the wrench to the screw below it and tighten that screw as you watch how the neck moves. The goal is to push the peghead downward until this first string hangs about 1/4" over the frets nearest the body. When you get to that point, switch back to the upper screw and tighten it back up again. You can do more fine adjusting after the rest of the strings are installed.

—25. Find the bridge and slide it under the string, positioning the bridge on the skin head 25-3/8" from the nut. This string should rest in the second groove from the left end of the bridge.

—26. Install three more strings following the diagram above (fig. 28) hooking their loops over the proper tailpins as you install them in order.

Leave the left-hand tail pin open for the 5th string.



HINT: If you find the lighter strings slipping on the tuning pegs, take care to cross at least one of the wraps over another as you turn the peg. This helps cinch the string to the outside of the post. (fig. 29)

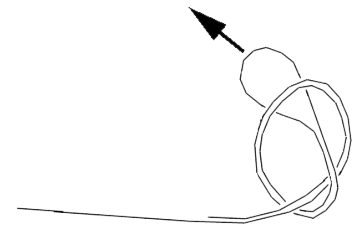


FIG. 27

NOTE: If you purchased NylGut strings for your banjo, you'll need to form a loop at the end of each string and tie that loop into an overhand knot. (fig.27)

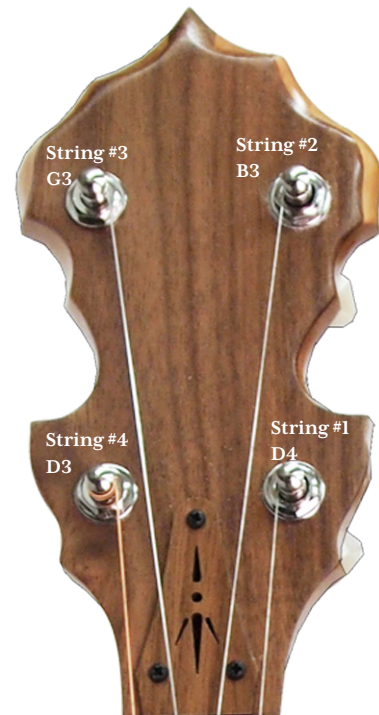


FIG. 28

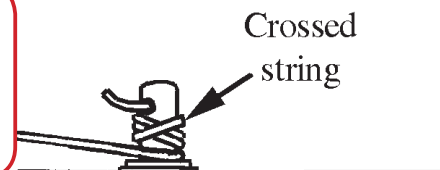


FIG. 29

INSTALL THE STRINGS (CONT.)

—27. Once the first four strings are installed, you can plan the placement of the 5th string. It will be cradled in the groove of a tiny slotted screw provided in the kit, as shown in this drawing. (fig. 30)

Use an awl to punch-mark the location for the slotted screw, as shown below. You want the screw to be about 1/8" away from the 5th fret, and it should match the spacing of the other 4 strings as much as possible.

Drill a pilot hole with the 1/16" bit provided, to a depth of about 1/4", and insert the slotted screw so it will hold the string in its slot.

Then you can install the 5th string, having it wrap around the tuning peg. (fig. 30)

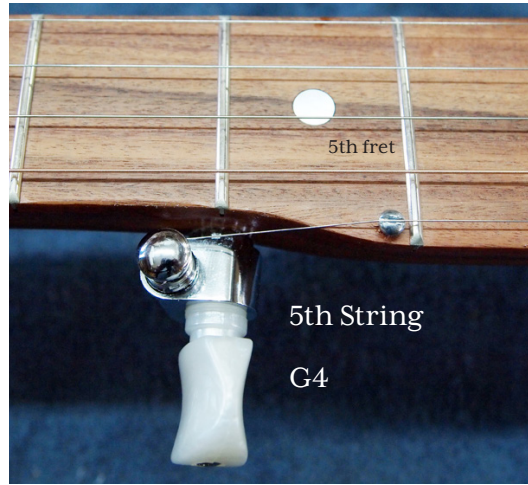


FIG. 30



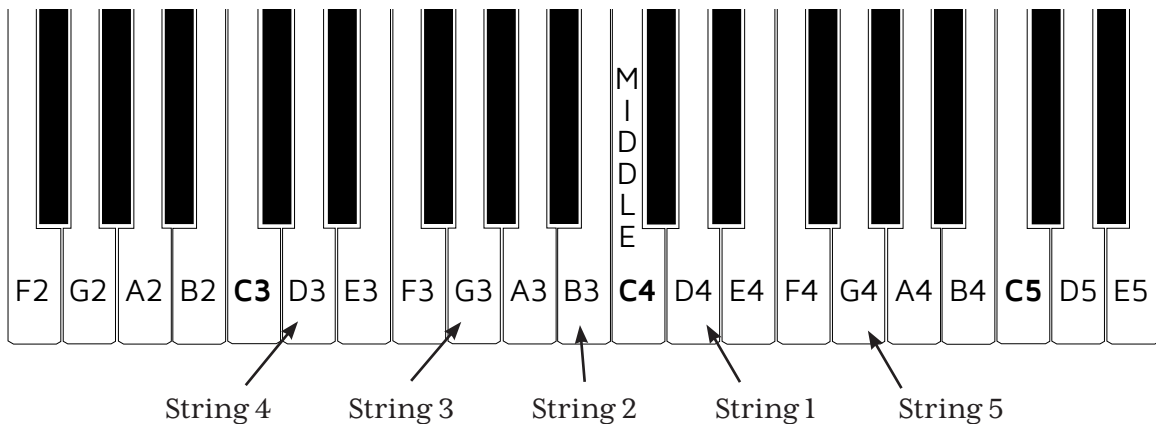
Banjos use what is called re-entrant tuning. This means that the top string (string #5) is tuned higher than the next string down (string #4)

You'll often see banjo tunings written out like this - gDGBD

The strings are listed, left to right starting with the lowercase letter indicating the 5th (shortest) string. Next is string 4, then string 3 and so on.



FIG. 31



FINE ADJUSTMENTS

Now we recommend doing some fine adjustments on your banjo. This instrument allows complete adjustment of the neck, the skin head, and the string action. Here are some suggestions:

NECK ANGLE

The entire neck can be adjusted (tilted) forward or backward with two capscrews in back of the body, where the tang enters the body (see arrows on photo).

Whenever you adjust the neck, you need to loosen the upper cap screw first to allow the angle to be changed by the lower cap screw. The lower screw determines the playing “action” or height of the strings off the fretboard when they are not pressed against a fret. Use the 5/32” Allen wrench for these adjustments. We like to set the strings so they have a gap of about 3/16” at the last fret (near the body). Then tighten the upper screw again to hold the neck firmly in place.

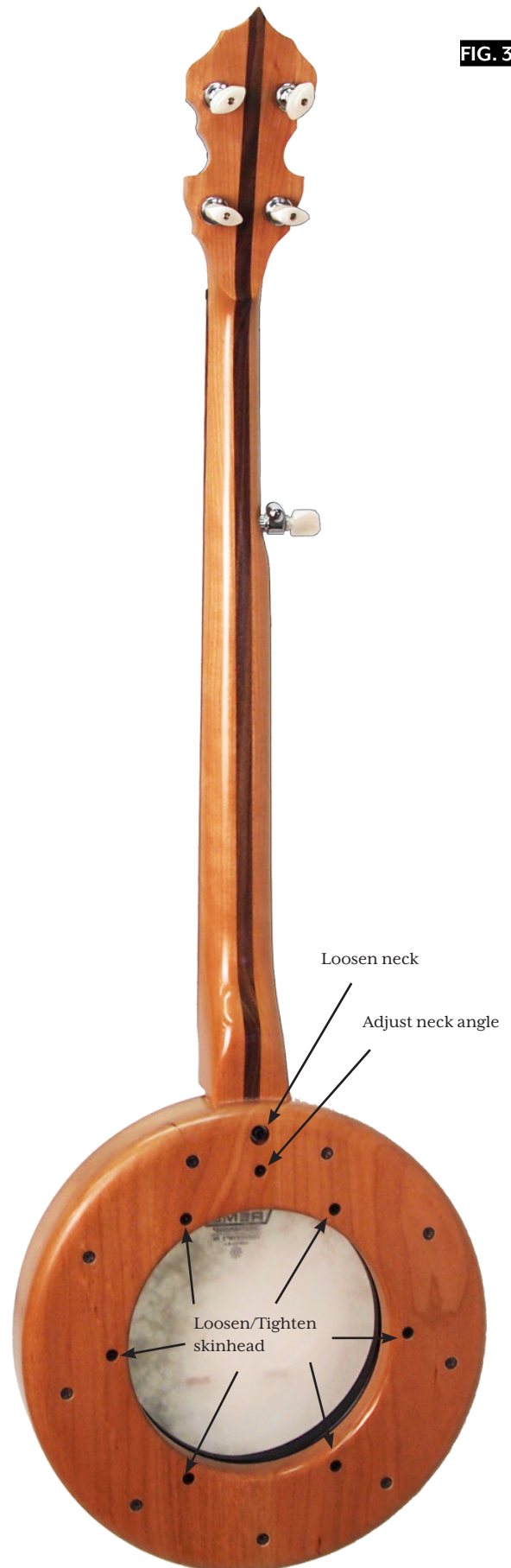
NUT GROOVES

Check the height of the strings at the 1st fret too. We like a gap of about 1/32” under the strings at the 1st fret (that’s about the thickness of a credit card). You can file the grooves in the nut a little deeper to lower the strings at this end, as needed. This will make the strings easier to press down to the frets.

SKIN HEAD TENSION

Skin head tension is a matter of preference. Basically, a tighter head will produce a brighter tone with longer sustained ring, and a looser head will produce a more muted tone with shorter sustained ring. Use the 5/32” Allen wrench to adjust the 7 capscrews indicated on the photo for tightening or loosening the skin head.

FIG. 32



TRUSS ROD: The truss rod is used for achieving a relatively flat playing surface on the fretboard. We don't want it perfectly flat, however, because that can cause some string buzzing. Remember that the truss rod works in two different directions, you can use it to put a slight hump in the middle of the neck or to put a slight dish in the middle. You'll want the latter, and here's how to test it:

The most playable fretboards have a very slight dip in the middle. If you press a string down against the first fret with one hand, and the same string against the last fret with the other (at the same time), you should see a slight gap between the string and the fret located about at the midpoint. This gap (known as "relief") can be adjusted by turning the truss rod with the allen wrench provided. Just be careful not to force the truss rod too hard -- you don't want to break the rod! Your goal is to have about 1/32" to 1/16" space under the string in the middle when the string is held down against the 1st and last frets at the same time.

ADDING A STRAP: You may add a shoulder strap to this instrument to make it easier to play while standing or walking. We like a standard guitar strap with two mounting buttons that are placed at approximately the "2 o'clock" and "8 o'clock" positions on the body as illustrated at right.

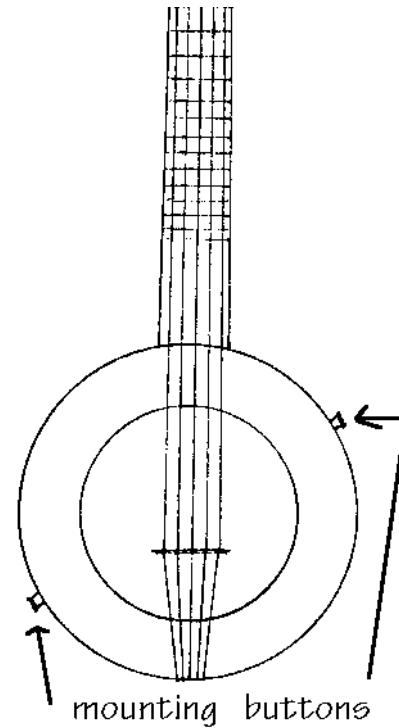
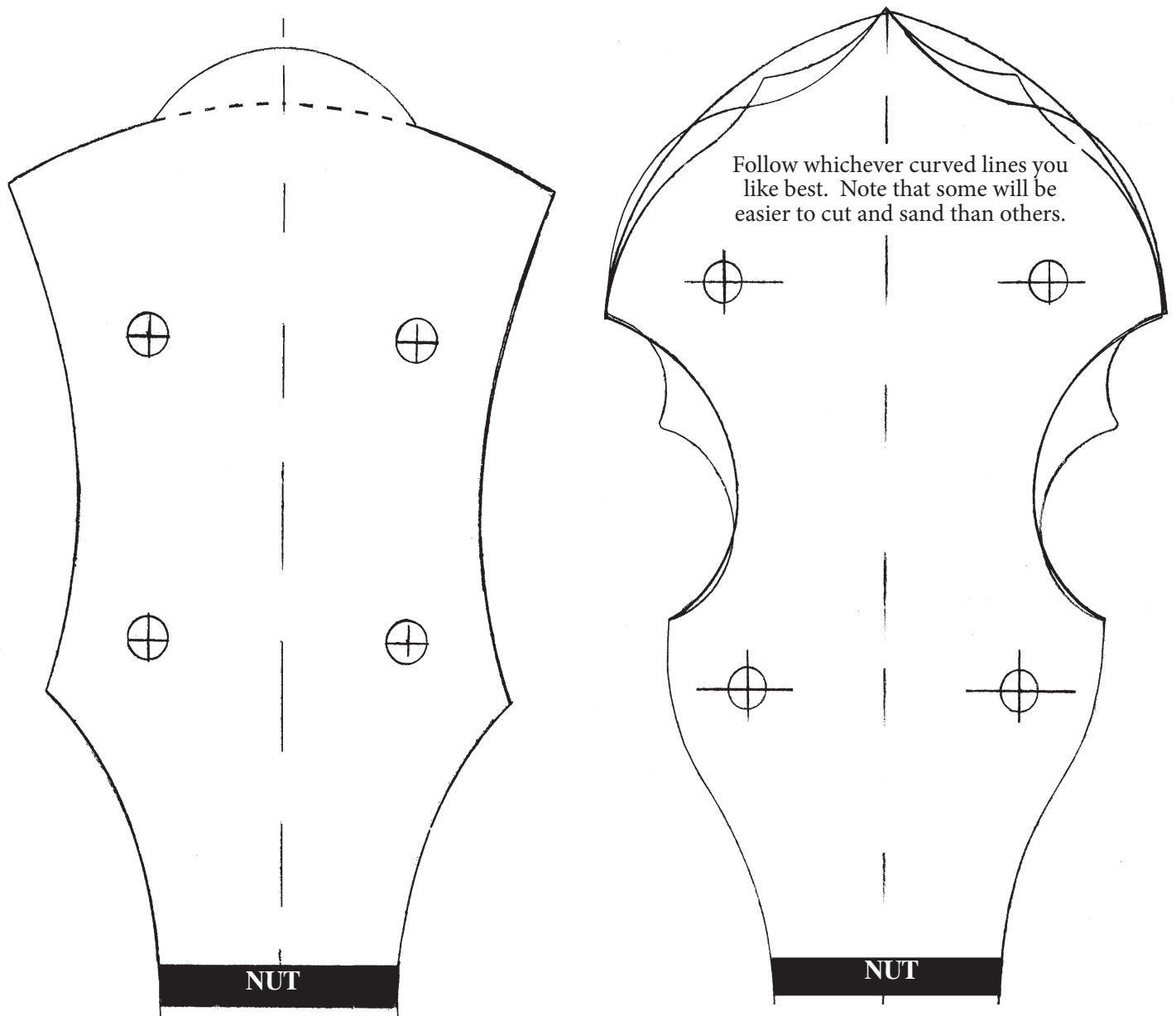


FIG. 33

NOTES

PEGHEAD TEMPLATES

Here are a few peghead templates. You can cut these out and trace the shape on your peghead.



If you aspire to be a banjo player, best to develop a sense of humor now!

Why do banjo tunes have names?
So you can tell them apart.

What is the difference between a macaw and a banjo?
One is loud, obnoxious, and noisy; the other is a bird.

What is the definition of a gentleman?
Someone who can play the banjo but doesn't.

Why are there no banjos in Star Wars?
Because it's set in the future.



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