

Various Fretboard radiusing tools

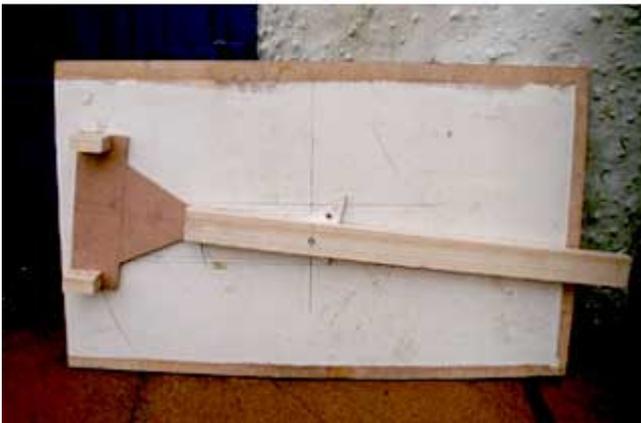
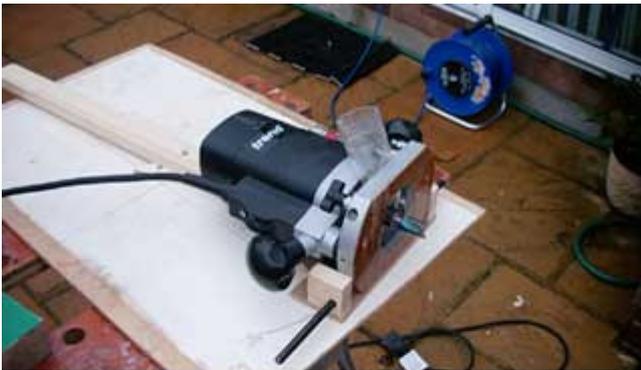
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1. Router jigs for making radiused sanding blocks [Pictures]

Anthony Setchell - 12:35pm Oct 31, 2002
Man of a thousand (unfinished) projects...

Somebody raised the question of producing your own radiused sanding cauls lately, and though it has been covered extensively in the library, here's my uniquely inelegant way of doing it...

1. I created a base to mount my router on, using the side-fence bar to hold it firmly in place. The base is on an arm slightly less than 12" long.



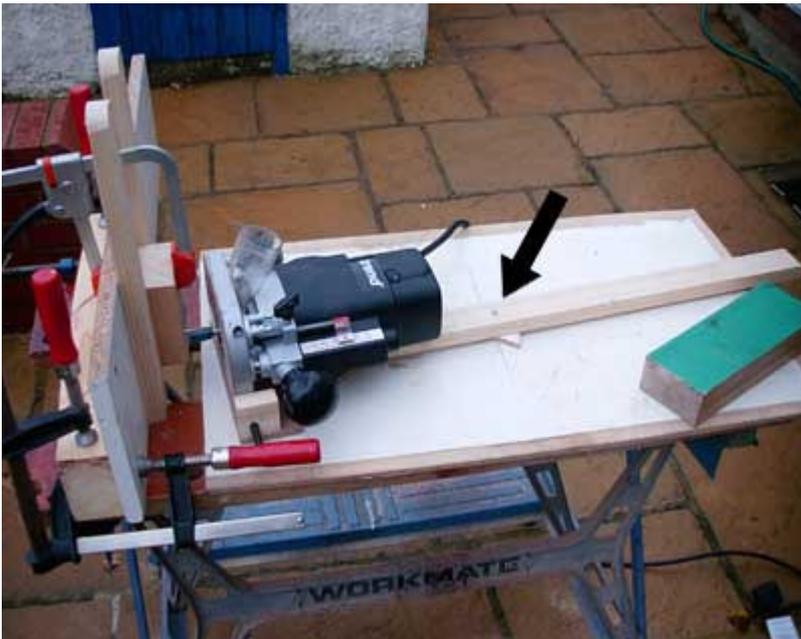
Anthony Setchell - 12:37pm Oct 31, 2002
Man of a thousand (unfinished) projects...

2. A block of wood is planed square and straight, and clamped to a board between two rails, which allow it to slide freely up and down, but prevent any side-to-side movement. This photo is staged - the block shown is an offcut from the longer piece I used to create the caul.



Anthony Setchell - 12:44pm Oct 31, 2002
Man of a thousand (unfinished) projects...

3. The router base is clamped to a flat desk (in this case a very wobbly workmate) and the board holding the block is clamped just within the reach of the router bit. The block is at 90 degrees to the router cradle. The jig is then adjusted so the distance from the pivot (marked with an arrow) to the tip of the cutter is exactly 12".



Jamie Uden - 01:37pm Oct 31, 2002
Abu Kabir, DXF Posse Member

How do you smooth-out the cutter marks?

gerrard smallwood - 04:23pm Oct 31, 2002
amateur builder

Nice one Anthony,
that's what I did too, except my pendulum was upright, and the workpiece fed in horizontally - works a treat doesn't it?
It may be inelegant, but it allows any radius to be carved - and any length you like - handy for long bass fingerboards!

I knocked out a block for each radius I'm likely to need, took about 3 minutes setup time, and 3-5 minutes work time per block.

Jamie - the cutter marks could be left alone if shallow enough - in use they will be averaged out by the sandpaper. The router is swung side to side, as the workpiece is fed in relatively slowly, so the marks go across the block, not along it. On mine, I glued some thin cheap veneer into the concave surface to average out the marks - I used a layer of de-laminated plywood.

G.

Anthony Setchell - 08:07pm Oct 31, 2002
Man of a thousand (unfinished) projects...

Sorry, I was interrupted by the necessary evil of work...

Jamie - exactly as Gerrard said - the tooling marks were so slight that once the sandpaper was attached to the block with some doublesided tape they were no longer an issue.

If anyone is interested I can post a pic of the finished block, but for now I'll leave it - no point using more RAM than needed, and I'm sure that if you've seen a radius block before this one will be much the same :)

Hope this was helpful,

-Ant.

Jamie Uden - 11:53am Nov 1, 2002
Abu Kabir, DXF Posse Member

Do you use a square-bottom or round-nose bit?

Anthony Setchell - 02:31pm Nov 1, 2002
Man of a thousand (unfinished) projects...

Square bottom - the cuts are made across the width of the block, not along it's length. If you used a round-nose bit you'd have to move the block in tiny increments to avoid making a surface like lots of waves. Using a square bottom lets you adjust the block by the width of the cutter for each pass, so using a 5/8ths cutter you can quickly create quite a long block.

Joel Laviolette - 06:38pm Nov 8, 2002

Nice one!

Do you need a hard wood to avoid chipping the wood? Your picture looks like pine. Joel

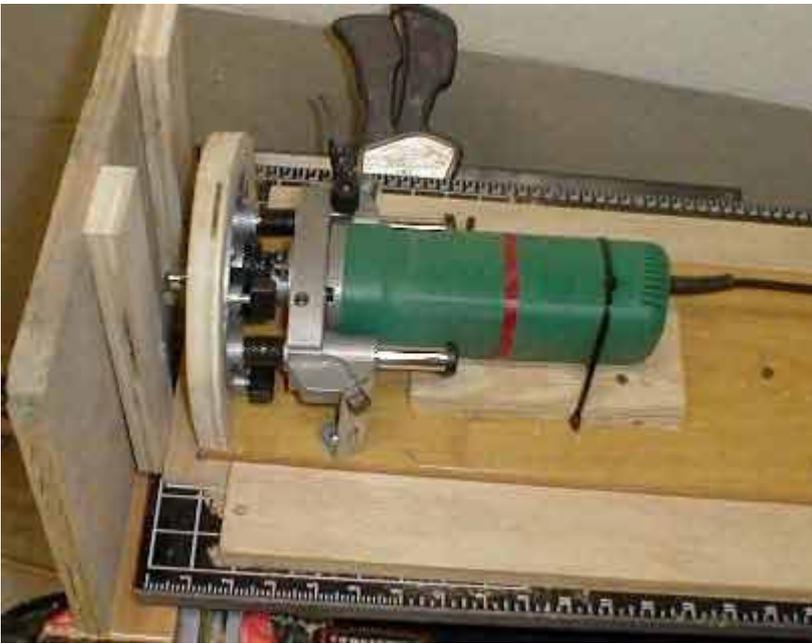
Anthony Setchell - 08:09pm Nov 8, 2002
Man of a thousand (unfinished) projects...

Yep, it's pine. I believe it used to be a door frame.

I plan on making a hardwood block as soon as I have a suitable piece of scrap, as well as another longer block.

rob budzinski - 11:49pm Nov 16, 2002

Thanks for this tip Anthony. It came in perfect time. I needed to create a 16" radius sanding block and neck caul for my project. I had no idea how I was going to do it until I saw your post. See my attached pic. It works Great. Thanks.



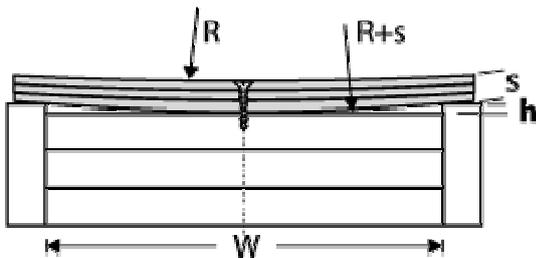
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2. Making a radius-sanding block



Long radius-sanding blocks for finish-sanding fingerboard surfaces are a great help. Necks with cylindrical fretboard are moved over these blocks, which are fastened on the workbench in a lying position. As I am unfortunately not aware of any source of such (long) radius-sanding blocks, you will have to make them yourself. The one I am going to describe gets its radius from three pieces of bent 3mm (1/8")- thick plywood. With plywood thicker than that you won't get an even curve. The base block can be built from five boards. The necessary height (**h**) of the two side boards can be calculated for any radius with the formula below. Spread glue between the plywood sheets and screw them down along the center line.



$$h = (R + s) - \sqrt{(R + s)^2 - 0,25 W^2}$$

$$s = 9 \text{ mm}, R = 12'' = 304,8 \text{ mm}, W = 150 \text{ mm}$$

$$h = 9,09 \text{ mm}$$

$$s = 0.375'', R = 12'', W = 6''$$

$$h = 0.369''$$

3. How to make a 36" long fingerboard radiusing block

David Root - 01:31pm Nov 27, 2000

I brought this over from another discussion on radiusing. Deb, is it OK here or should it be in Tools?

As I have a fingerboard with two high spots on it, I thought this tool could (a) correct the high spots out and (b) give a properly radiused board in future.

How are these things manufactured? To my knowledge, you can't buy them. If anyone knows how to make or where to get one, I'm all ears!

gerrard smallwood - 06:26am Nov 29, 2000
amateur builder

Hi David,

I have made a jig to allow me to make a radius sanding block of ANY radius up to 36 inches (my chosen limit, you could make it larger if you wish) and the block of ANY length up to.....well, as high as the tree grows I guess. You will need a router. It took a couple of hours to make out of scrap wood, but given the versatility, it is well worth the hassle, for future needs. It also dismantles into little bits.

Basically it is a pendulum with the router acting as the weight. As the router is swung from side to side with a normal channel cutter bit in it, the sanding block is pushed in little by little, and the router swung over again. The length of the pendulum from its pivot to the end of the cutter, is the radius of the block. The block is fed in until a concave curve has been cut into its entire length. If your jig is stiff enough, the block will be fine like this. If it is not, then you may have to glue a veneer into it's inside curve to get the smooth finish you require. I went the veneer method - pulled apart a scrap piece of plywood. I chose a reasonably hard wood for the block. To make a 12 inch long sanding block takes about 2 minutes of routing.

Obviously there are guides, and steps taken to keep a right angle between the block and the vertical support of the pendulum for accuracy.

This is all rather sketchy, if you need further info, I can elaborate. Hope it gives food for thought.

Gerrard.

David Root - 01:00pm Nov 29, 2000

Thanx for getting into this, folks. The reason for 36" length goes back to Cumpiano & Natelson's book. Cumpiano has one that length, presumably to ensure a straight (flat?) cylinder on the fingerboard.

I just did a board with the LMI 12" radius block, which is about 9" long, and I got two high spots, I think from uneven sanding pressure.

Gerrard, could you sketch that do you think?

On the original thread I was on, which was transferred here, I think it was Mario Proulx who posted that he made a bunch of radiusing blocks by going to a scrap yard, sticking sandpaper on the outside of a pipe, say 24" diameter and sanding the 12" radius into it. This sounds real easy, if you can find the right scrapyard.

John Moore - 07:39pm Nov 29, 2000
MIMForum DXF guy

I made a radius block a little differently. I started with a piece of plywood the size I wanted for the finished block. Then glued thin wood strips to the long sides about a quarter inch above the surface. The tops of the strips were trued on a sanding board. I made a 1 1/2" thick convex block at the desired radius, out of scrap, an inch or so wider than the block. For the surface of the block I used a substance called "Durham's rock hard water putty". The stuff dries in a few minutes and is hard

as ... well ... a rock. I troweled the putty onto the block between the strips and screeded it with the convex block, much like pouring concrete. When it hardened, I sanded it smooth, using the convex block with sandpaper. It only needed a couple of swipes with the sandpaper. It works well and is still straight after about a year. You could make it any length you want. I'll try to send Deb a photo, maybe it will clarify.

sysop - 08:01pm Nov 29, 2000
Deb Suran

Here it is:



Chuck Kish - 11:49pm Nov 29, 2000
MIMForum Library Staff

Excellent idea, John. Phillip Kearney has written a program for calculating different fretboard and saddle radii that is available on the forum's [links](#) page (Strings, general luthiery section). Your technique with his radius program should make it simple to create a block with any radius someone would want.

gerrard smallwood - 08:44am Nov 30, 2000
amateur builder

Hi David,

I don't have the facilities here for sketching, but I'll try to paint a verbal picture.....

John - that's a lovely elegantly simple solution, I think I prefer it to my method! I guess you could glue veneer onto the curved putty surface if you wanted to protect it, and replace the veneer whenever necessary.

Anyway, the verbal picture of my pendulum, sorry its so long:-

1. The backsupport is what we call MDF over here in the UK, 22mm thick very dense man-made board - quite hard mix of wood fibres and glue, the sort of stuff available in 8ft by 4ft or smaller sheets from your average every town has one, DIY and home decorating superstore. I guess thick ply would do just as well. It is about 4ft long and 10 ins wide. The bottom clamps in the vice, stands tall, the front face towards you, and there is a centre line running up its central front face.

2. There is a tunnel-mouth shaped hole about 8ins from the bottom, just a little wider than the widest block you wish to make. The shape of the hole is roughly like a cartoon entrance to a long road tunnel. The block will travel through this, end first, as it is being routed. The hole is just a little higher than the tallest block you wish to make.

3. A small rest table, approx 10 ins square sticks out of the front face of the backsupport. Made of the same 22mm material. It is dowelled with a few dowels to ensure it is at right angles to the back, is glued and has 45 degree supports underneath it to keep it at exactly right angles to the backsupport. Glued in position, it is very secure. The centre line of the backsupport is also marked on this table. I glued a thin strip to the table, to act as a guide when feeding the block through.

3. The pendulum arm is about 36 inches long, and 3.5 inches wide, again the same 22mm material as the rest of the device. A centre line runs up the centre of the 3.5 inches wide face. A pivot hole is drilled, front to back, through the centre line at certain points. More of this later. My router clamps to this pendulum very securely, after the stand has been removed, with a clamping arrangement I found in my box of bits. You would need to find an arrangement which could clamp your router to the pendulum. The router cutter bit should be in a parallel plane to the pendulum arm, and in line with the arm's centre line. There must be no screws, bolts etc protruding through the 22mm material out of the back. The back of the arm must be flush.

4. The pendulum arm is clamped to the backsupport, centre line matching centre line, router attached to the pendulum arm, and facing you, router cutter bit say 1 inch off the support table. Now drill through the pendulum arm, and the back support behind it, at certain radius points. ie. how many inches from the bottom of the router cutter. I have 7.5ins, 12 ins, 16 ins and 24 ins on mine, as well as a few others - your choice. A bolt placed through the pendulum arm hole and the back support hole, then provides the pivot, and the router is able to swing at the required radius. The bolt needs to be secure enough to stop the arm moving away from the back, but not too tight to prevent you guiding the arm when cutting.

5. Now take your block blank, say 1.25 ins thick, draw the running router to one side and feed the block towards the tunnel in the backsupport at the end of the table, using the guide rails. You will need to hold the block firmly to the table, but the router applies very little force as it cuts. Gently push the router pendulum back to the other extent of its swing, and it will cut a curved slot in the block. Feed in a bit more block, and draw the router pendulum back again, do this until the length of your block is fully cut.

6. Remember your router cutter is fully exposed, I wear safety goggles and riggers gloves and use a home made dust extractor, and I am still intact...physically if not mentally.

Sing out if any of this is unclear. This method probably allows you to make larger numbers of blocks once you have built it, than other methods, maybe even mass production! I still like John's method though! Cheers. Gerrard.

David Root - 11:16am Nov 30, 2000

Thanx, Gerrard, I think I get it! What type & size of router bit do you use? I have a solid carbide 1/4" endmill I use for truss rod slots, and a 3/4" plunge cutting straight bit, carbide tipped. My guess is the end mill would cut cleaner but the 3/4" bit would do the job in 1/3 the time. What do you recommend?

David Root - 01:08pm Nov 30, 2000

OK, Gerrard, I re-read your first post so a straight bit is fine. I agree with you that John's method is simpler, and safer too.

I also liked David B's suggestion of indexing the pendulum and running along the axis of the block. I think this might be quicker for long blocks. Your design could be adapted with removable indexing pins thru the pendulum arm & the back support, then it would cut both radially or axially just by inserting or removing the pins.

gerrard smallwood - 05:36am Dec 1, 2000
amateur builder

Hi David (R!)

yes, either router bit would do nicely I guess, as you suggest. I use a 0.5inch slot cutter in mine because I'm lazy.

I also like David B's suggestion of making the cuts along the length of the block by indexing the pendulum, but in the end I decided against it...for my setup. My thinking was, if there was any flex in the whole rig (I'm the first to admit my jig is not state of the art precision engineering stuff) then that would end in a small ridge running the length of the block, which could translate to a small ridge or dip along the fingerboard. If the ridge was ACROSS the block, then that ridge will be passed along the fingerboard many times, and so would be cancelled out by other ridges and dips. That may all be irrelevant though bearing in mind I glue veneer onto the concave surface which hides these little errors. I think David's suggestion is also safer, as the pendulum is not now guided by hand.

I think I feel a mod coming on..... Gerrard

David Root - 12:57pm Dec 4, 2000

I just realized the photo of the 36" radiusing block is in Bob Benedetto's book, not Cumpiano & Natelson's book. Sorry if I confused the issue! I refer to both frequently & just got mixed up.

David Root - 11:17am Dec 11, 2000

I built one! Three 3" wide by 36" long pieces of 3/4" MDF, glued up. Marked concave 12" radius on both ends at top edge & ran it lengthwise across a 1/4" flat end mill in my router table, side against the fence, step matching close to the line.

Cleaning up the steps was done by marking a 12" piece of 3" mahogany on ends with a convex 12" radius and moving it across a belt sander from side to side until the radius matched the drawn lines. Sanded with adhesive 80 grit paper to a smooth finish. This was not as difficult as I thought it would be. Checked radius with a scrap sanded to a convex radius. Looked good.

Put 120 grit adhesive backed paper in the 36" block, set it on the edge of my bench with one end butted up against a piece of clamped scrap and sanded the fingerboard, standing in front of the length of the radiusing block and sanded from left to right, keeping the board always on the block and shifting from one foot to the other like you would a long piece on a jointer. It was difficult to prevent the piece moving off the centerline as I sanded, but it was easy to see where the high spots were. This fingerboard is on the neck BTW. Once the board had 120 grit marks all over it, I switched to 220 & then a few passes with 320. It is now a much better (but not quite perfect) cylinder.

Checking the radius I find that it is between 10" & 12" rather than 12" all the way. This is presumably a result of not keeping the neck properly aligned with the block's centerline? Anyone care to comment here?

Other than the reduced radius, it works fine, but is probably better used as finishing block.

Barry Daniels - 05:05pm Dec 11, 2000
Part-time Luthier, full-time guitar nut

It's really hard to not have some rocking occur when using a radius block. I've theorized that holding the radius block in your hand places the down pressure on the edges which may cause the rocking. I believe that rocking would be less likely if a handle was placed so that it mounted in the center of the block, and pivoted so that no sideways forces were introduced. Over the weekend, I came up with a design that has two vertical handles (kind of like the handles of a plane) that also pivot side to side on a bearing. This would direct all of the holding force into a vertical vector in the center of the block. I will be building a prototype in the near future and would be interested in comments.

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4. Two adjustable homemade fretboard radiusing blocks [Pictures]

Allan Hamilton - 12:26am Nov 18, 2001
Wickersham Wannabe

Here's a tool I build recently. Not with a lot of research or testing - just an idea that was pretty easy to see through. It's an adjustable radius block made from a piece of aluminum extrusion from my work. The idea for the turnbuckles was sort of stolen from the Stewart/MacDonald version. It looks like it'll work pretty well but I have a plea for some help with a couple of details

First: Should I use a pad of some sort under the sandpaper or should I just mount it on the block itself?

Second: Should I do something radical about the ends of the block?, or is simply filing the edge into a nice radius enough?



Michael Lewis - 12:32am Nov 18, 2001
Fine Guitars and Mandolins

It looks like you need some self adhesive sandpaper, and you're in business.

Marty McClary - 05:24am Nov 18, 2001

Another way to make a cheap radius block is to take a router and make a trammel attachment out of a piece of wood or plywood. This is a way woodworkers rout out a round shape like a table top, except here you want the "scrap". Make the distance from the trammel center to the outer edge of your cutter the radius you desire. Rout the circle out and save the outer scraps. Glue sections of the scraps together in a stack and you have a radius block.

Chris Paulick - 11:40am Nov 18, 2001

Looks good. You probably could glue some 1/16" left over guitar side stock to it if you're concerned about the edges. Or a quick swipe on a belt sander will radius faster than filing. I worked in a production machine shop for a while and we would debur and radius parts made of steel all the time on a 6" X 24" sander. How did you attach the turnbuckles to the side?

Allan Hamilton - 03:09pm Nov 18, 2001
Wickersham Wannabe

The turnbuckles came with the standard eyebolts. I cut off the loops leaving about 1/8" of unthreaded bolt shaft. I then took 3 carbide grinding discs and stacked them on the mandrel for my Dremel and cut a slot in the end of the bolts. A similar notch was cut into the sides of the extrusion. The turnbuckles then went into the notches and can't slide. It's a little tricky to adjust

but if you do it in small increments, all of the turnbuckles stay in place. I intend to use computer generated gauges to make the proper radius and measure across the opening on the back to make all of the turnbuckles evenly adjusted.

Alain Lambert - 04:14pm Nov 18, 2001
New hobbyist builder

Nice tool Allan, I was just making a 16" radius wood block this afternoon.
Does the aluminum spring back when you change radius? I would think that beyond a certain point it would not.

Allan Hamilton - 08:06pm Nov 18, 2001
Wickersham Wannabe

Alain, the extrusion does spring back quite a bit but not all the way. I think that's OK though because where it does return to is a larger radius than what I would use it for. When I removed the turnbuckles, I put the block on a smooth surface and pressed in the middle and it flattened even more. Since I concentrate on basses exclusively, I only need a couple of radius'. If my needs were more varied, I'd probably make several of these for use in particular ranges of arc rather than just 1 for all of the dimensions.

Thanx for the compliments folks!

Alain Lambert - 08:07pm Nov 20, 2001
New hobbyist builder

Allan's tool gave me some idea.
I had material from a 55 gal plastic drum (which is about 16" radius)
Screw and glue some birch sides to it and put 2 turnbuckles.
Voila! my \$2 ajustable radius sander.
The picture is not great as I took it with my webcam but it gives the general idea.



Tim Brown - 09:28pm Nov 20, 2001
MIMForum Library Staff

Alain, thanks for the idea. I built a dedicated 16" radius sander by bending a piece of Plexiglas to the desired radius and slathering the backside with auto body filler. It works fine, but when I want a different radius, I'll borrow your idea.

Jason Rodgers - 05:28pm Dec 7, 2001

I was just thinking, it would be really easy to adjust those turnbuckles to make one of these things a fingerboard-length compound-radius sanding block.

Alain Lambert - 07:24pm Dec 7, 2001

New hobbyist builder

I sand my fingerboard to 16" this week using the block I made. Worked OK.

You can have slightly different radius from end to end by adjusting the turnbuckle. This is limited however by the flexibility of the sides. May be something more flexible for the side (like polymer) would allow a true compound radius

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5. Fretboard radiusing jigs for routers and sanders [Pictures, Illustration]

Chris Franklin - 10:42pm Jun 9, 2005
Mud Thrown is Ground Lost

Here's a router table sled, sitting on my white-formica-covered router table. You can clearly see the pivot bolts, and that it's designed to do a compound radius (both ends are actually angled the same). You can kind of see an unshaped neck hanging upside-down in there, mostly the carbon/maple/carbon center stripes, and a big block of white pine shimming the headstock. Sliding that wedge block left or right before screwing things down tight lets you line up the fretboard parallel to the router table. The screws go into the waste around the heel and headstock, of course. On the left side you can see the end of the slot for the router bit; you set the router table's fence so the bit is centered in that slot, and then just swing the inner carriage a few degrees and clamp, for each lengthwise pass. This leaves little tiny facets that sand right out, which proved to be far faster and less fuzzy than swinging the neck across the bit, advancing 1/2", swinging again, etc. My router table, and this thing when clamped, are pretty rigid; but I still find I need to make all passes in the same direction for it to come out even, even with very light finishing cuts. That means you can't turn around and climb cut "into" the second edge of the board, but so far (two necks only!) it hasn't been a problem.



David King - 12:33pm Jun 10, 2005
often headless

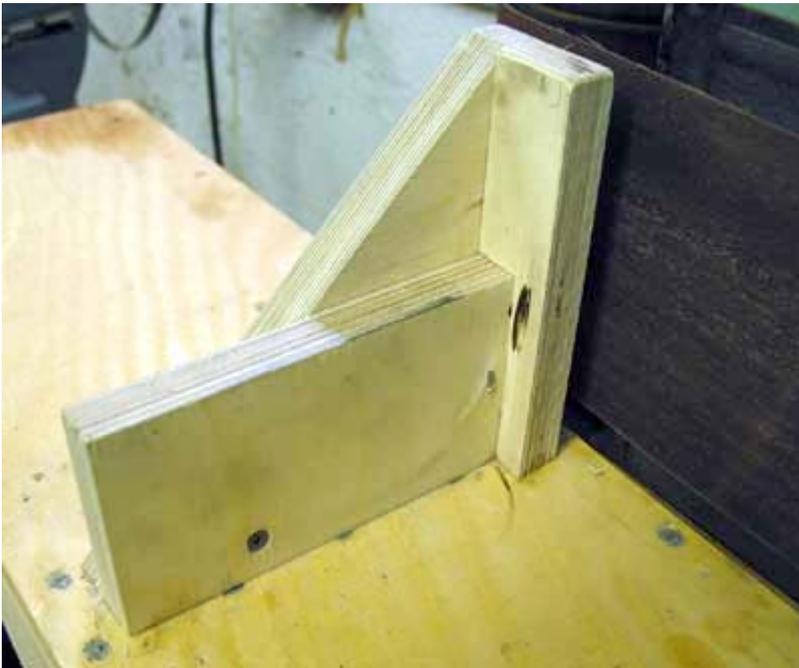
Here's a simple compound radius jig I attach to my 80" sander. This shows the posts on each end, the posts are parallel to the platen and need to be rigid.

*Thanks to Charles Fox who let me copy his design.



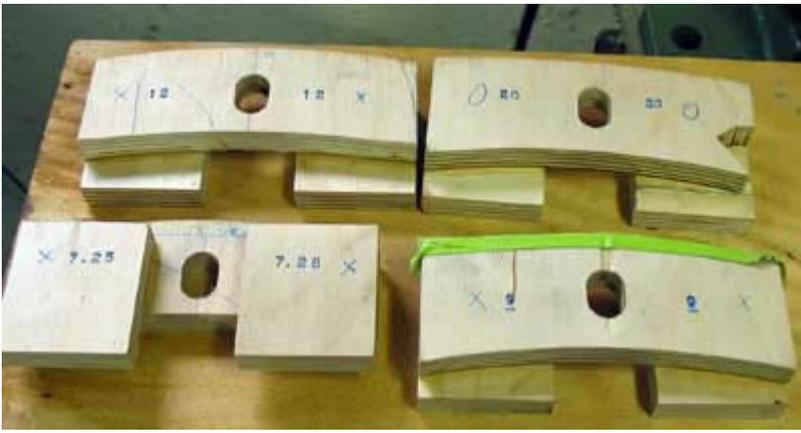
David King - 12:35pm Jun 10, 2005
often headless

Here is a close-up of one of the posts.



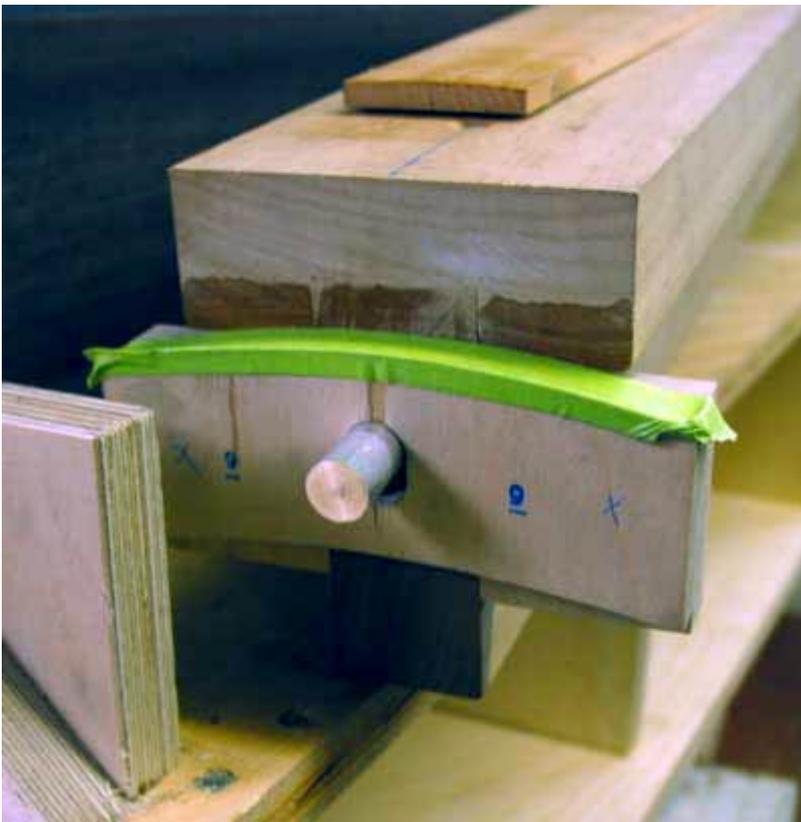
David King - 12:44pm Jun 10, 2005
often headless

These are the "rockers" that press against the posts and determine the radius at each end of the fingerboard. I cut them on a bandsaw using a giant compass to mark the curvatures. I have about 8 of them starting a 7.50" and going up to 25". These are attached to each end of a sled and can be fine adjusted in an out to set the depth.



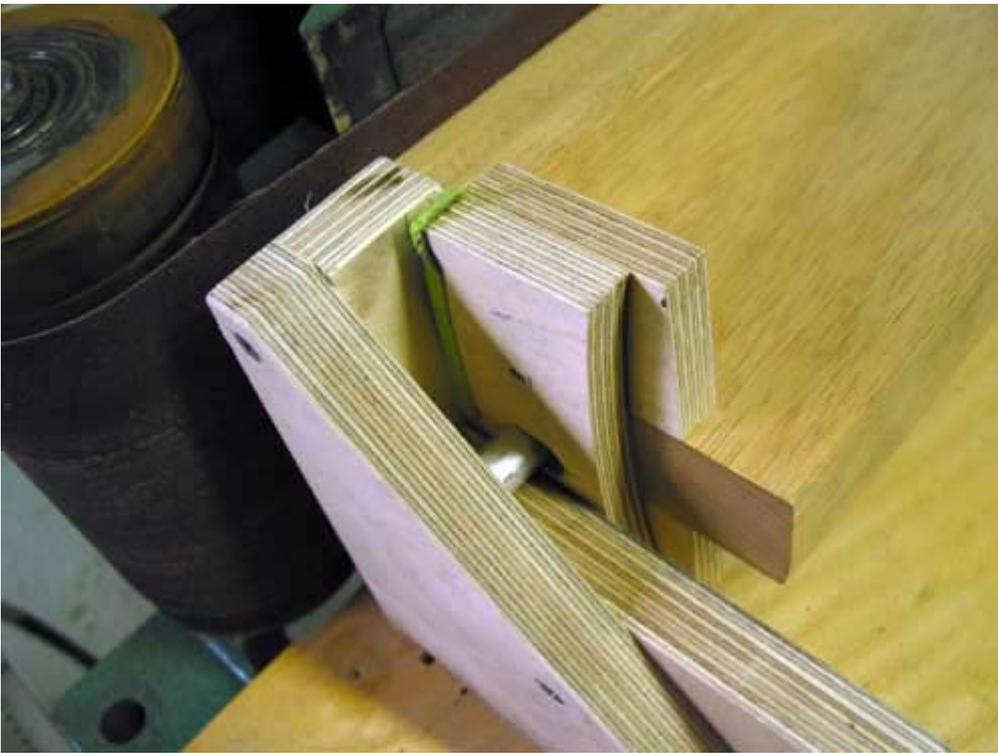
David King - 12:45pm Jun 10, 2005
often headless

This is the sled with a 9" radius rocker attached. There is a fingerboard laying on top of the sled. The fingerboards can be attached with double stick tape. I use a vacuum. There is an end stop at the far end of the sled that the nut end of the fingerboard anchors against. There is a centerline drawn the length of the sled to help line up the fingerboards. The aluminum pin at each end of the sled rides on a shelf that is part of the post. This keeps the sled and fingerboards centered on the belt and takes some strain off my arms.



David King - 12:54pm Jun 10, 2005
often headless

This shot shows the rocker up against the post and the pin riding on the shelf.



Barry Daniels - 01:46pm Jun 10, 2005
MIMForum Staff

David, Nice design. Do your radius patterns factor in the difference in distance of the rocker from the fingerboard? It looks like the fingerboard is 2 or 3 inches above the rocker and that will make the effective radius that much larger.

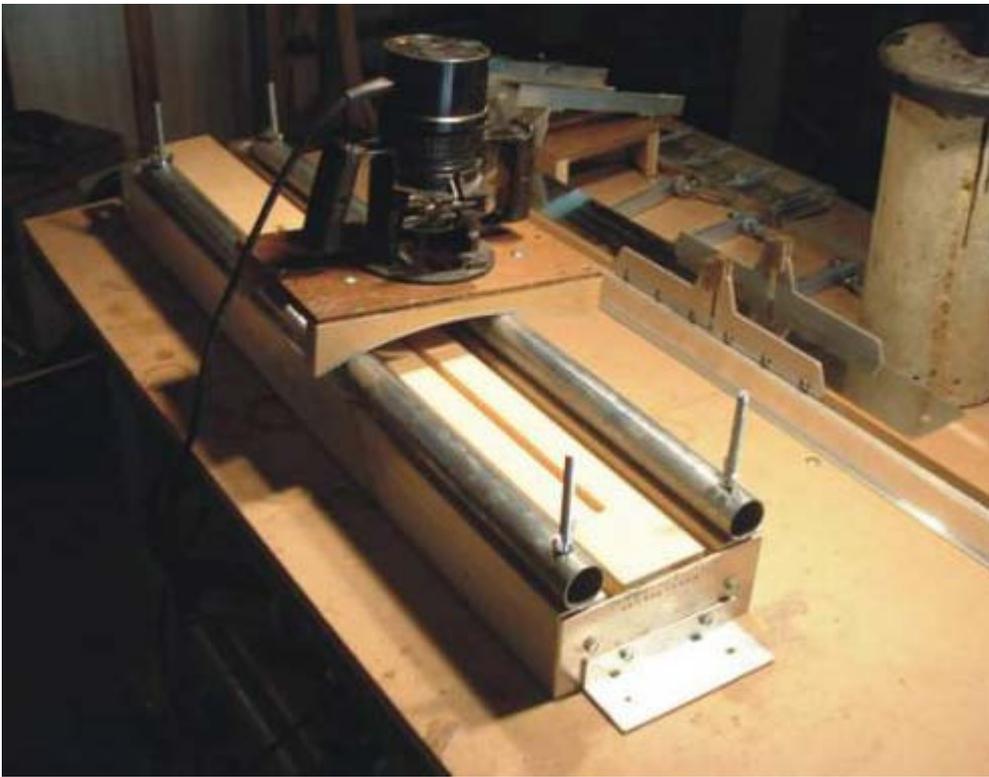
David King - 03:52pm Jun 10, 2005
often headless

Barry you're right, the sled is about 29" long and depending on the length of the fingerboard, the radius at the body end of the board can vary significantly from the number stamped on the rocker at that end. The nut is always anchored within 1/8" of the nut end rocker so the error is quite small at the nut end.

The main shortcoming of this system is that it only works on a raw fingerboard not the whole neck. The benefit is that I can use the same vacuum sled to do my fret slotting on the table saw without releasing the board. (I cut the slots first, then radius.)

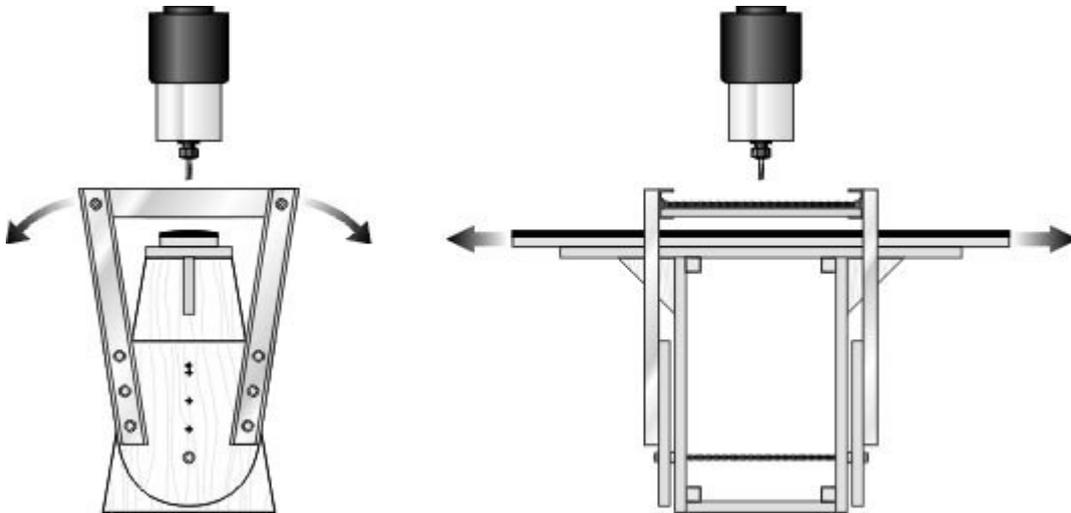
Allan Hamilton - 09:27am Jun 12, 2005
Wickersham Wannabe

Here's mine. Quite a bit more low tech than the others but it gets the job done. The basis for the rails is my neck jig that I use for routing my blanks. I attach the 1½" pipe rails in slotted anchor holes and use the carriage to hold the router. The arched rails are cut on the bandsaw from MDF and "smoothed" by applying a layer of 1/8" UHMW over them with double sided duct tape. that smooths over any imperfections. The dimensions and geometry were all based on the bit extending 1" below the bottom of the router base. The fretboard blank is held onto it's backer with double sided tape and clamped in place while the carriage is moved over the blank. This method has produced some error and I've since improved the process by reversing the movements and making the router location stationary and just letting it rock from side to side and passing the blank under the router. This way, you eliminate the small errors that occur along the length of the pipes.



Allan Hamilton - 09:33am Jun 12, 2005
Wickersham Wannabe

Before I made the one above, I was toying with this design. It accomplished the same thing in a stand-alone unit. But eventually I came to my senses and realized that I could incorporate the radius jig into my neck jig (along with a couple of other tools) and make a neater package so I went that route. In this design, different radii are achieved with changing the pivot point on the sides of the machine.



Kent Chasson - 12:52pm Jun 12, 2005

David, one easy modification I made on my radius jig (which is otherwise much like yours) is, instead of one ledge for the pins to ride on, I made a few slots. That way, you can sand on different parts of the belt without changing the table height (a real headache on my machine).

Marty, yes, the deadhead neck sander works on the same principle. But there you really do have to project the curves out past the ends of the headstock and fingerboard in order to make the patterns, or "rockers" as David calls them.

As for doing the fretboard while on the neck, same thing. I used to do mine that way on a long bed joiner till I bought my sander. You can build a jig that attaches to the headstock and the heel (and carpet tape the fb extension).

Julio Berrafato - 11:16am Jun 13, 2005

Here is another one, same principle as others, only adapted to use with my thickness sander. You can see the fingerboard in the uppermost part of the jig.



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6. Compound Radius Jig Question [Pictures, Drawings]

Mark

[Scott M Stofik](#) - 02:35pm Nov 3, 2005 EST (#1 of 39)

Mark

I have some question about Compound Radius Jigs. I am planning on purchasing an Edge sander and making a jig for imparting a compound radius on fingerboards. To do a compound radius, the arm for the larger radius should be higher than the arm for the tighter radius, correct? I want to make sure I get it right the first time. Also, the radius would be whatever radius - the thickness of the finger board, right? Does anyone use the radiusing jig for leveling the frets as well?

Thanks,
Scott

[julian gifford](#) - 11:35pm Nov 3, 2005 EST (#2 of 39)

Mark

Looks like you just missed the great thread about "radius sanding swing" It'll take awhile for it to make it into the library. Ideally compound radius boards should be set up so that looking at the side of the board, it should be a straight line the same thickness the entire length of the board-- along the outside vertical edge-.

The best advice I can give, is to get in contact with Kent Chason (sorry probably misspelled his last name) who is a member here on the board. As a last resort, I did copy/paste pictures and text of that thread in case you didnt see it, and I could e-mail it to you.

As I recall, power sanding frets was asked before, and is a big NO NO... I personally wouldn't ever consider it. To be smart and carefull, after sanding the compound radius, you would still double check to be sure the board is level... (I would anyway) so why "level frets on the sander and then still level them again to double check? Besides, sanders remove way too much material way to fast, and if the board was level, frets seated properly, very little of the fret should need to be removed for levelling...

[Tom Clift](#) - 02:22am Nov 4, 2005 EST (#3 of 39)

Mark

I got tired of being formal

The thread you want is down below. It's called "Radiusing jig wanted".

[Billy Dean Thomas](#) - 05:52am Nov 4, 2005 EST (#4 of 39)

Mark

"Carpe Cerevisi!"

I hate to be picky, but, isn't it really a "cone segment jig" your after! The fretboard is conical, right?

[sysop](#) - 09:42am Nov 4, 2005 EST (#5 of 39)

Mark

Deb Suran

[max pepe](#), "[radiusing... jig wanted \[Pictures\]](#)" #1, 05:32am Oct 27, 2005 EST

[Donl Mathis](#) - 10:52am Nov 4, 2005 EST (#6 of 39)

Mark

It is conical; conceptually, the fretboard is attached to the outer surface of a cone, and the axis is tilted so that the fretboard is horizontal.

If the radii are based on the taper of the fretboard (i.e., the taper is based on perpendicular slices through the cone), thickness of the fretboard will be constant along the center and along the edges -- otherwise, not.

One of the elements of the geometry that I have seen missing in some designs is that the "swing" should be perpendicular to the tilted axis -- not the fretboard platform. Otherwise, there is a necessary "twisting" in the arms, and the motion is distorted, not to mention an overall loss of rigidity. When the arms are perpendicular to the axis, the arms can be connected rigidly at both ends, and the whole assembly rotates around the axis as one piece, i.e., one section of the cone's surface.



[Henry Leparskas](#) - 01:15pm Nov 4, 2005 EST (#7 of 39) [Mark](#)

Let me see if I understand you Donl.

So, in simple terms, when we make a compound radius with such a jig, the average thickness of the neck at one end is different than on the other.

Is that right?

[Mario Proulx](#) - 01:31pm Nov 4, 2005 EST (#8 of 39) [Mark](#)
Hear the colors....

With a properly done compound radius, the edge and center thickness of the fretboard will remain constant the entire length.

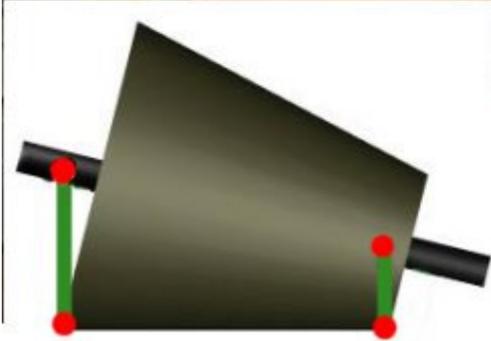
Not sure where Donl is headed. Explain again, please.

[Mauro Marchesini](#) - 01:42pm Nov 4, 2005 EST (#9 of 39) [Mark](#)

Donl, may be there is something wrong in my thought , but it seems to me that nothing bans to solder or connect rigidly the arms to the axis even if not perpendicular. It is however a conical surface connected to own axis, and the whole assembly can rotate as one piece.

Besides, it's exactly how works my jig without any apparent contraindication.

I repeat: may be something escapes me ...



[Mauro Marchesini](#) - 02:10pm Nov 4, 2005 EST (#10 of 39) [Mark](#)

Mario wrote

With a properly done compound radius, the edge and center thickness of the fretboard will remain constant the entire length

In my little experience to maintain constant the edge thickness (the center thickness is assumed as maintained) we need a big radius variation, i.e. from 8" 1/2 to 14".

Is that true?

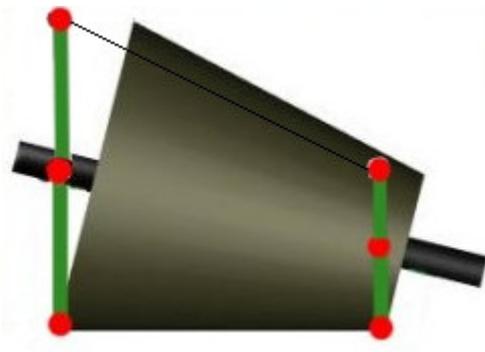
[Kent Chasson](#) - 03:34pm Nov 4, 2005 EST (#11 of 39) [Mark](#)

I think what Donl is saying can be illustrated by looking at what would happen if you took Mauro's jig and imagined rotating the arms a full 360 degrees. Stange things would happen and it would no longer define the same cone (or a cone at all?). I think (although I'm not positive) his concept is technically correct but vertical arms cause no practical or measurable problem when you are only swinging a couple of inches.

Also, given the fact that the string diameter and the height of the strings off the board changes from bass to treble side, I'm not sure that the best shape is a perfect conical section. But is sure is better that a cylindrical section.

to maintain constant the edge thickness (the center thickness is assumed as maintained) we need a big radius variation, i.e. from 8" 1/2 to 14".

I think I worked mine out to go from 16" to 23" but I wasn't worried specifically about the edges being a consistent thickness. It sounds like a big difference but, over the width of the fret board, it isn't much. In fact, after working on ideas for a flexible caul for my fret press, I finally just ended up pressing them all in with the 16" caul and then going over the whole board with a hammer and 4" block of wood. The 16" caul seats the frets pretty well even at the 23" end of the board.



[Donl Mathis](#) - 04:02pm Nov 4, 2005 EST (#12 of 39)

[Mark](#)

Mauro --

You are right; the arms don't need to be perpendicular. They can actually be any shape, and attach anywhere along the axis, or they could be replaced by one big solid "fin," or anything else that accomplishes the same fixed connection between the axis and the fretboard.

In your design, it looks like the shaft rotates, and the arms are rigidly clamped. This will work correctly; I am not saying there is anything wrong with such a design!

I guess the true point is a little different than the way I said it: the real issue is that the pivot should operate with a swinging motion perpendicular to the axis -- not parallel with the fretboard. This can happen if the design doesn't include a rotating shaft.

Suppose a different design, where each arm is vertical, and connects to a vertical support with a horizontal pivot, but where you can change the height of the pivots to get the different radii. Somebody might design such a jig. I seem to remember seeing such things. :)

Since the true swing axis is inclined, but these particular pivots swing on a horizontal axis, then they will want to "twist" at different rates as the fretboard swings back and forth. (I *think* the distance between them will want to change, too.) Somehow, this twisting must be accommodated. It could be designed into the joints, making things quite a bit more complicated, or it could simply be taken up as "slop," where looseness in the joint accommodates the extra motion. Neither of those seems like a good solution to me!

Such a jig *will* work accurately for constant-radius fretboards.

Note the difference between this bad design, and Mauro's good design: the angle of the pivot. It matters! His supports are vertical, his arms are vertical, and that's fine... as long as the pivot is inclined.

I was only trying to caution against a potential design problem that I've noticed here and there. Sorry for talking so much!

As to thickness... suppose we think of making the fretboard by making two slices along the length of the cone, and another slice connecting those two cuts to make the flat back. If the two lengthwise slices are parallel to the axis, each will be a straight line, the back slice can be flat, and the thickness will be consistent for the middle and for the edges.

If the two lengthwise slices, to make the edges of the fretboard, are *not* parallel to the axis, but supposing they spread outward a little as the cone gets smaller, the slices will "wrap around" the curve of the cone at least to some degree. These lines form the upper corners of the edges of the fretboard, but are no longer straight, and if the back is sliced straight, then the edges will necessarily have a curve in their thickness, along the length.

Similarly, if the edges are cut "inward" as the cone gets smaller, the thickness will be curved in the other direction.

In theory, I think the "right" answer is to figure out the radii based on the taper of the fretboard, which probably involves more math than most luthiers care to think about! :) (One approach involves finding the equation that relates the height, width, and radius of an arc, using a constant height, and plug in the widths at each end of the fretboard.)

In practice, I think techniques that involve making the shape with inherently straight cuts, which end up making "constant thickness" compound boards, sorta do this by default, without such math and measuring. The radii might not be

mathematically perfect, but they're still "right." Or just use a properly designed jig, like Mauro's. :)

[Chris Franklin](#) - 04:08pm Nov 4, 2005 EST (#13 of 39) [Mark](#)
Mud Thrown is Ground Lost

I built my jig around the sloped axis, with angled uprights like Donl's illustration. But having used it, I think that, as Kent says, if you're only swinging half a fretboard's width off center each side, it's not really necessary -- there's enough slop & clearance in any real-life jig to accommodate that little bit of misalignment without distortion.

[Kent Chasson](#) - 04:47pm Nov 4, 2005 EST (#14 of 39) [Mark](#)

As to thickness... suppose we think of making the fretboard by making two slices along the length of the cone, and another slice connecting those two cuts to make the flat back. If the two lengthwise slices are parallel to the axis, each will be a straight line, the back slice can be flat, and the thickness will be consistent for the middle and for the edges.

If you really want to get precise, the first and sixth strings usually aren't parallel to the edge of the f/b, at least in steel strings. They usually get further away from the edge of the f/b as they get closer to the bridge. So "technically", you would want the axis of the cone to be parallel to the strings, not necessarily the edges of the board (although it could be both). But again, I think we're talking about tolerances that are way smaller than you can reasonably account for. And we haven't even talked about how relief enters the equation!

[Chris Franklin](#) - 05:08pm Nov 4, 2005 EST (#15 of 39) [Mark](#)
Mud Thrown is Ground Lost

Ekshly, rather than parallel to the axis of the cone, everything (strings, fretboard edges, fretboard centerline) should be converging on its apex. Sort of. Except for the conflicting needs of string clearance over the frets, relief...my head hurts.

[Chris Franklin](#) - 08:29pm Nov 4, 2005 EST (#16 of 39) [Mark](#)
Mud Thrown is Ground Lost

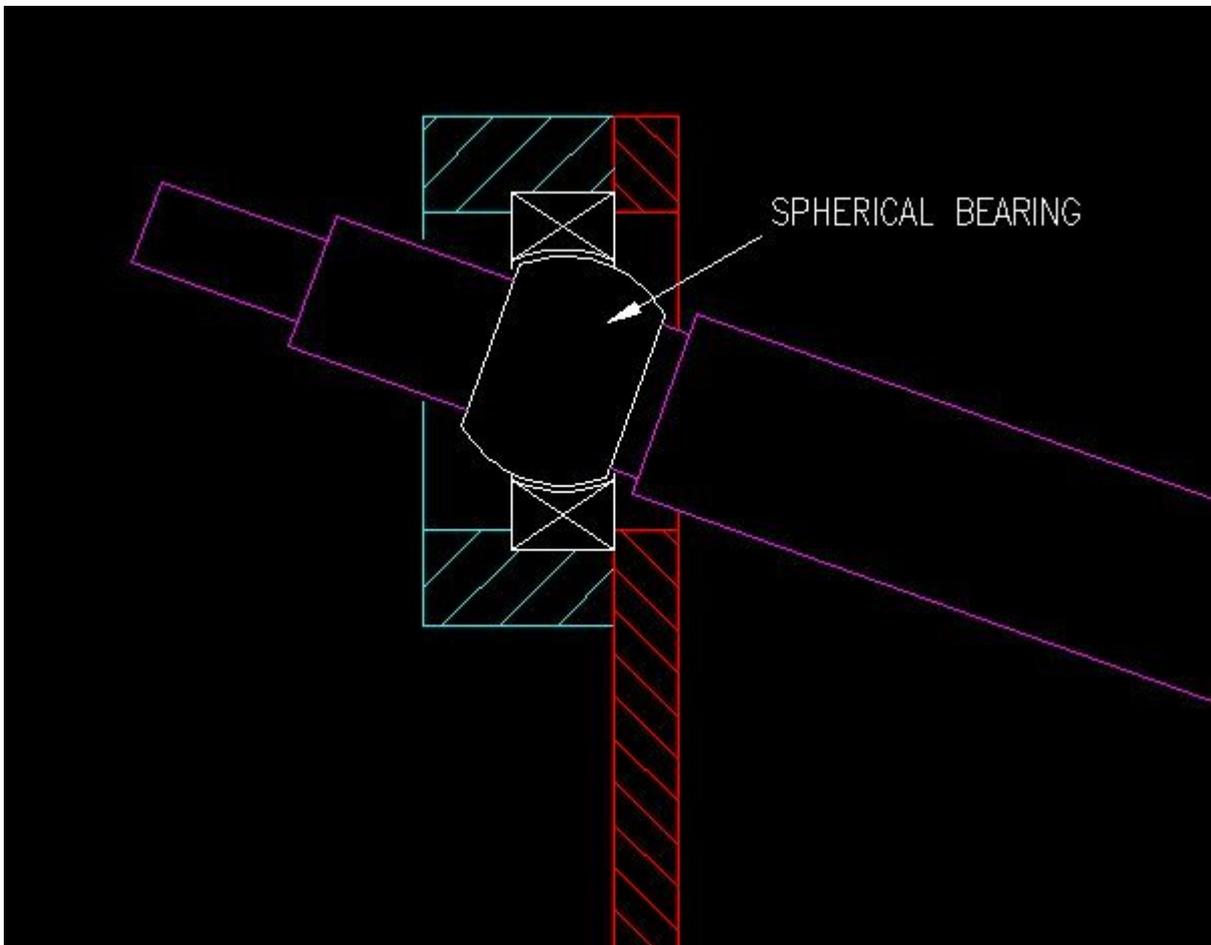
That's if you want the edges straight, that is, as Donl points out. Otherwise the edges start curving across the surface of the cone. Which I think means that you have to part company with theory about here -- a section of a cone won't really work, not if you insist that the edges and the center stay constant heights. For that, the rise of the curvature would have to be constant, but segments defined by lines converging on the apex would be proportional to the local radius, so the rise would, too. So either the thickness of the center of the board is changing, or the thickness of the edge is, or the edge isn't straight. Or it isn't a cone: the radius isn't changing linearly. Luckily, damn close is plenty good enough.

[Mauro Marchesini](#) - 08:16pm Nov 5, 2005 EST (#17 of 39) [Mark](#)

...these particular pivots swing on a horizontal axis, then they will want to "twist" at different rates ...Somehow, this twisting must be accommodated

Donl, it's definitely true.

Just needs to use some spherical bearings (search google "nhbb products spherical"), like those I used.



[Ron Hagedorn](#) - 10:21pm Nov 5, 2005 EST (#18 of 39) [Mark](#)

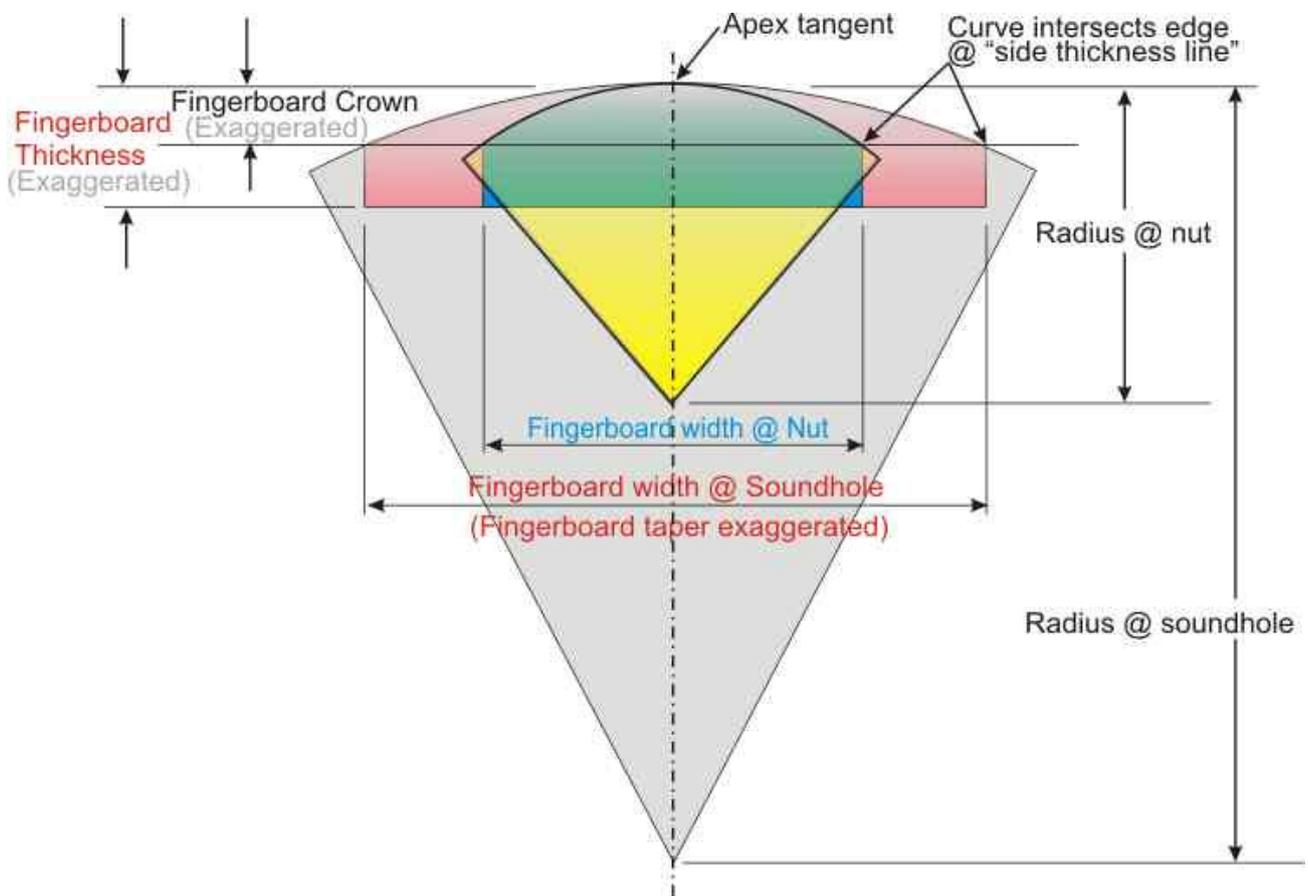
Great thread ... Even though my ukes have flat fingerboards, I find the problem intriguing. So here's my 2 cents for what it's worth.

I believe the easiest way to figure the solution is to start with two givens and make either a full size or even an oversize layout similar to the sketch (below)

1. The first given is the desired fingerboard taper, (nut to sound hole) as shown in the sketch.
2. The second given is to choose a desired radius (starting with either end)
3. Draw the (desired radius) arc to be tangent to the apex, and it should intersect the sides of the fingerboard layout, giving the thickness of the fingerboard at the sides at whichever is the starting end.
4. The second arc will take a little messing around (a reason for an oversize layout) because it must intersect the sides at the proper height (the side thickness line) as well as being tangent to the apex.

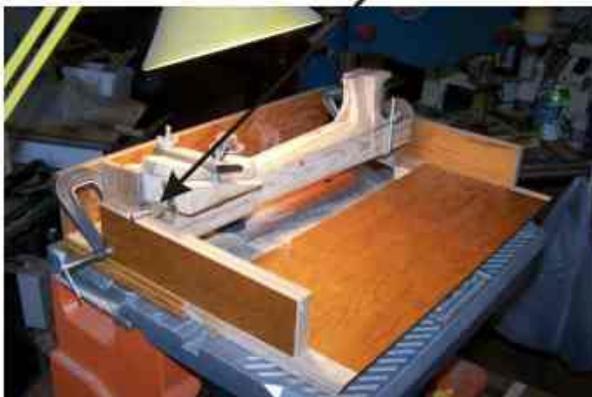
This should give a radius for each end, which if properly executed will produce a fingerboard with consistent side thickness as well as a consistent apex height.

Also it should be noted that these radii must be altered slightly to compensate for the distance that any swing arms or cams are in relation the ends of the actual fingerboard. This can be done easily by projecting the fingerboard taper the desired extra distance on each end and messing with the arc radius (step 4 for each end) (Although with the large radii to a relatively narrow fingerboard this is probably splitting hairs a bit)



I imagine a fingerboard radiusing jig similar to my (spindle sander) neck radiusing setup would work just fine to get the rough shape, then hand finish sanding as desired.

Cams to suit desired radii



[Donl Mathis](#) - 11:38pm Nov 5, 2005 EST (#19 of 39) [Mark](#)

Hi Mauro! Before my statement, I should remind that I know "close is good enough," as someone else said! And I still like your jig. :)

Looking at your bearings, though, I wonder if it's possible for the precise motion of the surface of a cone to be distorted. The factor that needs to be controlled is that both arms rotate at the same angle around the axis of the cone. If you could, for example, hold one end of the fretboard still, and then move the other end a little bit, it would change the shape of the motion away from the surface of a cone... I think! Maybe. Probably.

[Donl Mathis](#) - 01:07am Nov 6, 2005 EST (#20 of 39) [Mark](#)

Nice diagram, Ron!

Perhaps only a certain type of geek might think that

$\text{crown} = \text{radius} - \sqrt{\text{radius}^2 - (\text{width}/2)^2}$

or

$\text{radius} = ((\text{width}/2)^2 + \text{crown}^2) / (2 * \text{crown})$

is anywhere *near* as pretty a way to say the same thing! :)

As to small errors... e.g, at 2" wide, a 12" radius has a crown of 0.0417", and a 12.25" radius gives a crown of 0.0408", i.e. roughly a thousandth flatter. No sleepless nights!

But still, with my distorted psyche, when I finally settle on a design and build my radiusing jig, I'll want it to be as accurate as possible, so... a very rigid structure with triangles, tight bearings, computations to a thousandth, all that kind of thing. ;) It's probably emotional backlash from messing up my first fretless bass fingerboard with an ever-so-slightly-twisted radius block...

[Mauro Marchesini](#) - 03:19am Nov 6, 2005 EST (#21 of 39) Mark

factor that needs to be controlled is that both arms rotate at the same angle around the axis of the cone

Donl, it's still true, that's why in my jig you see a crossbar welded between the two arms. That crossbar guarantees the rigidity of all the swinging assembly.

[Mauro Marchesini](#) - 03:42am Nov 6, 2005 EST (#22 of 39) Mark

Ron, excellent drawing; there is depicted, in a very convincing way, the thought which brought me to ask if a radius range from 8"1/2 to 14" is reasonable for a consistent side thickness in a normally tapered fingerboard.

I must say, however, that I never made a compounded radius fingerboard with a even edge tickness as a goal; simply with my customers, we have choosed the radius range we believed suitable.

I guess that's what most people do. True?

[Mauro Marchesini](#) - 05:24am Nov 6, 2005 EST (#23 of 39) Mark

Ron, all you, in the other side of the Atlantic, are still sleeping, but here it's eleven and I'm considering from a while your jig which I've yet seen in another thread.

As it's surely useable also for a fingerboard, I'm actually interested in making a copy (with your permission, of course) for work my necks.

A curiosity: how do you obtain the projection of the neck's sections to shape the cams? Cad2-3D, manual drawing ...?

[Ron Hagedorn](#) - 11:24am Nov 6, 2005 EST (#24 of 39) Mark

Hi Donl .. I guess it's just the "back yard engineer" in me <g> I have to reduce my schemes to the simplest possible terms to even understand them, much less attempt to explain them. I truly envy your ability to do even what I know to be fairly simple math.

Mauro, thank you for your interest. The "cams" were only manual drawing projections. I knew their location in relation to the neck, then (on paper) projected both the neck thickness taper and the side taper to those points, then drew a nice curve to "connect the dots" As it turned out, the best cam shape for the body end was a radius, while the head end was a fairly flat ellipse.

[Mark Wybierala](#) - 12:32am Nov 7, 2005 EST (#25 of 39) [Mark](#)
Guest User

This is my radius cutter. The linear bearings came from ebay and are just barely long enough (43") to permit cutting a radius for a 34" bass scale on a Fender style neck. There is a drive screw that moves the router back and forth and its made from a piece of 5/8 - 11 threaded rod. It takes about 12 passes with the router to get a decent radius and the 1/2" bit that I use leaves a finish that requires some sanding. However, the set up and jig insure an absolutely perfect flat fretboard without any fault. I have a crank on one end of the drive screw that requires an awful lot of turning to do 12 passes and I've recently considered adapting a variable speed drill to turn the drive screw. Once the neck is secured into the jig, there are no user actions that could cause a malfunction unless the setup is wrong. There is a lot of leveling involved and I have a guide fixture to center the length of the neck under the router. At this time, I have two different jig units for this machine. One is for an 8 to 16" compound radius 34 inch bass scale and the other is designed to accomodate a telecaster neck with a 9.5 to 12" compound radius. By constructing different jigs, I can cut any radius and be confident of accuracy. I'm not sure if I'm correct but I refer to compound radius specs as the nut radius and the theoretical optimal bridge radius. The 12th fret radius ends up being midpoint between the two figures.

[Mark Wybierala](#) - 12:36am Nov 7, 2005 EST (#26 of 39) [Mark](#)
Guest User

I guess we lost the image file during the post



[Mark Wybierala](#) - 12:52am Nov 7, 2005 EST (#27 of 39) [Mark](#)
Guest User

This is the telecaster jig. It shows off a lot of the concepts involved in the above discussions. When the router passes over the centerline of the neck, the fretboard must be level across and, forward and back. The radius is determined via the pivot axis and its distance from the perpendicular location of the router cut. The major weakness of this whole process is the limited strength of the MDF used to make the jigs. This telecaster jig has locks on each end and the resulting finish is very clean compared to my bass jig that does not have these locks. With the other jig there is excessive vibration that is translated into uncontrolled small pivot movements which cause the router bit to cut a little rougher.



[Donl Mathis](#) - 04:26am Nov 7, 2005 EST (#28 of 39) [Mark](#)

Donl, it's still true, that's why in my jig you see a crossbar welded between the two arms. That crossbar guarantees the rigidity of all the swinging assembly.

Mauro --

I must apologize again! I got lost in all of these details, and didn't go back to look at your design again, but just noticed the bearings. I think I should quiet down, now. :)

[Mauro Marchesini](#) - 07:02am Nov 7, 2005 EST (#29 of 39) [Mark](#)

I think I should quiet down, now.

Absolutely not! :o(

BTW, since english is not my first language may be sometime I seem self-conceited or so. If this happens be sure that's not my intention.

In luthiery I'm just a rookie (despite my age) and I must rather thanks you all for the lot of hints I got in these years.

[Nelson Palen](#) - 10:55am Nov 7, 2005 EST (#30 of 39) [Mark](#)

luthi, luthier, luthiest?

Mauro--Your work speaks for itself and your doing an excellent job of getting your message "across the pond".

Very interesting stuff!

Nelson

[Nelson Palen](#) - 11:17pm Nov 7, 2005 EST (#31 of 39) [Mark](#)

luthi, luthier, luthiest?

Looks like I got my "You're" and "your" in reverse sequence in that last post. Oh well it's still Monday. <g>

Nelson

[David King](#) - 01:26am Nov 8, 2005 EST (#32 of 39) [Mark](#)

often headless

If we are indeed looking for identical crown height at each end of the fingerboard, I'd love to have a little javascript calculator or just a formula to plug in numbers and solve for the larger radius given the smaller one and the width at each end. I almost always start with 7.25" radius at the nut but I'm finding (by trial and error) that the radius at the wide end of the fingerboard needs to be quite large to work out correctly. I just did a 5 string bass fingerboard using my standard dimensions (string spacing 9mm at nut and 18 mm at bridge), the radii were 7.25" and 22". Does that fit with other folk's experience?

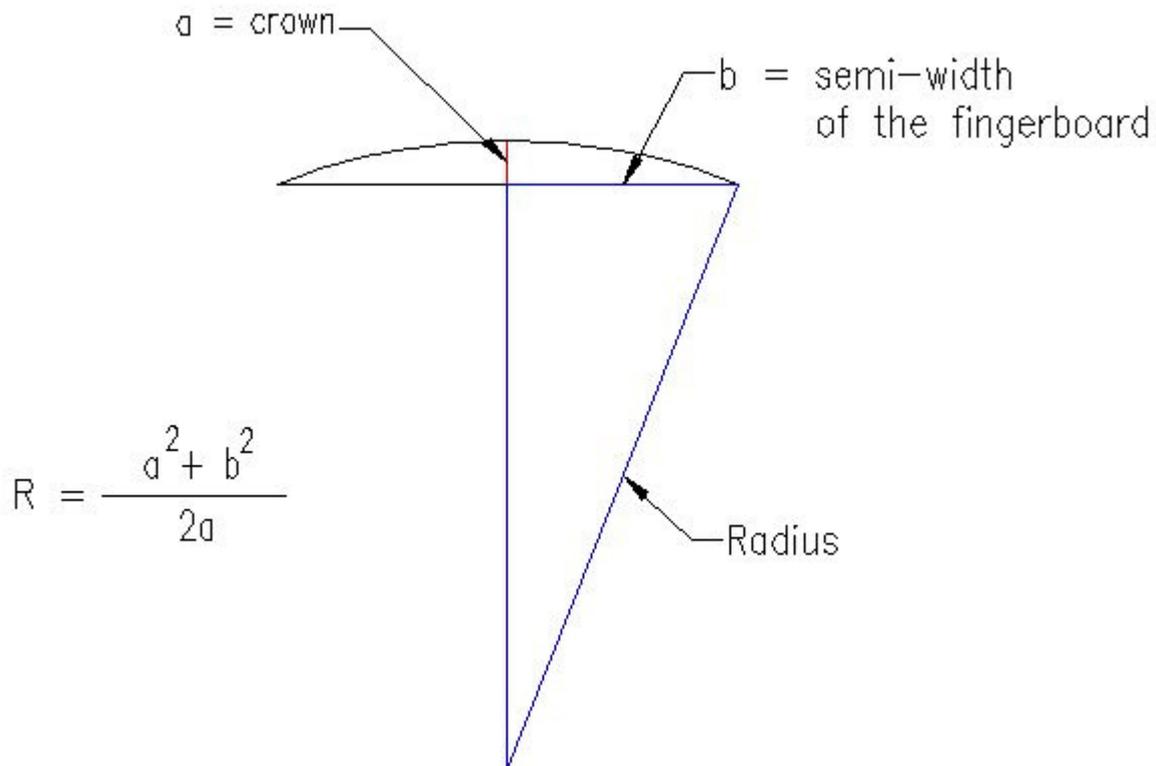
[Mario Proulx](#) - 09:02am Nov 8, 2005 EST (#33 of 39) Mark
Hear the colors....

David, it all depends on the length of the board, and the amount of taper you use. More taper, more length, the great the radius split will be. Yours sounds right.

[Mauro Marchesini](#) - 09:09am Nov 8, 2005 EST (#34 of 39) Mark

Hi David,

You may implement an Excel sheet using the formula in the drawing.



[Mauro Marchesini](#) - 09:31am Nov 8, 2005 EST (#35 of 39) Mark

If you prefer I can send you this file (Deb, are you OK?)

Width at nut	45,4
Radius at nut	215
Width at end	56
Radius at end	326,80

[David King](#) - 12:08pm Nov 8, 2005 EST (#36 of 39) [Mark](#)
often headless

Mauro, that would be fabulous and let me know if I may spread it around. I can try the excel first to see if I can get it right. The formula is much simpler than I had expected with no pi in sight, I see now we are just dealing with triangles.
Thank you.

[sysop](#) - 12:53pm Nov 8, 2005 EST (#37 of 39) [Mark](#)
Deb Suran

Yes, you can [send me](#) the Excel file, I'll have someone on the staff check it and then we can put it in the Library. Thanks.

[Scott M Stofik](#) - 11:08pm Nov 8, 2005 EST (#38 of 39) [Mark](#)

Thanks For the replies, I have learned a lot and am very appreciative.

[Billy Dean Thomas](#) - 04:54am Nov 10, 2005 EST (#39 of 39) [Mark](#)
"Carpe Cerevisi!"

The reason why, I mentioned conical segment in the first place, is, I have seen the use of flat radius(cylindrical) sanding fixtures used for truing frets. This always struck me as inerrant. The cone dressed cylindrical, would necessarily induce aberration from true conical shape. Allowing lateral hand dressing to make some difference in a total cylindrical form. This notwithstanding, the obvious conical generation of fretboard fixtures.

Contrary to previously said statement .001(in)/.025mm, can be a big difference considering the clearance of the string, especially at the nut, and anywhere, when fretted. This would explain a change in action, from one produced guitar, to the other.

I would absolutely love(crave, lust, whatever), to take after a bunch of different guitars with a surface plate, indicator and a rotary jig and check the variance across and down the fretboard. This would be interesting!

I sense a presence!
One, I have not felt for sometime!
I sense a posting from Al Carruth!

BTW, since english is not my first language may be sometime I seem self-conceited or so

Mauro: English, "is" my first language, and I seem self-conceited, don't worry about it. If you want to see how well your doing lets, all converse in Italian from hereon out, then you will see your doing great!

7. More Fretboard Radiusing Jig Questions [Pictures]

[Mark](#)

[Mark Wybierala](#) - 11:54am May 7, 2007 EST (#1 of 51) [Mark](#)

Full Time Instrument Tech

I built what I thought was the ultimate machine for this using 1-1/4" linear bearings, pillow blocks, a router, and a pivoting jig that held the neck or fretboard. It works but the set-up is finicky. I can use the expensive parts for something else in the future. I'm looking at the archived ideas for such a device and like the look of the type that uses a router on a curved bottom sled riding on a pair of rails or pipes. I have a fair quantity of 20mm linear bearing rails and in this application I could provide support horizontally under the length of the 20mm rails to eliminate deflection in the center due to the weight of the router or inadvertent downward pressure from the operator. I also have just scored a nice quantity of 1/2 phenolic to build the sled from. Are there any new ideas for this concept? Is there any issue involved with the sled leaving its alignment? The sled rides on the rail at four contact points and I assume that if the alignment of the sled is off, the router elevates and you can simply make another pass -- you can make as many passes as you like and still get the same resulting cut. The design looks simple and foolproof as long as the construction is accurate and solid. Comments please.

[Mark Swanson](#) - 12:16pm May 7, 2007 EST (#2 of 51) [Mark](#)

MIMForum Staff, Michigan

I tried a few different radiusing methods, and I built and use the one that you're talking about. I've had few issues, but if I try to take too much at one time I will get tear-out at the edge of the fretboard. For that reason, I always profile the fretboard after it's radiused, and leave a little on each side while radiusing.

[Marty McClary](#) - 05:36am May 8, 2007 EST (#3 of 51) [Mark](#)

Mark,

I am a believer in the "keep it simple principle". If you don't need a compound radius, try my design with some decent plywood. It is cheap, efficient, and accurate if put together correctly.

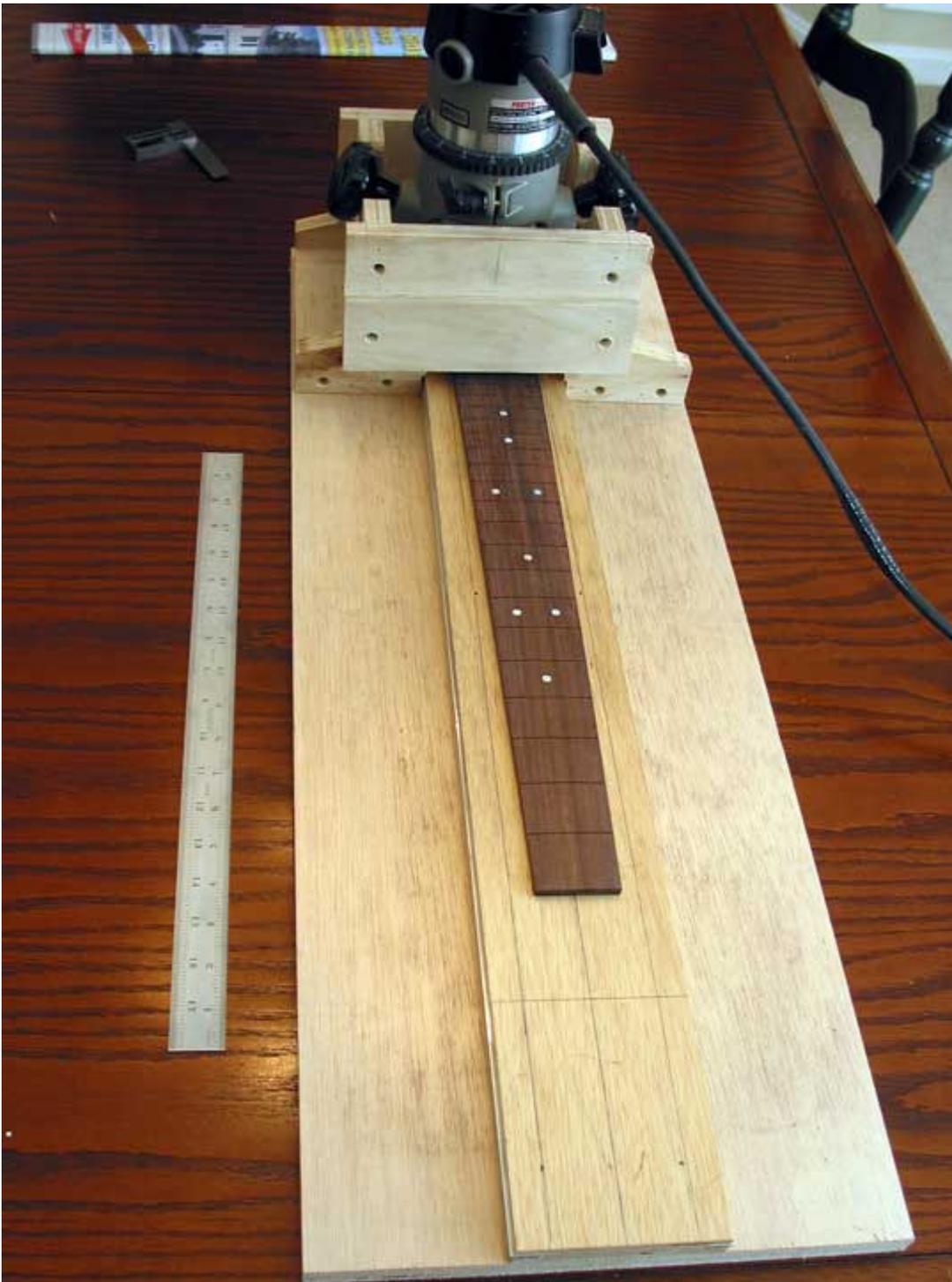
Marty

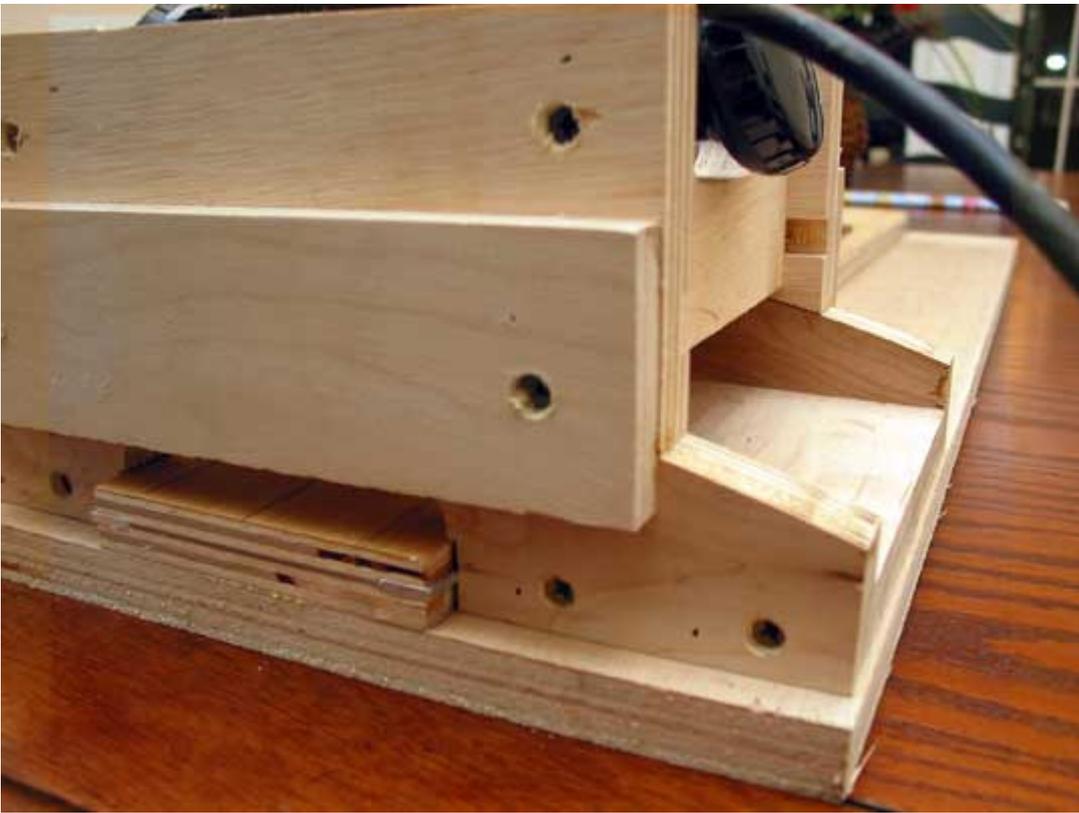
[Todd Stock](#) - 08:01am May 8, 2007 EST (#4 of 51) [Mark](#)

I second Marty's comment - his design is easy to use and is as KISS as it gets. As the thread has not yet been archived, here are some shots of my version of Marty's jig with a modified base.

I just did three ebony and two rosewood boards on this jig, and they all turned out nicely. I leave the board unprofiled, as with almost any router method, you'll get some chipout at the extreme edges if your feed speed is a little off.

There are also some excellent low-tech compound radius jigs available, but for acoustics, I can always flatten out the 14-20 fret area a bit with a 20" radius block if I feel the need, and refretting seems to have done this to a number of older Martins and Gibsons anyway.





[Todd Stock](#) - 08:03am May 8, 2007 EST (#6 of 51)



[Todd Stock](#) - 08:03am May 8, 2007 EST (#7 of 51)



[Todd Stock](#) - 08:04am May 8, 2007 EST (#8 of 51)



[Mark Swanson](#) - 08:35am May 8, 2007 EST (#9 of 51) Mark
MIMForum Staff, Michigan

When I do the routing, I start at the center of the board and work toward the edges. I make the lightest cut in the center and as I pass to the edges the cut gets deeper because of the radius, so to try and avoid the tear-out that makes the most sense to me- I'm wondering what the reasons would be for you to start at the edges, Todd.
This jig works great!

[Steve Senseney](#) - 09:45am May 8, 2007 EST (#10 of 51) [Mark](#)

Nice design.

[Barry Daniels](#) - 09:59am May 8, 2007 EST (#11 of 51) [Mark](#)
MIMForum Staff

I have found that tear out at the edge can be minimized with a climb cut that just skims the edge maybe an eighth of an inch wide. Then the remainder of the fretboard can be cut normally.

[Mark Wybierala](#) - 10:24am May 8, 2007 EST (#12 of 51) [Mark](#)
Full Time Instrument Tech

The pictures are great. Much thanks for the effort you made to share this info. It seems that all of my concerns are addressed with this design. As far as doing the edges first, I can relate that my old jig could do a tearout that resulted in a crack going into the fretboard if there was an element of diagonal grain. The board would be less susceptible to this if there was still the original thickness going toward the center but this is a small detail of personal preference. Actually, you don't usually need to go all of the way to the edge because its going to be cut off anyway when you profile. I have some nice materials on hand to pull this off including a 1 X 4 X 35" aluminum block that is perfectly flat and a quantity of 1/2" phenolic sheet for the sled. Thanks for the help.

[David King](#) - 01:11pm May 8, 2007 EST (#13 of 51) [Mark](#)
often headless

Since when has a single radius board been acceptable? Are the strings parallel?

[Barry Daniels](#) - 01:15pm May 8, 2007 EST (#14 of 51) [Mark](#)
MIMForum Staff

Acoustic guitars work just fine with single radius boards. Always have.

[Lauren Merritt](#) - 01:19pm May 8, 2007 EST (#15 of 51) [Mark](#)

Agreed, and while my jig produces a single radius, it doesn't take much careful sanding at the fat end of the board to flatten it out just enough.

Player preference, naturally...

[Barry Daniels](#) - 01:22pm May 8, 2007 EST (#16 of 51) [Mark](#)
MIMForum Staff

When I level the top of my frets I follow the string path, so I end up with a slight compound radius. But most acoustic guitar players don't really need a compound radius, in my opinion.

[Mario Proulx](#) - 03:13pm May 8, 2007 EST (#17 of 51) [Mark](#)
Hear the colors....

Acoustic players are the ones who can get the most from a compound, if i may say so.

Electric players already have slinky-weak strings, and an amp for all the volume needed. An acoustic player needs heavier, stiffer strings, and must dig-in to get volume. If a compound radius can give them the same amount of room to dig in, yet give them 10% lower action, they will thank you for it. A lot. And they'll come back. A lot.

The days of acoustic guitars being strummed-only are long gone....

[Mark Wybierala](#) - 03:57pm May 8, 2007 EST (#18 of 51) [Mark](#)
Full Time Instrument Tech

With the few hundred fret/fretboard levels under my belt, I just haven't seen much of a benefit to the compound radius concept because so many constant radius guitars play very well. It does make geometric sense to me but it just doesn't show up as an issue. The case of addressing the 7.25 radius and flattening out the upper radius is certainly valid and needed for some players. In pursuit of the lowest action possible, a compound radius should be considered if the radius is small but among my professional clients, a low action is typically not the priority. If the player wants the small Fender-esq radius I might consider it but once you get to up an 10 or 12" radius there doesn't seem to be a point to building a compound radius into the fretboard. For me and intentions for the end product, a really trustworthy flat and clean constant 12" radius is going to save me all kinds of time when it comes to refining the fretwork in the end and the simplicity of the process seals the deal.

[Marty McClary](#) - 05:02pm May 8, 2007 EST (#19 of 51) [Mark](#)

You can also minimize tear out by radiusing the fingerboard in multiple depth passes. I always would do a roughing cut to take material off the sides of the blank first to minimize the amount of material removed by pass number two and/or three. As was mentioned, climb milling the edges will help as well. Thank you for adding the pix Todd!

[Todd Stock](#) - 06:11pm May 8, 2007 EST (#20 of 51) [Mark](#)

Must be why all those old Martins have compound boards from about the 10th up...and all this time I thought it was poorly done refrets.

[Todd Stock](#) - 06:31pm May 8, 2007 EST (#21 of 51) [Mark](#)

Covered in the initial post, but worth repeating - I use a 1/2" shank 3/4" diameter two flute Oldham Viper or Whiteside bit in a 690. On both ebony and rosewood, I can usually go directly to 3X 320 to clean things up. Shot is of a board right off the jig - for reference, those router bit marks are about the depth of 80 grit sanding scratches. You can see just a bit of tearout on one edge, which can be eliminated with slower, lighter first cut or a climb cut. I don't do two passes unless the board is exceptionally figured.



[Barry Daniels](#) - 07:21pm May 8, 2007 EST (#22 of 51) [Mark](#)
MIMForum Staff

I do a lot of ebony fretboards with MOP block inlays and was getting some chipout on the inlays until I went with a CMT Dado and Planer bit, which has a negative rake angle.

That's looks great, Todd.

[Mark Swanson](#) - 08:51pm May 8, 2007 EST (#23 of 51) [Mark](#)
MIMForum Staff, Michigan

I might as well mention again the fine article by R.M. Mottola in the latest issue of *American Lutherie* dealing with this subject.

[Darrel Friesen](#) - 09:07pm May 8, 2007 EST (#24 of 51) [Mark](#)

The days of acoustic guitars being strummed-only are long gone....

You just shot a big hole in my sail Mario <g>

[Todd Stock](#) - 08:09am May 9, 2007 EST (#25 of 51) [Mark](#)

Taking some quick measurements this AM, there's not much in the way of advantage to compounding a 16" board that I can see, but on 12" and smaller radius, change in action height looks to be at least .005 at the 14th, so meaningful for players that do big bends in dropped tunings.

Sounds like a nice niche market - coupled with a short scale, extra- lights, and a nice pickup, all those aging boomer Les Paul players can go (almost) unplugged. Combined with a PLEK treatment and maybe scalloped boards, I could see some serious shred acoustic work.

[Mark Swanson](#) - 09:01am May 9, 2007 EST (#26 of 51) [Mark](#)
MIMForum Staff, Michigan

There are plenty of players who can rip on acoustic guitars, without using extra-light strings and super low action, Todd. I don't think that would be much help. In order for a setup like that to be played, the guitar would have to be so lightly picked- the extra-light strings have a wide arc of movement and will rattle on frets if played hard enough to drive the top and with super low action that would be happening. You'd need to play harder to get those strings to produce any tone. You can actually get lower action with heavier strings. Acoustic players who are searching for electric guitar action soon realize the trade-off is too big, and want their tone back.

[Mark Wybierala](#) - 10:40am May 9, 2007 EST (#27 of 51) [Mark](#)
Full Time Instrument Tech

I see this request for electric guitar action on an acoustic guitar almost daily; that and the occasional request to put a set of .009s on an otherwise decent acoustic guitar. Its a real time sponge.

[Todd Stock](#) - 11:50am May 9, 2007 EST (#28 of 51) [Mark](#)

I agree, Mark - dumb idea; however, all of my arthritic boomer Clapton wannabees seem to want it, so there seems to be a market.

Just curious, Mark - how many guys come back a week or so later to look at installing electronics on their acoustic guitar versus returning things to stock?

[Mark Swanson](#) - 12:12pm May 9, 2007 EST (#29 of 51) 
MIMForum Staff, Michigan

Todd, most of them have pickups already. But, they still realize a loss of tone, even through the pickup. If a magnetic soundhole pickup is used, the guitar ends up sounding too much like an electric, and if an undersaddle pickup is used then it just sounds thin.

[Mark Wybierala](#) - 12:13pm May 9, 2007 EST (#30 of 51) 
Full Time Instrument Tech

The majority of these requests are from beginner to just less than intermediate talents and the time span is typically the life of the string set -- budget concerns is my guess. I don't have a large number of people wanting to electrify their acoustics but then again I don't have an all-time favorite pickup set up that is economical and I recommend. I try to talk people out of slapping together acoust-o-casters because there is a decent availability of reasonably priced electrified acoustics and in the big picture it is not a good economy. For the strum on the couch crowd, a lot of beginners are satisfied with the poor tonal character of a set of .009s because they either can't hear the difference or won't appreciate it -- this is okay. There is the carpal tunnel and arthritis group and for these folks I work quite hard to find a solution and often it's a vintage radius strat (or copy) with piezo saddles or one of a half-dozen available hollow body strat/tele types with the acoustic style bridge and piezo. There just isn't a perfect guitar for everybody.

[Mark Swanson](#) - 12:17pm May 9, 2007 EST (#31 of 51) 
MIMForum Staff, Michigan

For the carpal tunnel group I always suggest a short-scale acoustic.

[Mark Wybierala](#) - 01:52pm May 9, 2007 EST (#32 of 51) 
Full Time Instrument Tech

There is almost enough demand and certainly enough importance to create a complete forum section for stringed instrument modifications for people with disabilities.

[sysop](#) - 02:26pm May 9, 2007 EST (#33 of 51) 
Deb Suran

We need to see at least a dozen discussions on any topic at all times to even think about a new section. I don't think we average even one a month on instruments for people with disabilities.

[Mark Wybierala](#) - 10:24am May 10, 2007 EST (#34 of 51) 
Full Time Instrument Tech

Sorry to put you in a position like that Deb -- It was a rhetorical thought and not a real suggestion. I'm sure if there was a justification by volume we'd have the section. It's a cool challenge to meet the needs of any player. I got the best job on earth.

[Bob Menzel](#) - 01:04pm May 10, 2007 EST (#35 of 51) 
Wannabe

Pros and cons of compound radii aside, if one was so inclined, are there any reasons why the jig illustrated couldn't be modified to do the job? I would think that the jig could be widened with the appropriate arches fixed on either end of the fretboard stock.

With the fretboard pre-tapered, fret slots pre-cut, don't you increase the risk of tear out at each slot?

[David King](#) - 02:12pm May 10, 2007 EST (#36 of 51) [Mark](#)
often headless

Oh Boy I didn't mean to re-ignite this discussion to such an extent. I was just in one of those dark moods and the computer mouse made me do it. For some obviously a constant radius is fine i.e. 16" or 20" with a wide nut etc. For those who are new to this discussion I suppose it's good to air the old laundry from time to time so that they don't march into a major jig investment uninformed. A modification of this jig will get you a compound radius but it makes the jig longer and that much harder to store. Keeping the modified jig aligned properly is not obvious so one needs to have guide lines and be able to lock the router carriage at each position for a pass. Perhaps someone will post pictures of the modded system?

[Barry Daniels](#) - 03:08pm May 10, 2007 EST (#37 of 51) [Mark](#)
MIMForum Staff

I can't see how this particular jig could be modified to do a compound radius.

[Marty McClary](#) - 04:30pm May 10, 2007 EST (#38 of 51) [Mark](#)

The way this works is this, at least this is the way I use it. Both arches on the carriage are about 10-12 inches apart and slide along the fingerboard from one end to another. The router is pushed all the way over to one side and a pass is made the length of the fingerboard. The router is pushed toward the center a bit and then I take another pass down the length. This gets repeated until the full arch is made on each side of the fingerboard. Each pass takes a few seconds with a sharp bit. I can't see how you could easily change the radius unless you had removable arches, which is do-able I suppose, but it would probably be easier to make a different carriage altogether for each radius.

Marty

[David King](#) - 05:44pm May 10, 2007 EST (#39 of 51) [Mark](#)
often headless

Barry, I was thinking that the router would slide the full length of the fingerboard inside of a long box with a slot in the bottom for the bit to pass through. The differently radiused arches would be fixed at the far ends of the fingerboard and the box would only move across the width of the fingerboard and it's motion would trace a section of a cone, determined by the arch's radii at each end. The trick would be to keep the box's travel from getting skewed relative to the centerline of the fingerboard. Ideally the box's centerline would be parallel to the string path at all times. It might also be useful to use perfectly fitted concave "trucks" to ride over the arches and keep things aligned that way.

I hope that's clear enough to give folks a mental picture of what I'm thinking...

[Jamie Uden](#) - 06:01pm May 10, 2007 EST (#40 of 51) [Mark](#)
Guitar Plans Unlimited

The router is pushed all the way over to one side and a pass is made the length of the fingerboard. The router is pushed toward the center a bit and then I take another pass down the length.

Wouldn't you have less tear-out if you went back and forth with the router and inch your way up the fingerboard?

[Marty McClary](#) - 06:39pm May 10, 2007 EST (#41 of 51) [Mark](#)

I never really had a problem with tearout. I radiused before tapering so any tear out would get cut off during that process.
Marty

[Marty McClary](#) - 06:40pm May 10, 2007 EST (#42 of 51) [Mark](#)

I also did it in 2-3 passes so that reduces the potential tear out too.

[Mark Wybierala](#) - 12:06am May 11, 2007 EST (#43 of 51) [Mark](#)

Full Time Instrument Tech

My super-fantastic gizmo that I mentioned in the original post never had an issue with tearout except if I got to the edge from the center and there was less than 1/4" of unradiused meat left on the edge. My passes were up and then down with about eight or ten passes completing the fret board. I need to read the descriptions of the compound radius method with a cup of coffee tomorrow. I didn't get it on the first pass.

[Todd Stock](#) - 06:25am May 11, 2007 EST (#44 of 51) [Mark](#)

Jamie:

I don't get any tearout when the feed speed of the first pass up the edge of the board is correct - the shot I showed earlier in the thread was one produced by a friend of mine - it was his first effort on the jig, and feed speed was a bit faster than desired.

I tried lateral passes when I first built the jig, and found the tool marks were more pronounced and tearout more likely at the exit side of the cut. Your router/bit combo may behave differently, so it's worth trying some different combinations of bit path and feed speed.

Todd

[Todd Stock](#) - 06:58am May 11, 2007 EST (#45 of 51) [Mark](#)

Reading the thread again, Marty's jig design is for constant radius only; however, there are other jig designs which are still relatively simple and handle compound boards.

[Mark Wybierala](#) - 12:43pm May 14, 2007 EST (#46 of 51) [Mark](#)

Full Time Instrument Tech

Looking at everybody's photos and comments, here is my new and improved jig. Okay, I know that some of the components are over-kill but its slick. All of the metal components are off of ebay. The bearings are 20mm. The aluminum bed is dead flat and I'll hold the fretboard in place with double-stick tape. With the high humidity here in New Jersey, I wanted to make sure that warping would never become an issue. The elevated bed is attached to the base via 3/8 studs and wing nuts. I wanted to have a capability to radius fretboards that were already installed on necks if I desire to return to this method. The router carriage is 3/4 polyethylene. I needed to build a circle cutting rounter jig to make the curves and the curve is clean and smooth. Oddly enough, the curve is so clean that I could get a decent jig completely without the lower part of the carriage by putting the upper part directly on the rails -- it rides smoother. But its too slick and too fast with virtually no friction on any axis. I'm staying with the lower carriage because it gives me a bit of stability to make straight longitudinal passes. The radius of the curve is 13" which gives me a fretboard cut radius of near 11-3/4. The next step will be a twin dust/chip collection on each side of the upper carriage.



[Todd Stock](#) - 01:54pm May 14, 2007 EST (#47 of 51) [Mark](#)

The linear bearings a def overkill, but I really like them, Mark.

Some of the other jigs in the library do just what you describe - rid on the rails. Only issue is keeping the router carriage squared up with the centerline. Marty's design locks in the angle, so a little easier to use in my opinion.

[Steve Senseney](#) - 02:04pm May 14, 2007 EST (#48 of 51) [Mark](#)

And to think I use a curved board with sandpaper to get my fingerboards to radius!!

It really looks nice.

[David King](#) - 02:54pm May 14, 2007 EST (#49 of 51) [Mark](#)

often headless

Mark, This design illustrates the use of fitted curves I was trying to get across in my description. I especially like the aluminum plate for holding up the board. It seems to me that this jig could easily be adapted for fret slotting -by using a biscuit jointer with a custom fret tang blade that bolts in where the router is (there is probably a jewelers or slitting blade that could be adapted). Curved bottom fret slots! think of that!

You could also reassemble this jig in a slightly different configuration to make the conical shape board. Just move your curves out to the ends of the finger board and install the linear guides on up under the router.

I've never understood what keeps these round linear rods from deflecting under even a slight load. Why not use the open sided bearings with a solid support under the whole length of the rods?

[Marty McClary](#) - 06:09pm May 14, 2007 EST (#50 of 51) [Mark](#)

"I've never understood what keeps these round linear rods from deflecting under even a slight load. Why not use the open sided bearings with a solid support under the whole length of the rods?"

David,

I used 36" long drill rod that was 3/4 in. diameter on my DIY CNC. The rods do deflect some when pressed with some finger pressure which is why I designed my linear bearing system to be open on the bottom for some supports.

Your idea of open bearings is a better idea. VXB(.com) has come out with rods and open bearings at a fairly reasonable rate for this type of application.

MM

[Mark Wybierala](#) - 06:48pm May 14, 2007 EST (#51 of 51) Mark

Full Time Instrument Tech

You're absolutely on the money about the deflection issue but in this application its not too bad. The solid mounted rails are far better. I acquired all of 20mm stuff a while back from ebay at a great price and at the time thought that the open bearings would have more of an issue with contamination from saw dust. The original project, a dupli-carver, was a bust because of the deflection problem. I have in my possession a pair of 1.25" diameter rods but there hasn't been anything as far as 1.25" pillowblocks at the right price on ebay. I have a fair quantity of the 20mm rod on hand including pillowblocks and other neat hardware left over and I want to put it to use if and when I can.

8. radiusing... jig wanted [Pictures]

Mark

[max pepe](#) - 05:32am Oct 27, 2005 EST (#1 of 24)

Mark

hi everybody

Hi,

I'm writing from Italy, please sorry for my english (I hope my question is clear) ;-)

what type of tool you use in order to make the fretboards radius? Only used the block radius or you have some particular jig? if you have some jig.. please, could you post some pics or a pictorial?

I hate to make radius by hand...

all the best

MAX

[Arnt Rian](#) - 05:44am Oct 27, 2005 EST (#2 of 24)

Mark

Trondheim, Norway

Hi Max,

your English is fine! I use hand planes and a long radius sanding block and it works OK. However, I just got a new long belt sander and I'm tempted to build a fretboard sanding jig like the one in this discussion:

[Magnus Fredholm, "Building fretboard sanding "swing" \[Pictures\]" #1, 07:56am Sep 9, 2005 EST](#)

[Mauro Marchesini](#) - 07:10am Oct 27, 2005 EST (#3 of 24)

Mark

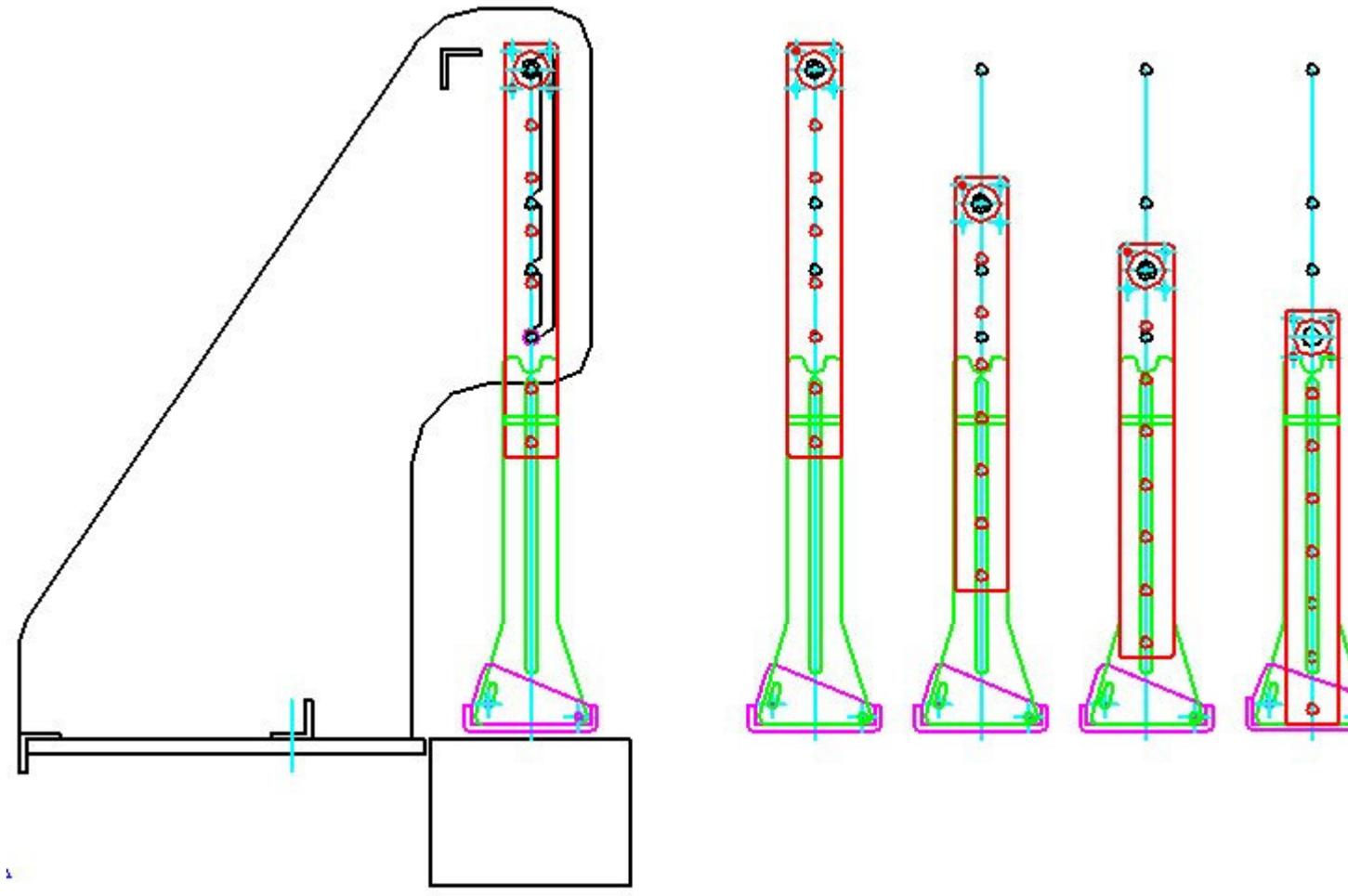
Hi,

I'm from Italy, like you (near Bologna).

Here my jig: four radius, 12"-14"-16"-20" on a 930mm 1.5 Hp belt sander. It take 3-4 minuts each fretboard.



A sketch



hi MAURO,

do you know??? I was thinking on a jig like your!!! Just the same... but I have just one problem... I don't have a belt sender :-P

That's why I'm looking for some jig that could be used with router.

Anyway your jig is very great and I think it works very fine. Just one more question... do you use bi-adesive to hold blank fretboard?? or wath??

Deb Suran

Arnt, please kill your mimf2 bookmarks, you can't make an internal link with it without dropping the login of anyone who clicks on your link. I have edited your message. Thanks.

Yes, bi-adesive

[will groff](#) - 09:31am Oct 27, 2005 EST (#8 of 24) [Mark](#)

Really nice jig, Mauro.
Will Groff

[Nelson Palen](#) - 03:46pm Oct 27, 2005 EST (#9 of 24) [Mark](#)
luthi, luthier, luthiest?

Very nice, Mauro!
Looks like it's constructed of sheet metal? I see the adjustment capability of the plate that holds the fingerboard and wonder if that is to initially level the board with the sanding belt.
A close-up of your cutting depth adjustment would be nice.
Why is it that you Italians always come up with such neat designs? I thought you were supposed to be lovers not engineers.
<g>
Nelson

[michael mcclain](#) - 11:33pm Oct 27, 2005 EST (#10 of 24) [Mark](#)
Crazymanmichael, Luthier, The Wood and The Wire

Contact ctholden. Policy forbids posting his url but if you google you will find him. He builds a router based radiusing jig which is very versatile. Those who have them rave about how good they are. One problem though; like most well engineered and manufactured things of quality they are not cheap!

[kevin justis](#) - 01:44am Oct 28, 2005 EST (#11 of 24) [Mark](#)

If you have a planer/moulder make(or get a tool shop to make)a knife with the radius you need.

[Mauro Marchesini](#) - 02:03am Oct 28, 2005 EST (#12 of 24) [Mark](#)

I thought you were supposed to be lovers not engineers. <g>

Yes ... supposed :-D

Nelson, the jig is made of 4mm tick sheet metal, laser cutted and zinc-coated. There is a plate adjustment because I have some friends who, really when I was plotting the jig, asked me the frets level slightly up-oriented, so I've made some fingerboards thinner on the upper side.

BTW, despite the simplicity, if you or anyone wish the plans, I'll happy to send the dwg or dxf file



[Nelson Palen](#) - 07:26am Oct 28, 2005 EST (#13 of 24) [Mark](#)
luthi, luthier, luthiest?

Max--Thanks for opening up a great discussion and as mentioned above ctholden offers a well built jig for radiusing. The fixture that Arnt mentions above also looks like a neat approach.

Mauro--Very, very nice work! Also, the CNC mill in the background is very interesting. I see you have mounted an auxiliary spindle in the form of a small router. And a tilting head, no less. What brand of mill is that?

Nelson P.S. Perhaps Deb would be interested in dxf plans for the MIMF.

[sysop](#) - 07:41am Oct 28, 2005 EST (#14 of 24) [Mark](#)
Deb Suran

Yes, e-mail them to me - ZIP them first, please. I'm way behind on getting files folks have sent into the Library, but as the weather gets colder and I close down parts of what has become a farmstead here, I'll have more time to get caught up on all that stuff.

[max pepe](#) - 11:35am Oct 28, 2005 EST (#15 of 24) [Mark](#)

Nelson... I think there is no one person that love to make radius by hand!!! Also I'm always looking for some jig to help any kind of job. Using tools and jig, you know, is the best way to work fast and right.
I think a forum (and specially this one) is like a big brain storming... so everyone can say something important for everybody!

anyway I don't have a belt sander, so I still have problem to make radius ;-P

all the best
MAX

[Paul Doubek](#) - 12:10pm Oct 28, 2005 EST (#16 of 24) [Mark](#)

Max,

Have you checked the library/archives? There are a couple posts in the "Radiusing Fretboards" section that show router-based solutions to cutting a radius on the fretboard. I think there was actually another thread recently that may not be archived yet, but I might be remembering wrong.

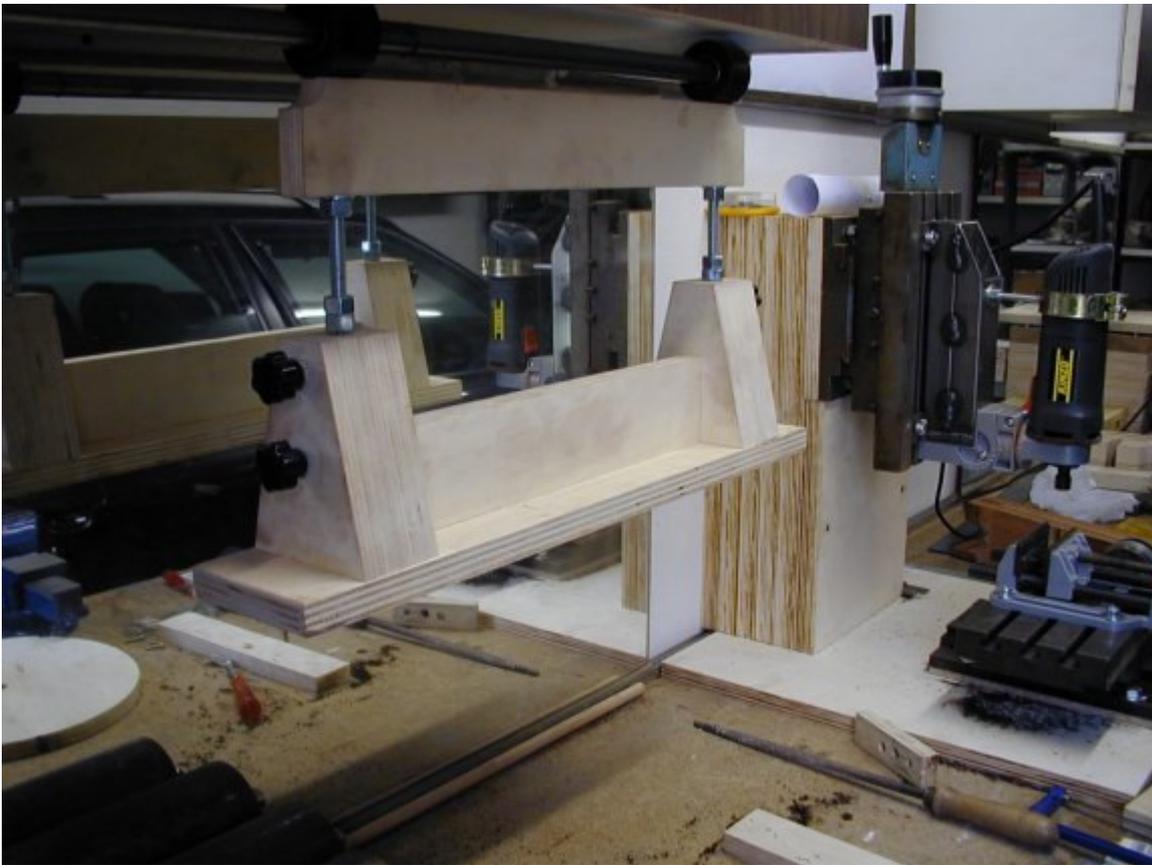
[Mauro Marchesini](#) - 12:51pm Oct 28, 2005 EST (#17 of 24) [Mark](#)

Deb, soon I'll post you the plan.

Max, before I made this big one I used a much small plywood jig with a hobby belt-sander (70€). It's required only a lot of patience in setting and working, but anyway better than by hand.

Nelson, the mill comes from a local industry, Meccanica Cortini; it is very heavy and can easily work metals. Unfortunately has a limited range (300x200x150).

The control comes from Germany (Engelhardt GmbH)



[Ron Belanger](#) - 02:00pm Oct 28, 2005 EST (#18 of 24) [Mark](#)

Mistakes are opportunities - Oh darn!! another opportunity

Hi,

Regarding the CT Holden fret board radiusing jig; I have one and so far so good. It does a great job on a variety of radii as well as compound radii. I certainly have no complaints.

[Nelson Palen](#) - 03:26pm Oct 28, 2005 EST (#19 of 24) [Mark](#)

luthi, luthier, luthiest?

Mauro--Yes I know I'm being snooty but noticed in the background again what looks to be a vertical slide with an XY slide mounted below it.????

Sorry can't help myself.

Nelson

[Alain Lambert](#) - 07:05pm Oct 28, 2005 EST (#20 of 24) [Mark](#)

Hobbyist builder, Quebec

That Holden jig is quite clever.

I need to build one!

Ron what kind of pivot is used for the 2 copper pipes at each end?

[Mauro Marchesini](#) - 02:03am Oct 30, 2005 EST (#21 of 24) [Mark](#)

Nelson, we are Max's guest :-), maybe we must start a new thread: "Watching for the background"... we ask Deb <g>.

Anyway: this is an old picture, I used the two crossing slides for a while, manually, before I got the cnc mill. I left the slides in place and sometimes these are useful for simple or particular works (I reach 700 mm in X and there is a wide clearance between the table and the router).

[Chris Franklin](#) - 09:23am Nov 1, 2005 EST (#22 of 24) [Mark](#)

Mud Thrown is Ground Lost

Max, my router jig is one of the ones Paul mentioned that is in the library queue, so I won't post a picture again, but it's similar to one posted by George Brown in an earlier library discussion titled "Swing-arm fretboard radiusing jigs for use with belt sander or router." It uses a swinging platform like Mauro's, and is intended for use on a router table, but could be used upside-down with a hand-held router. I radius the fretboard after it's glued to the neck, with a little tension in the truss rod so there's some relief in the radiused board when it's relaxed. I agree with you about jigs being the way to go -- using a press to put in the frets, I find I don't have to level the frets afterwards, just touch up one or two.

[max pepe](#) - 05:05am Nov 20, 2005 EST (#23 of 24) [Mark](#)

Hi everybody... just with your precious help, finally I made my jig for radiusing fretboard.

Works perfect and just few minutes I have a ready and perfect radiused fretboard. I would post these pics, maybe someone would find usefull.

Thanks

have a nice day

Max



[max pepe](#) - 05:06am Nov 20, 2005 EST (#24 of 24) [Mark](#)

another pic



9. Swing-arm fretboard radiusing jigs for use with belt sander or router [Pictures]

Scott Stulken - 05:02am Dec 23, 2001
college student, aspiring luthier

...by this I mean the one where you attach a fingerboard to two adjustable arms, each as long as the radius you want (i.e. 10"), which swing over a horizontal belt sander.

I've got a good idea of how it's made... I guess I'm just curious as to the pros/cons and how you like yours. It looks like a slick way to make compound radii.

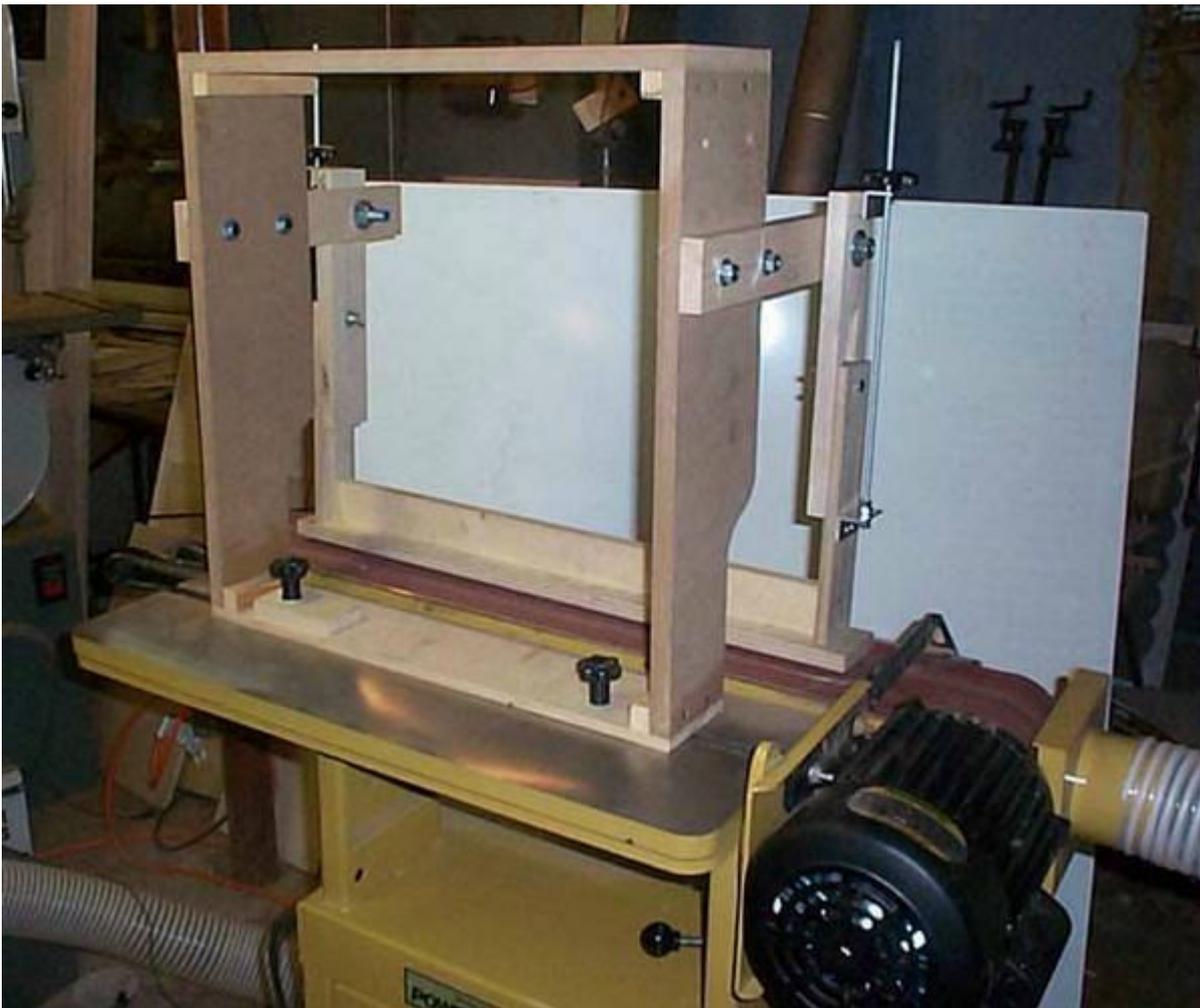
Thanks!
- Scott

Mario Proulx - 11:37am Dec 23, 2001
MIMForum Staff

I made one a few weeks ago. Works pretty nicely!

Don Williams - 05:30pm Dec 23, 2001
D.E. Williams Guitars

Here's a couple pics of the one I built a few months back...



Don Williams - 05:35pm Dec 23, 2001
D.E. Williams Guitars

And here's a better detail of the arm mechanism, the important thing was to have the arms swing fairly free and easy with no slop. I accomplished this by using some bronze bearings in the stationary cantilevered part, through which the all-thread ran. Works pretty well I think. The wood was all scrap, and most of the parts were too. I think I had less than \$20 in it, which was mostly knobs, nuts, and all-thread.

Deb, please feel free to shrink the photo if you need to...



Ellie Erickson - 05:36pm Dec 23, 2001
MIMForum Assistant Sysop

Don, That sure looks like a timesaver. How long does it take to radius a board with that jig?
Next time you post a photo, please try and make sure that you're under the 600x400 pixel limit, thanks.

George McCann - 11:18pm Dec 23, 2001
surfing sawdust supervisor

I've got the LMI one and have done about 15 fretboards with it. The first few were so-so. The last few are a lot better. If the bottom of the swing arm is perfectly flat you can radius a fretboard accurately in less than 5 minutes. The first few took a lot longer and a lot more work. Like all tools you have to tweak it here and there to get it right. After radiusing you still need to do light touch up - another few minutes - but it is fast and now that it is set up, it is accurate. Don's will do the same thing and did not cost him anywhere near what I paid for mine. The only difference I can see between the two is the ease of setting up difference radius's and compound radius'. Good job Don. You saved enough money to pay me a visit and teach me some good building tricks.

Don Williams - 12:23pm Dec 24, 2001
D.E. Williams Guitars

Ellie,

George said it right when he said it only takes a few minutes to sand a fingerboard. My first was more like 10 or 15 minutes, because well, it was the first one! Had to tweak it to get it right. You have to be careful you don't over sand one side more than the other, which it is possible to do. If I had to do it over again, I would build an entirely different setup, using a method that I saw someone else use, which seems more foolproof. But that's another thread...

George,

If ever I need to do a different radius or a compound radius, I will simply drill another set of holes. I like the idea of having holes instead of adjustable slots, just so that accuracy is maintained. I can go as small as I need, and over 20" if I want too. The current setup is 16", because that seems to me to be a nice radius for acoustics.

George McCann - 01:39pm Dec 24, 2001
surfing sawdust supervisor

Come on Don - kick out your ideas. I think you did a great job on your original one. One of the only things I would change. If I were to build one from scratch:

1. The end of the horizontal swing arms would be angled so the fret board would cross more of the sanding belt surface. This would allow the belt to wear more evenly.
2. On set up I have found you need to angle the whole thing. If I angle the jig to the sanding belt, I don't seem to have the problem Don mentioned - sanding more on one side of the radius. The first few fret boards were radiused/sanded in about 3 passes, taking a small amount of material on each pass. Now I place a 1/4" spacer at each end of the bottom plate and set my height. Double stick tape the fret board onto the bottom plate and slowly (avoiding any downward pressure) sand the radius in one pass. I'm sure there are other ways to do it - this is my way.



Don Williams - 08:43am Dec 25, 2001
D.E. Williams Guitars

O.k., O.k....

What I saw somewhere on the net, was a jig that was made of aluminum, that was ever so simple. First, there was a frame that set over the sander so as to create two solid platforms suspended rigidly just above the sanding belt. Then, there was a fixture for holding the fretboard, a flat plate with two ends. The ends of the thing had the desired radii machined onto them. All you do is rock the unit across the platform, and you get a perfectly radiused board. You can achieve all the combinations of compound radii, just by swapping out the ends of the jig. I can't remember if it was Olson's web page, or whoever, but it sure was nifty.

George McCann - 06:22pm Dec 25, 2001
surfing sawdust supervisor

Wow, that does sound simple and effective. Do you think there would be any expansion problems with the aluminum - or would it be too minimal to worry about. After all, this ain't no rocket ship we're building.

Chris Walsh - 05:55pm Dec 26, 2001

I considered making one of these things a while back, thought about it, looked at the lack of space in my cellar and thought man I have enough "stuff" already. Then, I took a closer look at the stewmac catalog and if you get enough of them, it's like \$2/piece difference for slotted and radiused fretboards. Well, I've tripped my fire alarm plenty, and for that kinda money, sign me up. A dozen fretboards will keep me busy for plenty long enough.

George Brown - 09:49pm Jan 1, 2002

After looking at various radius jigs, both sanding and router based. I decided on using the router since my belt sander was only 6X48. I built a jig to use in my router table. The jig consists of an open box frame and a sturdy pendulum arm and bottom plate to which the blank is mounted(tape). The box is attached to the miter slot via a store bought miter slide. The box is pushed back and forth over the bit and I move the arm with each new push. It was a simple solution. The pendulum arm (and box) is drilled for several radius profiles (not compound I'm afraid but it could be modified). Total time to build was about an hour including design.

The blank comes out clean needing little sanding, and routing takes only minutes. Dust is not a major problem and the jig could be made with a dust collection hose attached.

If anybody wants more info I'll send some pictures.

Don Williams - 12:34pm Jan 4, 2002

D.E. Williams Guitars

Yeah, George...let's see some pic's! I can't quite picture what you're doing so a couple photos would be great...

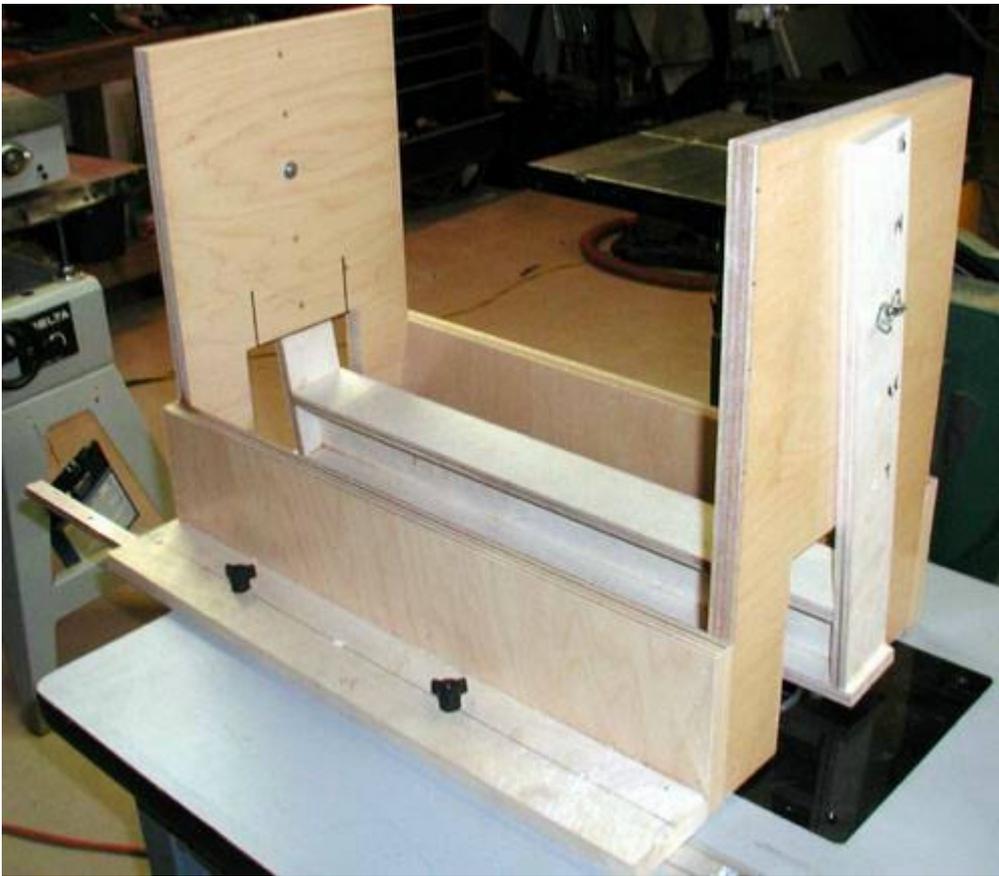
George Brown - 10:15pm Jan 6, 2002

Sorry it took so long. Here are some design notes.

1. make sure the bottom of the arm is 1/2" off the table for the height of the bit and the blank.
2. The radius holes must be drilled on both the arm and the side to which they attach. Subtract 1/4" before you drill from the bottom of the arm and add 1/4" from the bottom of the box. Yes you must drill a hole for each radius on the arm and the box.
3. Use a wing nut and washers so you can remove and tension the arm. You want the arm to move with tension and hold, not flop down.
4. Make the opening for the arm with the largest radius in mind for proper swing.
5. Make sure everything is centered in the box. Then make sure the box is centered over the blade when you attach the slide.

I used birch plywood wood for the box and baltic birch for the arm and a store bought miter slider which is T shaped so it doesn't come out of the slot. I use a 1/2" straight bit.

Ask if you need more help. For private use only.



Don Williams - 07:58am Jan 7, 2002
D.E.Williams Guitars

How can anybody work in a clean shop? I don't get it...
:)

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10. *Barry Daniels' router jig for radiusing a fretboard [Picture]*

Barry Daniels - 07:08pm Mar 26, 2003
MIMForum Staff

This is my recently completed radius jig based on the design in the library. It does not do compound radii, only cylindrical. Last night, when I tried it on the first neck (with MOP block inlays) I got a lot of chipping on the MOP. So I got a new router bit today, called a dado/planer bit. It actually has a slight negative rake to it. Much less chipping. The jig makes quick work and results in a perfectly straight fretboard. Much better than I could do with a Stew-mac radiused sanding block.



Brian Ristola - 08:12pm Mar 26, 2003

That is beautiful Barry... I bought a couple pipes to start building mine a month ago...but havn't gotten up the gumption.

Tell us more about the design as well as how you secure the neck in the jig..it looks like it mounted into a box.

Barry Daniels - 09:37pm Mar 26, 2003
MIMForum Staff

I radius my fretboards after they are glued to the neck (this is for an archtop), so I needed some depth to the jig. I decided to make a box to give me the depth and rigidity. The box is 3/4 inch MDF about 48 inches long, and the pipes are 1 inch diameter electrical conduit. There are two holes in the top of the box for the heel and peghead to stick through. There are two smallish (4" x 4") MDF plates under the neck to control the height: the plate under the fingerboard extension is screwed down tight; and the one under the nut area can slide towards the peghead to raise this end of the neck up. I use the sliding plate to adjust the fingerboard parallel to the pipes and then the plate is screwed down. A couple of wedges on either side of the neck, at each of the smallish plates, holds the neck in place. I can take a close up of that area if you wish, but it is pretty basic. By the way, the white posts on the router sled are limit stops to keep from routing into the pipes. When the posts are up against the pipe, the router bit is just over the edge of the fingerboard. Some slick tape on the bottom of the sled makes it slide smoothly.

I radiused five necks today, with excellent accuracy. Finally! I have been struggling and researching this jig for a long time. Now, if I could eliminate the slight MOP inlay chipping that is occurring, I would be done.

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