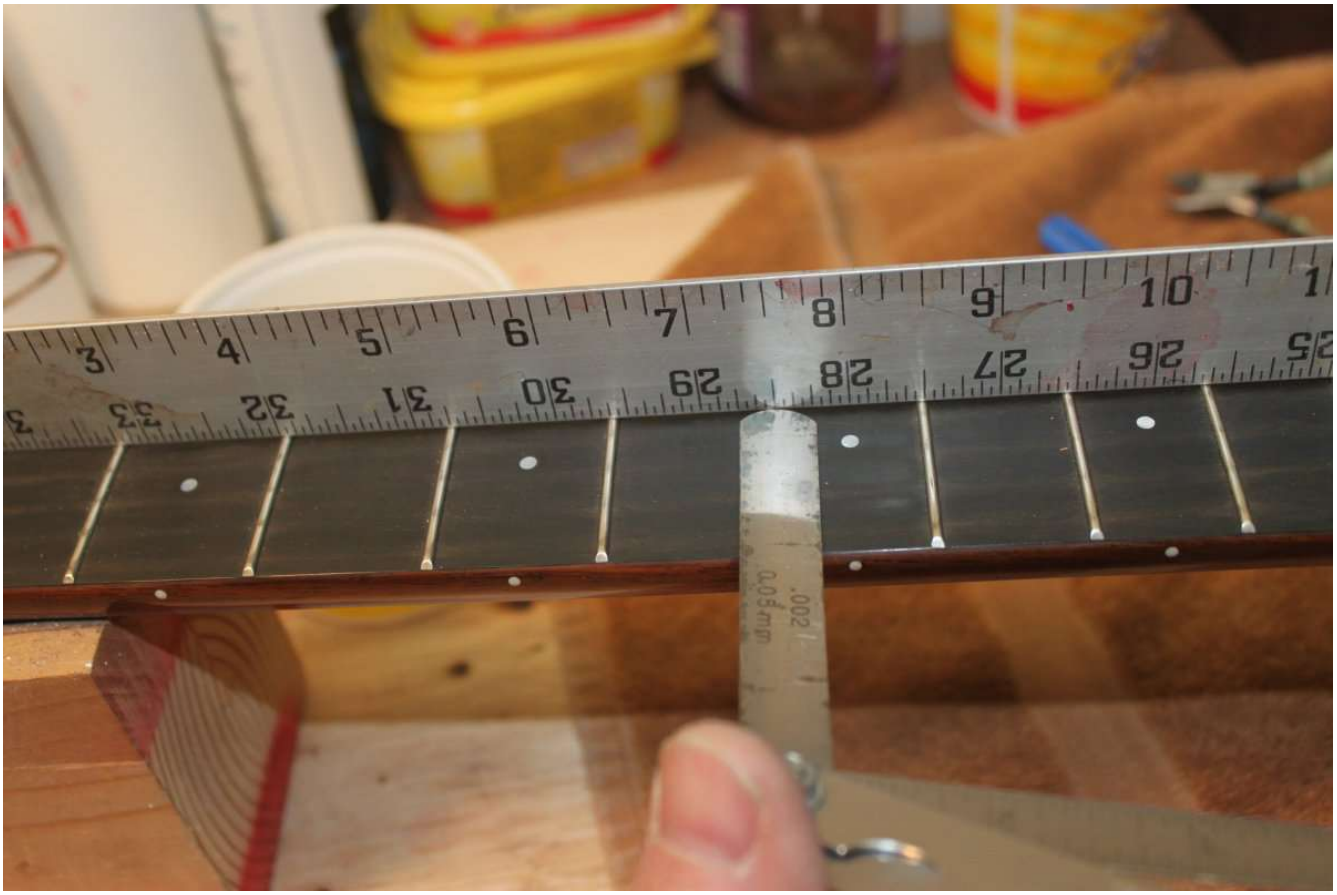
Frets

Moving forward, the next thing that I worry about is the frets. Frets are the player's interface with the guitar and the guitar's interface with the strings. Like a lot of things in this thread, there are a couple of different things that can be going on. First is a brand new guitar with new frets, I know they will be in good condition but need some attention. Second is an old guitar with frets that may or may not be good and may or may not need attention.

In either case, take the strings off and adjust the truss rod to its most neutral position - on a single acting rod that will be with the adjuster slightly loose, with a double acting rod as you back of the adjuster it will become easier to turn, then start getting harder again. Go back to the easy location (do we need a primer on truss rods?). Ideally the neck will be at its straightest condition, but I play with the t/r until its as straight and flat as I can get it. I put a straightedge on the f/b and try to push a feeler gauge under it at each fret. I know the straight edge is resting on the two highest frets and I make a note of which ones they are. I keep fiddling with the truss rod until there are (ideally) no gaps between frets and the straight edge



I will also use my little StewMac action gauge as a fret rocker, check each trio of frets to see if the center one rocks. Here I am using the short side of the gauge to rock frets 12-13-14, if I can feel it rock I know 13 is high relative to the others. Write it down.

If I find a high fret then I might try pushing a thing feeler blade between the crown and the fretboard - if it slips in then I know the fret is high in the slot

This guitar had several frets that were high in their slots. It makes no sense to file them, instead I pressed them back down and wicked a little thin CA under the crown. Now that its down I can go ahead with the level

Now I color the tops of all of the frets with a magic marker. I tape off any part of the guitar that might get scratched. I take the nut out (if it is correctly glued in you can put a block of wood against the side the abuts the fretboard and tap it lightly with a hammer, it should come out easily. Fender nut sit in their own little groove and might have to be tapped from the side with a small drift or block of wood. If I'm sure I want to reuse it I might leave it in but its so much easier to work on with it out of the way. If I know I don't want to reuse it I might saw it down the middle rather than risk damaging the fretboard)

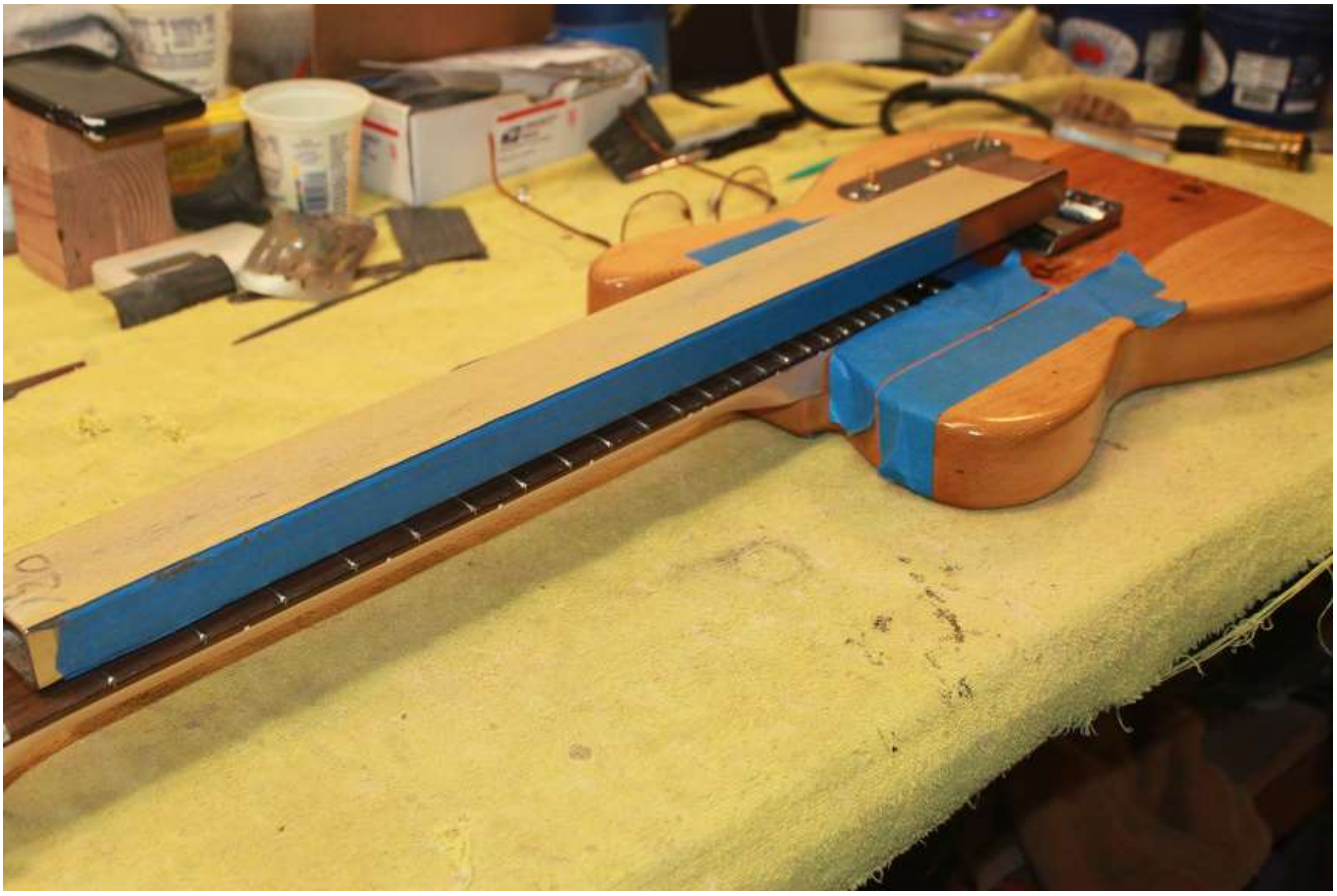
I'm going to show one picture that is my arsenal of fret tools. You don't need all of these and we will talk about some of them as we go on, but this is basically what I use

With my notes handy on which frets are high I can start leveling and dressing them. I usually start by doing the ends - if they are new the ends need work and many guitars with dehydrated fretboards have sharp fret ends. I just simply run a 6 inch bastard file along the edge of the fretboard at about 45 degrees trying to span two or more frets at a time. As long as I can feel it cutting metal I know its not damaging the side of the f/b. Besides the 45 degree will put a tiny radius in the edge of the board so the board won't feel sharp either.

This is an acoustic fretboard that I've just replaced the first 6 frets and clipped the ends. I might touch on refrets in another installment

I'll come back to the ends in a minute but next I'll move to actually leveling the tops of the frets.

I usually start with my full length heavy leveling beam. This is one of those expensive ones that SM sells, I didn't buy it, it was given to me. Before that I used an inexpensive aluminum carpenter's level from a box hardware store. I put sandpaper on the beam with double stick tape - usually something like 120 on one side for sanding wood and 320 or 400 on the other side for frets.



Its hard to describe the motion - I let the weight of the beam and the abrasive do the work. I want to follow the curve of the frets and just lightly touch the tops all the way across the board and the full length of the board. I don't move it much, just back and forth with a little rocking. I stop every couple of passes and look at the frets - I want to see a thin shiny line on the top where the abrasive has removed just the very crown and cut thru the black magic marker. Ideally each fret will just get hit, but the taller ones will get more than others. If I see a tiny bit of shiny filings at the base of each fret I can judge how the abrasive is cutting.

I'll take the beam off, do a little more poking with feeler gauges and the straightedge, and a little rocking with the SM gauge. I pay attention to those frets that were high before - do they still rock?

I might use a shorter flat block to work on a smaller area -

Here are two little short pieces of aluminum bar with sandpaper on them. One of them is kind of trick - there is a piece of sandpaper with the abrasive out in the middle and two pieces stuck on the other way on the outsides. When I rub that on three frets it only takes material off the middle one

After all that work I should have a pretty flat fret plane with little flats on the top of each fret.

The next step is to reestablish the crown. Like everything else we do here there are lots of techniques and tools - what ever works for you is good. I know lots of people who use a three sided (triangular) file that has been made "safe" on a grinder - they are able to file across the fret and redo the crown shape. I find it a lot easier to use a commercial fret crowning file sized to the fret I'm working on. I have several of them, fore acoustic and electric guitar work one double file with a medium and large channel should do the job.

The idea is to remove the sides of the crown but not lower the tops any more. Sometimes its helpful to put magic marker back on the fret so you can judge how much has been removed.

Its a good idea to mask off the fretboard but thats a real hassle so I use this little gizmo that probably dates me - that is an eraser shield used by draftsmen (women) back when plans used to be drawn with pencil. I was one of those in another life and still have some of the tools of the trade. Its shown here with a little jeweler's needle file - I'm putting a radius on the ends of the fret

The other thing you can just barely see in that picture is one of my crowning files that I've put a piece of 400 grit sandpaper in the groove - that effectively gives me a finer abrasive that I can go all the way up to 1500 or so polishing the frets.

The leveling operation put some lengthwise sanding marks in the frets, crowning put some from side to side. I work with wet and dry sand paper (used dry here) and steel wool to go up thru the grits and take all the marks out.

I don't polish frets with compound or a buffer or dremel - it is too easy to damage wood and particularly plastic binding. I also don't oil my fretboards - for one thing I read an article by Martin guitars saying that lemon oil can damage lacquer finishes (and I use lacquer) plus I don't think the wood needs it. Others disagree and I won't argue, I may however refuse to refret a board that has had a lot of oil rubbed into it.

Guess we're done with frets for a while, I'm going to go have a nice cold beverage.

More thoughts on frets. I have talked to a lot of great setup techs and almost all of them agree that factory frets can use some work. Even guitars that have been Plek'ed - thats only a machine after all and the job it does is only as good as the operator. There was an interview with Ken Warmoth in American Lutherie and he said the frets on their boards are good but they expect the installer to do a final check and dress if needed. I guess my point is that it doesn't hurt to take a little time at this point and make them the best you can.

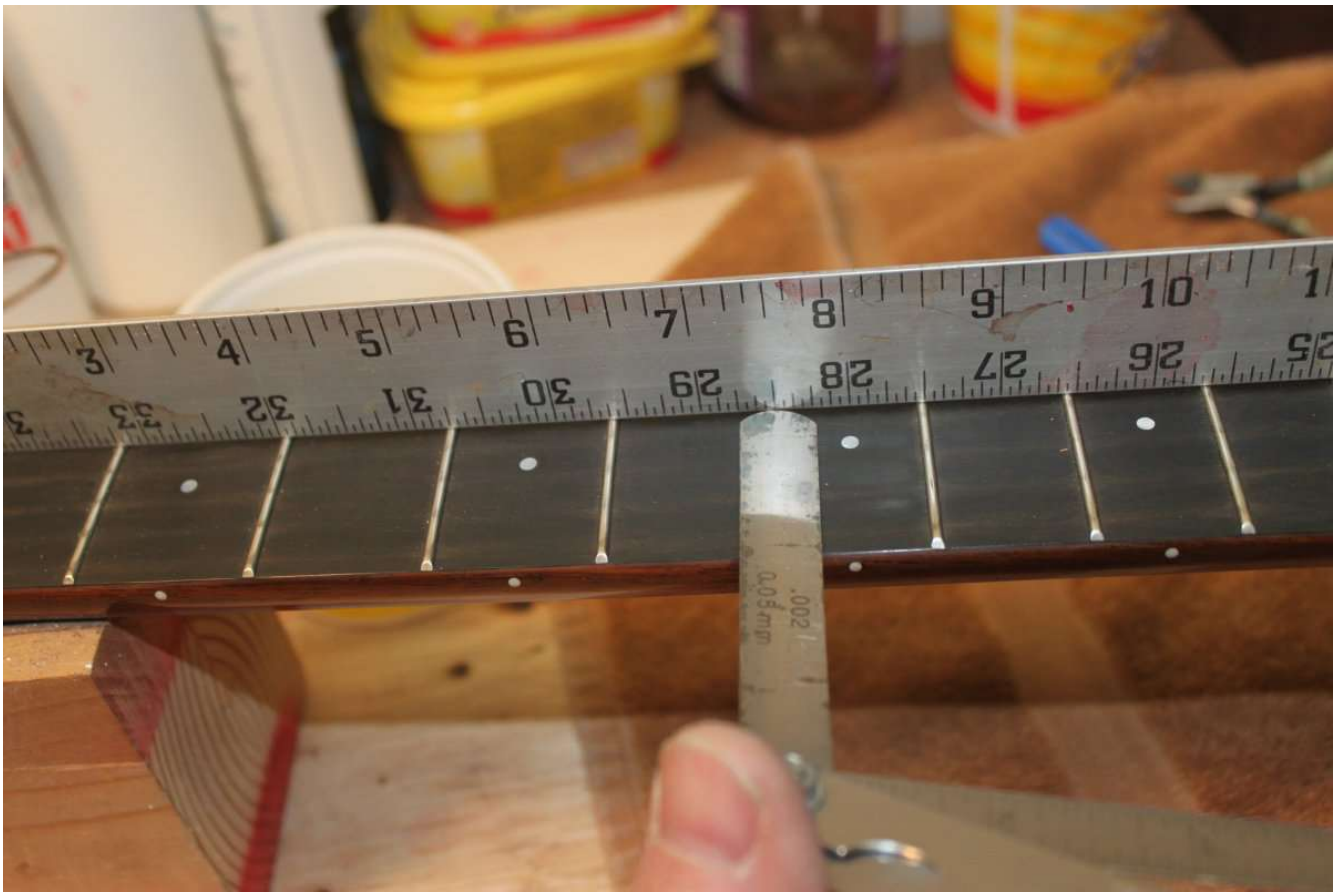
Lets just briefly touch on refrets since if you are working on a used guitar you need to make the decision of whether the frets are good enough. Its a judgement call - can you dress out little grooves in some frets without taking too much off or affecting others? Have they been dressed before? Are there divots in the fretboard? Here is a biggie - are there issues with the fretboard that you can't fix by leveling the frets (a hump at the 14th or 16 fret that just won't go away? I think of frets like tyres on your car - they wear out, need to be replaced periodically and will improve the guitar when done.

There are some other big things to think about on a refret. Vintage guitar may have frets that you are not prepared to deal with. Old Martins sometimes had bar frets that have to be glued in (with hide glue), some old Martins need "compression frets" to help with relief. Old Gibsons sometimes

have "nibs" of binding on the ends of frets, and the worse ones for us here, some old Fenders have the frets pushed in from the sides (they need to be removed the same way and new ones press from the sides). Point is, if you are working on an old guitar, there are ways to refret it that won't destroy its value, but if you do it wrong it can be a disaster.

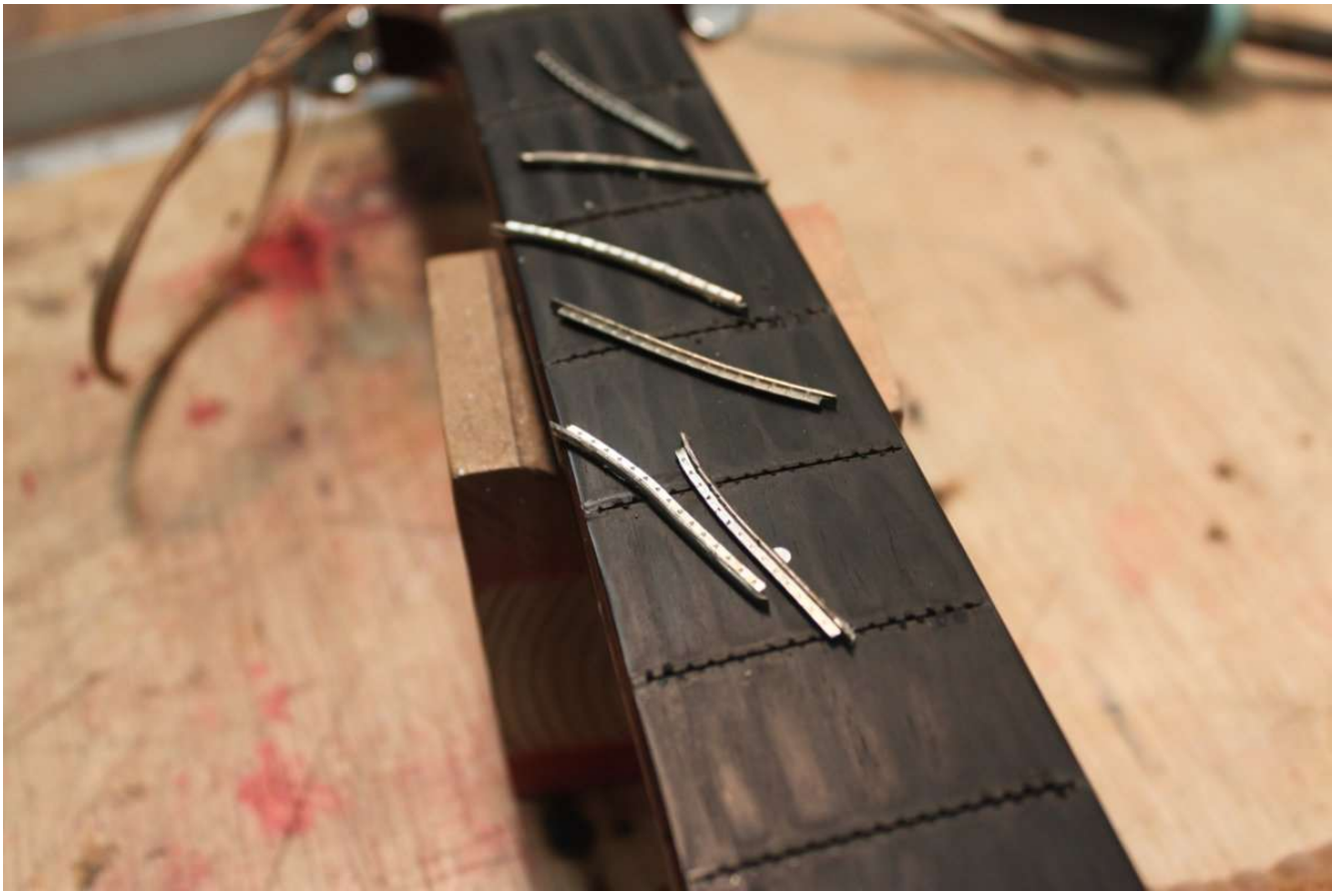
Another decision with refrets is whether to replace all the frets or just a few. Acoustic guitars frequently need only the first five or six replaced, electrics almost always need the middle and upper board. Its tricky to level only a few frets - I try to install them just a hair higher than the old ones and bring them down. Its also tricky replacing frets above the body of an acoustic - I mostly press frets in new boards but is often necessary to hammer them in old guitars. And frequently you'll damage the fretboard when you pull the old ones. I'll add one comment that drives me crazy - if the board has had a lot of oil pumped into it over the years it might be difficult to get new frets to "take" into the board.

Here is a partial refret of an acoustic with a bound fretboard. The frets weren't all that bad but the owner wanted new stainless frets in the first six. Adjust the board as flat as I can get it

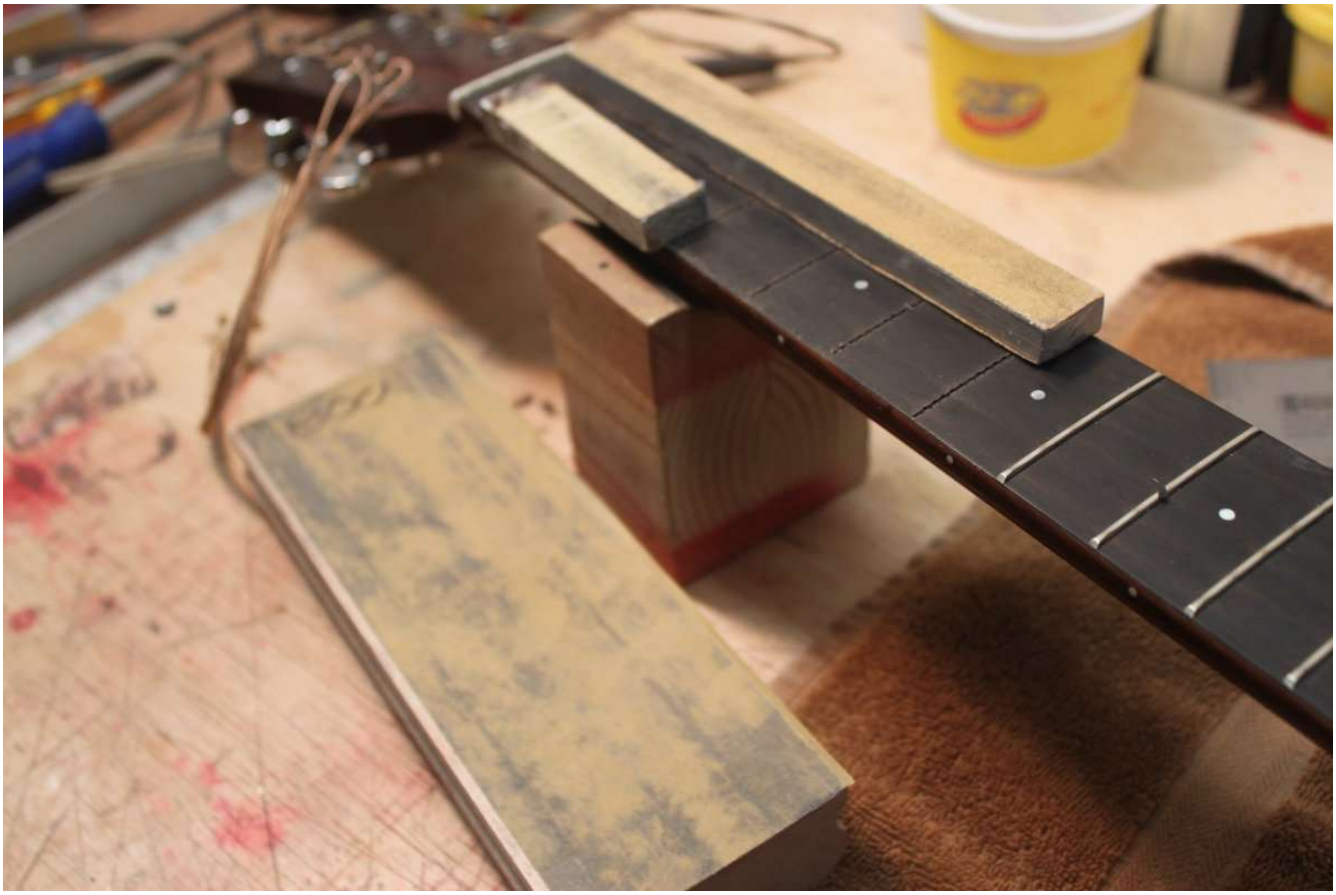


Pull the old frets. Any time you pull frets put a little heat on them - it loosens any glue that might be under the fret and helps loosen it in the slot

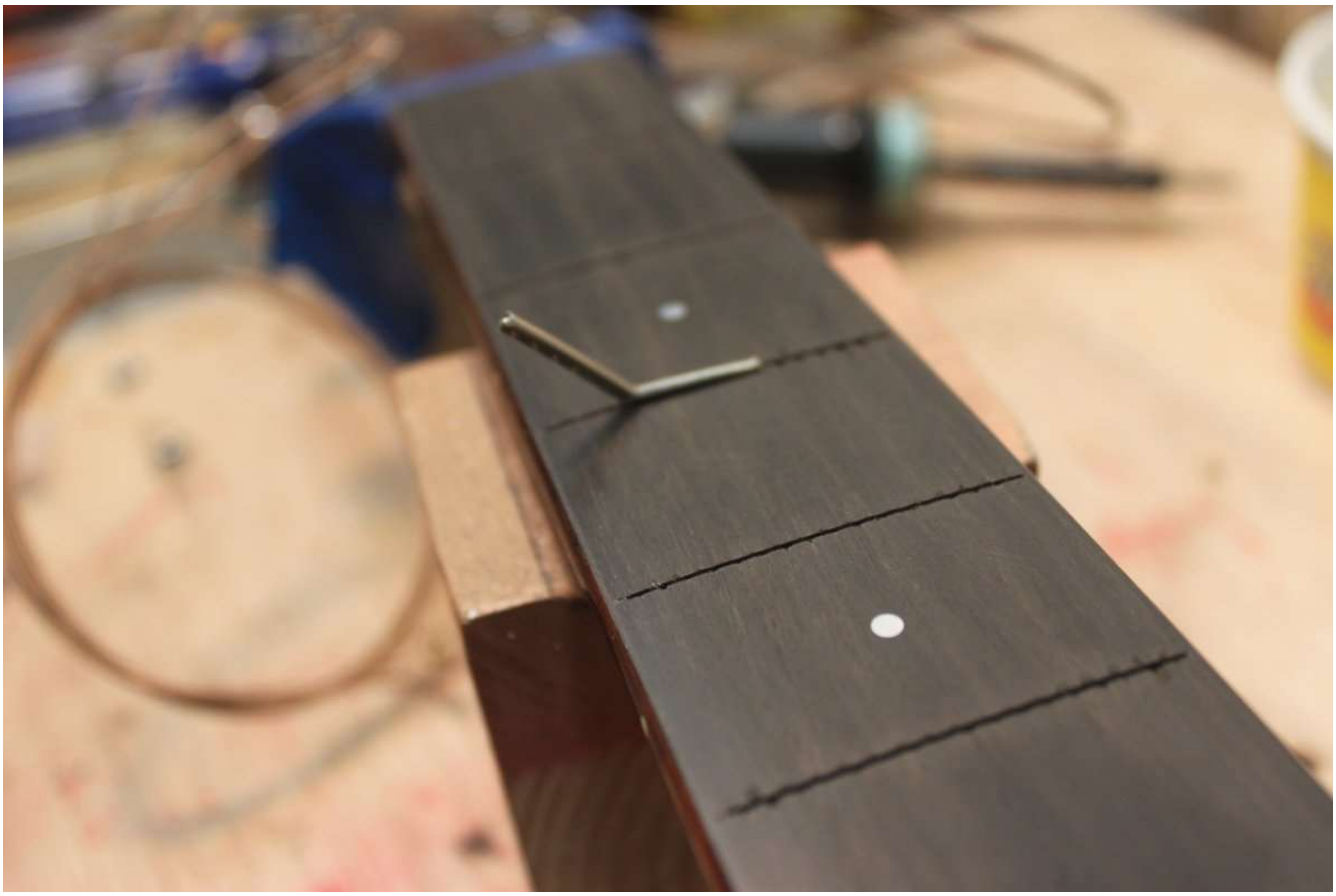
If the board chips you can frequently glue the piece back in with a little thin CA. There is almost always some damage



You can see the divots in the f/b - I try to sand those out without removing too much wood at this end of the board.

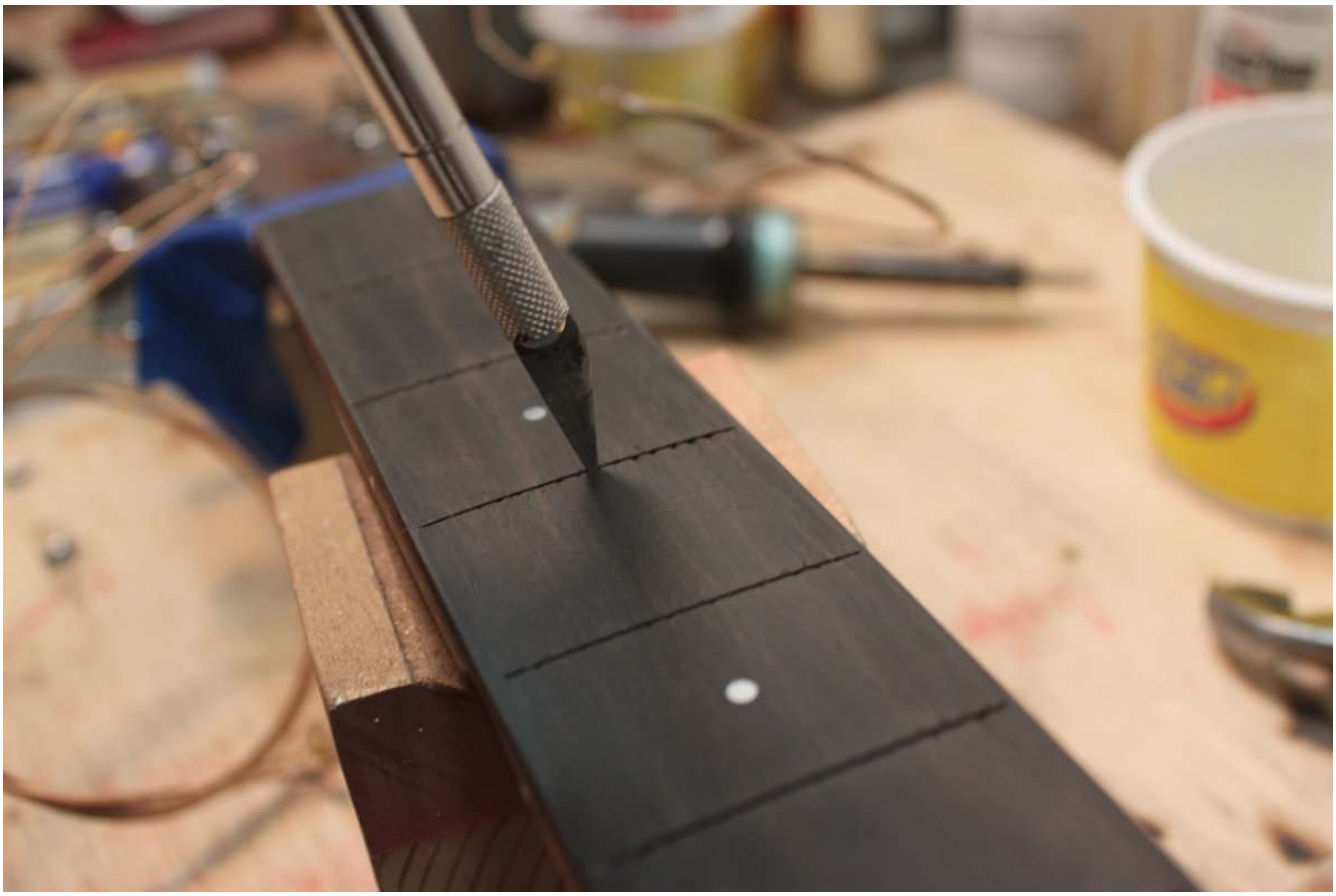


This is a trick you all should know about. This is a little piece of the fretwire that I will be using. I filed a notch in it and bent it back to make a handle and I filed the barbs off of the lower piece. I use this as a little gauge that the slot is clean and deep enough for the fret when I'm ready to install it.

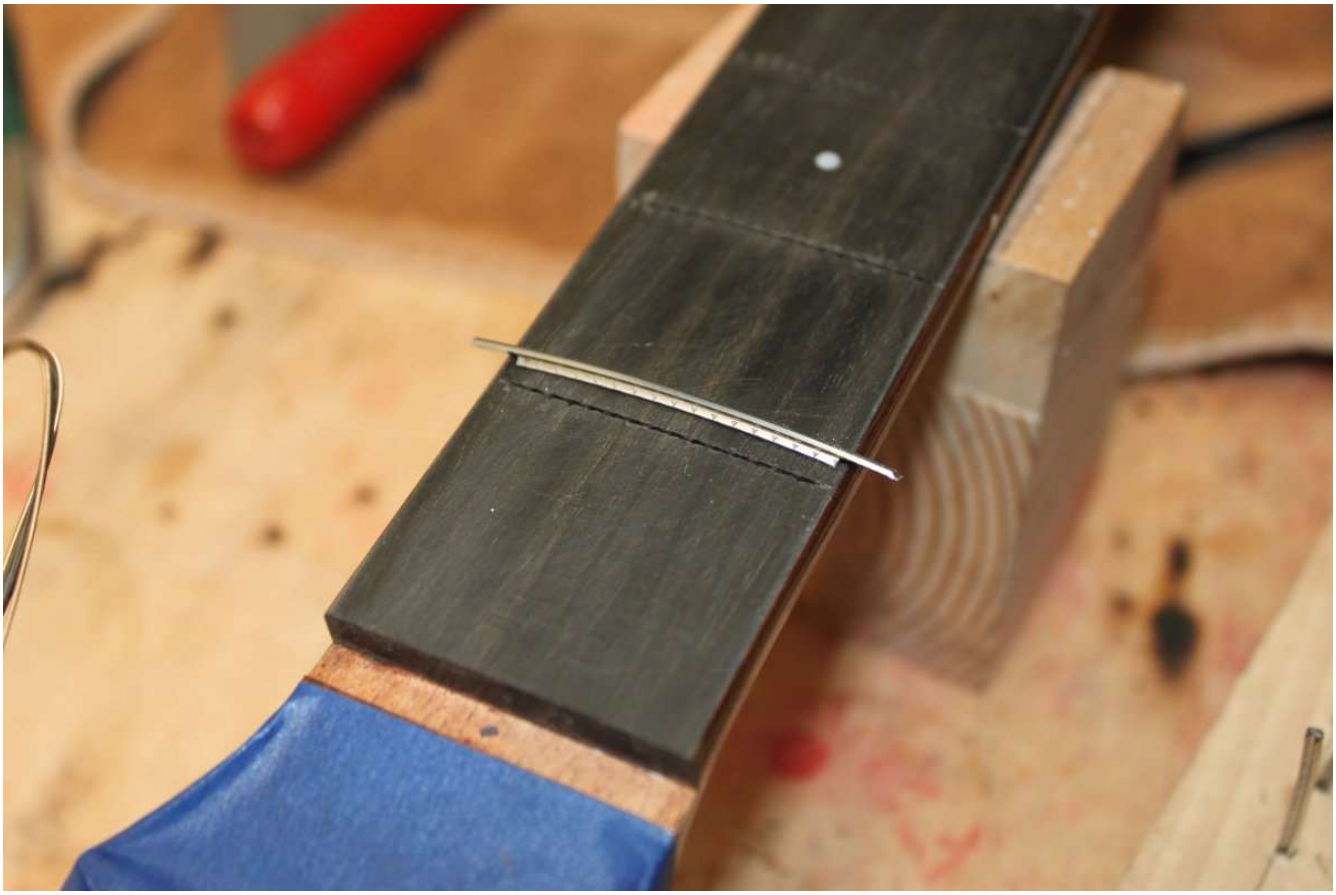


Notice that the slots don't extend to the end of the board, the f/b is bound but with matching wood.

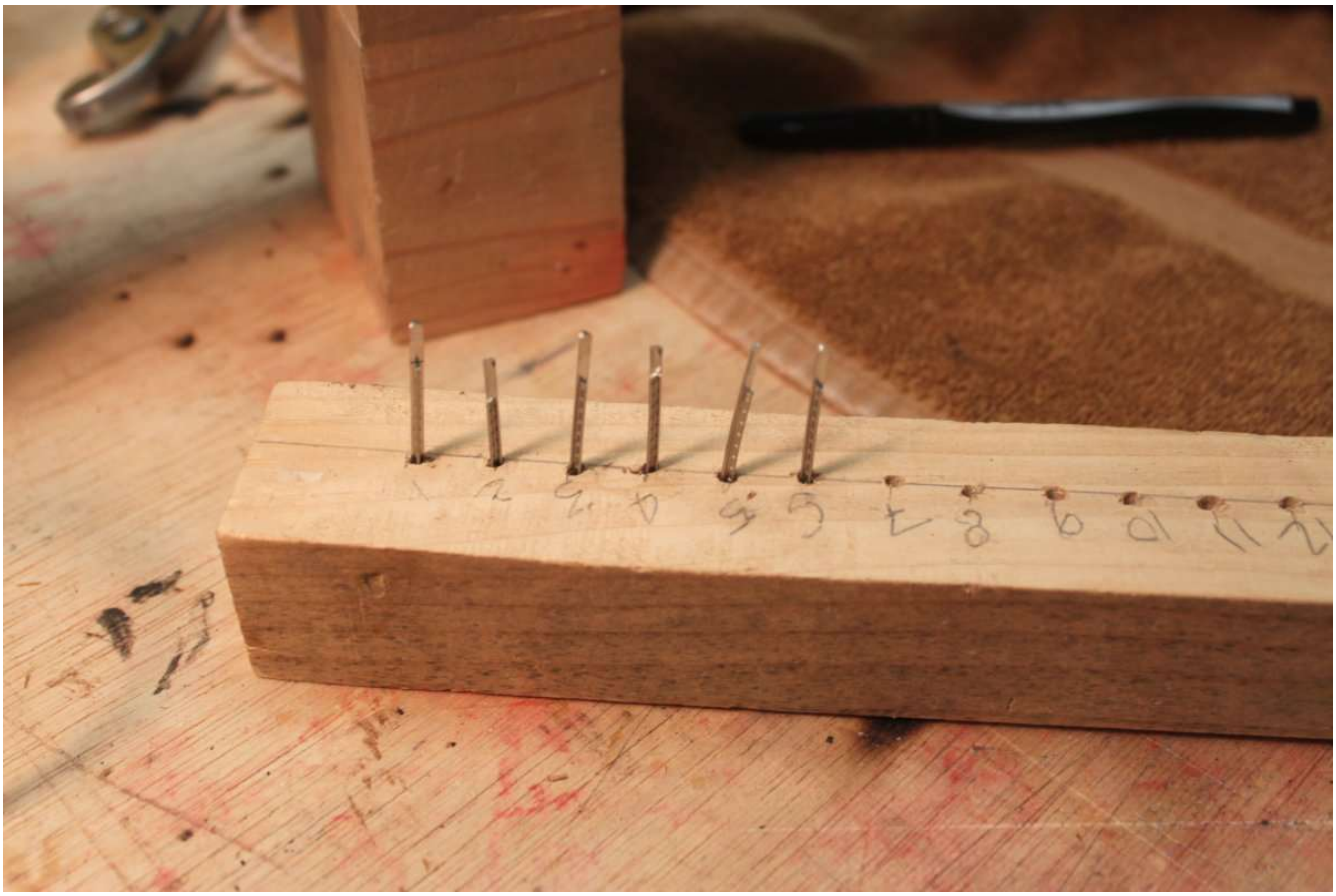
Here i'm cleaning the slot with a Xacto knife



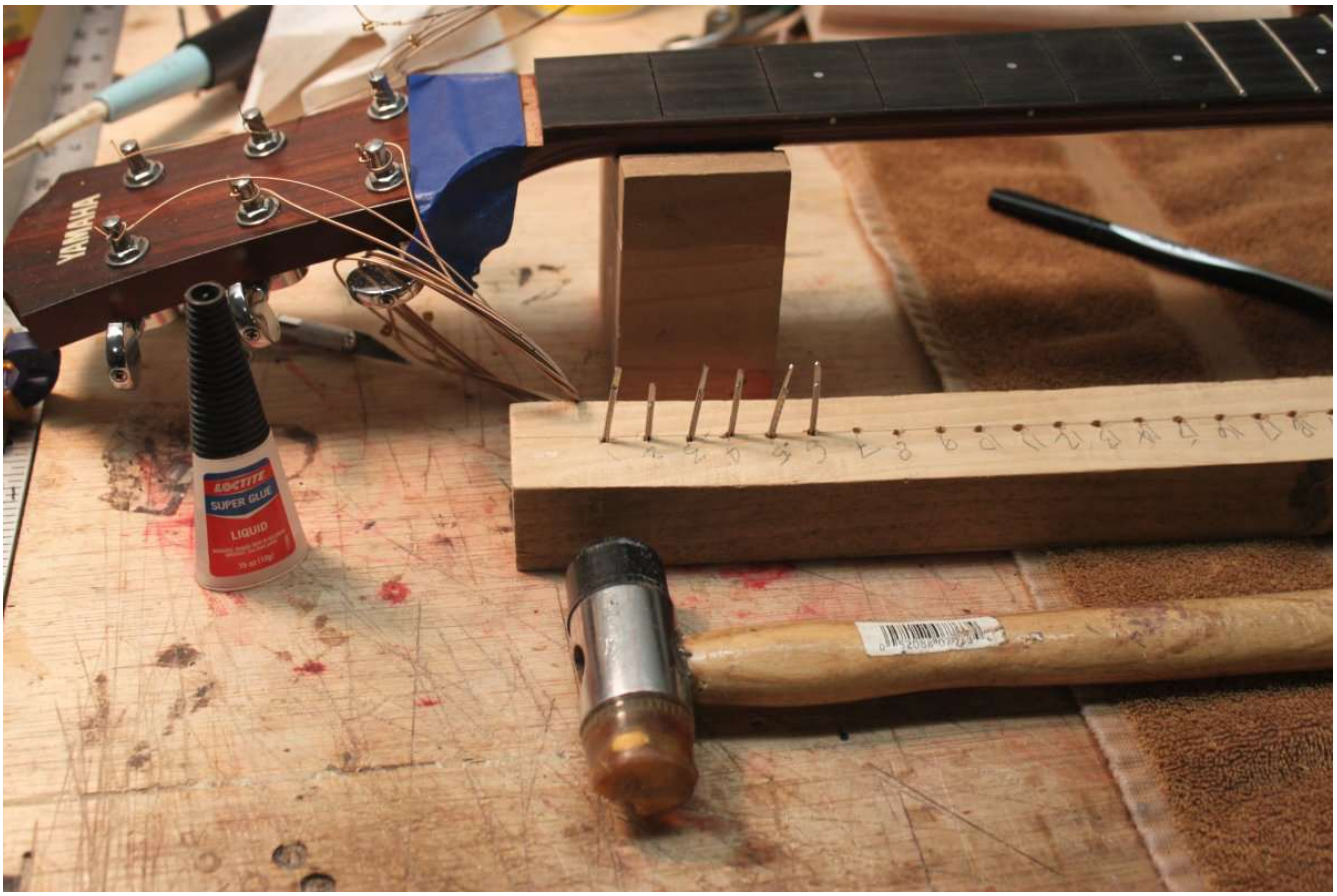
Since the board is bound I need to file the tang back so the crown extends over the binding. I just built a little holder for the fret, put the edge of the board where the binding will be and file the tang back



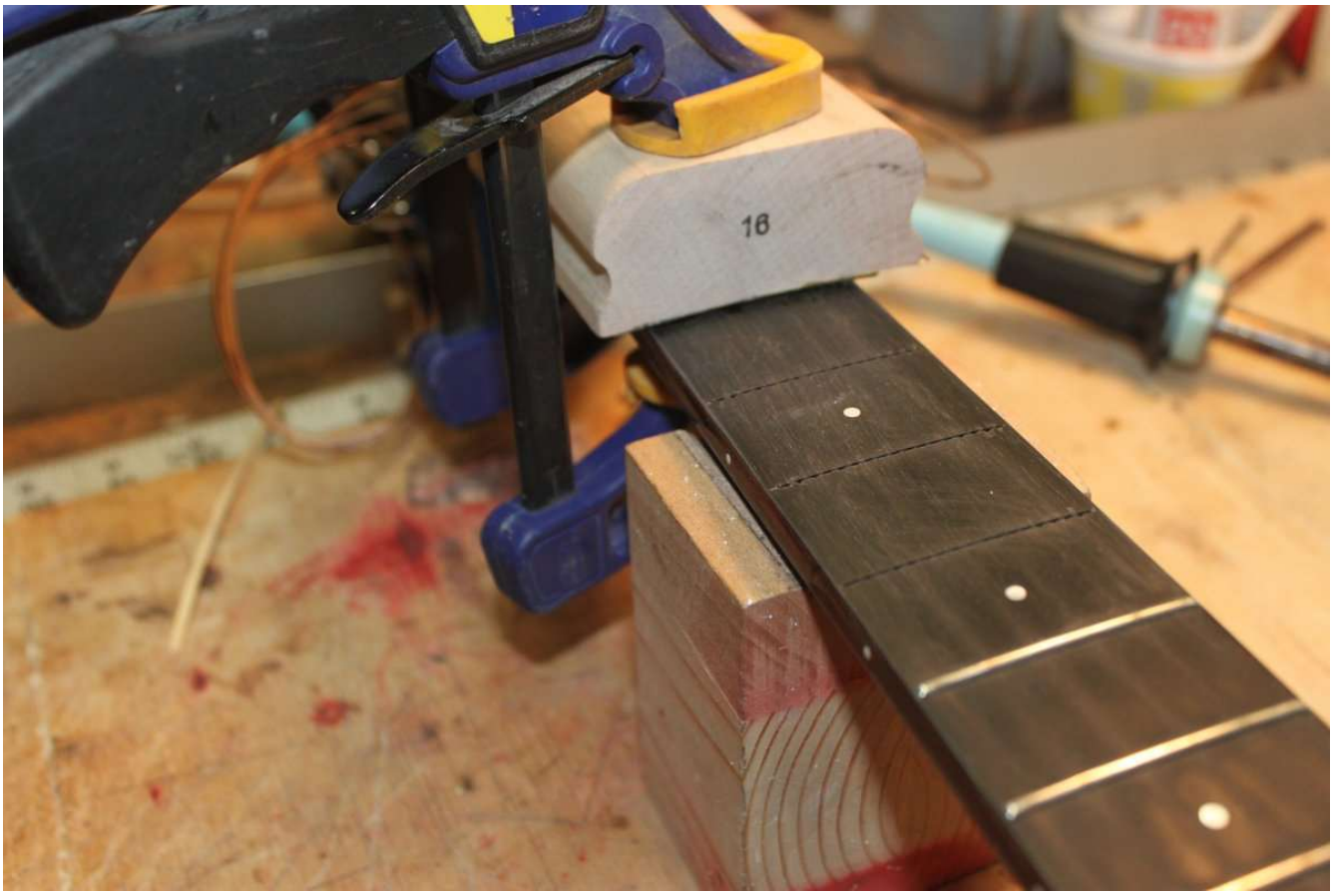
Each fret is fitted to its slot, they get progressively longer as you go up the board



Support the neck under each fret, put a couple of tiny dots of medium CA under the fret and tap it in. I start in the center, give it a couple of taps and move to the ends. I use glue, usually CA on all my frets - it helps hold the ends down over binding and I expect anyone refretting one of my boards to use heat to remove them

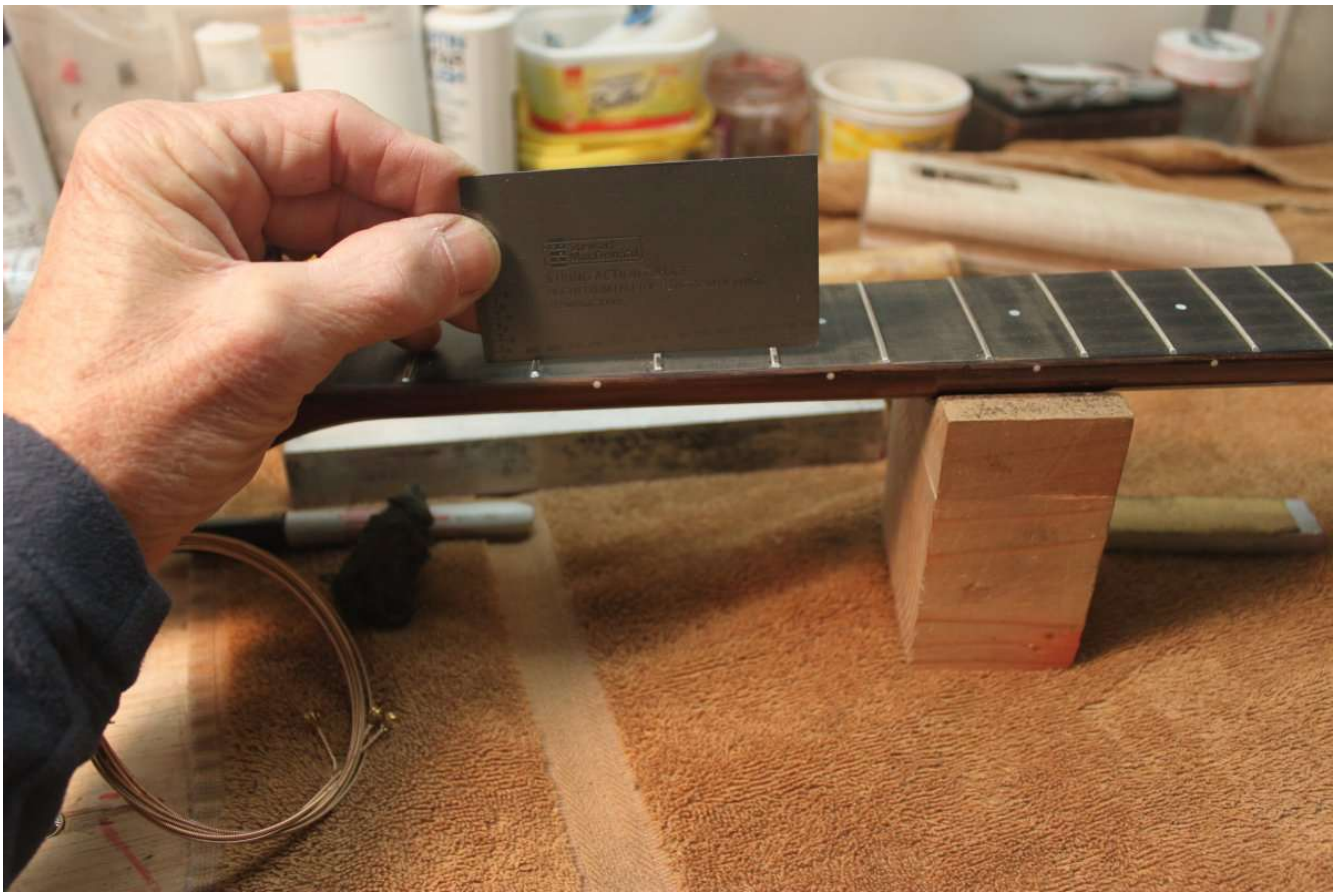


I like to clamp the new frets under a radiused block while the glue kicks off. I clamp the fret I just did while in install the next one, then move the block down and clamp it.

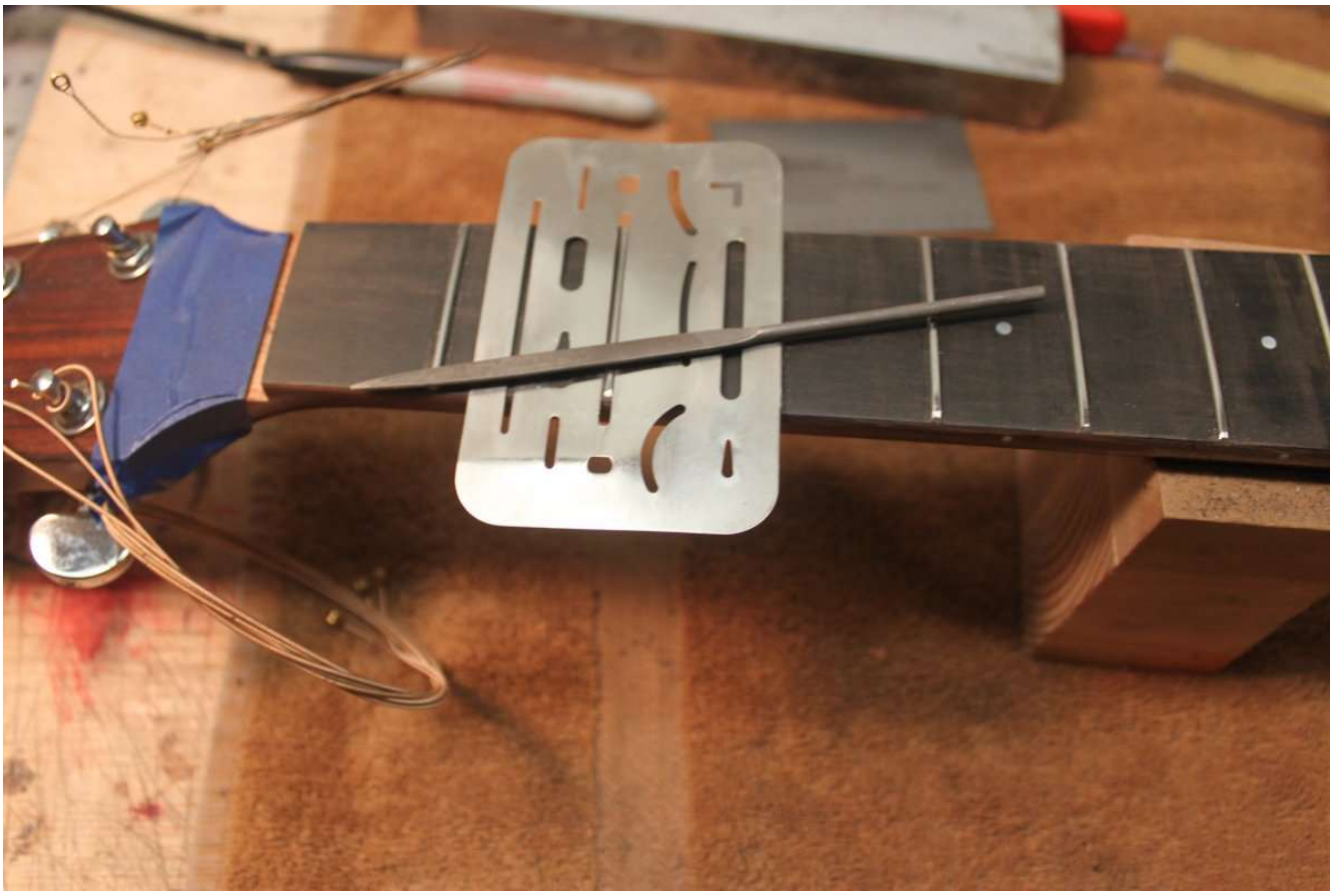


Level the frets just like before. These are stainless which takes more effort, but I'm trying to bring them all down to the same level

Just like before, rock groups of three looking for high spots



Bevel and round the ends just like before but being careful because its not supported as well as if the tang went to the end of the slot.



Polish as before and we're done