

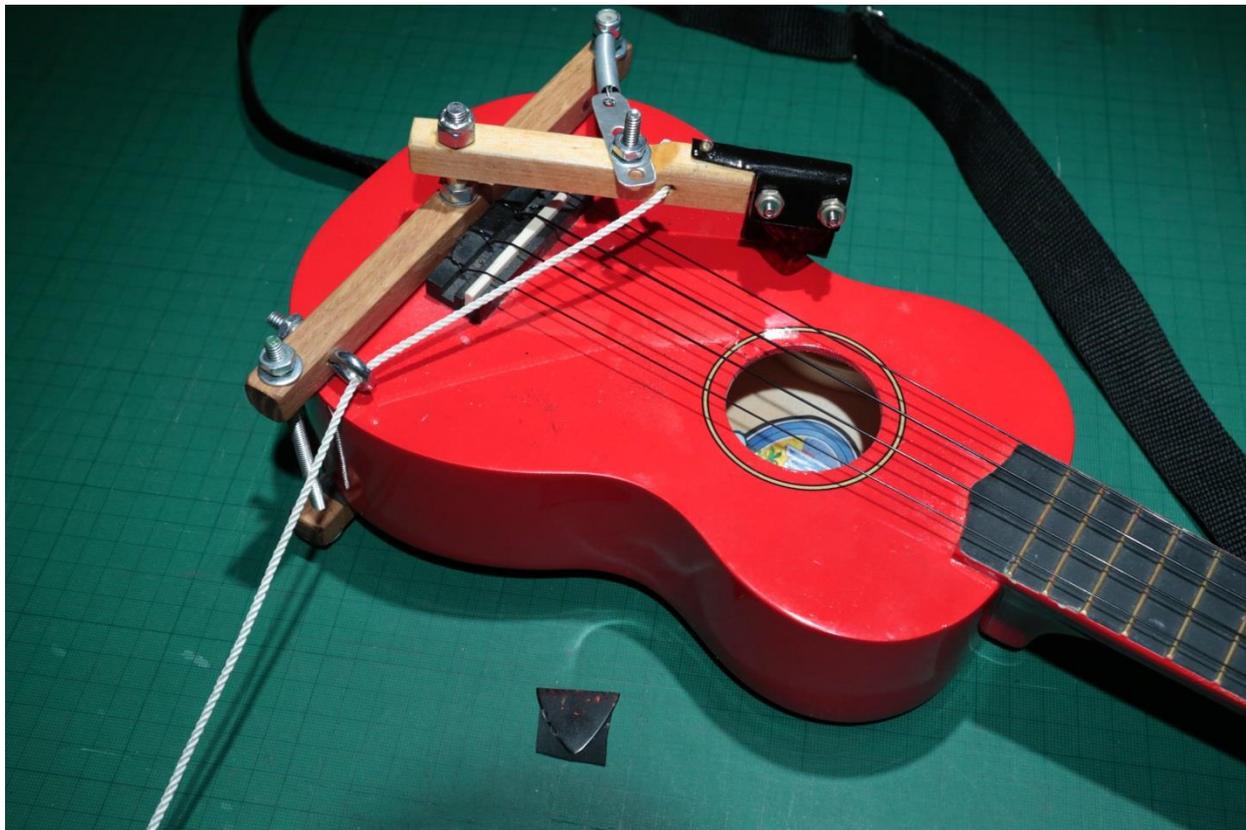
EXPERIMENTAL ARTICULATED SWING ARM

For

A ONE-HANDED UKUELEL

Don Pillsbury

Four years ago, Tavit Smith and I published an article on how to construct a one handed ukulele (<https://inbedbyten.weebly.com/the-one-handed-uke.html>). It worked well but had one significant drawback: there was very little opportunity for ‘expression’ while strumming. It had a swing arm that held the pick in a fixed position. I had puzzled on how to construct an articulated swing arm that could mimic the human wrist. This year (2018), I finally hit upon a workable idea. Not only does the wrist swing but it also allows TWO picks giving the opportunity to vary how the strings are stroked on the downswing vs. the upstroke. By varying the pick composition, though experimentation, you can alter the sound of a complete stroke.



FULL DISCLOUSER and WARNING: The original design of the one arm ukulele was simple and required few tools, This articulated swing arm is more complex and requires a degree of craftsmanship. Furthermore, unless you have access to a drill press and drill press vise and know how to use them, I do not recommend that you attempt this without help.

Now, since the person constructing this is a craftsman, I have not listed as many detailed construction notes. I will just speak about lessons learned as I built the prototype so you will not make all the same mistakes I made.

The articulated swing arm consists of three pieces plus hardware:

Swing arm
Pick carrier
Pick holder.

Swing Arm: the swing arm is very similar to the fixed swing arm and is interchangeable. In this case, I made it out of three-quarter by half inch poplar. See drawing. More on the hole in the end later.

Pick Carrier: the pick carrier swings on a 1 ½' dowel pin that is fixed into the end of the swing arm. The final version I made was out of oak because it will wear longer than poplar as it swings/pivots on the dowel pin.

There are two challenges in constructing the swing arm and the pick carrier: getting the hole for the dowel pin in just right location and forming the quarter inch radius on the top of each.

The first challenge is met by careful measurements and careful drilling, starting with a very small drill. It looks easy to get it exactly but it is not. The hole in the swing arm should be a snug fit for the dowel pin and a loose fit in the pick carrier to allow it to swing.

The second challenge is getting the radius around the dowel pin hole exact. Again it looks simple; it is not. So after some trial and error, and if you have a bench mounted disc sander, I found an easy solution. Make a fixture by drilling a hole in a piece of wood close to the end and insert the dowel pin. Stand the swing arm up on that dowel pin, put a drill into the previously drilled 11/16" hole and use that drill as a handle. Now approach the surface of the running disc sander with this rig, using the drill to swing the swing arm back and forth as you sand the radius being sure to not move the fixture while sanding. **Be careful!** The sander will sand your knuckles just as easily as it sands wood! Use the appropriate eye, hearing, and hand protection. You know what to do.

For the pick carrier, drill an 11/16" tooling hole into the bottom of the carrier and perform the same operation only this time have the center of the ¼" radius slightly above the center of the hole to allow the pick holder to clear the swing arm.

A word about the dowel pin: You need a hard, smooth, metal pin as the axle for the pick carrier. A dowel pin is ideal. If that is unavailable, you could use the smooth end of a quarter inch drill provided it does not have stamping on it. You'll have to use an abrasive cutoff wheel to cut off the drill proper. Or you could use any other quarter-inch hard, smooth metal.

I found the pick carrier to be the most difficult part to make. For stock I used a chunk of metal out of a large round duct that measured .021" thick. Anything along that line would do. I made a bending jig by gluing half of a 1/2" wooden dowel to the narrow end of a piece of wood 1/2" thick. Scribe/Mark a centerline on the dowel to align with the centerline of the uninformed pick holder. Worry the pick holder into shape being careful to match the centerlines. Continue to bend and check until you are satisfied. When you are happy with it, mount it on the pick carrier and match drill through the #28 drill holes. Use 4-40 machine screws ¾" long to clamp it and the picks in place. Make sure that the drill holes do not break through into the hole for the dowel pin.

Finish as desired and assemble. I put a very thin brass washer that I made from brass flat stock that I got at a hobby shop to prevent the wood of the swing arm and the pick carrier from binding. I secured the assembly with a #2x1/2" round head wood screw.

Experiment. Use a needle file to increase the swing as desired. Remember, the swings up and down do not have to be symmetrical. My slot wound up being 6.5 mm wide which yielded a 15° swing from vertical.

Try various thickness picks.

Try gluing felt or glove leather on the up-swing pick adjusting the skirt (that portion protruding beneath the pick as desired). I trimmed my picks to 19 mm high but yours may be different. I experienced a satisfactory difference between the up and down swings using felt trimmed about one mm from the end of the pick on a slight angle. See the sample in the photo above.

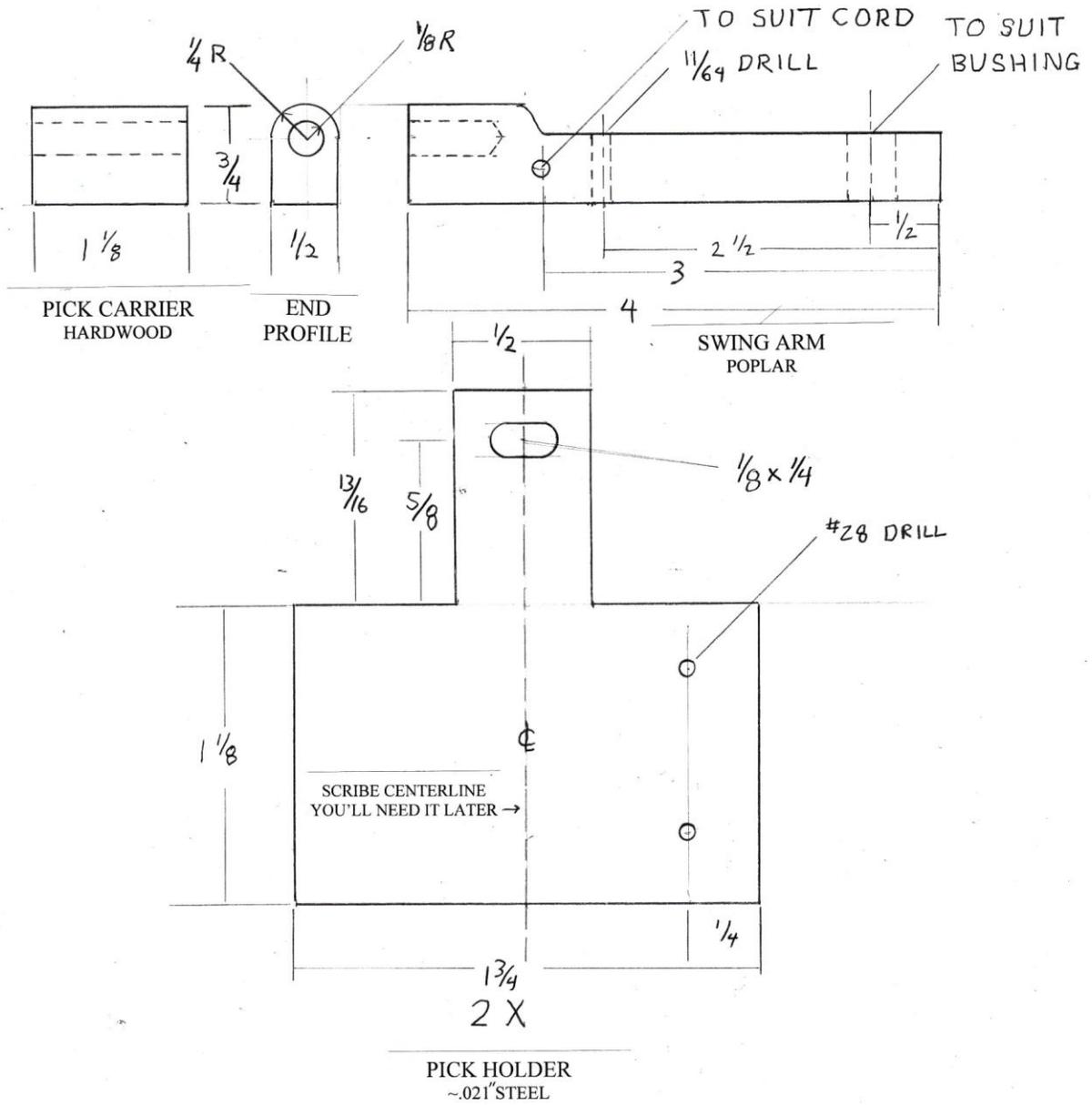
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Here are some photos of the piece parts:





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