## USING THE G78 CLARINET SOCKET GRAFTING JIG

When the tenon socket of the lower joint of a clarinet is broken, it is often impossible to replace the whole joint. It is then necessary to repair the socket by means of grafting a new socket section to the undamaged portion of the old joint.

After the graft is in place, it is necessary to drill tone holes and post holes in the same location on the graft as they had been on the original section of the joint. The G78 Jig enables the repairman to do this with absolute accuracy.

The G78 Jig is a dual-purpose tool which, in addition to the aforementioned application, performs all of the functions of the G74 Clarinet Tone Hole Jig.

The G76 Special Oboe Arbor accassary broadens the use of this tool to cover the same operations for Oboe.

 Remove all keys from joint. Remove posts from damaged area far enough down the joint to permit clearance of lathe tool bit. Remove socket ring.

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- 2. Select the D102 Fractional Drill which fits the "C" Pad tone hole.
- 3. Select the DIO1 Numbered Drill which fits the post holes.
- Insert depth gauge or wood dowel rod into "C" pad tone hole and seat against opposite wall of bore. Make mark on dowel rod at edge of tone hole.
- Measure the diameter "C" tone hole at it's widest point where it flares down and is countersunk into the joint. Mark down the measurements.
- Scribe a reference mark on the joint somewhere between the "Bb" ring tone hole and the "C" pad tone hole. This will indicate the end of your horizontal cut for the graft.
- Assemble upper joint into damaged lower joint. Line up carefully and measure exact distance from scribed reference mark to edge of upper joint where it comes flush with the ring. Mark down the measurement.
- Unscrew knurled pressure nut from threaded end of G78 Jig and slip joint over the arbor - broken socket end first.
- 9. Place G78 Jig on drill press bed, joint to your left. Insert one of the tapered pins in drill press chuck. Lower spindle and tapered pin into "Bb" ring tone hole. Lock spindle. Slide G78 Jig as far to left as possible to bring the broken socket up against the stanchion of the jig with the lock screw.

## G78 JIG - CONTINUED

- Make sure clar joint is mounted, so top of tone hole is flat and tapered pin is centered in hole. Tighten lock screw. Clamp jig to drill press with 2 "C" clamps.
- 11. Make sure all 4 template rings are loose on round bar. Insert locating pin in hole marked "B" on jig and into hole in template ring marked "B". Tighten set screw in ring "B" against round bar.
- 12. Raise spindle. Release lock screw. Remove locating pin. Slide joint to left. Lower tapered pin into "C" tone hole. Align tone hole with tapered pin and lock spindle, tighten lock screw. Insert locating pin in hole marked "C" on jig and into hole in template ring marked "C". Tighten set screw in rings "C" against round bar.
- Use same procedure for ring key post in holes marked "R" using preselected drill as guide instead of tapered pin.
- 14. Use holes marked "L" for side lever post.
- 15. Unscrew the knurled pressure nut and remove the joint from the jig.
- 16. Chuck the joint in the lathe. You may chuck directly on the tenon or on the outer diameter of the joint. A six-jaw chuck will reduce the danger of damage to the wood. The tail stock should be equipped with our E32 Ball Bearing Live Center. It may be necessary to use hacksaw to saw off broken partof socket so live center will center on bore of joint.
- 17. Using a tool bit that will make a square cut, turn down joint to reference mark made in STEP 6. Stop cut <u>precisely</u> at this point to maintain accuracy of new graft measurement.
- Make several cuts to reduce diameter of lower joint to the same diameter as middle joint tenon.
- Use G79A wood or G79B delrin graft tube and cut to the length that was measured in STEP 7.
- Bore out graft tube to fit turned down section of lower joint and middle tenon of upper joint.
- Mix a small amount of G20 Jet Magic and apply to both surfaces. Press in place. Wipe off excess cement. Allow 24 hours for cement to harden.
- 22. Chuck the joint in the lathe. Turn down the outer diameter of the graft to match the outer diameter of the joint. It may be necessary to use a file to compensate for any irregularity of the outer diameter of the joint. Finish with Emery Cloth #320 grit or fine sandpaper, then use R46 Tripoli and hand rag to a fine finish. Cut ring grove and insert ring.

## G78 JIG - CONTINUED

- 23. Replace joint on G78 Jig leave pressure nut loosened.
- 24. Insert locating pin in holes marked "B" on jig and template ring. Put tapered pin in drill press chuck and lower into "Bb" ring tone hole. Tighten knurled pressure nut, making sure tone hole is lined up perfectly.
- 25. Raise spindle. Remove locating pin and slide joint to left. Put locating pin in holes marked "C" on jig and template ring. Use preselected drill to drill out "C" pad tone hole.
- 26. Use same precedure for post holes. Put pin in "R" holes for ring key post and "L" holes for lever post.
- 27. Tap out post holes with proper size bottoming tap. Cut seats for posts with E57 Post Body Countersinks. Be extremely careful with final cut since even a very light cut will permit the post to turn another 1/4 turn! We suggest you make final cut by hand. An alternate method would be to drill the post hole oversize - fill with Jet Magic - screw in and line up the post while cement is still wet - let harden.
- Adjust angled fly cutter so that it will cut a diameter equal to that measured for "C" pad tone hole in STEP 5.
- 29. Insert angled fly cutter in drill press chuck. Insert locating pin in holes for "C" pad tone hole in template. Run drill press at moderate speed and feed fly cutter very slowly to start facing tone hole.
- Insert depth gauge or previously marked wood dowel rod into tone hole to determine how much cut must be deepened. Cut to proper depth.
- 31. An alternate method for putting the seat on the tone hole is to use G87B cutter with a pilot from G86 tone hole set. Select a pilot that is the same size as the hole that was drilled for the "C" hole. Remove joint from the socket graft jig and put it in the G74S tone hole jig.
- 32. Put G87B cutter in drill press chuck and align the tone hole with pilot on cutter. Clamp jig with "C" clamps. Feed cutter slowly into material until proper depth is cut.