Twice-Turned Lidded Boxes with Inlays

Demonstration to the Maine Woodturners, March 16, 2005

By Peter McCrea

Overview of the process

1. Rough turn vertical-grain tenoned lid and box body, let dry.

2. Mount lid, true surfaces, bevel flange face, turn flange. Turn, sand, finish interior

3. Mount body, true surfaces, and rough form mating flange. Turn, sand & finish interior, finish turn a tight flange. Install lid

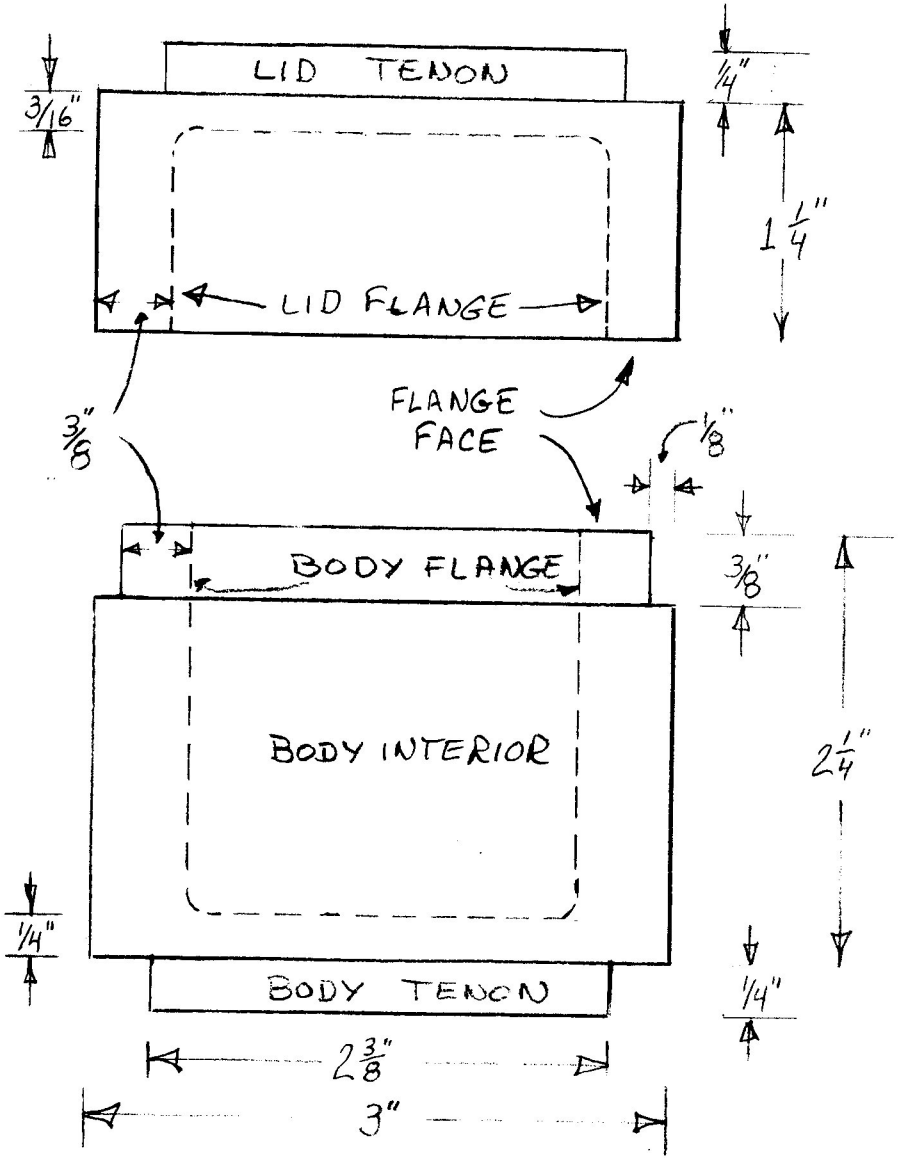
4. Turn assembly to diameter, remove lid tenon, form inlay cavity

5. Mount inlay , turn to fit cavity, part/saw wafer, glue in place

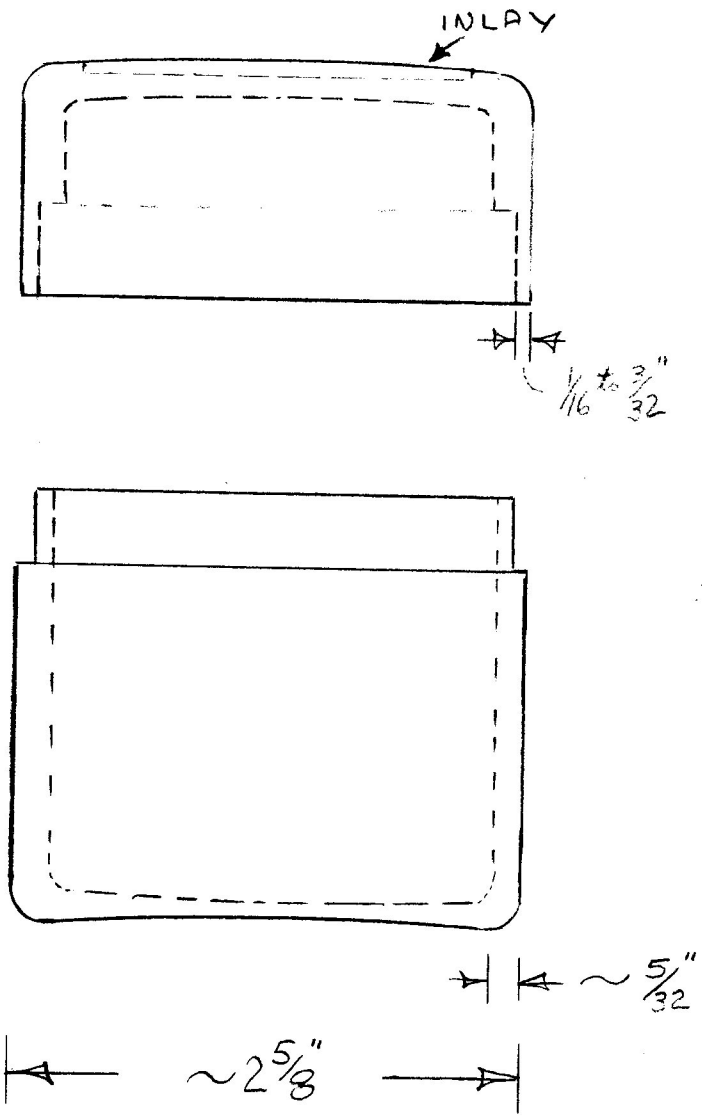
6. Mount assembly, form, sand inlay/lid, free up flange fit

7. Reverse chuck body, remove tenon, sand base bottom sign, date, finish all

ROUGH TURNED
LID AND BODY



FINISH TURNED
BOX LID, INLAY
AND BODY



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Step 1: ROUGH TURN VERTICAL-GRAIN TENONED LID AND BOX BODY, LET DRY.

1. Select straight vertical grain hardwood that is free of pith, checks, knots, and "notable" figure. Sapwood/heartwood mix can be attractive.

2. A rough-turned box can be made from a 4" long blank 3" in diameter. Turn the blank round between centers and create 1/4" long chucking tenons 2 3/8" in diameter on each end of the blank. Refer to the accompanying drawing of the rough-turned lid and box body.

3. Make a deep parting cut with a narrow (1/16" is best) parting tool about 1/3 of the way from the top ("lid end"). Turn the workpiece by hand while sawing the parting cut to 1/4" diameter. Remove the blank from the lathe to finish the cut. Label the box (body + lid) set with a date and identity code.

4. Mount a lid tenon in the chuck and face off the saw cut, removing minimal material. Scribe a pencil mark 3/8" from the outside diameter and hollow the interior of the lid out to that line. Use either a 3/8" spindle gouge or a 3/8" radius scraper for this operation. Use a depth gauge when approaching the target 3/16"-1/4" lid thickness.

5. Mount the box body tenon in the chuck and face off the saw marks as before. Begin to form the body flange (the part that will mate with the lid flange later) by forming a 3/8" long flange tenon, 1/8" deep on the "top" of the body - opposite the chuck. Scribe a pencil mark 3/8" in from the flange tenon- everything inboard of that line will be excavated to form the box interior. With a small spindle gouge, or with the long point of a skew held flat on the toolrest positioned across the center axis of the workpiece, make a conical indentation for the depth drill. Set the drill (I prefer 5/16" diameter with a positive stop, but masking tape works) so that the hole stops 1/4" from the bottom of the body. Drill the hole and proceed to hollow the body with spindle gouge or scraper. After the first inch of hollow, a box scraper toolrest is a definite help, as it will provide tool support close to the cut, improving control. Aim for uniform wall thickness and a radiused transition to a gently sloping bottom.

6. Best-fitting boxes are made from dry stable wood. I allow kiln-dried rough-turned boxes such as mahogany a weeks time indoors (30-35%RH @64F in wintertime) before finish turning. Green woods will take 3-6 months to dry properly. Forcing with heat or microwave may hasten the process, but I believe slow air-drying will yield the most stable wood. I do not attempt to make boxes in the summer when humidity levels are high- that is the time to make many rough box forms for fall and winter finishing.

Step 2: MOUNT LID, TRUE SURFACES, TURN FLANGE. TURN, SAND, FINISH LID INTERIOR

1. Mount cavity side of lid; true up lid tenon, then mount lid tenon.

2. True diameter and flange face (surface opposite tenon).

3. Bevel flange face about 10 degrees to allow a defined lid-body reveal.

4. On the flange face, pencil mark the lid flange inside diameter (ID), about 1/8" from the rough lid ID.

5. Turn lid flange ID 1/2" deep with a leveled box scraper.

6. Test lid flange for constant ID with inside calipers. Redo if taper exists.

7. Finish turn rest of lid cavity with small radius box scraper, leaving a small (1/16"-3/32") step transition at the base of the flange to separate the two regions

8. Sand cavity and flange face (*not* flange) 100-400 with steel wool former.

9. Sand flange sparingly with 220-400, testing with inside caliper.

10. Coat interior with sanding sealer or first coat of finish.

11. Measure and record flange ID for later reference when turning finished box diameter.

Step 3: MOUNT BODY, TRUE SURFACES, ROUGH FORM THE MATING FLANGE, TURN, SAND, FINISH BODY INTERIOR, FINISH TURN A TIGHT FLANGE. INSTALL LID

1. Mount body to true-up tenon, then mount tenon and true outside diameter (OD).

2. True body flange face, set dividers to lid flange ID *plus* 1/16" and mark body flange face.

3. Turn the 3/8" long body flange OD to lid flange ID *plus* 1/16".

4. Pencil mark a 1/10" flange wall thickness and turn flange ID and body interior.
5. (Box toolrest a definite asset for finishing the 3/16" thick cavity bottom)

6. Sand body interior 100-400. Coat inside with sanding sealer or 1st coat of finish.

7. Turn flange OD to tight lid fit. Install lid, aligning grain.

Step 4: TURN ASSEMBLY TO DIAMETER, REMOVE LID TENON, and FORM INLAY CAVITY

1. Turn assembly (body with tight lid) OD to lid flange ID measurement *plus* 2/10 ”

2. Remove lid tenon and face-off lid top surface.

3. Pencil mark inlay cavity on lid 1/4 ” to 5/16 ” in from OD..

4. Turn 3/32 ”deep inlay cavity with flat or slightly concave floor

5. Measure and record inlay cavity inside diameter.

6. Mark body tenon location in chuck and remove assembly from chuck.

Step 5: MOUNT INLAY, TURN TO FIT CAVITY, PART/SAW WAFER, GLUE IN PLACE

1. Mount inlay material on lathe (via faceplate or glued mandrel with chuck tenon, etc)

2. Face-off inlay material, leaving inlay center 1/3 slightly concave.

3. Turn inlay material to cavity diameter, aiming for entry taper to interference fit.

4. Test fit lid cavity to inlay without dismounting inlay from lathe.

5. Make a partial parting cut of 1/8”-thick inlay wafer, finishing cut with saw to avoid overheating the wafer.

6. Scuff the cavity-side of inlay with 150 grit, then blow out dust from inlay and cavity.

7. Add bead of thick CA glue to periphery of cavity, then tap in inlay.

8. Add a second bead of medium CA to inlay-lid joint and set with aerosol hardener.

Step 6: MOUNT ASSEMBLY, FORM, SAND INLAY/LID, FREE UP FLANGE FIT

1. Chuck body/lid/inlay assembly at body tenon registration mark.

2. Turn inlay/lid top to desired convex profile. See drawing.

3. Sand all 100-400, adding v-groove detailing near lid-body joint.

4. Remove lid and free-up lid fit with 220-400 grit, testing often.

Step 7: REVERSE CHUCK BODY, REMOVE TENON, SAND BASE BOTTOM, SIGN, FINISH ALL

1. Apply masking tape to body flange OD and install flange in chuck, tighten gingerly.

2. Carefully remove body tenon and form body base contours and detailing. Sand 100-400.

3. Sign, date base bottom, apply finish to all. (multiple coats, 600 grit between, then wax)

Problems? Questions? Call Peter McCrea at 354-2314 or email at panacea35@gmail.com