

# A Simple (well, somewhat simple) Way to Make a Lidded Box

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These are the pre-meeting notes for the WGO skills night demonstration scheduled for April 23, 2015

**Challenge:** Make, or have a good try making at least one box before the meeting. Bring it to the meeting for discussion.

Read this instruction thoroughly – make sure you understand all the steps BEFORE you start making your box.

Making a box can be one of the most frustrating project for a novice woodturner. Once learned – and a half dozen or so under one's belt – turning a box is not really all that hard.

The following is my 'method', distilled after attending a few demos, reading online articles (see references at the end for my best three), then turning out a few hundred boxes. Lots of videos available on You Tube, but be critical when viewing as some use dubious or unsafe techniques.

Tool selection and techniques have not been included. Different tool choices and techniques will be shown and discussed during the skills night demo.

## LETS START!

Pick out your blank. Remember that the height of the box will be along the grain. The size? The end must be slightly larger than the 'round' box dimensions. Length must include the box, the top, a finial (if required), two chuck tenons and three parting tool paths. Add a bit extra for safety if you are not comfortable parting off near the chuck face. Until you have made a few boxes, use wood that is not important to you.

1. Find the centre points on each end of the blank, define each with an awl to make it easy to locate the drive and live centre points. Mount the blank between centres and turn round. Ref: fig.1: Turn suitable tenons at each end (1.75" / 45mm for "#2" jaws). Mark off the point where the bottom will be parted off from the top.



fig. 1

2. Part bottom from top/finial section. Use a thin parting tool to preserve grain alignment when the box is finished. Do not part completely through as the tool will bind and the two pieces will fly off the lathe. To keep the parting tool from binding, swing the tool slightly back and forth sideways. This

will make the gap slightly larger than the parting tool width and keep it from binding. Finish the cut (fig. 2) with a thin kerf saw or hacksaw to preserve the narrow gap.



fig. 2

3. Mount "finial / top" piece in chuck (fig. 3). Clean up the face of the piece – flat. Remove only enough to clear off any parting tool marks and/or tear-out



fig. 3

4. Mark off the maximum inside dimension of the top. Ensure that there is enough material outside of the line to allow turning of the box top to final shape while leaving enough material for final wall thickness.



fig. 4

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5. With a narrow square end scraper or parting tool, turn a groove, slightly inside the mark made in step 6. It does not need to be as deep as the final dimension, this can be done later. Do this carefully, preventing the tool from rubbing the wall and distorting the shape. The outside wall of the groove must be parallel to the length of the box to fit the tenon, made later on the base. This cut will be cleaned up later. It will also act as a 'stop' while hollowing the top, helping to prevent catches.



fig. 5

6. Hollow out the inside of the top to desired shape and depth. Box tops are normally fairly shallow so only a minor hollowing is usually required. A domed shape is common. You can 'decorate' the centre of the inside with a recessed jewel or other item for a user 'surprise'. Final sand the inside, but do not sand the 'mortise' wall.



fig. 6

7. Clean up the 'mortise'. Wall must be exactly parallel to the box length. Check angle with calipers. Caliper measuring edges must be parallel to the 'mortise'. Clean up the face, with a very small angle towards the centre to aid fitting to the box later. Do not sand the face or the 'mortise'. Chamfer the sharp inside corner of the 'mortise'.



fig. 7

8. Begin shaping the outside of the top. Do not turn the outside rim at this time. It will be turned when fitted to the bottom. If the top is to have a finial, make the initial shape as shown in fig. 8, leaving a thick section to help prevent vibration when turning. If there is no finial, the blank would have been shorter, so turning the outside of the top would be closer to the chuck and some caution would be required.



fig. 8

9. Complete turning the top, up to the point where the finial shape change begins. Do not turn or sand the outside edge, it will be done later, together with the base. Final sand the top now, while there is still good material support to keep vibration to a minimum.



fig.9

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10. Complete the finial, working from its base, leaving as much material as possible towards the chuck as turning progresses. As the 'tip' turning progresses and there is less material supporting the top, make only very light cuts. Fig. 10 shows the extreme that can be reached if turning is done with very light cuts. Fig. 10 also shows parting off – hold the top lightly while parting to keep it from flying off. A saw to part off the top is a good alternative. The top of the finial will be finished later, so some extra wood at this stage is not a problem. Save the stub, you may need it later to finish the base.



fig. 10

11. Mount the box bottom in the chuck. Clean up the face of the piece – flat. Remove only enough to clear off any parting tool marks and/or tear-out. Make a small dimple in the centre if you will be using a drill to start the hollowing.



fig.11

12. If your box is deep, you may wish to use a forstner bit to make the initial hole, prior to hollowing. The drill bit diameter must be at least 20% less than the final box inside diameter. Note; use a black mark on the drill bit to show the depth required – remember that the depth should include the point of the forstner bit used.

For boxes less than 2" (50mm) deep, although they can be drilled first, drilling does not present any great advantage.



fig. 12

13. Mark the inside and outside of the tenon required. The outside measurement is for a fit inside the already made top mortise. The inside measurement defines the thickness of the tenon and the inside diameter of the box. Be just a little generous (a bit 'wide' for the outside and a bit 'narrow' for the inside) – it's easier to take wood away than to add it.... Fig 13 includes a pre-drilled hole.



fig. 13

14. Define the outside of the tenon – make it slightly larger than the inside dimension of the top. You will be fitting the top later. Note that the mark for the maximum inside diameter is still showing. The tenon height must be equal to or less than the height of the mortise made in the top.



fig. 14

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15. Hollow out the inside of the box. There are many different methods to achieve this. Tool choices and technique explanations will be discussed during the skills night meeting. The simplest method is to use a scraper. If this is chosen, drilling a hole first can be an advantage. Finish sand the inside of the box.

Clean up the face of the tenon and make a small chamfer on the inside corner.

Fig. 15 includes a simple depth measurement gauge made from a stiff wire bent in a "U". Place a mark on the outside that is the depth of the inside PLUS the desired thickness of the bottom (see mark made on fig. 17).



fig. 15

16. Now it's time to fit the top to the base. Take your time on this step, making only very small cuts.

You want to make a tight fit between the top and base. Make trial fits as you work your way to the exact fit. Check with calipers as you go to ensure that the tenon is exactly parallel to the box. When the top can be pushed on with a little pressure, you are done. Final fit will be done later.

If you pass the tight fit and end up a bit loose, place a layer of paper towel around the tenon to make a tight fit between the top and the base.

Measure and make a note of the box wall thickness at the top, middle and bottom so you know how much material you can remove when turning the outside with the top attached.



fig. 16

17. Ensure that the mark put on the base showing where the bottom of the box will be (inside measurement plus thickness of the bottom plus the amount you will clean up is accurate. The top must be a tight fit on the base before finishing the finial. Bring up the tail stock to give a little support on the tip of the finial. Note: I forgot to take a photo before I finished the tip of the finial – so it does not show the extra wood that allows bringing up the live centre to support final cuts.... If your box does not have a finial, a tight fitting lid should support the final clean up cuts.

Very carefully, with light cuts, finish the top of the finial (or the centre of the top if no finial). Lightly finish sand the finial.



fig. 17

18. Note: you can exchange steps 17 and 18 if you would like to have the tail stock support the top while finishing the outside of the box.

First, with a parting tool, make a groove below the mark, just deep enough to be a smaller diameter than the planned finished diameter of the box bottom. Shape the entire outside of the box, keeping the wall thickness in mind.



fig. 18

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19. Remove the top. If you made it too tight it may take some effort to get it off :) If it is this tight, try tilting it, rotate the box and continue section by section until it begins to release, then continue until it comes off.

Now you can final fit the top. Sharpen the tool used before starting – this step requires a very sharp tool. Remove only very, very little at a time and keep trying the fit until you have what is desired. Do not sand the tenon. Photo shows a skew chisel being used as a scraper. If used, care must be taken not to put the point into the flat that's against the tenon.

Note that only the straight and parallel type of fit has been described. There are other shapes that can be used to make different fits. Some will be described during the skills night meeting.

When the fit is where you want it, part off the box. If you are not comfortable holding it while parting off completely, finish the cut with a saw.



fig. 19

20. Time to finish the bottom of the box. Don't take off the stub left behind in step 19. If it's too small, use the stub left behind in step 10, when you made the top.

Make jam chuck. Cut a groove, wider than the thickness of the box as shown in fig. 20 and deeper than the height of the box tenon. The outer diameter must be a tight fit on the box tenon.



fig. 20

21. Fit the box to the jam chuck, for some safety and a better hold, you can tightly wind some tape over the joint between the box and the jam chuck. If there is a significant difference in diameter, remove some material from the outside of the jam chuck before applying tape.

Now with careful, light cuts, finish off the bottom and final sand. Spindle gouge option shown in use for this step.



fig. 21

22. Apply finish to outside. Finishing inside is optional. If using an aromatic species, I like to leave the inside unfinished to preserve the aroma.



A few of the places I learned about making boxes:

Brian Clifford (1999) Box article at:

<http://www.turningtools.co.uk/projects/box/box.html>

Alan Lacer (2005) AAW magazine article at:

<http://woodturninglearn.net/articles/CriticalDimensions.pdf>

Michael Stafford (2006) Teknatool article at:

<http://www.teknatool.com/projects/MikeBOX/Turning an End Grain Lidded Box.pdf>