

Turning Lidded Boxes

by Paul Proffitt



Basic Steps to turning a lidded box

1. Select a turning blank
2. Rough turn a cylinder
3. Mark the top, bottom and neck and turn the rough exterior shape
4. Turn the neck to final diameter and part off the top
5. Hollow the box and finish sand the inside
6. Hollow the top and finish sand the inside
7. Finish turning the outside of the box and finish sand the outside
8. Part the box off
9. Finish the inside and outside and sign your artwork

Lidded Box Turning Details

1. Select a turning blank
 - a. Length of the blank -- The blank should be as a rule-of-thumb 1" longer than the final box size. This allows for tenons and/or mortises as well as the neck of the box.
 - b. Diameter of the blank – The blank should accommodate the desired diameter of your box. The neck diameter may be dictated by your tools.
 - c. Green or dry wood – Both green and dry wood can be used for boxes. Green wood can move dramatically and affect the final shaping and fit of the lid to the box. Dry wood is better to use for learning to turn a lidded box.
 - d. Figured wood – Aesthetically, figured wood makes beautiful lidded boxes, but the figure match after separating the top can be disappointing.

2. Rough turn a cylinder to the desired diameter

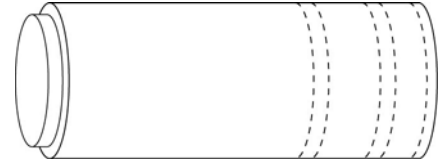
- a. Tenons or Mortises -- Turn a tenon or mortise on both ends of your rough turned blank based on your particular chucking method for hollowing. Mortises can cause splitting in small pieces. Tenons are often preferred, but the best solution depends on your piece.
- b. Multi-box blanks -- Turning a cylinder blank that can yield multiple lidded boxes takes no more time or effort. Figure the length of the blank = number of boxes per blank * [height of finished box + waste per box(nominal 1")]. Example: For a finished box height of 1.5" a blank for three boxes would be 7.5" long calculated as { 3 (boxes) * [1.5" (box height) + 1" (waste per box)]}.



3. Mark the top, bottom and neck and turn the rough exterior shape

a. Mark the top and bottom

- i. Hollowing Considerations – Your box can only be as deep as you are willing or able to hollow. The top must be deep enough to receive the neck and allow for a final mortise if desired.
- ii. Top Length – A tenon on the top can often be used as part of the design of your top.
- iii. Bottom Length – If the blank is only long enough for one box you must consider the distance needed to part off your box. Alternatively you can reverse chuck the box to finish the bottom which you will often do anyway.

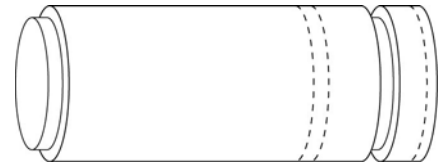


b. Mark the Neck

- i. Neck Length -- The neck of your box should typically be 1/8" to 1/4" long.
- ii. More Neck Length -- The rough neck length must also include your parting tool width. It must also allow for a 1/16" or less bit of neck to be left on the top. This may make your neck up to 1/2" long. Pay close attention to grain changes at the neck.

c. Turn a Neck

- i. Neck Shoulders – A parting tool is typically used to turn the neck to the desired diameter. Typically a crisp right angle shoulder is desired. A slight undercut can ease the fit of the top to the box. A slight chamfer can make the joint an obvious part of your box design.
- ii. Neck Diameter – The diameter you make your neck will determine the mortise you need in the top for the neck. Be sure to consider the neck diameter since you will be hollowing the box through the inside of the neck.



d. Partially part off the box to clearly define the bottom

- i. Sooner – Defining the bottom edge of the box now better defines the bottom of the box and will allow you to set your outside shape design accordingly.
- ii. Later – Shaping the box first may 'adjust' your design dynamically. Waiting until after the rough shaping to define the bottom of the box will allow more design flexibility.
- iii. Either way – Where possible cut the tenon on the bottom of the box larger in diameter than the neck of the box you are making. This will allow you to use that piece as a jamb chuck if needed to finish the bottom of the box as a last step.



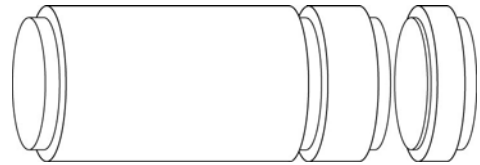
e. Turn the rough shape of the box

- i. Out of Order – Some shapes may dictate that you turn a basic outside box and top shape prior to marking the neck. If you do this be SURE to consider the necessary length of the neck when roughing the shape.

- ii. Shoulder Width – Leaving a thicker than needed shoulder will allow you more flexibility in the final shaping of the combined box and lid.

4. Turn the box neck to the final diameter and part off the top

- a. Neck Taper – You want the entire length of the neck to be the same diameter. Some designs utilize a tapered neck, but most people will find a straight neck much simpler to implement. A tapered neck will require special consideration in allowing for the mortise in the receiver (typically the top).
- b. Parting the Neck – When parting the neck (and top) off always leave a slight bit of the neck on the receiver part (typically the top). This slight bit of the neck will be your guide to cutting the mortise in the receiver for the neck.



5. Hollow the box and finish sand the inside

- a. Open Hollowing – In a box where the inside of the neck is the largest diameter to be hollowed you can use a small bowl gouge and/or various scrapers. Since most turned boxes will have you turning end grain care must be taken with the end grain at the bottom of the box to limit tear-out.
- b. Deep Hollowing – If your box has a narrow neck and/or a deep bottom you will need to use your hollowing tools instead of a bowl gouge. Boring an initial hole can be a quick start, but boring into end grain you must be careful to hold the box securely to avoid damage.
- c. Sanding – Start with the finest grit that will get the job done, but don't be afraid to start with a coarse grit as needed to smooth the end grain. Be careful when sanding the inside of the box. It is easy to sand the inside of the neck too much if you are not careful.

6. Hollow the top and finish sanding the inside

- a. Receiver Top – In most cases the top receives the neck from the bottom of the box. So the top must have a mortise to fit the box neck. The lip of the neck remaining on the top should be your ultimate cutting guide. Cut close to that line, but don't cut the line. Remember there may be some sanding needed to smooth the mating parts.
- b. Hollow the Top – Hollow the top first using a bowl gouge or scraper depending on what tools you have. Make sure the hollowing is deep enough to receive the neck of the box. Cut the hollow just a bit smaller than the lip that you are using as a marking gauge. Hollowing to the mark may not be accurate enough.
- c. Cut the Mortise – A skew may be your best tool to cut the final mortise into the top. Remember to cut the mortise sides straight since any taper will alter the possible fit of the lid. It may be best to make this cut in very small stages, testing the fit often to ensure you don't make to mortise too large.
- d. Sanding – Start with the finest grit that will get the job done, but don't be afraid to start with a coarse grit as needed to smooth the end grain. Be careful when sanding the inside of the box. It is easy to sand the inside of the neck too much if you are not careful.

7. Finish turning the outside and finish sanding the outside

- a. Lid Fit – The lid should initially fit snugly on the box. This way the box works as a jam chuck to hold the top while the final outside shaping is completed. Turn the lid carefully.

A catch here can do serious damage to the lid and turn it into a projectile. An alternative is to bring up the tailstock to hold the top on the box while you finish turning the top. This keeps the top from becoming a projectile, but it doesn't allow you to turn the entire top. If you plan to use a finial this may work out better since you may be drilling a hole for the finial anyway.

- b. Box-to-Lid interface – There will often be a line where the box and lid meet. Grain of the wood and squareness of the shoulder will determine whether that line must be addressed. In figured wood boxes the objective is often to minimize the line so the figure in the wood is highlighted. One way to optimize the grain continuity in figured woods is to use your thinnest parting tool to part off the lid and use a neck insert. Another way is to use a tenon cut from a similar or contrasting wood. In less figured wood the edges of the line can be chamfered, rounded or otherwise made a part of the box shape and design.
- c. Sanding – Remember that the lid lip may be very thin and aggressive sanding can damage the lid. Final sanding grit can be from 220 to 400 or higher depending on the wood you are using and the finish you want. Don't be afraid to go back to 50, 60 or 80 grit if you find a bad spot that needs to be addressed. Always sand at the slowest speed possible when sanding under power. And, use your sandpaper as if someone else paid for it.

8. Part the box off

- a. Angle of the Cut – You may want the base of the box to be slightly concave to avoid any rocking of the finished box. This is most easily done during the parting off process. Be very aware of the tear-out that you might get during the parting off process. The smoother this cut the closer you will be to finished.
- b. Reverse Chucking – If you still need to finish the bottom of the box after parting it off, you should create a jamb chuck to hold the nearly finished box. This is safer than your scroll chuck since it will not leave marks on your box and it won't crush the box either.

9. Finish the inside and outside and sign your finished artwork

You may have already applied your initial or complete finish to the inside of the box and lid. Some finishes are better applied with the piece on the lathe (e.g. friction polishes). So you might want to complete the finishing of the inside parts as soon as you hollow and sand them in steps 5 and 6.

If you did not finish the insides earlier then do it now. Just be careful when applying any finish to the connecting parts (neck) between the box and lid. Too much finish can cause the lid to be too tight. Sticky finishes can effectively 'glue' the lid to the box. It is often best to use just a wax or no finish at all on these mating surfaces.

References for Turning Lidded Boxes

Books, CDs and DVDs

Stott, Chris
Turning Boxes (VHS and DVD)
Turned Boxes: 50 Designs (Book)

Raffin, Richard
Turning Boxes (Book, VHS, and DVD)

Kline, Bonnie
Turned Boxes & Projects (DVD)

Web Sites of Interest

Gwinnett Woodworkers Association (GWA) – <http://www.GwinnettWoodworkers.com>

American Association of Woodturners (AAW) – <http://www.Woodturner.org>

Drozda, Cindy– <http://www.CindyDrozda.com>

Proffitt, Paul – <http://www.WhisperedImages.com>

Doing a search on Google for “turned boxes” or “turned lidded boxes” results in numerous interesting sites, many with a variety of design ideas.

Examples – Dogwood (air dried)



This blank was roughed from a log. Rough blank was turned to approximately 12" long by 3.25" in diameter. This blank should yield three or four lidded boxes depending on the height of each box.

The blank doesn't have to be smooth since you will be turning it down to a smaller final size. Pay attention to cracks and defects that may affect the integrity of your lidded box. If your blank is long like this one you may want to part off a section to work with to limit vibrations during hollowing. Using the tailstock to steady long pieces is also a good idea.

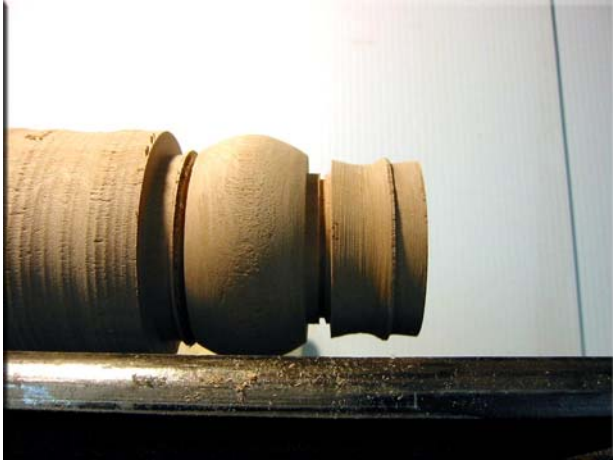


Looking closely in this picture you can see the pencil marked rings for the neck and bottom of the box. The top is to the right and a tenon was cut to hold the top while hollowing. More complex box shapes may require some partial parting to mark the neck and bottom since pencil lines will quickly be turned away.



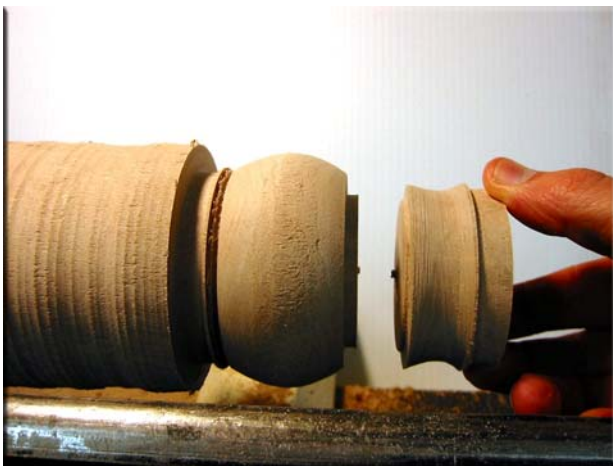
Initial shaping is completed. Notice the parted slots that mark the bottom and neck of the box. Also note the continuation of the shape from the bottom to the top across the gap that is currently the neck. This gap will be eliminated once the lid is fitted to the box so shape the box with that in mind.

It is helpful to leave a broader shoulder on the box at this point. This will allow you to continue shaping the outside of the box after the lid is fitted to the bottom.



Once you have the initial outside shaped and the neck cut to the desired size you are ready to part off the top. Notice in this photo that the parting should leave a small shoulder on the top. This small shoulder serves as a reference mark when hollowing the top. Cutting almost to this mark should get your lid close to fitting the neck you left on the box bottom. Having sanded the neck on the bottom it may be slightly smaller than the reference. So, you should sneak up on the reference when hollowing the top and test fit the top to the bottom numerous times to get the best fit.

What happens if the lid is bigger than the neck (too loose)? Shrinking the lid down isn't usually an option. The best solution may be to replace the neck with a sleeve cut from the same or a contrasting wood. *Note that grain orientation is important here.* The sleeve can be made to fit the existing top. Then the neck can be cut off the bottom and the bottom can be made to fit the new sleeve.



This photo shows the top just after it was parted off the bottom. Notice the important small shoulder that remains on the lid (right piece) that will be the reference mark. The most important consideration when parting off the top is to make sure you have a long enough neck left on the bottom piece (left piece) for your box design. A 1/16" parting tool is very useful for this operation.

Leaving a small nib and twisting the top off after the parting operation is better than parting the top all the way off. When you part the top all the way off the lid may fly off and be damaged.



After parting off the lid, the bottom of the box is hollowed and the inside should be sanded (and perhaps finished). It may be easier to sand and finish the inside of the box while still on the lathe. Be very careful with sandpaper inside the small cavities. Use small bits of sandpaper to avoid the piece grabbing the paper and causing injuries.

Now is a good time to final sand the outside of the neck (before you start hollowing the lid and fitting it to the neck). You should only need a light sanding with 220 or 320 grit paper to finish outside of the neck.



Here the lid has been hollowed and is ready to test fit to the neck of the box. The lid was hollowed while holding it in the chuck using the tenon you made initially on the lid back at the beginning. An initial tight fit of the lid allows you to use the box bottom as a jam chuck to hold the lid while you finish turning the lid. It also allows you to finish turning the contour of the outside of the box so that the edges where the lid meets the bottom fit the way you want.



This photo shows the completed box prior to parting it off of the blank. Once you part the bottom off you will need to reverse chuck the bottom with your lathe chuck or a jam chuck in order to finish turning the bottom of the box.

It is easiest to do as much final sanding and sometimes even finishing at this stage prior to parting off the box.