

# WESTERN CAPE WOODTURNERS ASSOCIATION



**NEWSLETTER : September 2025**

The Western Cape Woodturners Association is a group of folk with a common interest in woodturning and wood.

We aim to promote the art of turning wood and to create awareness of this craft in the community and encourage young members to join the fellowship.

Members meet every Wednesday at 6.30pm to do “hands-on” turning and get instruction and help.

The venue is the Pinelands Hobbies Club, Nursery Way, Pinelands, Cape Town.

The Formal Meeting is on the 3<sup>rd</sup> Wednesday of the month at 7pm.

Visitors are welcome .

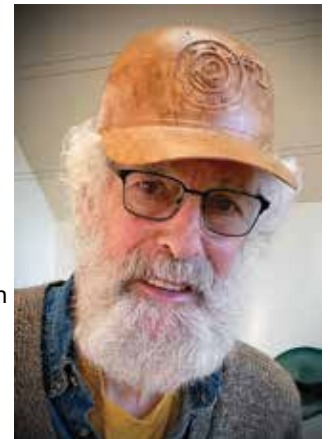
## September 2025:

The demonstration on 17th September is still to be decided and an email will be sent in due course.

## IN MEMORIUM

Last Month saw the passing of David Ellsworth. He was Member No. 1, a founding member of the American Association of Woodturners. He attended every symposium of the AAW except this year's one. He embodied the spirit of woodturning. The spirit of woodturning is a spirit of :

- > Openness and generosity
- > Support and encouragement of others
- > Teaching and lifelong learning
- > Community, sharing and caring
- > Volunteerism and service to others



David Ellsworth wearing his No.1 wooden turned hat.

[This is what WCWA embodies as a woodturning club too.](#)

Thanks to the American Association of Woodturners, American Woodturner publication, Woodturning Fundamentals and authors John Lucas, Bill Ooms, and Steve Wilson for their permission to reprint their articles.

### Western Cape Woodturners Association Committee :

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<b>Secretary/Treasurer</b>	Chris Briers 082 490 1157	<a href="mailto:gertff3@gmail.com">gertff3@gmail.com</a>
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		<a href="mailto:pnicolle43@gmail.com">pnicolle43@gmail.com</a>

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## EDITOR'S NOTE :



Thanks to "Woodturning Fundamentals" digital journal - this edition has a brilliant photographic depiction of gouges, tool-grinds and angles that often confuse beginners and experienced turners alike. The pictorial depiction of differences between spindle gouges and types of bowl gouges, the different kinds of chisels and scrapers including carbide tips and the grind angles etc, is well shown in this article. There is also a basic picture of wood structure, grain direction, end-grain and side-grain, and how to get the best use out of a log.

I have also put in some articles on various indexing ideas, especially as some of the smaller lathes do not have an indexing facility.

Indexing allows you to get accurate patterns and spiral designs on your bowls.

## ASSOCIATION OF WOODTURNERS OF SA - SYMPOSIUM 3-6 OCTOBER 2025

The symposium this year will again be held at the Northlink College in Platteklouf. We have the privilege of bringing to our symposium the renowned British woodturner [Helen Bailey](#), as the guest demonstrator. She is from Newcastle-on-Tyne, in North-East England. You can look at her website for more information about her work : [www.helenbaileywoodturning.com](http://www.helenbaileywoodturning.com)

**NOTE :** There are **FOUR PLACES** still open for the masterclasses to be held by Helen Bailey at the club in Pinelands on 1st and 2nd October.  
The cost is R1200 for the day.  
The theme is making a 3-legged decorated and coloured pot.

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## BIRTHDAYS IN SEPTEMBER:

Best wishes to all the members celebrating their birthdays in September :  
Colin Christian, Tanya Dreyer, Wendel Du Buy, John Jones, Dan Martin, Eddie Marchio, Donovan Pretorius, Michael Starke, Lorraine Steyn, Willem Steyn, Andre Visser, Hans Woermann.

## NEW MEMBERS :

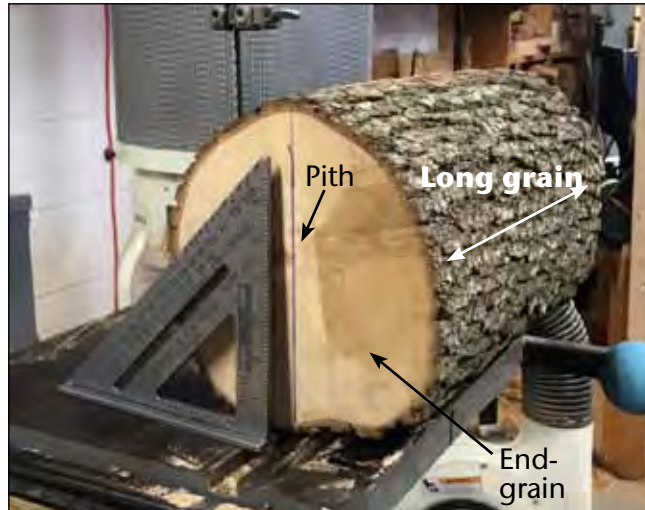
We welcome new members - Nicholas Inggs, Bradley Rogers and Franco Santovito.

Welcome to the family and may you have many happy hours in front of the lathe creating wonderful things.

# FUNdamental Overview

## Grain Direction on the Lathe...

Firewood-sized hardwood log, 9" dia (24cm) by 16" long (40cm), sawn down the middle yields two long-grain blanks for spindles or endgrain turning, and two crossgrain blanks for bowls or platters.



### EXPLORE!

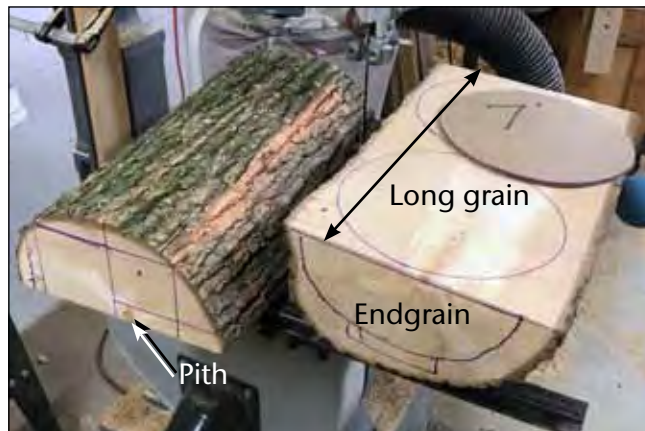
Click the blue box or scan the QR code to find out more...



[tiny.cc/sawlog](https://tiny.cc/sawlog)



To bandsaw safely, stand the log on end or secure it on a sacrificial sled.



*Long-grain blanks*

*Crossgrain blanks*



Long grain parallel to lathe axis (spindle orientation)



Long grain perpendicular to lathe axis (crossgrain, or faceplate, orientation)

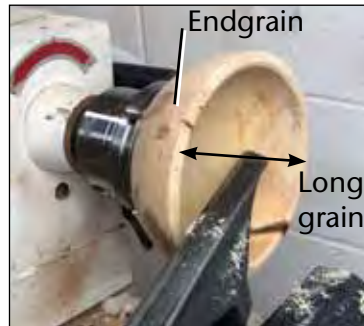


FUNdamental Overview

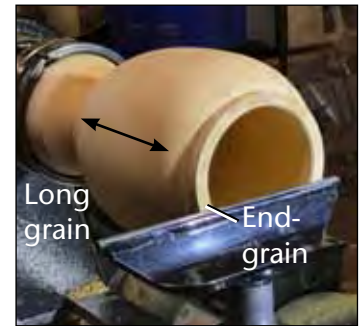
# ...Grain Direction and Turning Tools



Long grain (spindles)



Crossgrain (bowls)



Endgrain (hollowing)...



*Spindle roughing gouge*



*Bowl gouge*



*Bowl and spindle gouges*



*Spindle gouge*



*Hollowing scraper*



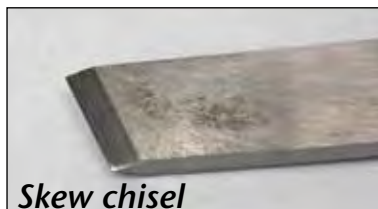
*Parting tool*



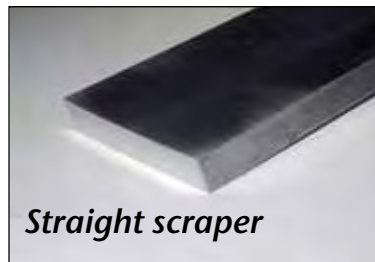
*Radius scraper*



*Adjustable hollowing*



*Skew chisel*



*Straight scraper*



*Side-cut scraper*

Any grain orientation



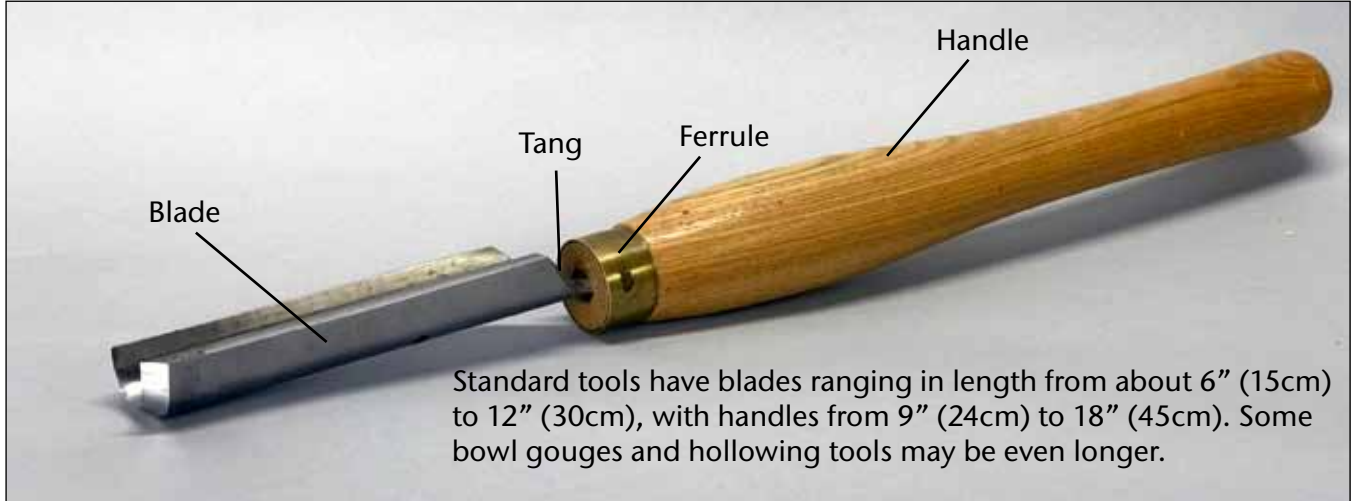
*Carbide-insert*



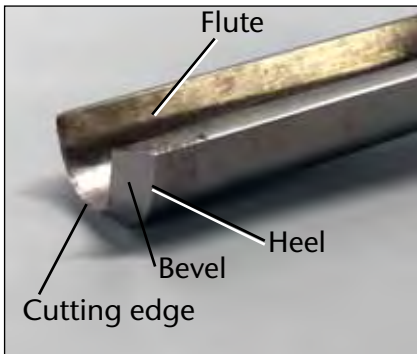
*Cupped carbide*

# FUNdamental Definitions

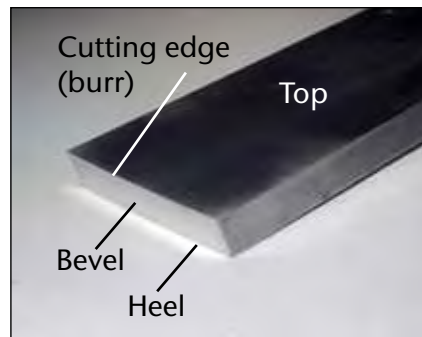
## Parts of a Turning Tool...



### Gouges

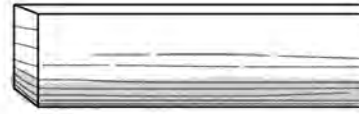
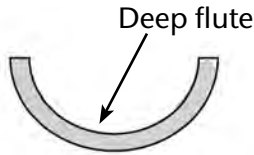
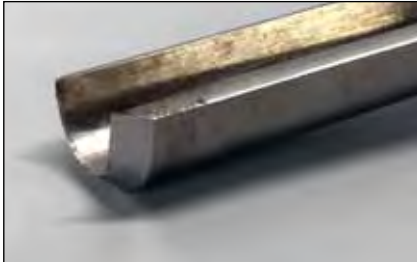


### Scrapers



# FUNDamental Overview Spindle Gouge Shapes, Angles

*Spindle roughing gouge*



Bevel angle 40° to 45°

The spindle roughing gouge is only for cutting long grain in spindle orientation, anything else risks a dangerous catch. Size range: 3/4" (20mm) to 1-1/4" (32mm) in width.

*Spindle gouge*



Flute



Bevel angle 35° to 50°



The versatile spindle gouge is useful in all types of turning and grain orientations. Gouges are measured by widest diameter from 1/4" (6mm) to 1/2" (12mm); 3/8" (9mm) is a good general-purpose tool.



*Detail gouge*



Bevel angle 30° to 40°

Shallow flute



Detail gouges have a long nose, shallow flute, thick body, and long bevel.

## Gouge orientation



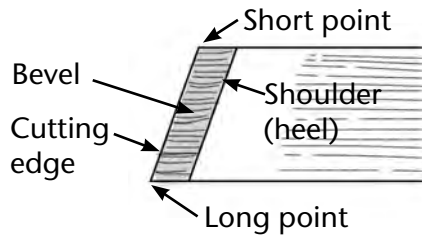
Open = flute faces up, 12 o'clock position



Closed = flute faces right (3 o'clock) or left (9 o'clock).

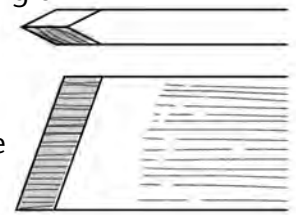
# FUNDamental Overview Skew Chisels and Parting Tools

## Skew chisel



Included angle  
50° to 80°

Skew angle  
65° to 75°



Skew chisels range in width from 1/4" (6mm) to 1" (25mm), with 3/4" (20mm) a good starter size. Skews can make precise cuts and leave clean surfaces on spindles. Skews are various:

- The blade may be rectangular in section, or oval.
- Some turners prefer a curved cutting edge.
- The bevel may be ground flat, concave, or convex.

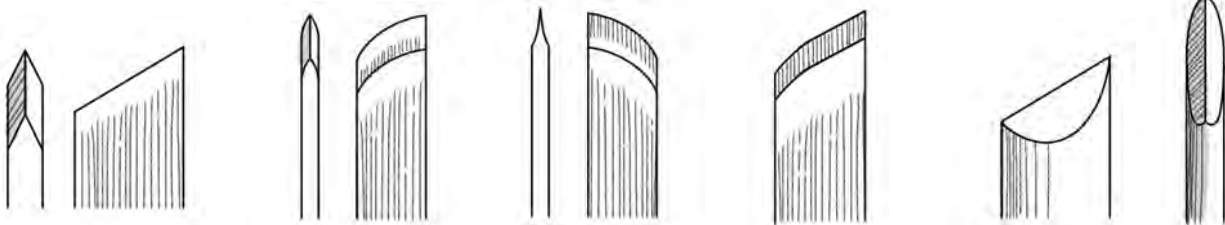
Flat bevel

Convex bevel

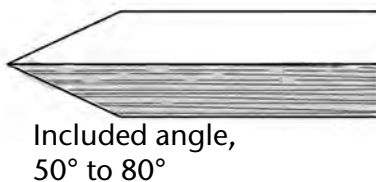
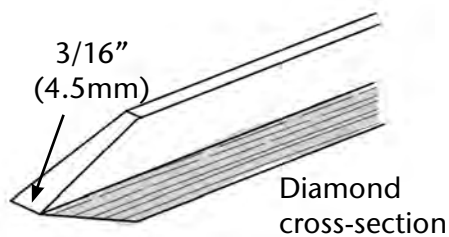
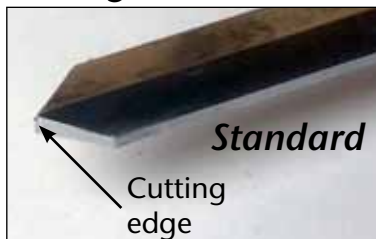
Concave bevel

Curved edge

Oval blade

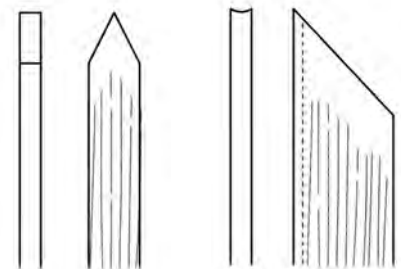


## Parting tool



Flat

Fluted



The cutting edge of a standard parting tool is about 3/16" (4.5mm) wide with the blade about 3/4" (2cm) across. The included bevel angle ranges from 50° to 80°. Thin parting tools are about 3/32" (2mm) wide. Some parting tools have a sharp flute ground into the blade's bottom edge.

# FUNdamental Overview

## Bowl Gouge Shapes and Angles

*Bowl gouge*



Photo by Glenn Lucas

Fingernail grinds

Traditional grind

V-shaped  
flute



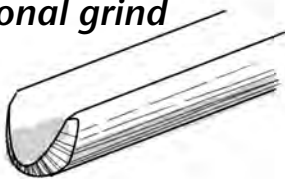
U-shaped  
flute



Bowl gouges, ranging from 1/4" (6mm) to 1/2" (12mm) in width, have deeper flutes than spindle gouges. Flute profiles may be V- or U-shaped.

Bevel angles affect what shapes the gouge edge can reach. Long wings can remove a lot of wood quickly.

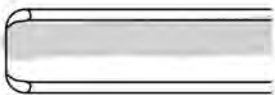
*Traditional grind*



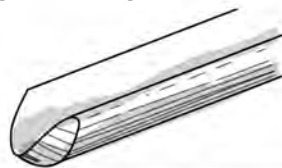
Bevel angle 50° to 60°



Rake angle 0° to 25°



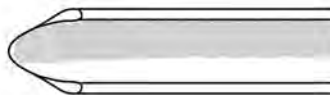
*Fingernail grind*



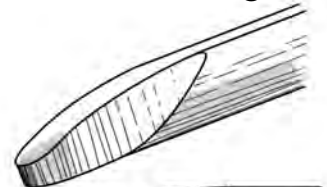
Bevel angle 35° to 45°



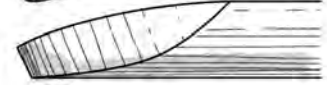
Rake angle 40° to 50°



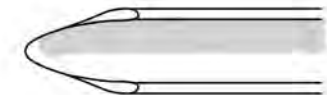
*Irish (Ellsworth) grind*



Bevel angle 55° to 65°

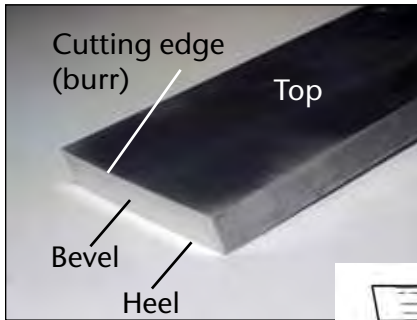


Long wings swept back



# FUNdamental Overview Scrapers Scrapers Scrapers

*Straight*



Bevel angle 65° to 80°

*Curved*



*Negative rake*



*Radius*



*Hollowing*



*Adjustable hollowing*



*Side-cut box*



Scrapers are made in myriad shapes and range from miniature size up to about 1-1/2" (38mm) wide and 1/2" (12mm) thick. The cutting edge is a raised burr at the top of the bevel. Scrapers can cut

in all wood grain orientations. They cut best held flat on the toolrest or angled slightly downward, with the cutting edge at center height. Negative rake scrapers make light finishing cuts.

## Carbide-Insert Tools

*Square*



*Round*



*Point*



*Cupped*



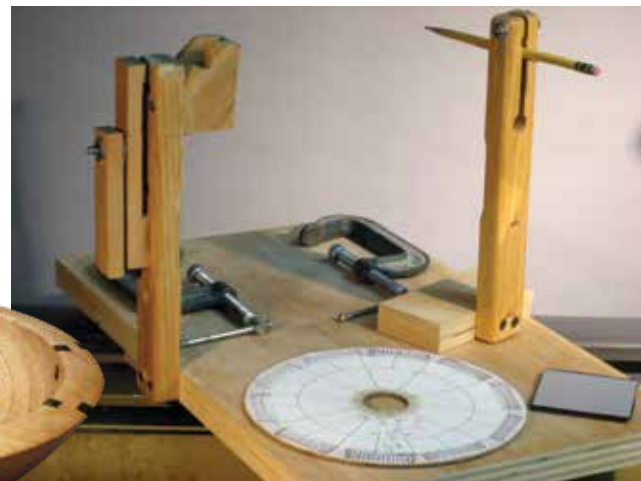
Carbide tools have a steel shank carrying a carbide cutting bit held in place by a small Torx screw. Flat bits scrape while cup-shaped bits cut.

Carbide tools stay sharp a long time; dull bits can be honed on a diamond plate but ultimately must be replaced.



# SHOPMADE INDEXING JIG

Steve Wilson



Using figured wood to make a bowl is always nice, but sometimes finding interesting species is not easy. Where I live, north of Detroit, Michigan, there were many silver maple trees planted in the 1950s and 1960s that have come to full maturity and beyond. So there are a lot of neighborhood trees and trees being cleared off of building lots that are now being thrown away. These are the trees I have the opportunity to use, and most of them are maple.

These old growth neighborhood trees usually have smooth grain, except at branch areas, so a lot of the wood is plain grained and solid. This is prime wood for bowls, but the plain grain does not show off the bowl form well. As a woodturner, I count myself primarily a sculptor, so form, proportion, edge, and shape are important. I want to highlight these attributes, but I'm not likely to put cows or flowers or faces on my bowls. To put that kind of ornamentation on a bowl distracts and



obscures the form, and it becomes the art, rather than the bowl itself.

To overcome this challenge, I prefer to use modest abstract decoration to accentuate the form. In my case, I like small squares. To this end, I've developed a jig to accurately divide a bowl down to a single degree. From here, I lay out the horizontal lines by eye so that each division is a square. These line intersections could be considered center lines for other patterns such as inlaid circular plugs. Instead, I use them as is to burn in squares either in lines or spirals. I find that these little squares in a spiral pattern act to show off the form of the bowl without obscuring the wood (*Photo 1*).

## A better indexing jig

I find the indexers on most wood lathes to be useless, so I ignore the one on my

lathe. Being able to divide a circle into 360 radial lines is the key to laying out spirals, diamonds, and other patterns you might dream up. My indexing jig allows for more accuracy and flexibility (*see Downloadable Drawings! sidebar*). Note that because there are so many different lathes in use today, the drawings should be used only as a guide and adapted to your particular lathe.

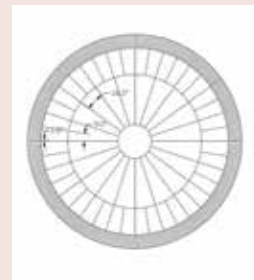
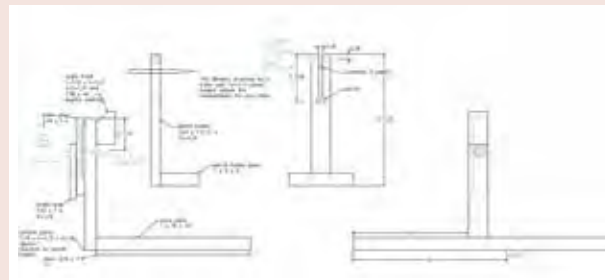
At the heart of an accurate layout is an accurate disk with crisp black lines. I used a computer-aided design, or CAD, program to make a circle 8" (20cm) in diameter, called a polar grid. This size allows it to be printed on a regular printer. So far, I've tried three spacings for different applications: 360, 216, and 180. Next, I made groups of 9 and then 18. This just keeps me from getting lost among the lines. Last, the center circle is the same size

## Modest abstract decoration



The 11" (28cm) bowl illustrated in this article, Norway maple, with two sets of spiral patterns denoted by small squares.

## Downloadable Drawings!



Detailed technical drawings of Steve Wilson's indexing jig, including polar grids, are available for download at [tiny.cc/AWextras](http://tiny.cc/AWextras).

as the pilot on the spindle. The first group of lines on the polar grid should be at least  $\frac{1}{2}$ " or  $\frac{5}{8}$ " (13mm or 16mm) long. The second group is 1" (25mm) long, and the third group ends at the pilot diameter.

Avoid using water-soluble glue to mount the printed paper grid on a  $\frac{1}{8}$ "- (3mm-) thick piece of hardboard; to avoid wrinkles in the paper, use a spray adhesive instead. 3M makes a good spray adhesive, but do this work outside because of the fumes. After the paper is mounted on the hardboard disk, drill or saw an undersized hole for the pilot and saw the 8" diameter close to final size. Use a disk or belt sander to trim the diameter to size. Use cyanoacrylate (CA) glue to stiffen the hardboard fibers of the pilot hole, then wrap a piece of medium-grit sandpaper around a round handle or dowel and carefully bring the pilot diameter up to a snug fit on the lathe spindle using the center circle to keep the pattern centered.

Mount the disk with the two-degree markings behind the chuck on the lathe spindle. The plywood baseplate is mounted to the bed ways with two C clamps. I used a  $2\frac{3}{4}$ "- (7cm-) square make-up mirror for illustrating this article, but a  $1\frac{1}{2}$ " (38mm) square would be less bulky in use (*Photos 2, 3*).

I use a good flat piece of plywood as my work surface, or baseplate, on the bed ways. I chose 1"-thick Baltic birch plywood. My baseplate measures 12" x 20" (30cm x 51cm), but I think a width of 13" or 14" (33cm or 36cm) would be better. This depends on the size of the work that is to be laid out; mine is usually under 20" in diameter and less than 8" tall. I have had to add another piece of plywood across the bed ways to lay out taller pieces.

The vertical piece that is attached to the base does several jobs. First, it acts as the accurate reference for the height to the center of the spindle. With the mirror mounted, the top surface acts as the sighting plane to accurately see the line on the disk. Second, it holds the drag brake and acts as part of the friction, and third, it has an angle block to mount

## The jig mounted on the lathe



Mount the disk, or polar grid, with the paper facing the tailstock. The author uses a chuck to hold the disk in place, but a faceplate up to 6" in diameter could also be used. The plywood base is clamped to the bed ways.



An angled mirror allows for sighting across the top of the vertical piece without having to bend down to the centerline of the spindle for each division line.

## A finely sharpened pencil



A pencil sharpened with a sanding block to an acute angle improves marking accuracy.

## Sand to 600 grit



The bowl turned and sanded, ready for indexing.

the mirror. Measure the distance from the top of the bed ways to the center of the headstock spindle, then add at least  $\frac{1}{8}$ ". This length will be adjusted later. I mounted this piece 9" back from the front edge of the baseplate with two #10 x  $1\frac{1}{2}$ "-long flathead, square-drive screws and yellow glue. Sand off any remainder below the baseplate.

As noted, mount the baseplate to the lathe with a couple C clamps. Mount a flat disk of plywood in the chuck. Place the pencil holder on the baseplate and set the pencil to the center of the disk in the chuck. Mark a horizontal line on the disk, then revolve the disk 180 degrees and mark it again. Chances are that one line will not be drawn exactly over the other, so adjust the pencil and try again. When one line is drawn perfectly over the other,

the pencil is exactly at the centerline of the spindle. Now, mark the vertical piece. If possible, saw this surface on the table saw using a fine carbide blade and miter gauge, as it needs to be smooth and flat.

I use a mirror mounted on the angle block to allow sighting across the top of the vertical piece without having to bend down to the centerline of the spindle 360 times per bowl. A piece of mirror  $1\frac{1}{2}$ " square or  $1\frac{1}{2}$ "-diameter round is attached to the angle surface, then the block is moved up or down to find the best view for sighting across the top of the vertical. Glue and screw the mirror block here, but make sure the flathead screws are set below the wood's surface because this is a braking surface. Next, mount the brake arm with glue and two more screws. ▶

A little trial and error is called for next. Temporarily mount the cleat to the bottom of the baseplate so that there is a good view of the lines on the disk across the top of the vertical piece and that the brake arm will make nearly full contact with the back of the indexing disk. Set the cleat perpendicular to the long edges of the baseplate and position just so, then C-clamp two more pieces of wood tight to the cleat as a reference for location. Remove the cleat, then glue and screw it back in place.

The pencil in the holder is set to the height of the view table (center height of the chuck). Notice how the pencil

has been sharpened with a sanding block. I make mine about a 10-degree angle and less than  $\frac{1}{32}$ " (0.8mm) thick at the tip (*Photo 4*). In use, the pencil holder can be quickly set to center from the top of the vertical.

### Decorating a bowl

To start, decide how large and small the squares need to be for your project.

For an 11" (28cm) bowl, the "two degrees" disk (180 divisions) works well. Held by the foot, finish the bowl inside and out, and sand it to 600-grit abrasive (*Photo 5*). Remove the chuck from the lathe, put on the disk, or

polar grid, of choice and return the chuck to the spindle. Snug the chuck, place the baseplate on the lathe bed so that the brake is around the disk and the cleat is pulled tight to the front bed way, then clamp the base to the ways—one clamp under the chuck and under the front bed way, one clamp toward the tailstock under the back bed way.

Sight down the mirror and across the view table to locate disk lines accurately. Set the brake lever for light drag, so that the bowl remains steady while drawing the lines (*Photo 6*).

*Photo 7* shows measuring the size of the largest squares—in this case, a bit more than  $\frac{3}{16}$ " using the two-degree spacing. This is just what I wanted for this project. For your project, use different numbers of degrees for different sizes of bowls or artistic requirements. For this bowl, I drew lines on the bowl every two degrees, inside and out (*Photos 8, 9*). Mark all of the divisions. Sometimes I only mark inside or outside, and sometimes both. Remove the indexer, remove the disk, and then return the chuck to the spindle.

Make a worktable to fit in your banjo (*Photo 10*). Start with two scraps of  $\frac{3}{4}$ " (19mm) plywood, 3" × 12" (8cm × 30cm). Drill a 1" hole through one piece of plywood offset toward one end by 1" and centered on the width. Glue and clamp these pieces together face to face, so that the corners align.

Next, turn the leg, or post, to fit your banjo, so that the height of the table will be  $\frac{1}{8}$ " to  $\frac{3}{16}$ " less than the center height of the chuck. Make one end a snug fit for the 1" hole and about  $\frac{1}{8}$ " shorter than the depth of the hole it will go into. Take care to cut the shoulder cleanly and that the rim of the shoulder is high. This will allow the table to sit squarely on the post. The middle part of the post should be at least  $1\frac{1}{2}$ " in diameter and long enough to fit your banjo at center height. Make the last bit of post a close fit for your banjo with sufficient length to clamp with the banjo clamp. Glue the post into the table mortise and add

### Locate disk lines accurately



(6) Sight down the mirror and across the view table to locate disk lines accurately.

(7) The author draws lines every two degrees and measures to confirm accuracy.



### Draw lines outside and in

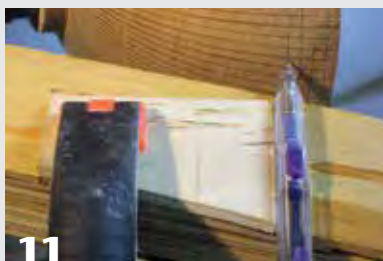
Lines vertical to the bowl are drawn both outside and in.

### Banjo-mounted work surface



**10** Make a custom work surface with a post to fit your banjo.

### Add horizontal lines



**11** On the work surface, clamp a scrap of plywood as a pencil guide, and begin laying out the cross lines (latitude).

a flathead screw into the top of the post for extra strength and to hold things together while the glue sets.

Install this shopmade work surface in the banjo, and using a spring clamp and a scrap of plywood as a guide for a pencil, mark the lines that will be horizontal in the finished bowl (*Photo 11*). Hold the pencil against the guide, lightly press the pencil to the bowl, and revolve the bowl by hand. Gauge the length of the square by eye against its width. The squares get progressively smaller as the center of the bowl is approached.

For this bowl, I chose to use a double spiral pattern. So, starting at the top outside of the bowl, I marked every eighteenth square for ten spirals. For this spiral, I counted two squares toward the foot and two squares down and burned the two horizontal lines. Then, with the burning knife, burn all the horizontal lines for the first spiral (*Photos 12, 13*). The second spiral set was based on counting four squares by two squares. The two spiral sets can be seen in *Photos 1, 16, and 18*.

I draw the latitude lines with the chuck on the lathe, but the vertical lines are

## Burn in spiral patterns



When all of the lines are drawn, both vertical and horizontal, it's time to decide on a pattern. The author started at the rim with a square, then counted toward the headstock two squares and down two more before burning another square. The spiral pattern is repeated.

more easily done off the lathe. Leave the bowl in the chuck, of course (*Photo 14*).

A piece of plywood with a hole sawed through it to accept my chuck lets me work over the bed ways, making the burning more ergonomic for some of the lines (*Photos 15, 16*).

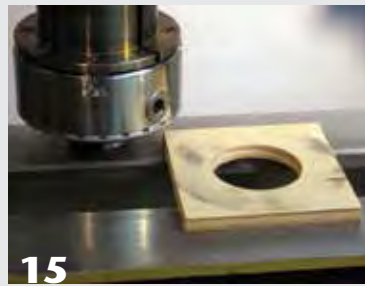
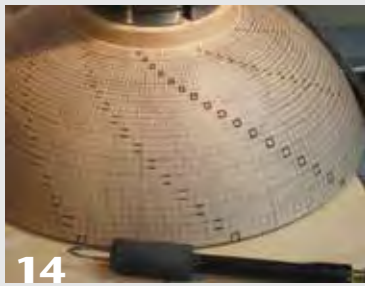
### Final steps

With all of the woodburning completed, erase all of the pencil lines. The graphite will get embedded in the grain and darken the wood. Even with a good drafting eraser, some of the graphite remains. It helps to wet the full surface of the bowl, which raises the grain

and helps with the small dents caused by penciling the lines. Fully wet the surface, but it shouldn't drip. Let the bowl dry completely. Re-sand the bowl with 320-grit paper to remove all traces of the graphite and the raised edges of the burn lines, then bring the surface back with 400-grit and 600-grit paper.

Using a shopmade jam chuck and some ½"-thick foam, bring the tailstock up to finish the bottom (*Photos 17, 18*). Now simply add your favorite finish. ■

*Steve Wilson has been turning since the mid 1970s, showing since 2010, and demonstrating and teaching since 2008. For more, visit [theboxandbowl.com](http://theboxandbowl.com).*



## Off-lathe burning

(14) Vertical lines are more easily drawn off the lathe.

(15-16) A plywood disk with a hole in the middle to accept the chuck allows the author to hold the work securely on the bed ways.



## Reverse-mount, complete bottom

After all the patterns have been burned in, reverse-mount the bowl and complete the bottom.

# A Better Index-Locking Pin

John Lucas



There are many ways to make use of a good indexing system on your lathe.

I have been using indexing on the lathe for a long time. What is indexing? It is a way to lock the lathe spindle in regularly spaced intervals, allowing you to carve, burn, draw, or route on turned projects with precise spacing, as shown in *Photo 1*.

## Available options

I have tried several ways of locking the lathe spindle, but all of my methods

have had minor drawbacks. My first, very basic, approach was to use a box to hold the turned spindle and a screw to lock it into position. Some lathes have a built-in indexing system, but often this limits the number of available holes used to lock the spindle in place.

Over the years, there have been aftermarket indexing systems that offer improvements at a low cost, including index wheels with a wide variety of index

positions. One example is the Iron Fire index wheel, which is quite inexpensive and offers a huge variety of positions. It comes with a pin that fits the holes. You have to rig up your own way to hold the pin in position, and it can be hard to keep up with that little pin even after putting a knob on it. But this is not difficult to do and it works pretty well. Then came the Alisam index wheel, which is heavy duty, well marked, and comes with a massive index locking system. However, you have to screw the index pin in and out. It's a very positive locking system but slow to use, especially if you need 120 or 144 index positions like the basket illusion turners use. It's pretty annoying just doing twenty-four.

## A better pin

I wanted to design a spring-loaded index-locking pin to work with the Alisam and other aftermarket systems. With several designs in mind, I asked for input on the Internet forums. Someone posted a really simple solution and I loved it. I started building one and came up with some modifications that I like even better. My new index-locking pin system comprises a long metal rod fastened to a base (metal or wood) fixed to the bed of the lathe. The rod has a tapered point that fits into the index holes of aftermarket index wheels (*Photos 2, 3*). You can add a little spring tension to the rod by pushing

## Precise spacing



A router on an auxiliary table can be used to make repeatable cuts in a workpiece. The index wheel and locking pin ensure consistent spacing.

## Simple and effective pin



The author's shopmade locking pin, affixed in a base on the lathe bed, provides a positive hold for accurate indexing.



the point into a hole, moving the base slightly further in the direction of the hole, and locking the base. This provides enough tension for a very positive lock. I simply pull the pin out against the spring tension, reposition the wheel, and release the pin into a different hole.

One modification I made is to allow the locking pin to be rotated for use in any orientation. The rotation is helpful because I can use the pin not only in a wheel mounted behind a chuck, but also directly in my chucks that have index holes—either on the side or back of the chuck (*Photos 4, 5*).

Another modification I made was to provide fine adjustment of the pin's height above the lathe bed. I did this by threading the bottom of the rod and adding an adjusting wheel, as shown in *Photo 6*. A set screw locks the pin in position after fine adjustment. A key benefit is that if I remove and then remount the turning for any reason and find that the index pin is off a little, I can fine-tune its position to replicate the previous setup perfectly.

Another benefit is that you could add more holes to your indexing wheel. Since the pin can be adjusted precisely, you can position it half-way between two holes and double the number of available positions. Or you can move it a fraction one way or the other to make overlapping index cuts. By changing router bits, altering the orientation of the router, and overlapping cuts, you can simulate ornamental lathe work.

## How to make one

The first step in building this indexing pin system is to taper the end of a  $\frac{3}{16}$ "- (5mm-) diameter metal rod. I chucked the rod in my hand drill and slowly rotated it against a grinder wheel to “sharpen” it to a point. Then I ground off the tip until it fit into the various index holes in my chuck and wheel. I heated the rod red hot about  $\frac{3}{4}$ " (19mm) from the tip and bent it 90 degrees. I also bent the rod near the bottom to make it fit the larger index wheels.



## Works with chucks, too

Aside from the indexing wheel provided on some lathes, you can purchase (or make) an aftermarket version, such as this yellow disk with evenly spaced holes. Some chucks also offer indexing holes on the side or back.

## Fine adjustment of pin height



The author's shopmade base, fabricated from metal, allows for fine adjustment of pin height. The end of the pin is threaded and fine-tuned using a threaded adjusting wheel.

The metal base shown in *Photo 6* requires some metalworking knowledge and could require access to a machine shop. But you can make a wooden version that will work very reliably (*Photo 7*). To allow for a rotating pin position in the wood, I started by drilling a hole to fit the rod. Then I inserted the rod with thin cyanoacrylate (CA) glue. Before the glue hardened fully, I rotated the rod, which effectively broke the glue bond but made for a tighter fit. The resulting friction of this fit means it takes a little effort to rotate the rod, but also the rod easily stays in position.

I also added a slot in the locking base so that the pin can be adjusted in or out for the various index wheel and chuck sizes.

## Wooden base version



A wooden base is a good option if metalworking is beyond your skillset. The base is made to slide along the bed ways and adjust in or out. This allows for precise placement of the pin in relation to the indexing holes.

I hope you're inspired to build one of these, as I was. You will find it very quick to use with a positive locking position. I also use this system a lot when sanding natural-edge bowls; I can lock it in any position to make it easier to sand each area with the lathe off. I probably use it more for this than I do for its originally intended purpose. ■

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*John Lucas, a retired photographer, has been working in wood for more than thirty-five years and also dabbles in metalworking. He enjoys modifying machines, making tools, and sharing his knowledge through written articles and videos. He has taught classes at John C. Campbell Folk School, Arrowmont, and The Appalachian Center for Crafts.*

# INDEXING FOR THE ORNAMENTAL TURNER

Do you want to get into ornamental turning without spending a lot of money? Start with indexing which has always been the primary tool of the ornamental turner. This presentation will show you how to adapt your present lathe to a state-of-the-art indexer by adding a stepper motor to the spindle of an ordinary lathe. I'll present information on additional equipment like cutters and slide rest. The presentation will show how to decorate a Castle Box using simple indexing techniques as well as other decorative patterns that can be done with indexing.

You can use a traditional index wheel like those made by IronFire or Alisam. However, you may want to consider adding a simple stepper motor to the spindle of your lathe and drive it with an old computer. This will give you a lot more options (any combination of holes plus phase shifting), it will be more accurate, and it will be a lot less prone to errors that can result from miscounting the holes.

Unlike a regular motor, a stepper motor has a fixed number of positions. A typical stepper may have 200 or 400 steps per rotation that are very accurately controlled. This makes it ideally suited for controlling the rotation of the lathe spindle.

You can mount a stepper motor to just about any lathe. It just takes a bit of ingenuity on your part. I prefer a spring-loaded mount so that it's easy to remove the belt from the stepper motor and put back the regular belt on the spindle. This makes it easy to switch between regular turning and the use of the stepper motor for indexing. In the demo, I'll go over how I added a stepper motor to my JET mini-lathe.



Below is a parts list that includes the important components. For making your own mounting, you can get various sizes and shapes of metal from your local hardware store. Using wood or plastic for motor mounting is also possible.

## Parts List

Parts available from [www.phidgets.com](http://www.phidgets.com)

- |   |      |          |
|---|------|----------|
| • Stepper Motor                                     | 3308 | \$23 CAD |
| • Controller Board                                  | 1063 | \$80 CAD |
| • Power Supply (Other options for other countries.) | 3024 | \$10 CAD |

Plastic pulleys from [www.plasticpowerdrive.com](http://www.plasticpowerdrive.com)

- |                        |          |
|------------------------|----------|
| • 20 groove, 1/4" bore | 20MXLDF  |
| • 130 groove           | 130MXLDF |

MXL Timing Belt from [www.mcmaster.com](http://www.mcmaster.com): (Order a length that is compatible with your motor mounting.)

Alternate source for pulleys and belt: [www.sdp-si.com](http://www.sdp-si.com)

Various hardware for mounting the motor:

- Local hardware store
- [www.onlinemetals.com](http://www.onlinemetals.com)
- [www.use-enco.com](http://www.use-enco.com)

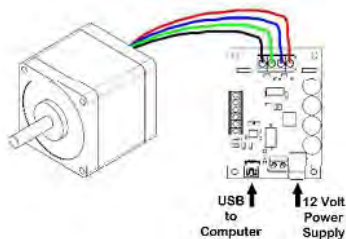
Software information at: <http://cornlathe.billooms.com/indexer.html>

The belt is an MXL timing belt to avoid the possibility of slipping. The large and small pulleys are compatible with the MXL timing belt. The small pulley has 20 teeth and the large pulley has 130 teeth to give a 6.5:1 increase in torque from the small stepper motor. The small pulley has a 1/4" bore to fit on the stepper motor. However, the large pulley will have to be bored out to fit the size of the outboard spindle shaft on your lathe. I mounted the big pulley in my chuck and used a small parting tool to bore the center of the plastic to the size I needed. During the demo, we'll go through more details on mounting the stepper motor. A video of the process of mounting the stepper motor to the lathe is available at

<http://www.youtube.com/watch?v=hqoIk6IRizY>

Don't be afraid of the electrical connections. As with any electrical wiring, make sure that the power supply is disconnected from the AC outlet and that the interface board is not connected to your computer. The supplier of the interface board

(<http://www.phidgets.com>) has a manual on their website with full information about connecting and testing the interface board. The connections are simple – connect the four wires from the stepper motor to the interface board (as shown in the diagram below), plug the 12 volt power supply into the connection on the board, and connect the provided USB cable to your computer. The final assembly is shown in the photo below.



The final step is installing the “Indexer” software on your computer. I recommend using an old computer which can usually be obtained for free. The software can be downloaded from my website <http://www.billooms.com>. You can use a PC, a Mac, or a Linux computer. During the demo, we'll go through the use of the computer program. A video on using the Indexer software is available at <http://www.youtube.com/watch?v=XHpQbDNsyfU>

During the demo, we'll briefly discuss the use of a slide rest and various kinds of cutting frames that will be of interest to the ornamental turner.

To illustrate a simple project that can be done with indexing, I've made a simple castle box. The box is made in 3 separate pieces (see photos below). Although I've made threaded joints, you could use simple close-fit joints and could even glue the pieces together if you choose. During the demo, we'll cover the basic construction of the castle and illustrate the various cutting techniques.



The “corbels” at the top of the center piece are done with a 1/8” diameter end mill mounted in a “drilling frame.” At each index point, the cutter is moved to cut a groove in the work. As with any router-like work, it’s better to take several shallow cuts rather than one single deep cut. Likewise, the top of the turret is cut with a 1/4” diameter end mill mounted in a “drilling frame.”



A more complex example of a castle is shown in the photo below. All the ornamentation was done with indexing (except for the arched tops of the windows).

The brickwork decoration is done with a 1/8” diameter cutter that has a sharpened flat end. It’s mounted in a “universal cutting frame” which is rotated so that the cutting motion is vertical. At each index point, the cutter is moved into the wood by a fixed distance. Each successive layer of “brickwork” is shifted by 1/3 of the pattern to give an attractive spiraling effect. This is difficult to do with a traditional index wheel, but it’s easy with the computer-driven stepper motor.



There are a lot of other attractive cuts that can be done using simple indexing. In fact, most of the historic ornamental work was done with indexing. The book, “The Principles & Practice of Ornamental or Complex Turning” by John Jacob Holtzapffel is the best reference book for ornamental turning. Although published in 1894, reprints are readily available.

~ Bill Ooms