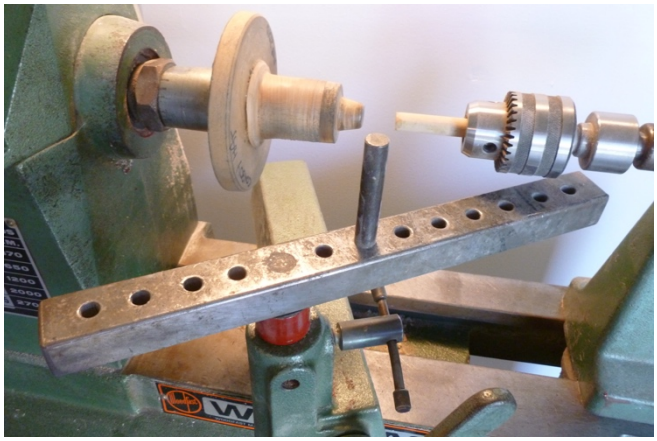
Metal Spinning for Woodturners: James Thurman

Howdy y'all! Although I am a Metalsmithing & Jewelry faculty member at the University of North Texas, I'm not really a Texan (but, as the bumper stickers say, I did move here as fast as I could). Ever since I made these spun cowboy hat pins for the 2010 SNAG (Society of North American Goldsmiths) Conference in Houston, I thought they would be a great example for a technical article about metal spinning. Although metal spinning is a centuries old process, there are surprisingly few practitioners and even fewer using it as part of contemporary one-of-a-kind work. The proliferation of CNC metal spinning equipment has made production components more affordable but reduced the number of skilled spinners making one-of-a-kinds. I hope that this article inspires more people to experiment with metal spinning and perhaps incorporate into their own work.

For those of you not familiar with metal spinning, it is the forming of metal with specific tools while the metal blank is rotating on a lathe (not a subtractive process like machining). Spinning tools are used like simple levers, pushing against the rotating blank of metal to form it. Depending on the size of the spun piece, different sizes of woodturning or metal spinning lathes can be used. The most important aspect of the lathe is that it is sufficiently stable for the forces involved. The lathe I use was manufactured for woodturning but is great for metal spinning as well. The only alteration I had to make in order to use it for metal spinning was to change the toolrest.



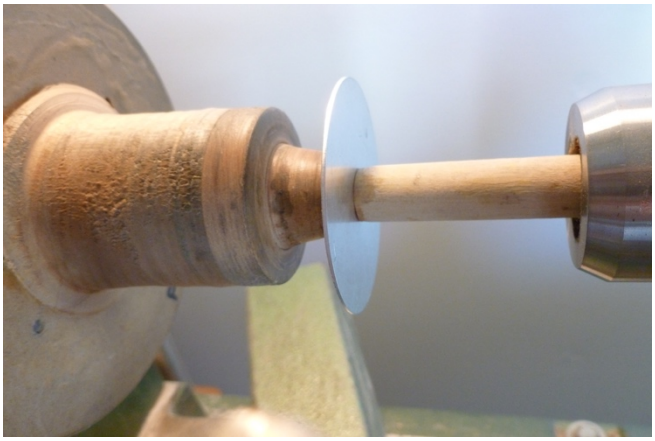
The toolrest used in metal spinning is very different from the kind used in woodturning or machining. Because of the need of a fulcrum for the spinning tool, the toolrest must be able to accommodate toolposts. Throughout the spinning of a piece, the toolposts and toolrest are moved frequently to adjust for the constantly changing outside diameter of the metal.

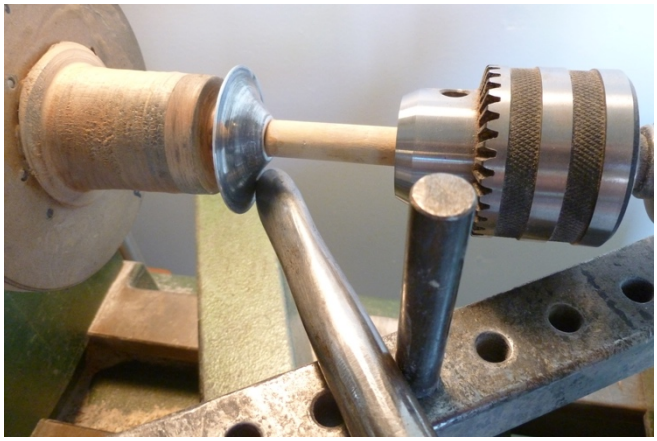
Basic metal spinning tools are relatively simple to make, especially if you are able to do any hot forging or have a blacksmith friend that could help you out. I've been fortunate to either find my spinning tools used or have them gifted to me. The typical "spoon" tool usually has a variety of radii within a single tool to allow it to be used in a variety of ways during the process of a piece. Other more sophisticated tools are used for more advanced or technical processes, like a wheel tool for the rolling of the edge of the piece.

"Chucks" are the positive forms that metal is spun up against to maintain uniformity while producing a series of similar pieces. Most of the spinning of any piece is mostly done "on air" (the metal not up against the chuck. The metal is only spun against the chuck at the end of spinning to help ensure the piece has the required form and dimensions. When making prototypes or one-of-a-kind pieces, any chuck can be used that will not interfere with the final form desired.

As with any process involving rotating power equipment, appropriate safety precautions should be taken. Beyond just securing anything that might get caught in the lathe (long hair, loose clothing or jewelry, etc.), I would strongly recommend a face shield, tight fitting gloves, and a dedicated work apron or worksuit. A variety of lubricants are applied to the metal blank which eventually spin off the work (and onto you) so having separate work clothes for spinning is helpful in keeping grease and oil from getting all over everything. Obviously NEVER touch the edge of the rotating blank and be aware that the blank can fly out so a face shield is always required.

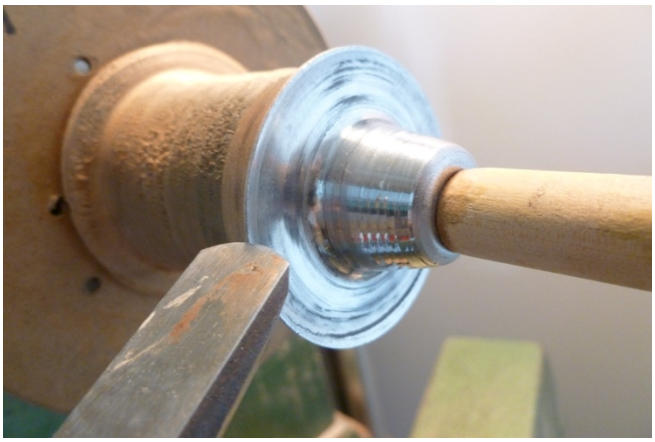
For this article, I will be illustrating how I spin and form the Cowboy Hat Pins. In this image, the aluminum blank is held between the chuck and the follower block. The follower block should have a small enough outside diameter to allow the spinning tool to push the blank around the first shoulder of the chuck, seating the blank on the chuck and reducing the chance of the blank slipping out. The follower block is held in the tailstock, ideally with a live bearing that allows it to spin along





with the metal blank, reducing friction and heat. Typical RPM while spinning is 500-1000. Be sure that the disk is precisely centered. Experienced spinners can do this with the lathe running by loosely holding the disk between the chuck and follower block and centering with a push stick. This is an extremely advanced and dangerous practice so it is advised that you center the disk before starting the lathe.

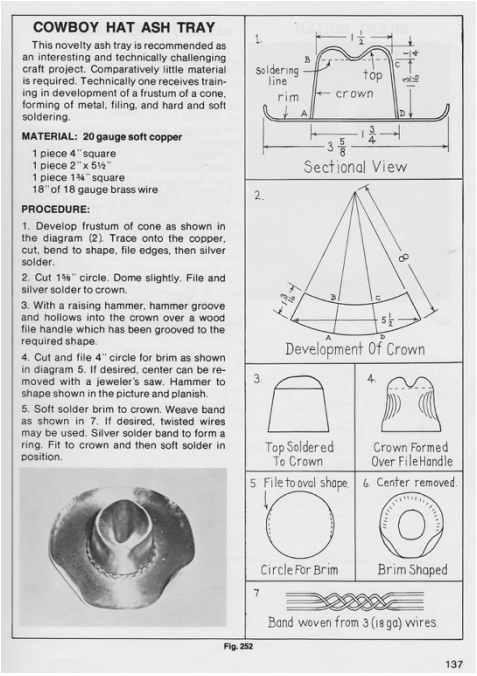
One of the most challenging aspects of learning metal spinning is that a certain amount of strength and confidence is necessary to get the metal to move. The other challenging aspect is that every piece is a little bit different and knowing exactly how to move the spinning tool and how much force to use only comes with experience. Generally, the force should decrease as you move out towards the edge, which helps keep the edge perpendicular to the axis of rotation. This is critical so that the piece maintains structural integrity, which prevents collapse or wrinkles.



For larger pieces, it will be necessary to trim the edge. Trimming keeps the edge of the piece concentric with its center and relieves some tension that builds up in the piece. The effect is like slightly annealing the piece. When the piece is almost complete, burnishing or polishing the piece is usually done while still mounted on the lathe.

Although not a typical approach in spinning, the Cowboy Hat Pins have several subsequent forming stages not done on the lathe. Knowing that I would dap the top of the hat in, I spun the blank a little taller to account for the metal compressing back down. I used this example to encourage the incorporation of other techniques along with basic metal spinning.

Since metal spinning is typically used to create hollowware and vessels, I wanted to show a variety of my experiments. As you can see, many of them have involved the exploration of perforated blanks and how the perforations deform through spinning. Other techniques that you see in the samples include the use of a backstick to support the metal while spinning (which can reduce wrinkles), rolling an edge (a standard industrial approach to finishing the edge of the metal), and backspinning (rolling the metal back on itself, like the metal version of a turtleneck sweater)



COWBOY HAT ASH TRAY

This novelty ash tray is recommended as an interesting and technically challenging craft project. Comparatively little material is required. Technically one receives training in development of a frustum of a cone, forming of metal, filing, and hard and soft soldering.

MATERIAL: 20 gauge soft copper

1 piece 4" square
1 piece 2" x 5½"
1 piece 1¾" square
18" of 18 gauge brass wire

PROCEDURE:

1. Develop frustum of cone as shown in the diagram (2). Trace onto the copper, cut, bend to shape, file edges, then silver solder.
2. Cut 1⅝" circle. Dome slightly. File and silver solder to crown.
3. With a raising hammer, hammer groove and hollows into the crown over a wood file handle which has been grooved to the required shape.
4. Cut and file 4" circle for brim as shown in diagram 5. If desired, center can be removed with a jeweler's saw. Hammer to shape shown in the picture and planish.
5. Soft solder brim to crown. Weave band as shown in 7. If desired, twisted wires may be used. Silver solder band to form a ring. Fit to crown and then soft solder in position.

1. Soldering line, rim, top, crown — Sectional View
2. Development Of Crown
3. Top Soldered To Crown
4. Crown Formed Over File Handle
5. File to oval shape — Circle For Brim
6. Center removed — Brim Shaped
7. Band woven from 3 (18 ga) wires

Fig. 252

137

I did want to share my inspiration for the Cowboy Hat Pins. As a frequent visitor to flea markets, garage sales, and junk shops, I noticed and started collecting the cowboy hat ashtrays pictured. Although some were certainly produced as souvenirs, I see most of them as a form of folk/outsider art since they are probably inspired by the typical Industrial Art assignment also included here. Ironically (or perhaps prophetically), I began collecting these items before I ever knew that I would end up living in Texas.

By necessity, this article can only be the briefest of introductions to metal spinning. Thankfully, there are a myriad of print and online resources available to anyone interested in pursuing this further. Of course, I would be happy to answer any questions since this article is only able to include the most basic of introductory information. In the future, I am hoping to offer metal spinning workshops and other public demonstrations once suitable venues are found. Please contact me with any suggestions or opportunities on how to share metal spinning with others.

ONLINE RESOURCES

www.jamesthurman.com	James Thurman's website
https://www.maytool.com/	high quality metal spinning tools (not cheap…)
http://www.metalspinningworkshop.com/	Terry Tynan: sells DVDs, tools, etc. (from England)

BOOKS

Fred Crawshaw, Metal Spinning: Practical Instruction in a Fascinating Art, 1909 (Lindsay Publications reprint 1991)

Reagan & Smith, Metal Spinning, 1936 (Lindsay Publications reprint 1991)

SME (Society of Mechanical Engineers), Tool and Manufacturing Engineers Handbook, Vol II: Forming

Robert E. Smith, Etching, Spinning, Raising and Tooling Metal, 1951

Tuells & Painter, Machinery's Reference Series: #57 Metals Spinning, 1910 (Lindsay Publications reprint 1994)

Paul Wiley, The Art of Metal Spinning: A Step-by-step Guide to Hand-Spinning, 2004