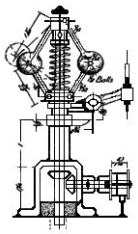


The NEMES Gazette

NEW ENGLAND MODEL ENGINEERING SOCIETY INC.

No. 210 October 2013

Gazette Staff

Editor	George Gallant
Publisher	Bob Neidorff
Events Editor	Bill Brackett

NEMES officers

President	Victor Kozakevich
Vice Pres.	Jeff Del Papa
Treasurer	David Baker
Secretary	Todd Cahill
Director	Steve Cushman

NEMES web site

http://www.neme-s.org

Contact Addresses

George Gallant, Editor
571 Chestnut Street
Ashland, MA 01721
editor@neme-s.org

David Baker, Treasurer
288 Middle St.
West Newbury, MA 01985
treasurer@neme-s.org

Bob Neidorff, Publisher
39 Stowell Road
Bedford, NH 03110
publisher@neme-s.org

Bill Brackett, Event Editor
29 East Main St
Northborough MA 01532
events@neme-s.org

Errol Groff, Webmaster
webmaster@neme-s.org

Contributors

Bill Brackett
Kay Fisher
George Gallant
Victor Kozakevich
Bob Neidoff

President's Corner

Victor Kozakevich

Ou speaker this month will be Brian Vaill. Brian is a retired financial consultant who never grew up. He and his wife build O gauge model trains. Their current layout contains approximately 30 trains, 250 structures, numerous car, buses, shrubbery. in a climate controller room.

Next Meeting

Thursday, Oct 3rd, 2013

Charles River Museum of Industry
154 Moody Street
Waltham, Massachusetts

Membership Info

New members welcome! Annual dues are $25 (mail applications and/or dues checks, made payable to "NEMES", to our Treasurer David Baker) Annual dues are for the calendar year and are due by December 31st of the prior year (or with application).

Missing a Gazette? Send a US mail or email to our publisher. Contact addresses are in the left column.

Issue	Contributions Due
NOV	OCT 18, 2013
DEC	NOV 21, 3013
JAN	DEC 18, 2013

Table of Contents

President's Corner.....1

Shop Talk.....2

Metal Shapers.....3

Editors Desk.....7

Upcoming Events.....7

Shop Talk

Bob Neidorff

Threading Pipe On A Lathe

Pipe threads are different from screw threads because they are tapered. This makes the pipe joint structurally tight, even gas tight. The taper isn't very much, perhaps 1/16" per inch of length, but that's enough so that the threads tighten up and seal. Pipe threading equipment is expensive and bulky, so if you're not using it frequently, it's very hard to justify.

If you need to have pipe threaded, you can go to a hardware store like Home Depot or Lowe's and ask them to thread the pipe for you. They may charge $1 per thread, which seems like a lot, but isn't really that much considering the time and equipment required.

On the other hand, if you have to have it done right now or if you're like me and have to do it yourself to prove that you can do it, then there has to be another way. My project is repairing a two-wheeled hand-truck handle. The original handle was thin-walled pipe that was bent into a "U". I wanted to use ¾" iron pipe, because it is stronger, but it is extremely difficult to bend. So my plan is to cut the pipe into three pieces and join them together with threaded elbows.That requires cutting four male threads on pipe ends.

Machinery's Handbook lists ¾" pipe thread as 14 TPI with a taper of ¾" diameter change per foot of length. My Logan lathe can cut 14 TPI threads but I don't have a taper attachment. I can cut a taper by offsetting the compound, but thread cutting involves moving the whole carriage, not just the compound, so you can't just cut threads using an offset compound.

One friend advised me to just cut straight threads and cram them into the tapered socket. That didn't seem right. The threads would only contact at one point and might rock rather than engage tightly. And it's cheating!

Another friend advised me to taper the end of the pipe on the lathe with the compound and then cut threads normally.That seemed like a smarter idea. But it won't cut perfect threads, so I developed a different approach.

Here's the technique that I tried. I put the pipe in the lathe, mounted a threading tool in the tool holder upside down, setup the lathe for 14 TPI, ran the lathe in reverse so the tool cuts from the headstock towards the tailstock, and cut the thread using my hand to gradually move the tool inward as it cuts. The length of threads required is approximately 0.5".Tapering ¾" diameter per foot of length comes out 0.0156" change in radius over 0.5".

I started the cut with one very light pass and no taper. That lightly scored the surface of the pipe and allowed me to confirm that everything is correctly cutting 14 TPI. For the next pass, I cranked the crossfeed inward what seemed like 0.005" halfway through the cut. It was hard to tell exactly how much I was actually cutting inward, because the tool was digging in pretty hard at the end and the lathe has some flex. I cut many more passes, each one cranking in gradually harder and harder at the end until it seemed like 0.015" to 0.020" of taper over the ½" threaded part. After 6 passes, I used a file to remove the sharp points and tried the thread in the elbow. It just barely started. So I cut another 6 passes, stopping and testing after each two passes.When I could engage three full turns by hand without too much effort, I figured it was good enough, so I gave it one last lick with the file and took it out of the lathe.

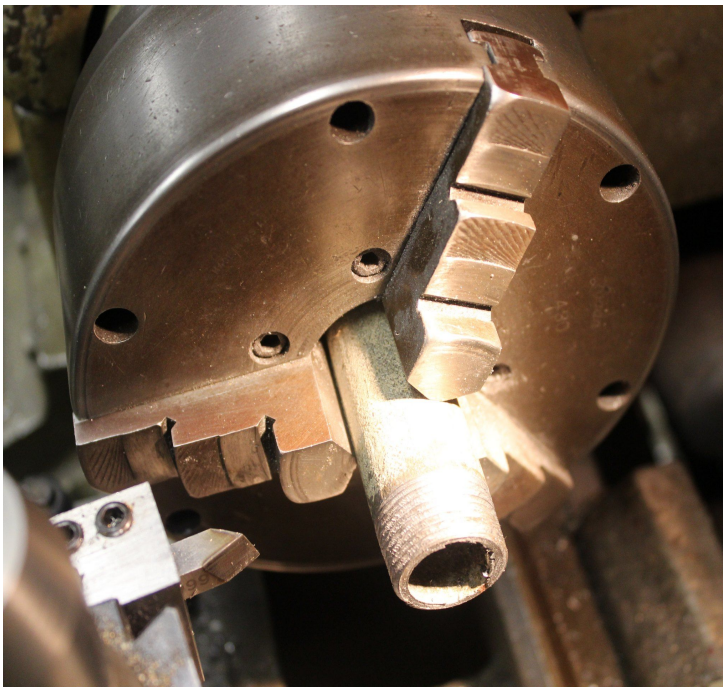


Figure 1 – Setup Used To Cut Threads.

Note that the threading tool is upside down. The lathe is run in reverse using caution to avoid spinning off the chuck during cutting

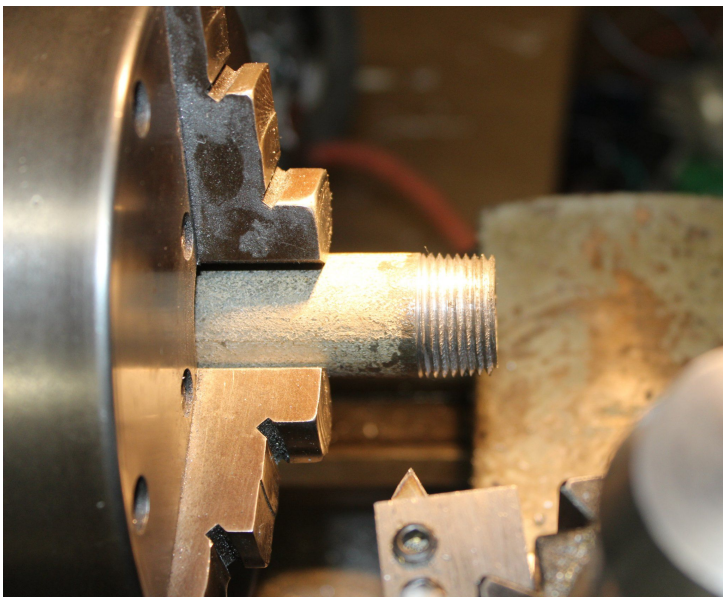
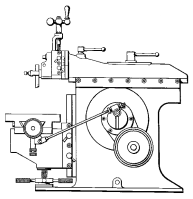


Figure 2 – Finished Tapered Pipe Thread

With the pipe in a vice, I was able to screw it to the elbow even deeper and made a very secure coupling.So I'm pleased to say that this type of cutting works! It isn't a precision operation, but it resulted in a good tapered thread and mates tightly with a tapered fitting.I don't know if the result is gas-tight and I'm sure that it wouldn't pass any industry standard for pipe threads, but it works very well for my handle.

Figure 3 – New Handle In My Old Hand Truck

Four male threads took 90 minutes of machining time, including the time to figure out what to do, time to cut the pipe, and time to take a few photos. Comparing the effort to do it at home and the cost of doing it at the store, next time, I just may ask Lowe's to thread the pipe for me.



Metal Shapers

Kay Fisher

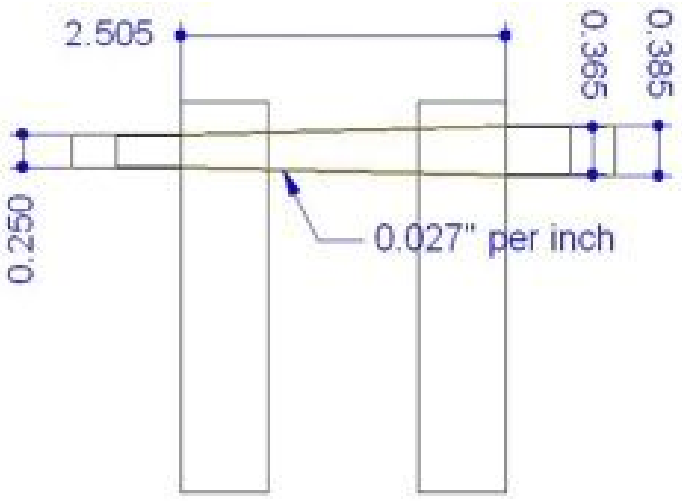
R. G. Sparber's Gingery Shaper - Part 41

My next task will be to cut the thickness of the clapper so it is even with the top of the box and then add a radius to the top back corner so the clapper can swing out of the box.

Machining The Clapper Pin and Hole, Version 2

Since I do metal working as a hobby, I am more interested in "the journey" than the "destination." In this case, it means that I prefer to try my hand at making and installing a tapered clapper pin rather than just use a piece of straight drill rod. The journey included making a tapered D reamer, making the tapered pivot pin, step drilling the hole, and then using my tapered D reamer to cut a nice, smooth taper.

No one is more surprised than me. On my second try I was able to make a serviceable reamer and then use it to cut the tapered hole.



Taper Drawing Drawing by R. G. Sparber

A Bit of Math First

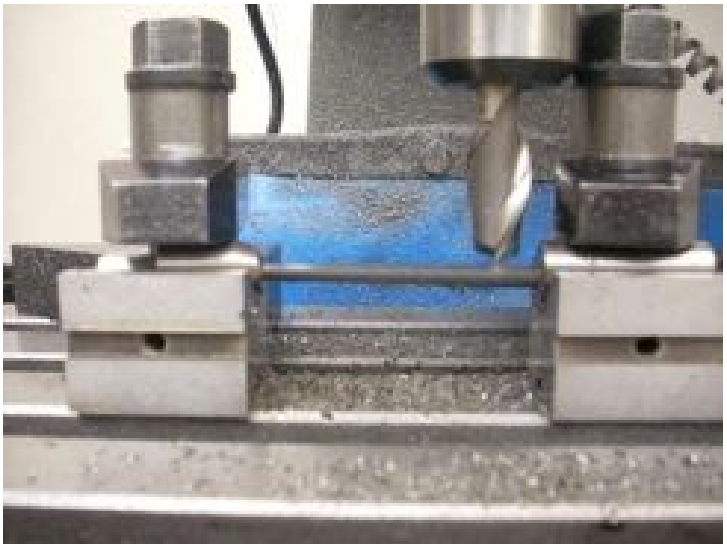
My first step was to figure out what taper was needed. I measured the clapper box and then arbitrarily decided I wanted one end of the taper to be 0.375" in diameter and the other 0.250". The 0.375" diameter was not entirely arbitrary. If the taper could not be cut, I could drill and ream the hole for a 3/8" piece of CRS. The distance between the supports is 2.505" as shown. This turns out to be a nice round 0.025" per inch for the taper. But due to a shift in my dead center taper attachment, the taper changed to 0.027". I wanted to keep the small end 0.250" in case I decided to thread the straight part later. This means that the larger part had to be larger. It really does not matter since I made the D reamer and pin to match. I just pity the poor sole that someday inherits this shaper and decides to replace the pivot pin with one from a catalog.

In the figure, if you can see color, one taper outline is in red and the other is green. The green outline is 0.010” smaller than the red one and was my attempt at defining the volume that I planned to step drill. In the end I found it far easier to just use an.

Cutting Taper Photo by R. G. Sparber

Many years ago I made an adapter that permits me to mount my boring head in my tailstock. A dead center is set where the boring bar can go and I have a nice way to dial in a taper without disturbing my tailstock alignment. The only problem with this arrangement is that the boring head is not pinned in place. After initial alignment I bumped the head when there was nothing pushing on it at the dead center. The head shifted slightly but then seemed to go back in place. Well, it almost did. After making the tapered pin out of CRS, I discovered that the taper was 0.027” per inch instead of 0.025” per inch. Now I just have to stay with the new taper value. The CRS taper pin would at least be a means of testing my reamed hole and it turned out to work fine as the pivot pin.

I started with 0.500” CRS and turned the taper in the middle. This left some uncut stock on the ends which is very handy as you will see later.



D Reamer - 1st Try Photo by R. G. Sparber

Although I used water hardened drill rod, it didn't cut much different than CRS. After turning the taper, I moved the part to my mill and put it on precision V blocks. I knew the diameter was 0.500” so milled down 0.250” to get a D cross section. Because there was uncut stock at each end, it was easy to fixture.

Heat Treating Photo by R. G. Sparber

I asked a lot of people for advice on how to make this D reamer. One expert said to not hold the torch on the part too long or it would warp. Another suggested mounting it in a drill press and run the part at 200 RPM while heating and quenching it. Both ideas made a lot of sense to me so I did both. The only problem was that I really didn't know how long to hold the torch on the part.

I turned on my drill press and slowly brought the reamer up to the color of “cooked carrots” as suggested by another expert. When it looked about right I raised the yogurt cup full of water up onto the reamer to quench. Another expert suggested I temper the reamer at 350° F for a few hours but I was in too much of a hurry.

Taper Pin & D Reamer Photo by R. G. Sparber

Above is the D reamer, ready to use. To the left is the CRS pin waiting to have the end cut off.

I stoned the flat to sharpen it but did not grind any relief behind the cutting edge since another expert said this was not necessary.

Testing the D Reamer

I was excited to try out my new D reamer but after all the work I have in my clapper box and clapper, now is not the time to risk them. Instead I started by making a tapered hole in an ingot.

The first step was to figure out which drills will be needed to rough out the hole and what depth they must go in. I have a selection of fractional, letter, and numbered drills. It is hard for me to drill to an exact depth even with my DRO so I decided to leave about 0.01” for the reamer. A little algebra was handy here:

r = 0.183” - (0.027 x depth)

where r is the radius of the drill and the depth is the distance the drill must go down into the part as measured from the drill's lip. A little more rearrangement gave me

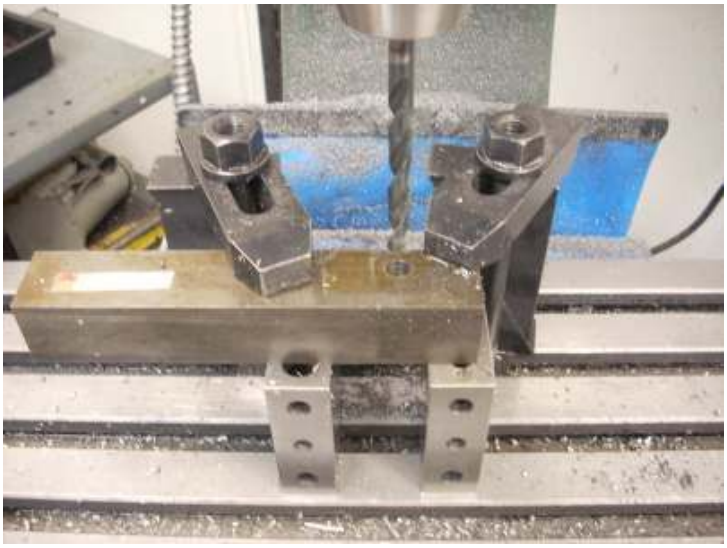
depth = (drill diameter – 0.366”)/0.054”

Tapering Ingot Photo by R. G. Sparber

Starting with a “T” letter drill with a diameter of 0.358”, I calculated a depth of -0.148”. I lined up the lip of the drill at the surface of the hole, set the DRO's Z axis to 0, and feed down until it read -0.148”. It is only difficult because I chose to use every available drill which turned out to be 22 drills. I over-drilled a few times but the 0.01” allowance saved me.

Taper Pin in Ingot Photo by R. G. Sparber

The reamer worked great in the ½” thick cast aluminum ingot. My tapered pin was a nice snug fit.



Drilling Steel for Test Photo by R. G. Sparber

The next test of the reamer was 12L14 leaded steel. This is the same material used to make my clapper. The 12L14 is up on 3” blocks to insure enough room for the reamer.

Reamer Damage Photo by R. G. Sparber

Well, this time the reamer didn't work as well. After some head scratching I noticed a few things. First of all, the center of the reamer was necked down, as visible in the shiny areas along the edge.

Reamer Warp Photo by R. G. Sparber

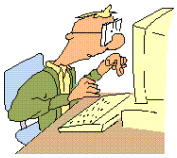
Then I noticed that my reamer was very badly warped, probably from heat treating. No wonder it worked fine in ½” thick stock but poorly in the thicker 12L14. After taking a break to clear my head, I made another reamer.

The second reamer was made the same as the first but I took a little more time to evenly heat the drill rod as it turned in the drill press.

An expert on line named “doc” gave me a few pointers for next time. "O-1 steel is way more forgiving. There will still be warpage but much less. Make it oversize & grind it out. You can anneal the rod first at 500 deg, straighten it then anneal it again. Use the oven and then cool in your freezer. Repeat the cycle a couple of times to take out the internal stresses. Uneven heating will still cause some warp. If you can't do overall grinding after hardening, then grind out the D bit ½ after hardening. Alternately, "draw" metal in the oven at 375. You can fudge a straight D bit that warped by relieving beyond the cutting head."

D Bit 2nd Try Photo by R. G. Sparber

This time I was much luckier. The reamer has much less warp. I still have some curve but it looked good enough to risk using on my clapper box and clapper.



Editors Desk

George Gallant

The following is the guts of a email from the American Precision museum in Windsor Vt. Removed some of the gloss and formatted to fit our Gazette.

The American Precision Museum's 14th annual Model Engineering Show will take place at the Windsor Recreation Center, 29 Union Street, and at the museum Saturday, October 12 from 9:00am-5:00pm.Both sites are wheelchair accessible. The fee of $10.00 for adults and $5.00 for students with school ID covers admission to both the Recreation Center location and the nearby American Precision Museum at 196 Main Street. There will be a reception at the museum with behind the scenes tours and an opportunity to see the museum's exceptional collection and Civil War exhibits on Friday, October 11 from 5:30 – 7:00pm.

Now celebrating 14 years of bringing fine craftsmanship and engineering excellence to the Upper Valley, the American Precision Museum's Model Engineering Show has become an October tradition giving visitors the chance to see the work of some of New England's finest model engineers, along with engaging demonstrations throughout the day highlighting the most intricate of skills. Perfection is the hallmark of the model engineering and miniature movement, and visitors to the show will experience some of the best.

Special presentations this year include, Rich Colton, historian from the Springfield Armory National Historic Site in Massachusetts, who will be on hand to display and talk about the Springfield Armory's working model of a Blanchard Lathe. Developed circa 1817, this lathe revolutionized the way irregular shapes were cut.

Also museum Trustee, Bill McCarthy, one of the show's founders and a restoration professional, will present a workshop on *Reproducing the Merrill Civil War Carbine*. The Merrill carbine was a breechloader gun designed by Baltimore, Maryland, gunsmith and inventor, James H. Merrill. It was used primarily by Confederate cavalry units and used the .54 Minie balls with paper cartridges which loaded by lifting the top of the breech lever. They are ranked among the more rare and sought-after of percussion breech-loading rifles.

There will be a reception with behind-the-scenes tours at the museum on Friday from 5:30 – 7:00 p.m.

The year's show is most generously sponsored by Mascoma Savings Bank, O & H Holding Company, and Harpoon Brewery. For more information visit the museum's web site: www.americanprecision.org or call the museum at 802.674.5781.

The museum exhibits:

Full Duty: The Civil War Collection of Howard Coffin
Arming the Union: Gunmakers in Windsor, Vermont

will close for the season October 31st, 2013.

Upcoming Events

Bill Brackett

To add an event, please send a brief description, time, place and a contact person to call for further information to Bill Brackett at:

thebracketts@verizon.net or 508-393-6290.

Oct 3rd Thursday 7PM
NEMES Monthly club meeting
Charles River Museum of Industry 781-893-5410
Waltham, MA

Oct 5th - 6th
Foreign Auto Festival & Antique Aeroplane Show
Owls Head Transportation Museum Owls ME
http://www.ohtm.org/

Oct 20th 9:00am
The Flea at MIT
Albany Street Garage at the corner of Albany and Main Streets in Cambridge

Oct 12th 13th 8:30 to 4:30
Battle for the Airfield
The Collings Foundation
137 Barton Road in Stow, MA
Cost at gate: $20 Adults
www.collingsfoundation.org/cf_OpenHouseEvents12.htm

October 12th 9-5
American Precision Museum 14th annual Model Engineering Show
Windsor Community Center, Windsor VT
www.americanprecision.org 802-674-5781.

Oct 30 & 31
Design-2-Part Show
Royal Plaza Trade Center Marlboro Ma.
Free admission at www.d2p.com/ShowInfo

Nov 1st – 3rd
World Championship Punkin Chunkin
East of Bridgeville, Delaware
www.worldchampionshippunkinchunkin.com

Nov 7th Thursday 7PM
NEMES Monthly club meeting
Charles River Museum of Industry 781-893-5410
Waltham, MA