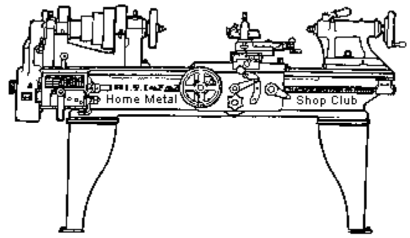
January 2013

Newsletter

Volume 18 - Number 1



http://www.homemetalshopclub.org/

The Home Metal Shop Club has brought together metal workers from all over the Southeast Texas area since its founding by John Korman in 1996.

Our members' interests include Model Engineering, Casting, Blacksmithing, Gunsmithing, Sheet Metal Fabrication, Robotics, CNC, Welding, Metal Art, and others. Members enjoy getting together and talking about their craft and shops. Shops range from full machine shops to those limited to a bench vise and hacksaw.

If you like to make things, run metal working machines, or just talk about tools, this is your place. Meetings generally consist of ***general announcements***, an ***extended presentation*** with Q&A, a ***safety moment***, ***show and tell*** where attendees share their work and experiences, and ***problems and solutions*** where attendees can get answers to their questions or describe how they approached a problem. The meeting ends with ***free discussion*** and a ***novice group*** activity, where metal working techniques are demonstrated on a small lathe, grinders, and other metal shop equipment.

President *Vance Burns*	Vice President *John Hoff*	Secretary *Martin Kennedy*	Treasurer *Emmett Carstens*	Librarian *Dan Harper*
Webmaster/Editor *Dick Kostelnicek*	Photographer *Jan Rowland*	CNC SIG *Dennis Cranston*	Casting SIG *Tom Moore*	Novice SIG *Rich Pichler*

This newsletter is available as an electronic subscription from the front page of our website. We currently have over 324 subscribers located all over the world.

About the Upcoming February 16 Meeting

NOTE: The February meeting is to be held on the third Saturday at 12:00 noon due to room availability. This is a one-time change of date. General meetings are usually held on the second Saturday of each month at 12:00 noon in the meeting rooms of the Parker Williams County Library, 10851 Scarsdale Boulevard, Houston, TX 77089. Visit our website for up-to-the-minute details, date, and location and for the main presentation topic.

Next month's presentation is about Making Molds for Plastic Parts by Kevin Capps.

General Announcements

Videos of recent meetings can be viewed at the HMSC Website's Video page.

The HMSC has a large library of metal shop related books and videos available for members to check out at each meeting. The library is maintained and curated by the club librarian, *Dan Harper*. These books can be quite expensive, and are not usually available at local public libraries. Access to the library is one of the many benefits of club membership.

We need more articles for the monthly newsletter! If you would like to write an article, or would like to discuss writing one, please contact the Webmaster *Dick Kostelnicek*. In the September, 2012 HMSC board meeting, the board elected to waive membership fees during the next membership renewal cycle for those providing newsletter articles.

Ideas for programs at our monthly meeting are always welcome. If you have an idea for a meeting topic, or if you know someone that could make a presentation, please contact Vice President *John Hoff*.

Recap of the January 12 General Meeting

By Martin Kennedy, with photos by Jan Rowland, Dick Kostelnicek and Martin Kennedy

Thirty one members and one guest, Chuck Baker, attended the 12:00 noon meeting at the Parker Williams County Library. President *Vance Burns* led the meeting.

The location for the meeting will move to the Montrose library starting in April.

We are sad to say that one of our club members, *Ed Gladkowski*, passed away. Ed was a mechanic in the Navy in the late1960's. He then became head machinist for Rutgers University. Ed built exquisite engine models, and was a 'machinist's machinist.' Ed worked for several years on a model of a Colt steam engine. He made every part by hand, including the bronze castings (see article below In Memoriam of Ed Gladkowski).

Safety Moment

Rich Pichler noted that you shouldn't solder in an area that has moisture. The area must be dry, or the solder can pop out and burn you.

Joe Scott recounted an incident where he had a small motor that he was working on in his lap. To test it, he turned I on, and it wrapped up in his pants leg and bent the shaft on motor.

Dan Harper was working on another iteration of the work stops he built for his milling vice. The head on his mill was not clamped down, and a 5/8-inch carbide end mill pulled the head down and ruined the end mill, a drill chuck, and a part.

Dick Kostelnicek said that he really likes double insulated drills. He remembered a time when a friend drilled into a water pan on a window mounted A/C with a non double insulated drill. He got shocked as water drained onto the drill. He said that that fellow could not let go of the drill till the power cord was yanked from the electrical socket.

Presentation

Jan Rowland, HMSC member and photographer, was a very early adapter of CNC. He built his first custom CNC lathe in about 1984 using a Commodore PET! He's now using hand-built CNC lathe Number 4.

Jan uses the CNC lathe in his business of building "stops", or wooden knobs, for pipe organs. The knobs allow the organist to stop the air supply to the organ pipes when pressed in. They are also called register knob and draw knobs (photo below).

A typical order for stops is for 3 to 220 pieces, with the average order being for about 40 stops. He has made over 14,000 knobs so far. In 1889, knobs with oblique handles became the vogue. Today, they're still the most popular shape.

His favorite material is diamond wood, which is made from veneers. Other woods he uses are pear wood, boxwood, American maple, and ebony.

The CNC lathe that Jan built in 1999 is a custom lathe designed by specifically to build organ stops. He built it himself because the specialized lathe that he needed was not available commercially. He wrote his own control software in the programming language Basic to control stepper motors.

The CNC lathe's X any Z axis feed nuts are made from Turcite – a compound of RED Teflon and fiber-glass; very tough, yet self-lubricating. Ball screws and actuators were obtained from a local supply company. The chuck has a 5C mount. The tailstock is air actuated only and has no hand wheel. The lathe uses carbide inserts and is driven by a 1/2 HP 3 phase motor.

A dust collector is part of the setup since it's for used mainly for woodworking. Another thing that Jan builds with the lathe is brass parts that are used by a manufacturer of kaleidoscopes.

Show and Tell

Dick Kostelnicek made a presentation on some of the many different types of micrometers he has accumulated. Some of the types discussed were: Anvil, Inside, Tube Wall, Blade (for grooves), Screw Thread (measures pitch diameter with replicable anvils for various sized threads), Disk (for soft surfaces), Depth, V-anvil (for round objects such as mills and gears), Point (for gullets on gear teeth and roots of splines) and Bore micrometers.

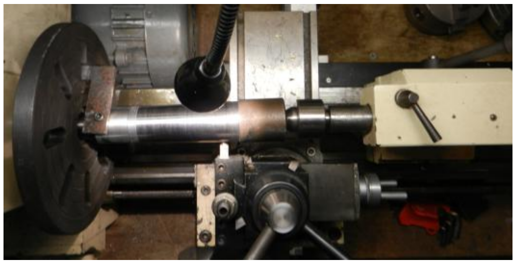
Joe Williams brought in an old but still unused Bulletin 5910 set of blocks made by South Bend to grind cutting tools. Aluminum reproductions of them are still made today. (right photo). He also showed and gave away a very tiny #4 or #6 single point thread mill.

Joe Sybille brought in two replacement parts he made for his drill press. Joe is new to machining, and a club member had assisted him in making the parts.

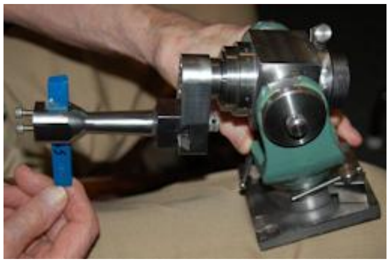
Joe Scott showed a folding handle for the M-14 E-2 machine gun that was part of the design for 14 years. He bought a lot of aluminum castings and then made a rounded part using a wooden block mold and a hammer. The handle included a machined bracket. He had the stock cut out with a water jet, which leaves tapered edges that he removed using a belt sander. The part didn't quite fit. After three days of machining, he discovered that the water jet part was made from 13mm plate (0.0512-inch), and not the ½-inch plate he specified.

Rich Pichler brought a watch repair parts kit he bought at a garage sale. It consisted of many hundreds of tiny parts that were in a cigar box.

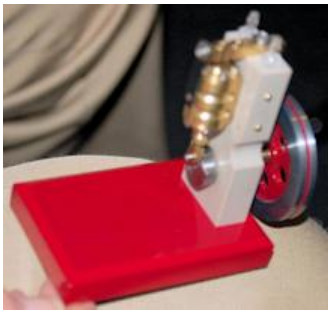
He passed around a mystery tool that no one could identify (left photo).



Martin Kennedy showed a Jarno 12 x 2 MT adapter that he made for his Monarch lathe. The Jarno taper has a fascinating history. Martin described how he made it by offsetting the tailstock and turning between centers (right photo).



Phil Lipoma built an ingenious end mill and lathe bit sharpening fixture (left photo). It was made from a truck U-joint. It includes several attachments such as one to hold 5C collets and another to hold lathe bits for sharpening.



Phil passed around an oscillating steam engine that he built (right photo). It used a graphite piston and parts such as bearings from a tape player.

Lee Morin showed a very nice Tormach Superfly cutter.

Tom Darragh built a device to anneal brass shell cases. Cases need to be hard in the neck head area, but soft in body. He used temperature indicator crayons that melted at 750 degrees to indicate when the proper temperature had been reached.

An 1868 book was recommended called *507 Mechanical Movements: Mechanisms and Devices* by Henry T Brown.

An article describing adding a tracer to a lathe from the Nov/Dec 2009 Home Shop Machinist was circulated.

Novice SIG Activities

Rich Pichler and the novice group demonstrated soldering techniques.

Problems and Solutions or Ask the Blacksmith

A member asked where he could obtain a piece of 2 x 4-inch bar steel. Several suppliers were mentioned - both Internet sources such as Speedy Metals, Online Metals and eBay and local businesses such as Triple S Steel, Morris Metals (SS, Aluminum), Rose Steel and Texas Iron and Metal.

A member needed to drill a countersink on a steel plate. He was using a tool with inserts which worked, but he had to drill at 0.1-inch/min and 100 RPM. The answer was that he may need to run at a higher speed. There should be a chart for feed and speed for the specific carbide insert he was using.

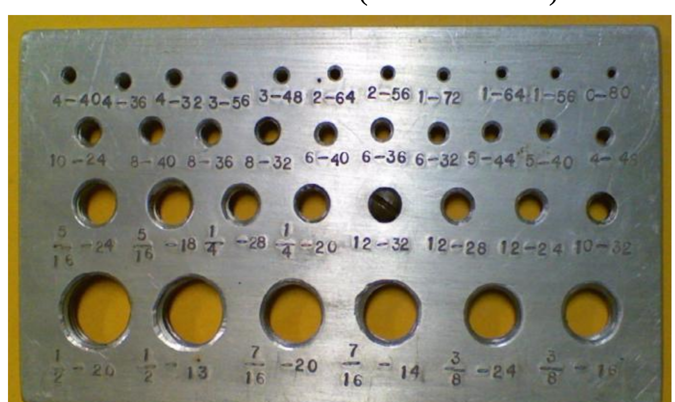
It was noted that an easy way to cut a custom radius was to sand it in using sandpaper with two sided tape adhered to a rod of the radius you want.

In Memoriam of Ed Gladkowski

By *Dick Kostelnicek*

Ed Gladkowski recently died. He was a machinist's machinist and a long time Home Metal Shop Club member. He loved to build engineering models, especially historic engines. Ed used classic methods and machines ranging from the shaper to the vertical knee mill. He was patient and meticulous in his machining pursuits. Shown below is Ed's handmade Imperial screw gage, crafted from ¼-inch thick aluminum, identically hand stamped on both sides (without errors). It has all popular Imperial screw sizes from #0 through ½-inch. Not something that you couldn't purchase, but just an example of Ed being Ed.

Ed wrote articles for the HMSC newsletter (see links below) and presented talks during our monthly meetings about his machining pursuits. For some of the articles that he authored, he requested anonymity. He didn't like to bask in the lime light over his accomplishments. However, as his Editor and since he can no longer complain, I'm going to announce his authorship of the October 2003 Newsletter article A Sea Story. In it he relates how a machinist on a USS Destroyer, during the Korean War, saved an immobilized ship with his ingenuity and the available but scant mechanical tooling.



Ed Gladkowski's Imperial Screw Gage

A Sea Story
by an anonymous HMSC member (a.k.a. *Ed Gladkowski*)

A few wars ago in 1968, my old destroyer was back in the south China sea off Vietnam after some quick repairs in the Subic Bay (Philippines) shipyard, when a little problem came up. The steam turbine-driven main condenser water circulating pump in the forward engine room wasn't working too good (to put it mildly). The pump end had a water-lubricated split bronze sleeve bearing about 14 inches long, 3 inches ID by 4 inches OD. The 1/2-inch thick bearing walls were perforated with a bunch of 3/8-inch holes for water to cool and lube the shaft. The two halves of the split bearing were aligned by four dowel pins in the mating faces.

Maybe because things were kind of busy then, the shipyard workers had reassembled the bearing with only two dowels engaged, so that each half of the sleeve overhung the other by about three inches on each end. Somehow, they managed to get it back in the pump bearing housing which was also split, put the cover on, and slug up the nuts.

When the pump finally quit, it was torn apart and the mangled bearing found. When it had been bolted up, about 3 inches of each half had been bent diagonally outward by almost an inch. Since we had no spare bearings on board, it was fix it or leave our duty station and limp back to the yard.

Fletcher-class destroyers had a 16 inch lathe, a drill press, and a small workbench with a good heavy bench vise. The way we fixed the bearing was as follows:

The pump shaft was "miked" and a piece of brass bar stock turned between centers .004 inches oversize for running clearance, using the old rule of thumb ".001 inch of clearance per inch of shaft diameter plus .001 for luck.

Each bearing half was held in soft jaws in the bench vise and beat back into something like the original shape using the biggest (about 5 pound) rawhide mallet we had in the ship. Sounds extreme, but there was nothing to lose; it was no good as it was.

The two bearing halves were then fitted to the .004 inch oversize bar using Prussian blue, half-round files and finally scrapers. When it was as good as we could get it on the bore, the outside diameter was fitted into the pump housing again using blue, files and scrapers, while hanging upside down in the bilge through a hole in the engine room deck plates.

Not much more to add – the pump was reassembled (this time with all four bearing dowel pins aligned!), lit off and put on the line. It ran fine until we got back to the U.S.A. about six months later.

Maybe the moral is, you don't always need elaborate equipment to do a job if it really has to be done.

After his death, Ed's sister shared copies of several US Navy commendations for Petty Officer Gladkowski. One of them issued on 21 April 1969 reads, in part, as follows:

Subject: Letter of Appreciation for Services Rendered.

1. Petty Officer GLADKOWSKI is a more than able mechanic. He possesses a "way with machinery". No job is too menial or too immense for him to undertake. He is very meticulous and conscientious in the performance of his duties. GLADKOWSKI always pursues all jobs with enthusiasm and confidence. He demonstrates his ability by his versatility, initiative and knowledge of his rate. GLADKOWSKI is "always on call" and in many instances has been called upon to perform jobs far beyond the scope and capabilities of this ship with both equipment and material being substandard in condition. He takes great pride in each assignment working many extra hours to complete a job with the finished product being only short of perfect at the very least.

2. Through your knowledge and ability you have been directly responsible on certain instances for keeping the Engineering Plant in operation therefore enabling the ship to meet its commitments.

3. For this service and devotion to duty we offer our most sincere thanks and appreciation.

Signed by numerous officers of the ship USS WEDDERBURN DD-684

We'll all miss Ed. Links to his HMSC Articles follow:

1. **The MK.1 Eyeball**
2. **Drilling a Long Bar on A Short-Bed Lathe**
3. **Mill/Drill and Drill Press Alignment during Tool Changes**
4. **A Rotary Sine Bar for the Lathe**
5. **A Sea Story**
6. ***Wagon Wheel* Wrench for Miniature Nuts and Bolts**

Articles

Engraving, Stamping, and Indexing

By *Phil Lipoma*

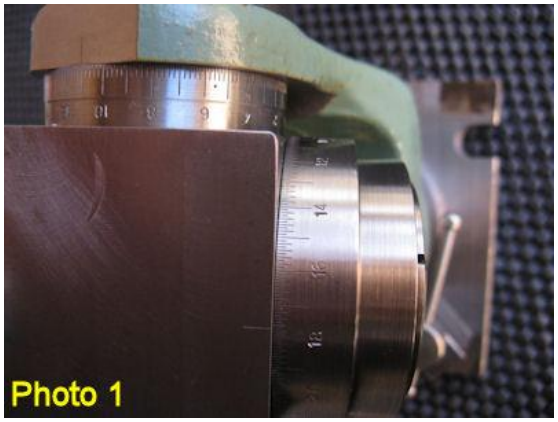


Photo 1

Many machine tool settings depend on angular scales (tics) for setup and actual operation. In fabricating certain machine tool accessories, angular scales are sometime required. Photo 1 is an example. This paper will discuss techniques and fixtures that are usually required for accurately locating and engraving scale tics and stamping identifying characters that have a good appearance.

In locating angular scale tics, a very accurate angular reference is required. The most common angular references found in the home shop are a spin index, rotary table, and a lathe with an indexed head-stock.

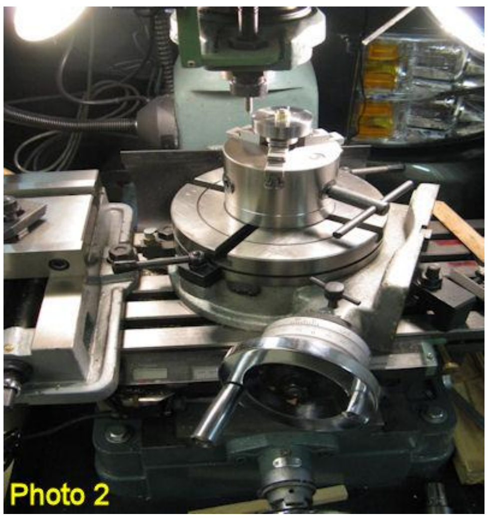


Photo 2

Photos 2 and 3 illustrate a setup using a milling machine with a rotary table to engrave radial tics. The engraving blade is made from a ¼-inch diameter round tool steel blank ground to a point and halved at the tip. The quill is set for tic depth and the table can be set for either X or Y- control of the tic length.

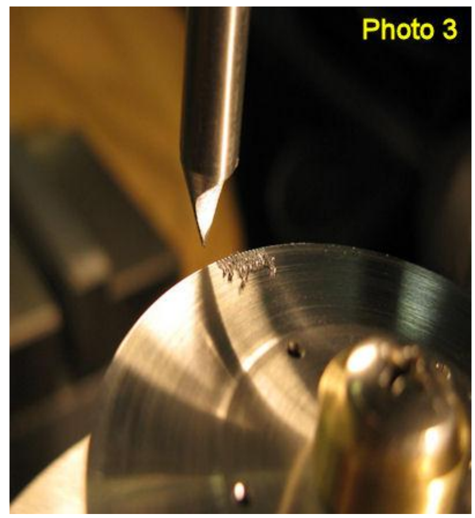


Photo 3

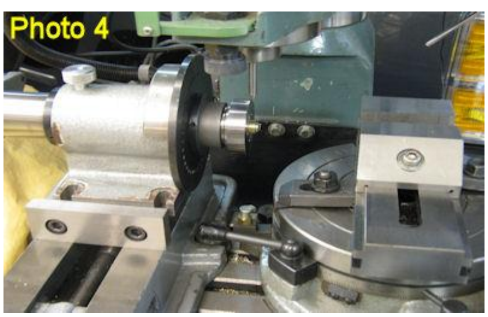


Photo 4

Photo 4 illustrates a setup using a milling machine and a spin index to engrave axial tics and uses the same blade and procedure described above.

The author's preferred method is a lathe setup with an indexed headstock for both axial and radial tics.

Most home shop lathes do not have an indexed headstock that also finds other uses. With a little ingenuity and a few hours of work, most any lathe's headstock can be indexed. This paper will visit that issue next.

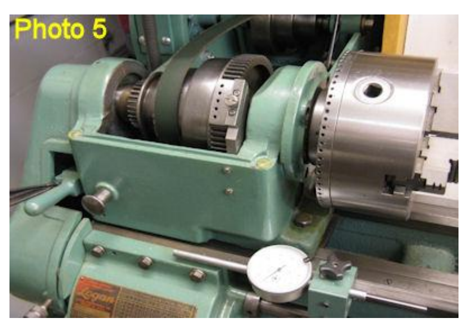


Photo 5

Photo 5 illustrates a 1950's model Logan lathe whose headstock has been indexed. The 72 tooth 5^0 head stock gear on this particular Logan lathe makes the indexing task relatively easy.

Photo 6 also illustrates a shoe machined to mount over the headstock gear with 5 holes drilled over the gear. These holes are spaced 6^0 apart. A locating pin is made to fit the holes with a tapered end that fits the gear to zero-out backlash. These holes are marked 0-1-2-3-4. Also note, the pulley

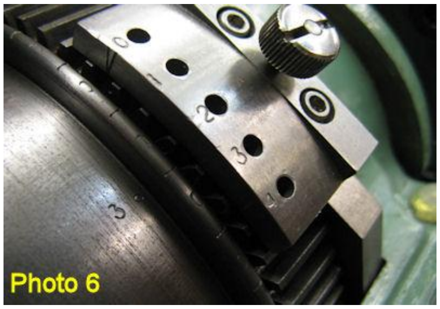


Photo 6

was stamped with a number every 30^0, $0=0^0$, $3=30^0$, $6=60^0$, etc. Example, place the pin in hole 0 and drop it into tooth marked 3 on the pulley, this represents 30^0 from the 0 mark on the pulley. Rotating the headstock one gear tooth forward represents 35^0, rotating the headstock forward an additional gear tooth represents 40^0 from 0, etc. Now, if we go back to tooth 3 (30^0) on the pulley and move the pin to hole 1 and the next tooth above 30^0, the headstock will move forward 1^0. Doing the same, moving the pin to hole numbered 2-3-4 and the next tooth ahead moves the headstock 1^0 each time, representing 31^0, 32^0, 33^0 and 34^0 respectively. The 5 holes form a vernier, allowing the headstock to be moved in 1^0 increment. A 6th unmarked hole in the shoe is for storing the pin when not in use.

One important caution, when drilling the 5 holes 6^0 apart in the shoe, care must be taken before drilling to locate the shoe to the exact same radius from the reference center as the radius will be from the headstock center when the shoe is mounted in the lathe. Otherwise, the 1^0 accuracy will be compromised. To drill these holes a spin index was used. The author made a bracket that mounted the shoe at the proper radius from the spin index center.

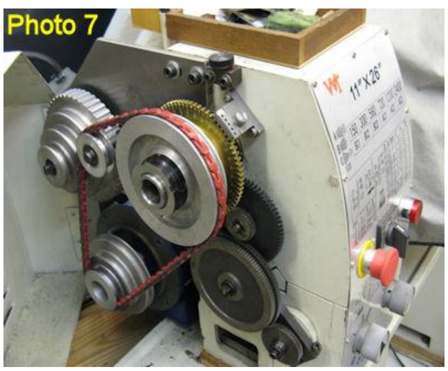


Photo 7

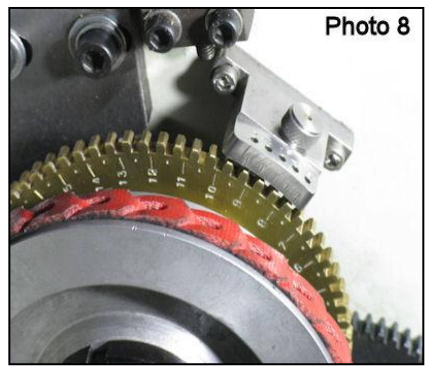


Photo 8

Photo 7 and 8 illustrate an Asian lathe whose headstock has also been indexed. This particular lathe does not have a headstock gear so it was necessary to fabricate a gear like plate that was mounted to the headstock pulley. This plate was made on a milling machine using a spin index and a 5^0 tapered end mill with slots located every 5^0. The shoe is made and mounted differently than on the Logan lathe but the concept, fabricating technique and operation is the same as described for the Logan lathe.

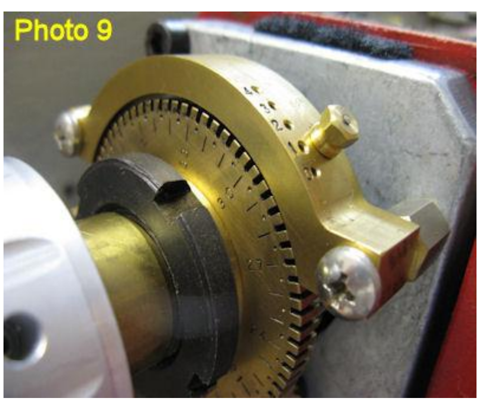


Photo 9

Photo 9 illustrates the headstock indexing of the small Harbor Freight lathe. Again, the concept and operation remains the same as described earlier.

Photo 10 and 11 illustrate the lathe setup for engraving angular scale tics around a cylinder and uses a 60^0 threading bit while moving the compound axially to engrave the tic length.

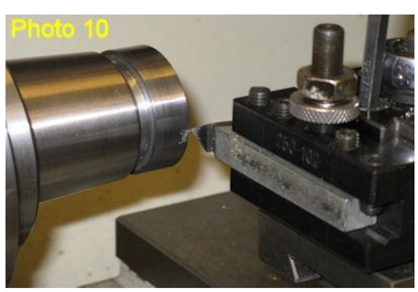


Photo 10


Photo 11

Photo 12 and 13 illustrate the lathe setup for engraving scale tics radially on a flat dial or disc. This also uses the 60^0 threading bit but the cross slide is used for the engraving the tic length.

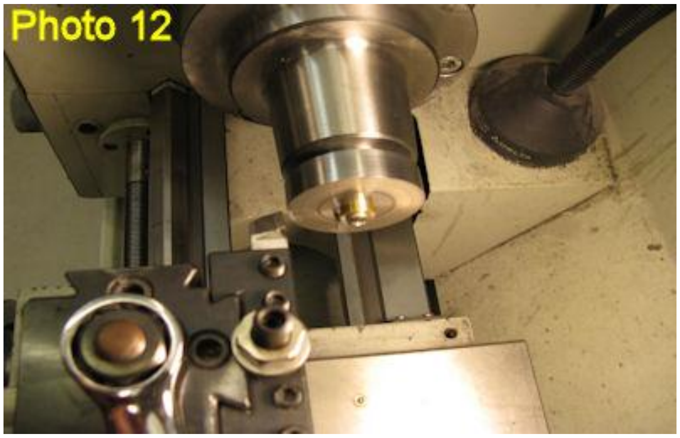


Photo 12


Photo 13

Now, consider stamping the numbers that identify the scale tics. Freehand holding the stamping die usually results in crooked, uneven and / or misplaced characters.

Photo 14 and 15 illustrate the use of a stamp die holding fixture for accurately locating characters around a cylinder. The fixture is made from a 1 x 1 x ¾-inch long section of aluminum and designed for a ¼-inch square stamp die.

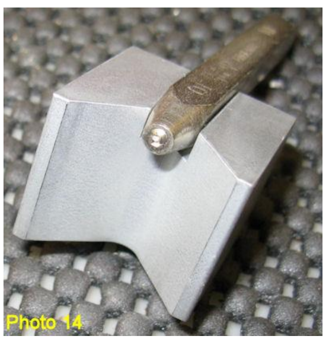


Photo 14

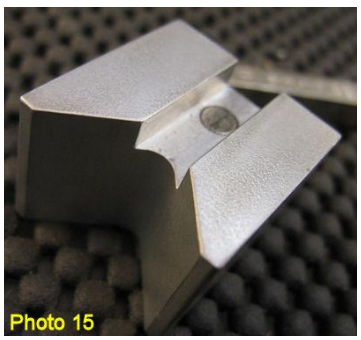


Photo 15

Photo 16, 17, and 18 illustrate the use of the holding fixture used for stamping characters on a flat dial or disc. This fixture is made from a ½ x ¾ x 3-inch long section of brass and also designed for a ¼-inch square stamp die.

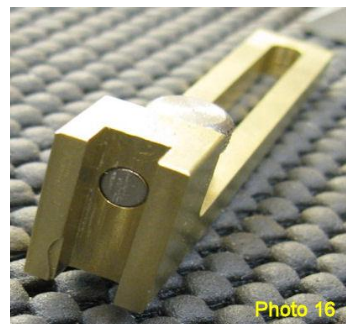


Photo 16

Both fixtures include an embedded rare earth magnet to hold the stamp die in place. For good results and appearance, stamp and engrave a little deeper and then file off the raised tips of the material around tics and characters.

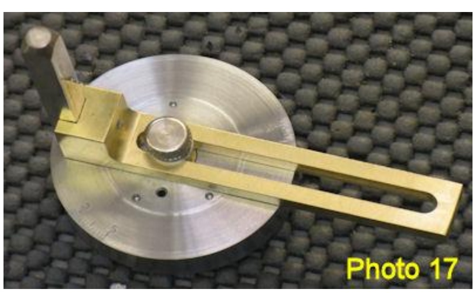


Photo 17

Earlier reference was made about another use for headstock indexing. The author frequently uses the indexed headstock for locating equally spaced holes on a bolt circle with a tool post mounted center drill.

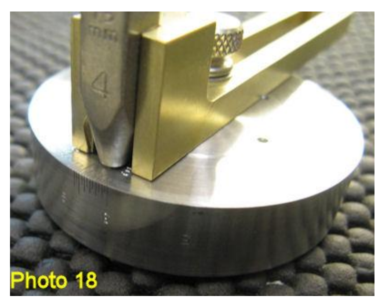


Photo 18

Photo 19, 20, and 21 illustrate this setup with a homemade tool post drill. The tool post drill was made with a surplus motor and a collet chuck set from an expired Dremel tool.

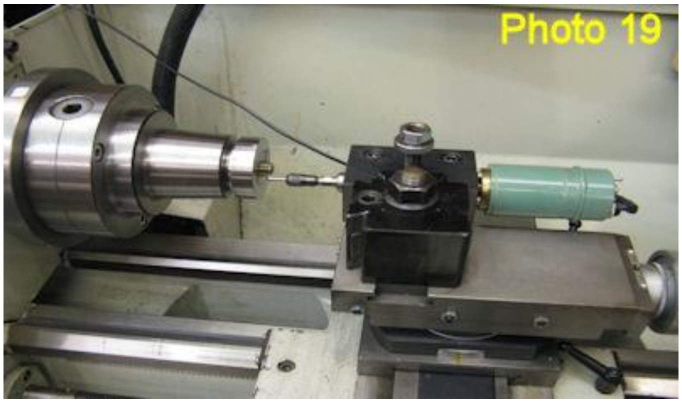


Photo 19

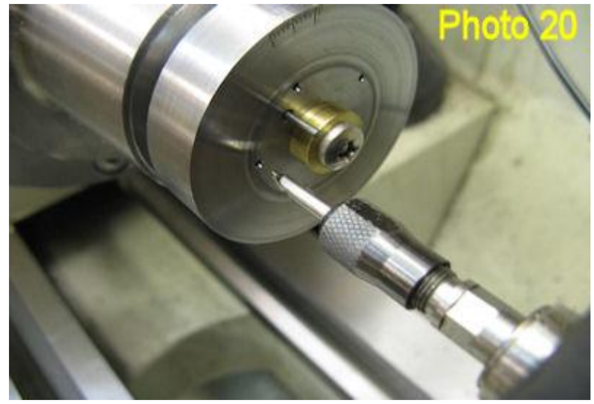


Photo 20


Photo 21

Photos 22 and 23 show the engraving point being ground with a tool post grinder made from a Harbor Freight hand held router.

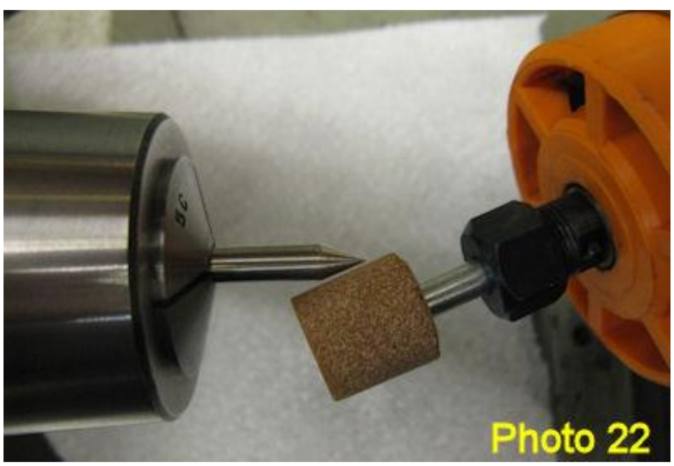


Photo 22


Image 23

CAUTION! EXTREME CARE must be taken not to operate a router with a mounted grinding wheel at full voltage. Since this router turns about 24,000 RPM, an electronic speed reducer must be used. Most mounted grinding wheels when operated at this speed will fly apart and can create serious injuries.