Home Metal Shop Club

July 2014
Newsletter

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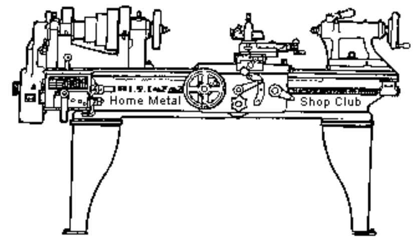


http://www.homemetalshopclub.org/

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 *Norm Berls*	Secretary *Joe Sybille*	Treasurer *Emmett Carstens*	Librarian *Ray Thompson*
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 658 subscribers located all over the world.

About the Upcoming 9 August Meeting

The next general meeting will be held on 9 August at noon at the Spring Branch Memorial Library at 930 Corbindale in Houston TX. The presentation will be on AC Induction Motors by Dick Kostelnicek.

Visit our website for up-to-the-minute details, date, location, and presentation topic for the next meeting.

General Announcements

Videos of recent meetings can be viewed on the HMSC website.

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 by the club librarian. 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.

The club has funds to purchase new books for the library. If you have suggestions, please contact the librarian.

We need more articles for the monthly newsletter! If you would like to write an article, or would like to discuss writing an article, please contact the Webmaster Dick Kostelnicek. Think about your last project. Was it a success, with perhaps a few 'uh ohs' along the way? If so, others would like to read about it. At 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 Norm Berls.

All annual memberships expire on September 1st. Dues of $15 for the next fiscal year should be paid to the treasurer Emmett Carstens in the August meeting.

Recap of the 12 July General Meeting

By *Martin Kennedy*, with photos by *Jan Rowland*

Vance Burns

Club president *Vance Burns* led the meeting held at the South Houston Branch Library in South Houston, TX. Twenty two members and four visitors, David Dorr, Lamar Flannigan, Sidney Wallace and Jerry Downs, attended the meeting. After the meeting, Gil Groendyke, Larry Hancock, Sidney Wallace and Jerry Downs joined the club.

Ray Thompson volunteered to replace *Dan Harper* as the new librarian. Thanks to Dan for his years of service as the librarian!

Presentation

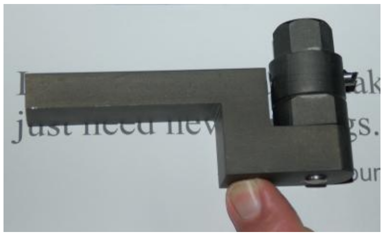

Phil Lipoma

Club member *Phil Lipoma* made two presentations. The first was about a "Large Radius Tube Rolling".

A friend of Phil's wanted to build several large commercial greenhouses. Greenhouse kits were available, but he felt that they were too expensive. The materials necessary to construct the greenhouses were substantially cheaper than the kits, and he elected to go that way. There was a challenge, though. The pipes used for the rounded top section needed to be rolled to a large radius. Phil agreed to design and construct a rolling machine to roll the pipes.

The machine that Phil built was made from 3/8" steel plate, about 16" long x 9" deep. It employed two fixed and one adjustable rollers. The rollers turned on bronze bushings. One of the fixed rollers was driven by a worm gear, and was connected by a sprocket and chain to the other fixed roller. The gear was driven by a pulley connected to a ½ HP electric motor. The belt was gravity tensioned using the weight of the motor. For testing and short runs, Phil made provisions to operate the roll manually with a crank.

Phil built the mechanism on his tabletop mill-drill and lathe. Total construction time was about 50 hours.



The tubing to be rolled was 1 5/16" OD x 0.050" wall thickness. To cut the necessary profile into the rollers, Phil built a custom rotating tool bit and holder for his lathe (right photo). In use, the holder is clamped into the lathe toolpost, and the bit is slowly advanced into the stock. A wrench is used on the bolt at the top to slowly rotate the cutter back and forth.

In use, the adjustable roller was moved in toward the fixed rollers using an acme screw. Sections of tubing were rolled and the radius was checked. Additional adjustments were made until the desired radius was obtained. The acme screw has a locking nut and handle so that the adjustable roller can be locked in place once the desired radius is obtained.

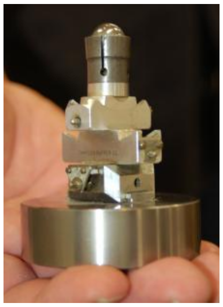
Phil's second presentation was on "Machining a Flywheel". Phil wanted to make an aluminum flywheel for a Stirling engine he was building. He wanted the flywheel to have classic curved spokes, similar to the way many cast iron flywheels were built. The curves were originally employed to prevent breakage caused by the stresses generated when the cast iron was cooling.

Constructing such a flywheel would be fairly easy on a CNC mill, but Phil wanted to build the flywheel on his manual mill. He built up a jig to let him cut the various radii on the curved spokes. It consisted of an 8" rotary table bolted to the ways on his mill, an X-Y table bolted to the 8" rotary table and a 6" rotary table bolted to the X-Y table. The stock was bolted to a fixture on top of the 6" rotary table.

Some adjustment of the four tables and careful cutting followed. Phil passed around the resultant flywheel.

Show and Tell

Martin Kennedy brought in a container full of dull and broken milling and lathe cutters. He said that each of the broken pieces represented a lesson he learned about machining. He also showed a punch that he built to make some felt washers (left photo). The punches are easy to make, and can be used either by placing the material to be cut on a hard wood backer and hitting them with a hammer or pressing them with an arbor press. They can also be used in rotary cutting mode, either on the lathe or on a drill press. For cutting gaskets, he had better luck using the tool as a punch. For the felt washers, the tool worked better in rotary mode.



Joe Williams brought in an item from his past. The top part is a ball chuck with a ball from a Four Ball Wear Tester and the lower part is a precision X-Y table with a circular rotating top and is used to hold a specimen (Goniometer) for X-Ray diffraction studies.

Gary Toll described the use of a Blake co-axial indicator.

Larry Hancock showed an aluminum hub used for a rope starter from a motorized bicycle he built (left photo).

Dan Harper designed a machinist jack for his mill (right photo). The bottom of the jack had a T-nut. The flat surface on the top could be adjusted to the elevation of the bed of his vise. The jack was used when a piece overhung the milling vise and needed support for machining.

Shop Safety

A member stressed the importance of using [lockout / tagout procedures](#) when working on equipment that could be electrically or physically energized. Several instances of accidents or near misses when these procedures were not used or understood by others were recounted.

Problems and Solutions / *Ask the Blacksmith*

An attendee said that he was building a cabin that would employ exposed timber trusses. He wanted to use fancy 3/8” truss plates to build the trusses. He checked the cost of buying standard plates, and of having plates machined, and found them to be prohibitively expensive. He was considering buying a plasma cutter to make the plates himself. One member had experienced this same problem building his house, and suggested using an alternate design employing tensioned cables located inside false wood beams. He said that the resultant look was indistinguishable from the real thing. Another member has a commercial machine shop and a plasma cutter, and said that he might be able to make the pieces more economically.

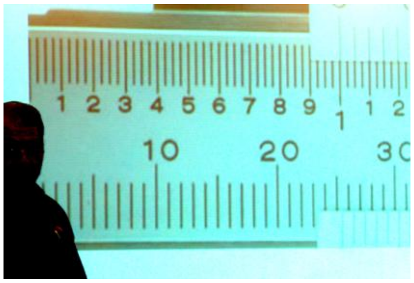
A club member was looking for a lathe that was to be a birthday present from his wife to friend. He wanted to know where he might acquire the lathe. Suggestions included: Bolton Tool, CW Rod Tool and Bass Tool.

An attendee said that he had recently moved to town, and had not been able to bring his machine shop with him. He wanted to build some parts that would be used in a Cotton Candy machine to be run from a Maytag gas engine.

An attendee was looking for a source for small round belts. A vacuum cleaner repair shop was suggested.

An attendee wanted to make a 90° ell from aluminum, and wondered how to smooth the transition at the bend. Use of a ball mill was suggested.

Novice Group



The novice SIG, led by *Vance Burns*, focused on making measurements with calipers, micrometers, and other measurement devices. He described how the Vernier scale works by dividing the main instrument scale by a factor of 10 or 25 on a rotary micrometer. He showed several historical versions of measuring instruments having Vernier scales.

Articles

Spindle Laser Locator

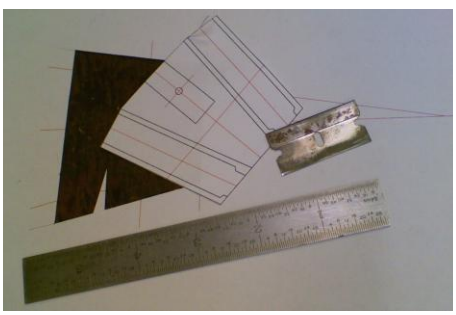
By *Dick Kostelnicek*

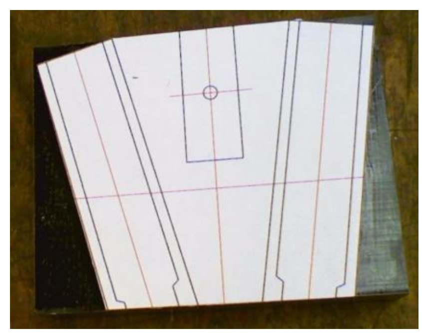
A small laser pointer is slipped into a pocket of an aluminum block holder chucked in a mill or drill press (left photo). There are two pockets, one on each side of the holder, slanted at 15 and 10 degrees to the vertical axis. The pointer's laser beam crosses the machine tool's rotational axis respectively at about 2.25 and 4 inches below the bottom of the holder (see drawing at the end of this article).

As the holder spins, centrifugal force throws the mass pointer outward against the outer wall of the holder, thereby closing the laser's On-Off push button (photo below right).

Note that the circles drawn by the rotating lasers, shown in the left photo, on a piece of paper that was lying flat on a drill press table, don't appear to be continuous. But, that's just due to the finite aperture time of my camera's shutter. Also, in this case, two pointers were placed in the holder to give concentric circles. As the machine's quill is raised and lowered, the diameter of each circle expands and contracts. At the focal depths of 2.25 or 4 inches, the appropriate circle will turn into a spot and then a circle again as the quill travels further.

There is no need for precise alignment of the pointers in the holder. Circular symmetry always guarantees that the laser's circular rings are precisely registered with the rotational axis of the drill or mill. Now, don't be afraid that the laser pointer could fly out from the holder. The largest angle that the pointer makes with the axis of rotation is 15 degrees. This behaves just like a self holding taper. At 15 degrees, the minimal coefficient of static friction that keeps the pointer from flying out of the holder's pocket is given by the trigonometric TAN(pocket angle) = 0.27. The coefficient of static friction between the laser's plastic push button and aluminum holder housing is about 0.35, within a margin of safety for it becoming a projectile. If you still feel uncomfortable, pass a safety wire though the keychain hole at the top of the laser pointer and the holder.

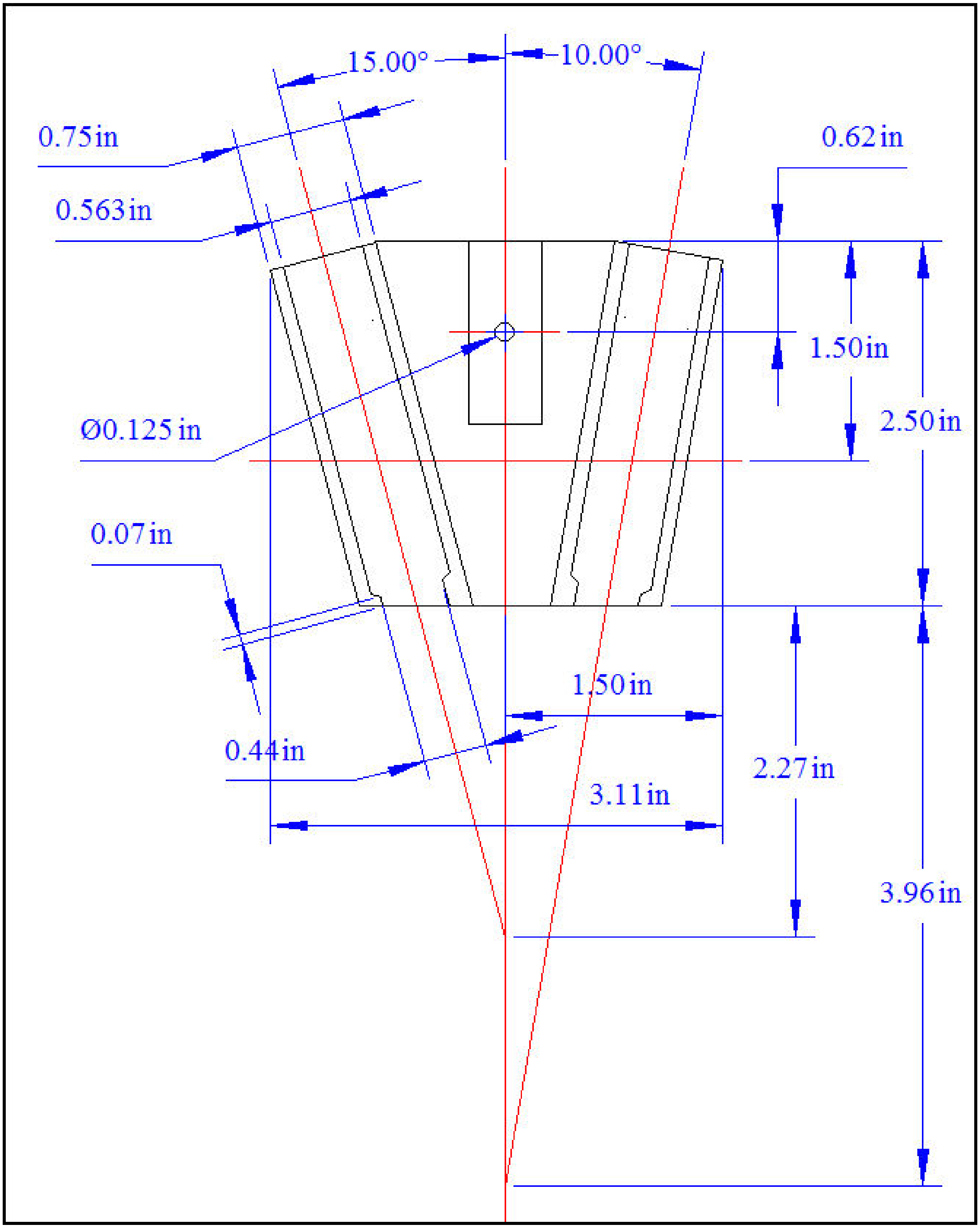




I printed a full size drawing of the holder, cut it out with a razor, and then pasted it on to a ¾ inch thick block of aluminum (see left and right photos). Using the drawing's lines as reference, I milled and drilled the holder as per the drawing shown at the end of this article. A chuck-able ½ inch round steel rod was inserted into the top of the holder and it is held fast by a 1/8 inch roll pin. I made the chucking rod extend about 2 inches above the holder's top. In the drawing below, the 0.07 inch slanted lip at the bottom of the circular pockets results from the 9/16 inch drill's 118 degree lip angle. The 0.44 inch through hole in the pocket's bottom is not a critical dimension, since it just lets the beam from the pointer pass through.

The horizontal offsets of the two pockets were chosen so that with two pointers installed, the holder is dynamically balanced. At a speed of 1275 RPM, where centrifugal force just actuates the ON button, the holder doesn't vibrate significantly with just one pointer installed. However, for very high speed spindles, place a dummy weight equal to that of a pointer in the empty pocket in order to achieve rotational balance.

The laser is an Alpec brass body red light laser keychain pointer that cost $11.50 at Fry's electronics (Frys # 4354205). The pointer body is 0.524 inch D and 2.51 inch OAL. It comes with a set of two LR44 coin batteries. Mechanically, it appears to be well constructed.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