February 2010
Newsletter

Volume 15 - Number 2

http://www.homemetalshopclub.org/

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

Our members' interests include Model Engineering, Casting, Blacksmithing, Gunsmithing, Sheet Metal Fabrication, Robotics, CNC, Welding, Metal Art, and others. Members always like to talk 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 a presentation with Q&A, followed by ***show and tell*** where the members can share their work and experiences.

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

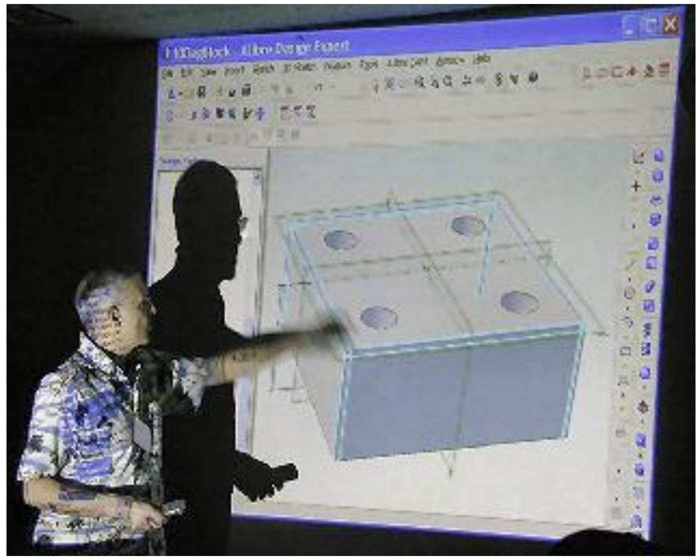
About the Upcoming March 13 Meeting

The March general meeting will convene at the Freed-Montrose Library on the second Saturday in February at 2:00 p.m. A business meeting will be held on the same day at 12:30 p.m. Both meetings are one hour later than usual. Joe Scott will show a video on Building the B24 aircraft at Ford's Willow Run, Michigan facility. Dick Kostelnicek will give a demonstration on manual keyway broaching. Go to http://www.homemetalshopclub.org/events.html for meeting details and the latest updates.

Recap of the February 13 Regular Meeting

The regular meeting was held in the Club Room of the Freed-Montrose Library at 2:00 p.m. Due to a tax preparation seminar, the meeting was delayed one hour. Thirty-five members and nine guests; Jose Rodriguez, Mike Valentine, Phu Wim, Frank Kleinworth, Levi Lamming, Kevin Douglass, Robert Lao, Victor Shum, and John Mudny were in attendance.

Presentation



Lee Morin presented a slide tutorial on 3-D CAD ,Computer Aided Design, using the Alibre http://www.alibre.com/ computer software program. Lee showed how to draw and dimension a machine part that that would eventually be used in one of NASA's simulators. Drawing a 2-D profile and then extruding it in the third dimension is how the process evolved. While he was discussing each stage in the drawing's development, Lee passed around partially machined parts so that his audience could get a feel for each stage in the 3-D development. Lee's presentation is available for viewing at the web link:
http://homemetalshopclub.org/news/10/alibre_walk-thru2-2.pdf

Show & Tell

Joe Scott discussed how he uses a belt sander with a pivoting jig to round metal parts. He also asked for advice on how to remove the pits from a rifle barrel's breach in order to prevent cartridges from not being ejected after firing.

Joe Williams talked about the shear ease of cutting perfectly developed screw threads in a lathe using 12L14, a high lead content steel alloy. Joe also showed a tool holder with a radial ball bearing mounted on one end; like a single wheel knurling tool without the teeth. With the lathe's compound, he adjusts the bearing's position as it nudges the unsupported end of a chucked bar to become centered.

John Hoff discussed his method of straightening a six-foot long 3-inch diameter ¾-inch wall aluminum tube using a small hydraulic press and a cross supporting I-beam. The tubes are used as mandrels for mounting large paper rolls. The off-the-shelf tubes can be bowed along their length by as much as 0.05-inch. John's presswork reduces that to a negligible amount.

Dick Kostelnicek talked about alternative gearing for cutting metric threads on an English lathe. See the article on Transposing Gears for Metric Threading in this newsletter.

Articles

Tool Box Heaters

By *Keith Mitchell*

In any environment where temperature swings can be dramatic and there is significant humidity, our machine tools can potentially rust. During cold weather the iron cools. When it warms quickly and the humidity is high, the iron stays cold. When the moist air contacts the cold iron, water condenses on to the tools.

To combat this phenomenon, I’ve installed some small heaters in my toolboxes. They are small rod heaters called GoldenRod Gun Savers and are intended to keep the moisture out of gun safes. I got mine from Midway http://www.midwayusa.com/, but Brownells http://www.brownells.com/ also carries them. I use the 12-inch version rated at 8 watts. They cost about $20 each.

Remove the toolbox’s bottom drawer and confirm there is adequate space behind it to contain the heater. Drill a hole in the lower side of the toolbox, large enough for an insulating grommet to protect the wire as it passes through toolbox wall. The grommets are not provided with the heater. I got mine at the local hardware store. They should also be available at an electronic supply house. The AC plug on the heater can be removed. Follow the instructions that came with the heater and detach it from the electric cord. I tied a knot in the cord to help keep the heater centered in the cabinet and remove any strain on it should it’s power cord be pulled. Feed the cord through the grommet from the inside and reinstall the AC plug. Plug the heater into an electric outlet and confirm that it is working. Reinstall the drawer.

Where I have stacked toolboxes, I put one heater in the lower box and one in the upper.

Transposing Gears for Metric Threading

By *Dick Kostelnicek*

In order to cut metric threads on a lathe having an English threaded lead screw, you'll need a pair of transposing gears. There are exactly 25.4 mm per inch. Hence, the smallest diameter pair of gears that will provide an exact transposition have 100 and 127 teeth.

Years ago the Logan Lathe Co. suggested using a gear ratio of 37:47 rather than 100:127. Refer to the article at the web link http://www.loganact.com/tips/metric_threading.pdf. The tread's crest-to-crest or *lead error* is only 0.02% or about 0.0025 inch for a one-foot long threaded rod. Furthermore, the mounting space used by the 37:47 gear set is much smaller than that for the 100:127 pair. If you cut your own or plan to purchase transposing gears, the smaller 37:47 tooth set is preferred.

There are several gear sets that provide transpositions that are also *close enough*. In the table below I've listed the gear sets whose diameters are smaller than the 100:127 pair and generate a lead error of less than 0.1 percent. This error is equivalent to having the last crest on a foot long thread out of place by less than 0.012 inches. The gear set 63:80 is the most accurate choice, having a lead error of only -0.0015 inches per foot. This is probably more accurate than your lathes lead screw. The 26:33 set is the most compact, taking up the least amount of space on the lathe's gear banjo. A (+) sign in Lead Error indicates elongation, while (-) implies foreshortening.

Relative Distance Between Shafts	Small Gear's Teeth	Large Gear's Teeth	% Lead Error	Lead Error (inch/foot)	
1.00	100	127	0.0000	0.0000	
0.26	26	33	-0.0606	-0.0073	Most Compact
0.37	37	47	0.0213	0.0026	
0.48	48	61	0.0656	0.0079	
0.59	59	75	0.0933	0.0112	
0.63	63	80	-0.0125	-0.0015	Best Accuracy
0.85	85	108	0.0463	0.0056	
0.89	89	113	-0.0265	-0.0032	
0.93	93	118	-0.0932	-0.0112	

Fabricating a Piano Keyboard Pin Press

By *Jan Rowland*

During the summer of 1962, I became interested in the manufacture of pipe organs. Subsequently, I was professionally employed in this interesting small industry, it paying my way until 1984.

I soon realized that most of the machining done in the organ business was just plain woodworking. The machines were the same as those used in the furniture and cabinet making trades. I noticed that there were many *small part* operations that *cried out* for special tooling and machines that could not be obtained from suppliers such as Sears or Rockwell-Delta. Only a few of the best organ shops had personnel who could make *application specific* machines to facilitate the repetitive and precise manufacture of organ parts. There was profit to be made by producing one's own small parts, mostly made from hardwoods. Without any real attempt to do so, I became infamous in the organ business for my ability to create small *application specific* machines. My moniker became *The Old Ugly Texan* as my ability to figure out ways to do non-standard manufacturing tasks circled the globe.

One day, I got an order from a Massachusetts piano maker who specialized in custom keyboards. He requested a pin press for inserting polished, chrome-plated pins into maple rails used as the frame under the piano's keys. In order to make that press from metal, a small amount of mill and lathe work, but mostly sawing, grinding, and welding was required. There was also a large Formica covered table onto which the press attached, but the customer specified that he could make it himself. I produced only the pin press for him.

The following photos show the sequence in the fabrication of that Piano Keyboard Pin Press

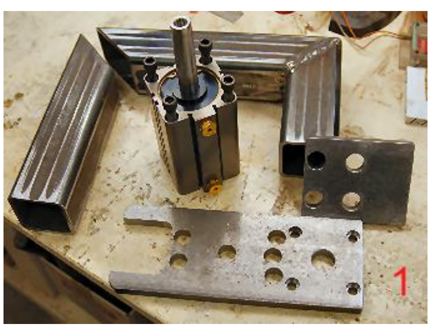


Photo 1 shows the first weld. I was reminded by my *better half* to take snapshots, as they might come in handy in the future.

Photos 2 - 7 show the fabrication's progression.

Photo 4 illustrates how the pneumatic piston was bolted to the end of the 1/2 x 4-inch upper support plate.

The white ruler seen in photos 5 - 7 is 10-inches long.

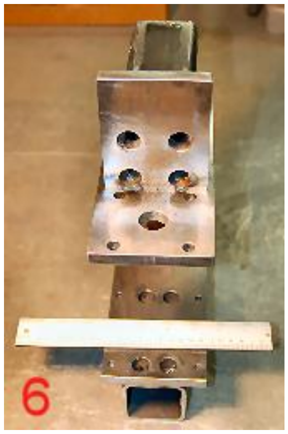


Photo 8 shows the painted pin press frame after all machining and welding was completed. A bit of careful weld grinding and some Bondo can make a bit of *home-shop-cobbled* iron look like it came from a proper factory!

Photo 9 depicts the piston and Clippard valve with all fittings in place. The piston is actuated from a finger lever just beneath and to the left of the valve's body. There is a Clippard *flow-control valve* in the pneumatic circuit with which the operator can adjust the *down-feed-rate* to suit his needs. The up stroke is at *full-throttle*.

The base of the pin press is securely bolted to the worktable, as pins are pressed into holes in the rails of a keyboard's maple wood frame.

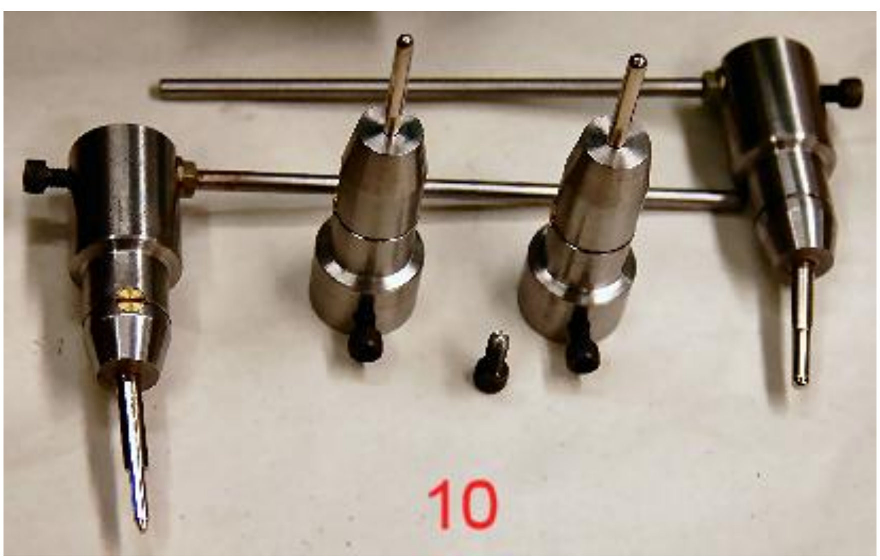


Photo 10 shows four sockets that hold various styles of keyboard pins. The two in the middle are for round pins of different diameters and lengths. The outer sockets are for oval front rail pins. They are shown with the pins partially inserted in order to illustrate their shape and size. The long rods in the photo's background are used to orient the long axis of oval pins as seen in photo 11.

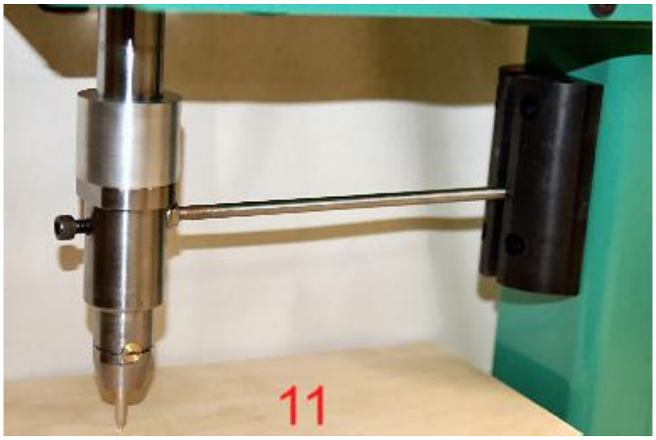


Photo11 illustrates one of the oval pin sockets installed on the press. The orientation rod rides in a guide slot made from black Delrin and is attached to the rear of the press frame. The guide orients the long radius of the oval pin as it is inserted into the wood rail of a piano keyboard.

Photos 12 show a round pin socket partly dismantled. A brass friction plug and a one-turn spring-wire hold the pin in place. With no pin inserted, the brass plug protrudes about 0.006-inch into the bore of the pin socket. It rides against and securely holds the pin before it is pressed into the wood rail.