Newsletter of the Horological Tool Chapter #173 of the NAWCC

Tool Enthusiasts' Round-Up

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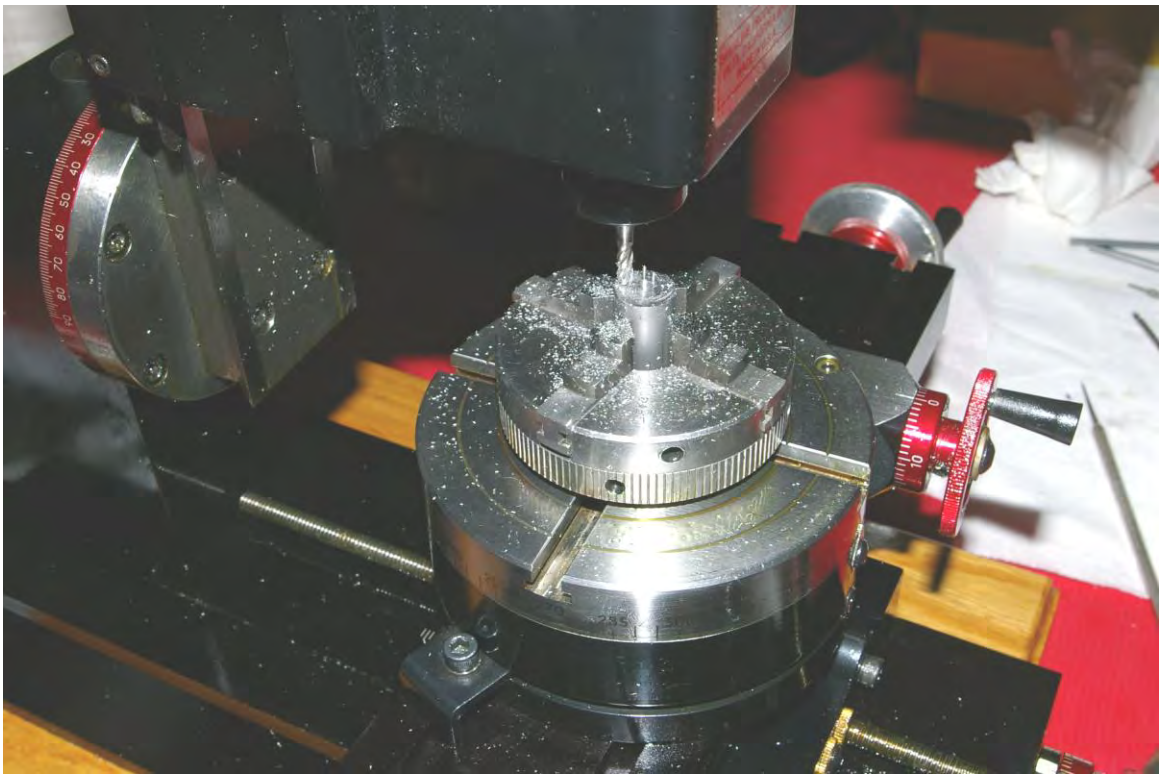


Fusee Chain Links Being Machined Using a Rotary Table

Winter 2013
No. 18

The Horological Tool Chapter of NAWCC

The Tool Enthusiasts' Round-Up is the newsletter of the Horological Tool Chapter #173 of the National Association of Watch and Clock Collectors Inc., a non-profit educational organization. This chapter and its newsletter are intended to foster interaction among NAWCC members who share a common interest in the use and collection of horological tools of all sorts. If you have an item you have researched, a book of interest, or notes on a project you have made, please consider sharing your knowledge with others through the newsletter.

The annual chapter dues of $10 will ensure that members receive the newsletter and are included in the Membership Directory when it is published. Members are also entitled to one classified ad in each issue.

Board of Directors

Local News

We announced that Harvey Schmidt had passed away in the last issue of TER. The newsletter insert contained his obituary and some of my thoughts about his life. He founded the Horological Tool Chapter in 1997, and ran it for over 10 years. He was helped along the way by several of our members who are still alive today.

NAWCC chapters have had their ups and downs. In the 1990s, the Philadelphia Chapter attracted 350 people to a single meeting and had over 100 mart tables. Since I removed from Philadelphia, I understand that attendance has dropped in half and the chapter is struggling to survive. In comparison, the Horological Tool Chapter has continued to trend upward over the last four years.

I credit this trend to Ron Bechler and David Kern. They have done much to increase our membership. We have also been more visible by having annual meetings at the Mid-Western Regional. Next year, John Koepke will host a meeting at the Greater LosAngles Regional; so, book your hotel early.

You can be active too by writing an article for TER or by helping to edit the newsletter. Hosting a chapter meeting at a local regional is also another way to promote the chapter. We have not had a meeting on the east coast for some time; so, why not volunteer.

In reviewing our membership list, I realize that many of the charter members are still present. Some must be pushing 80 or 90 years right now. Remember, unlike the pharohs of Egypt, you cannot take your tools with you. So, why not down load some of your extra tools in our classified ad section. Your wife will praise you and you can generate a little extra cash to finish that kitchen remodeling project that you started 20 years ago. We are cheaper than EBay and you will be helping to promote the chapter.

Best Wishes,
Bruce Forman

Machining Fusee Chain Links

A good description of the English fusee chain making industry was written by Allen White and titled "The Chain Makers." This small book chronicles the trade in Christchurch, England, that existed from 1790 to 1916. Fusee chain was traditionally made by outworkers or in small factories. Most chain making was done by young girls and some were only nine years old. Fusee chain for clocks and watches became obsolete by the 20th century because of the improvements in mainspring quality. The fusee chain industry died out about this time but, fusee chains were still needed for marine chronometers.

The famous chronometer maker, Thomas Mercer, visited Christchurch in 1916, to interview the last living chain makers and to purchase what equipment he could find. The plan was to transplant these traditional methods of manufacturing to his chronometer factory. This would guarantee that England would have a reliable supply of chronometers for their Navy. After his visit to Christchurch, Mercer donated the primitive chain making equipment he purchased to the BHI Museum and went about designing his own tooling based on modern manufacturing methods.

The modern horologist is sometimes called upon to repair some of these old fusee chains when they brake. One method is to make a stamping die to punch out the chain links, just as it was done originally. Making a die set is no simple feat and can be uneconomical if only a few links are needed.

Figure 1. The Sherline milling machine and rotary table used to make the fusee links.

At a recent NAWCC Chapter #3 meeting, we had an interesting talk on making fusee chain by Jerry Keiffer. Jerry is a model maker and horologist who has developed a new method of dealing with this problem. His method is based on using a Sherline rotary table and milling machine to make the needed links, Figure 1.

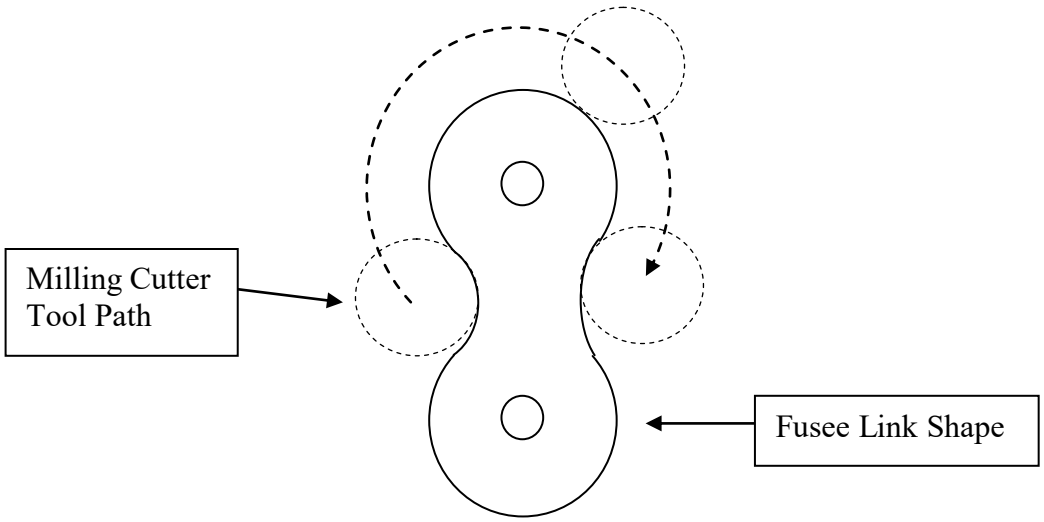


Figure 2. A drawing of the fuse link and milling cutter path.

Mr. Keiffer explained that the geometry of the chain link can be imagined as two half circles. Using the rotary table and a jig he is able to mill both these circles to create the finished link. A drawing of the fuse link and the milling cutter tool path is shown in Figure 2.

Figure 3. Drilling the two link holes for the rivets.

The process starts with a small piece of W1 drill rod slightly larger in diameter than the chain link. The ends of this rod are faced off in the lathe before being chucked up into the rotary table chuck. Next, the two holes in the link are drilled, Figure 3. Keiffer has developed a system using a dial indicator and stops to make sure he has the correct location for the link during the various stages of the machining.

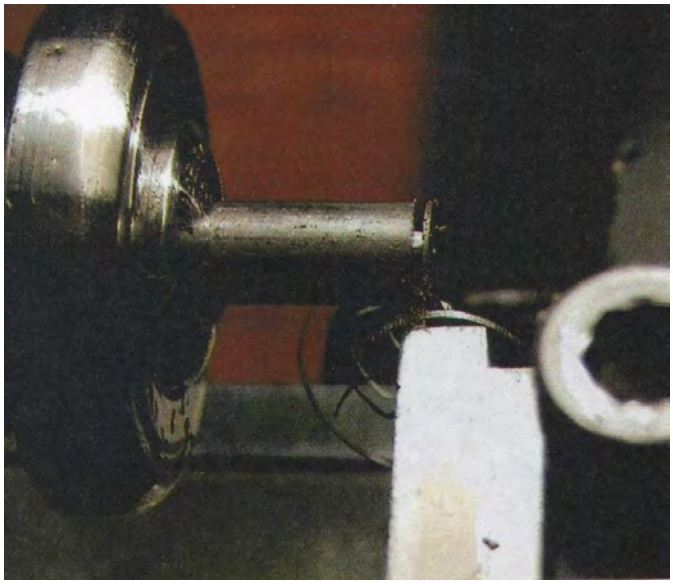


Figure 4. Parting off the raw disc.

Once the two holes are drilled, the bar is removed from the milling machine and placed in the lathe. The end with the holes is then parted off. The thickness of this disc is the same thickness as the finished link, Figure 4.

Figure 5. The steel disc placed on the milling jig.

Once two or three of these discs are made it is time to move to the next step. A milling jig is made from a piece of bar stock that is chucked up into the milling machine. Two holes are drilled in one end just like was done before in Figure 3. A pointed dowel pin is then inserted into each hole. The pointed end is facing upward. However, this time it is important that one hole is located exactly in the center of the bar so that when the rotatory table is rotated the end mill doing the cutting will traverse around this center, as shown Figure 2

Two or three links can be stacked on this jig as shown in Figure 5. The rotatory table is now rotated clockwise and counter clockwise the number of degrees to form the shape needed for one chain link end. Once this is done the links are removed and flipped. The reverse end is now milled. The steps to mill the links are shown in Figure 6.

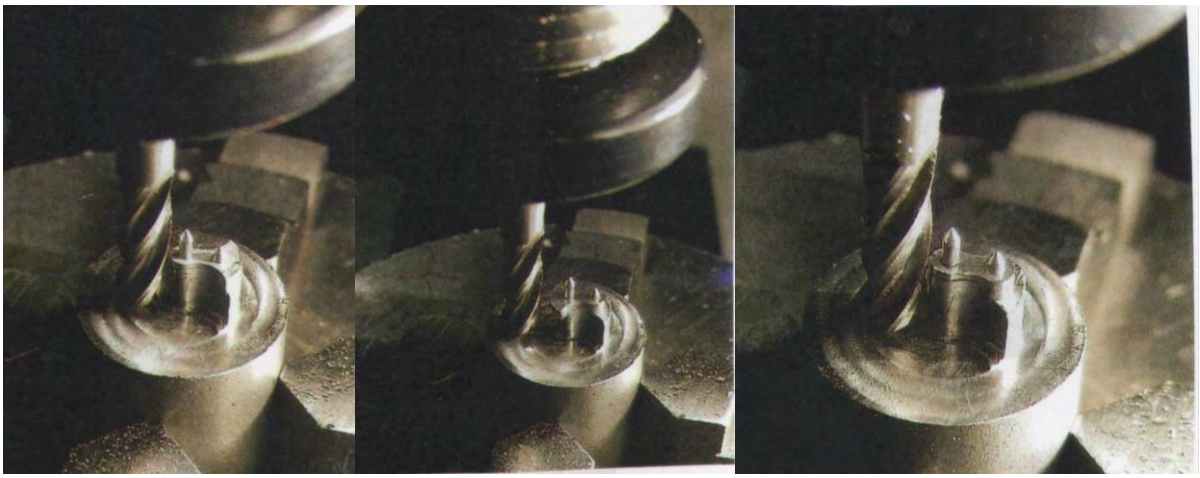


Figure 6. The links being milled with the rotary table.

Figure 7. The finished link.

After the links are milled they are removed and inspected, Figure 7. Each link is put on a sharpening stone or fine sandpaper to remove any burs. This finishes the links that must now be joined by rivets.

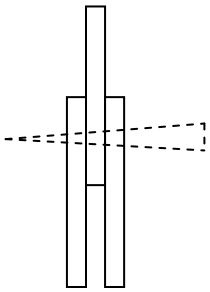


Figure 8. Riveting using a taper pin.

Links are riveted using a taper pin, Figure 8. The links are sandwiched together and a reamer the same taper as the pin is used to open the hole slightly. Mr. Keiffer has found that the tapered reamers in his jeweling set work well for this but standard reamers can also be used.

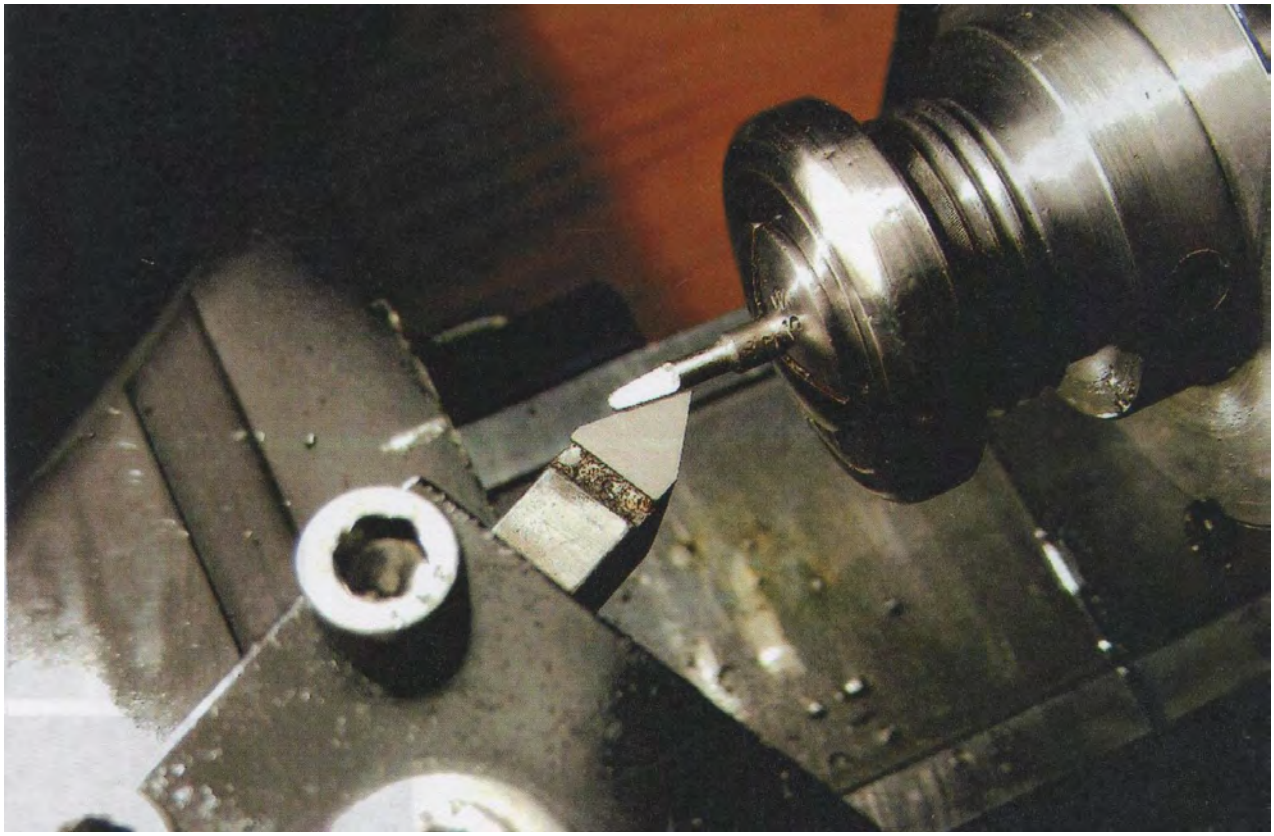


Figure 9. Aligning the cutter to the tapered reamer.

He makes his own tapered pins using a lathe. He first chucks up the reamer in the head stock and aligns the cutting tool to the taper, Figure 9. The reamer in Figure 9 is larger than would be used but is shown to make the method easy to visualise.

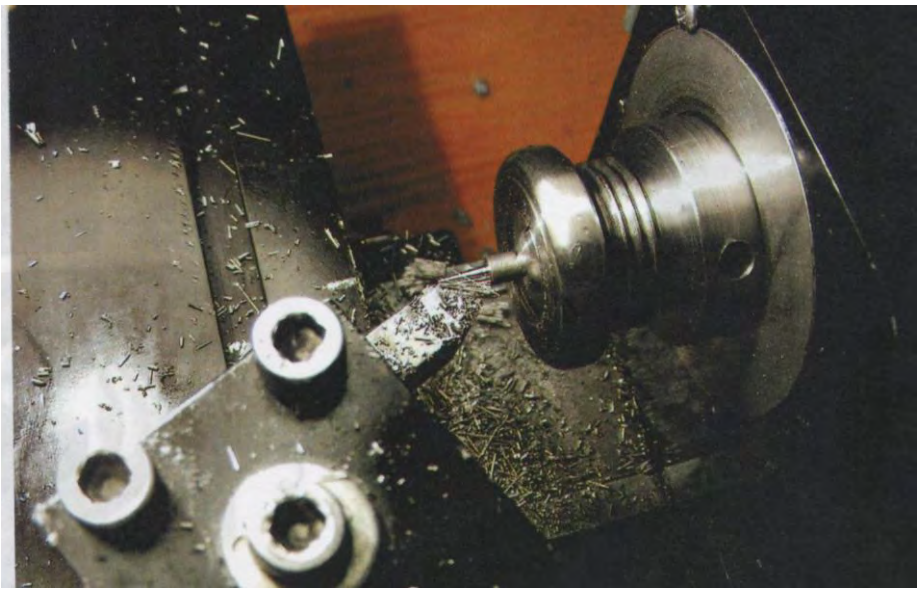


Figure 10. Cutting the taper.

Figure 10, shows the cutter now being used to cut the tapper on a piece of W1 bar stock. The pins are then cut off and ready to use. It took about 20 minutes to make three links of chain during the demonstration. The quality of the links appeared much better than those made using traditional methods.

Although stamping out links must be more efficient when large quantities of chain are to be made, the Keiffer method seems much more practical for the everyday repair work most of us do. We thank Mr. Keiffer for allowing TER to publish his story and photographs.

Bruce Forman

Pictures Courtesy of Bruce Forman and Jerry Keiffer

Future Articles Coming To TER

The Waltham Mainspring Gauge

The Mulliken Tools

Making Gear Cutters

Rose Engines and Straight Line Machines

Wanted

Levin and Derbyshire headstock and tailstocks (lever feed) in 10 mm sizes, any condition, running or not. Also 10 mm Levin collets and other related equipment. M. L. Shetler, Watchmaker, 7676 Route 62, South Dayton, N. Y. 14138

Deckel, Aciera, Rivett, Schaublin, Lorch, Hardinge, Levin, lathe or mill accessories wanted. Will trade, or sell if I have duplicates. Mark Fulmer
(330) 877-2021, Markusfu@hotmail.com

Derbyshire Elect model lathe attachments- pivot polisher, screw cutting attachment, roller file rest, and screw feed tailstock - will trade - for sale: tools from the Elgin watch factory, lathes, grinders, millers, etc…some made by American Watch Tool. J. Dill, 2117 22nd St. Road, Greeley, Co. 80631, Tel: 970-353-8561, jimdle@yahoo.com.

Clock pinion leaf polishing machine, Bruce Forman, 234 Eagle Ridge Drive, Valparaiso, IN 46385, (219) 763-4748, email: forman21@netzero.net will buy or trade.

For Sale

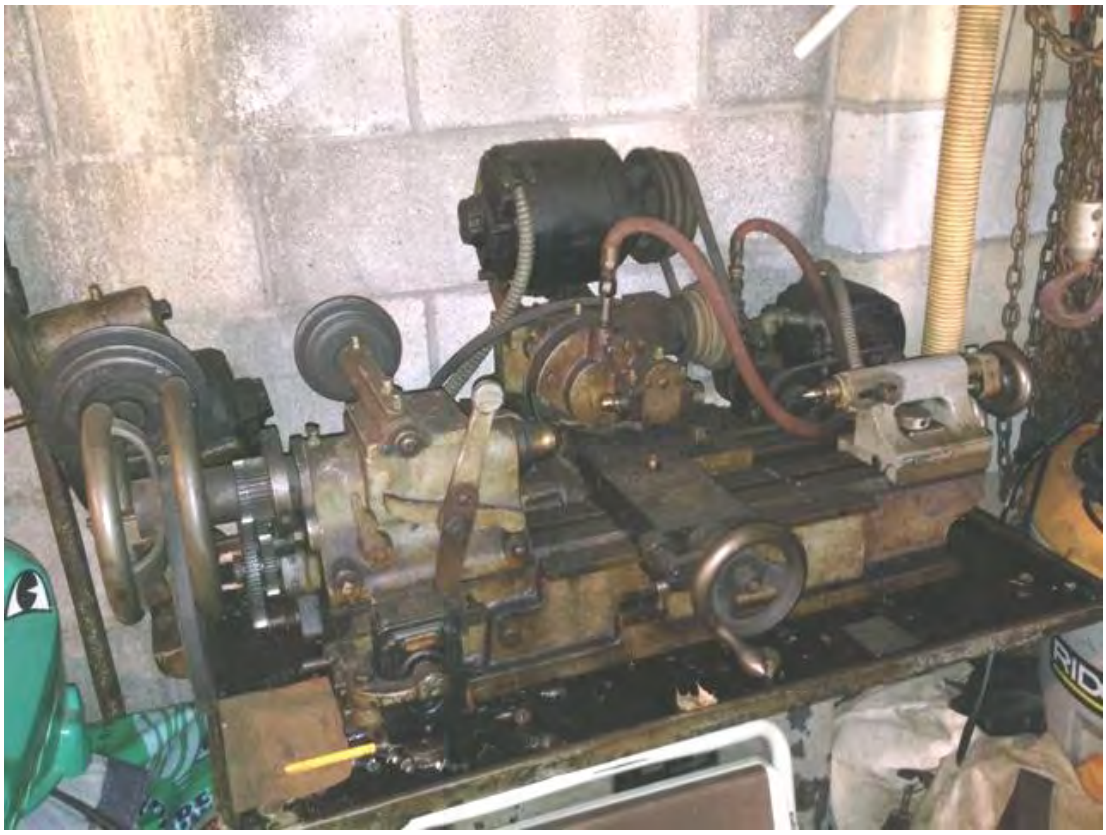
NOW AVAILABLE ONCE AGAIN "THE WATCHMAKERS STAKING TOOL" BY PERKINS & LUCCINA, $35.00 Postpaid, send remittance to, Ronald G. Bechler, 726 Royal Glen Drive, San Jose, CA 95133-1446, (408) 926-3212

Antique Engraving Machine, with three boxes of fonts. $500 or Best Offer
Jim Bove, 3654 Dryden RD, Fremont, Ca 94555, 510-792-7352

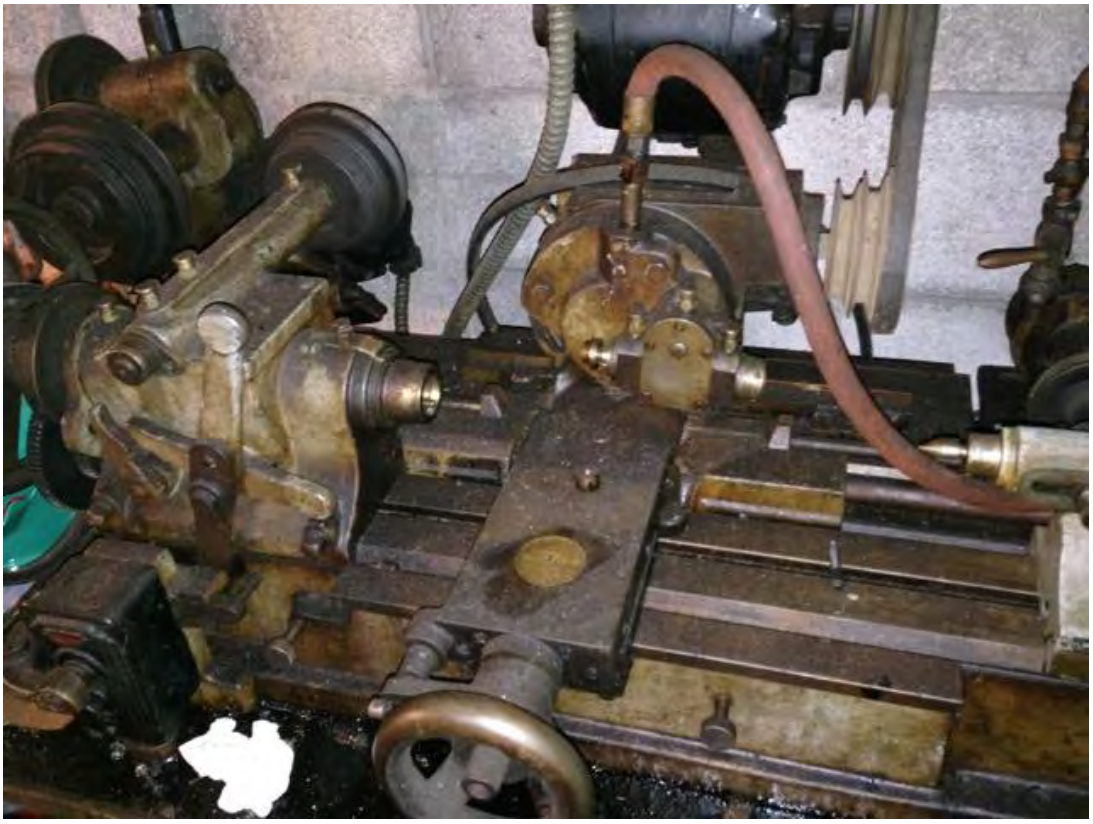
Watch Pivot Polishing Machine, from Bulova Watch Factory, $450, Bruce Forman, 234 Eagle Ridge Drive, Valparaiso, IN 46385, (219) 763-4748, email: forman21@netzero.net will sell or trade for antique tools I want but do not need.

Derbyshire Lathe, 8mm lathe, good chrome, t rest may be from another lathe, no tail stock, motor and jack shaft, motor needs rewiring, one pulley looks bent. Bruce Forman, 234 Eagle Ridge Drive, Valparaiso, IN 46385, (219) 763-4748, email: forman21@netzero.net will sell or trade for antique tools.

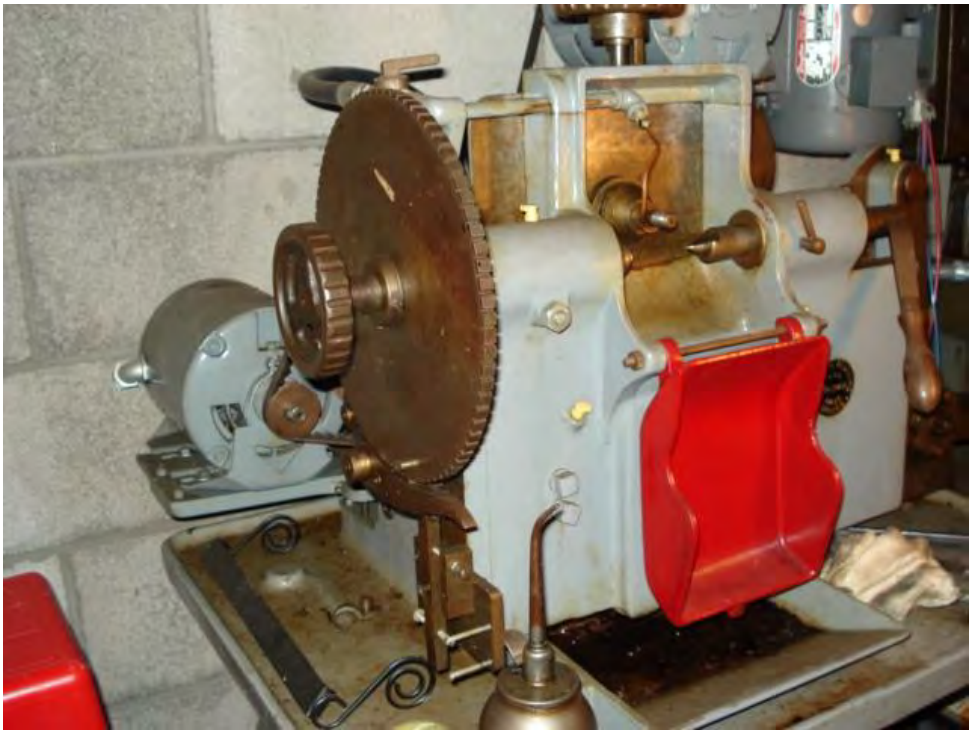
Waltham Thread Mill, $900 and Waltham Spur Gear Cutter, $1,000. Mark Fulmer
(330) 877-2021, Markusfu@hotmail.com



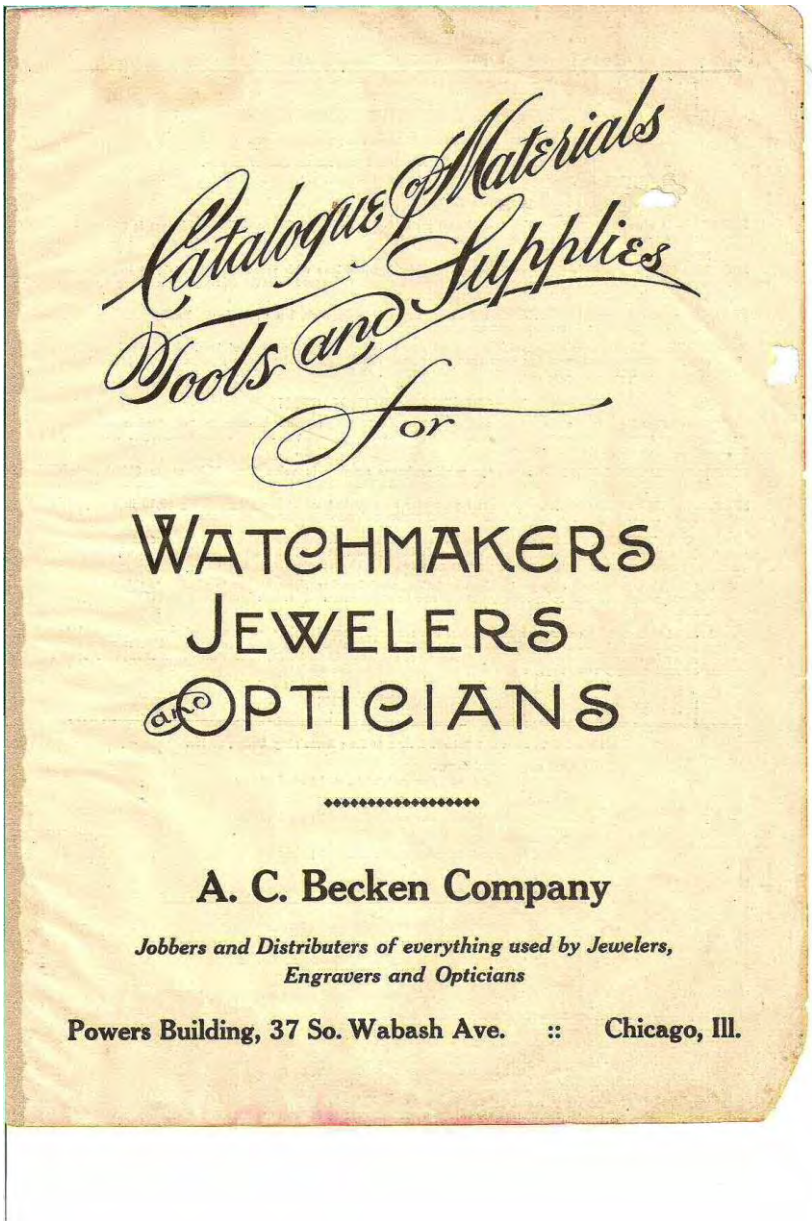
Waltham Thread Mill for Sale



Waltham Spur Gear Cutter for Sale



Something New For Our Members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Now available on CD is a partial reprint of the A. C. Becken Company Catalogue. This catalogue is undated but is believed to have been printed in the early part of the 1900s. There is a lot of detailed information on watch and clockmaking tools. Please send a check for $13 to Chapter #173 Secretary/Treasurer: Dave Kern, 5 Hilltop Drive, Manhasset, NY 11030

The CD was made available through the efforts of our Vice President, John Koepke.