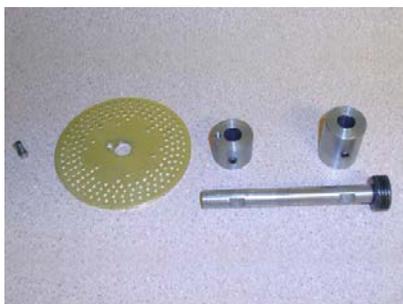
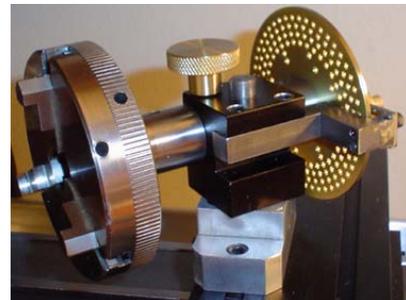
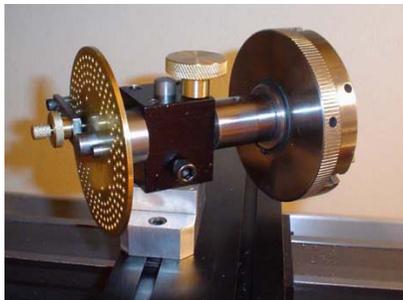


Tip 37 — An Indexing Head and a Toolpost Grinder Using the 7600 Toolpost/ Jim Knighton



The above photos show Jim's indexing head made from a 7600 toolpost, a Sherline chuck and parts of his own making. Note that riser blocks are left in place at all times on Jim's lathe, so there is plenty of vertical room for this attachment.

I am taking the liberty of sending you photos of a couple of recent projects that might be of general interest to the Sherline community. First and foremost is an unusual conversion of a P/N 7600 toolpost, which I used as the basis around which to build a very nice and compact indexer. It is literally a "toolpost indexer" built in part from a toolpost and as you will see in the photos it is mounted on a toolpost in rather different manner than is usual.

The toolpost indexer is unique in that it can be oriented in virtually any position and even used in a stand-alone mode with the addition of a suitable base. The indexer was designed to be fully functional on my lathe, which as you know has permanently installed risers. On this machine, the height of the central axis of the indexer's spindle matches exactly that of the lathe's headstock in no small part because of the fact that this is the nature of the round bore in the P/N 7600 toolpost. I simply took advantage of the existing

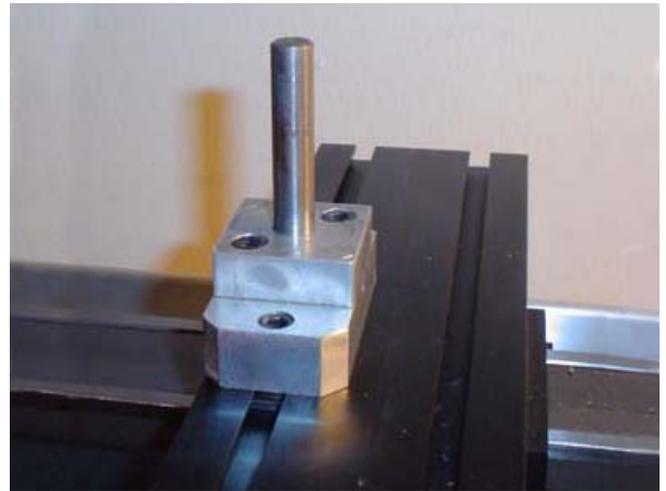
relationship. While the indexer was designed as an accessory for my lathe, it is fully functional on a Sherline mill in horizontal mode (which I also have in my shop) and delivers partial functionality on a vertical mill as well where it could serve as the basis of a gear-cutting setup.

As built, it will not work on a standard lathe, but the basic approach can be adapted provided that the builder takes into consideration that there is much less clearance over the cross slide table for work-holding devices and/or index plates. This index plate has 6 rows of division holes: 48, 42, 40, 36, 8, and 6. The outer four rows allow all divisions 2-10 and the even divisions 10-20 in addition to the actual number of holes themselves. The inner two rows are strictly for my convenience. These numbers are personal choices based on my expected usage of the device. Additional plates can be fabricated with any reasonable number of holes for a 3" plate. 60 is definitely possible and 72 will probably work as

well, although it might be necessary to use smaller diameter holes in the plate.

Also included is a photo of the “tool post” on which the indexer is mounted. This “post” is also the starting point for several other accessories that can be mounted in this manner. This is demonstrated in the photos of the second of these projects (see below); a toolpost grinder. I needed a grinder setup to accurately make the pin for the

above indexer and this is the method I came up with. There are any number of ways to mount a Dremel tool, but I suspect this is a bit out of the ordinary. Please note that the grinder can be locked into position at any angle. With this gadget the aforementioned pin was a snap to make precisely and accurately. I have several other accessories in various stages of completion and/or planning that all mount using this same approach.



The above photos show Jim's adjustable toolpost grinder. It holds a Dremel tool and can position the grinder at any angle. (Click on any photo for larger image.) The photos should give you enough info to build your own. Jim didn't make any drawings.

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In a second e-mail, Jim added the following comments for those interested in more background on the indexer project:

“The evolution of the indexer is curious in its own right. Initially, I needed a way to do off-center drilling on the lathe for a project I was working on. That issue was quickly resolved by making a 3/8" shaft with the threaded button on it's nose that I locked in place in the 7600 toolpost. The chuck went on the shaft and the Jacobs chuck went on the headstock. That solved the immediate problem, but the more I looked at the setup the more it started talking to me. It looked like a miniature indexer in my mind's eye. While I resisted the notion for a while, the ability to present work at an angle to the headstock for indexed machining operations was the feature that made this an irresistible project, since that capability was also essential for another task immediately at hand. Please note that while the original impetus for this project came from a turning project, the primary use of this device will likely be on my horizontal mill. As noted earlier, it is fully functional on either machine.

It may be possible to duplicate the setups made possible by this indexer with other accessories. I have a CNC rotary table, which was used to space out the holes in the index plate, and also the Indexer attachment. Neither of these devices, as capable as they are, gave me the setup options I needed for the project at hand. The CNC rotary table mounted on the tilting angle table under a vertical mill gives much of the same functionality, but it is a large and heavy setup. I've done this in the past, but not on the Sherline mill. I also have a "small" 500 lb Jet mill/drill in my shop and it has sufficient clearance under the spindle for this kind of setup. Doing this, however, is a cumbersome affair and takes considerable time. The toolpost indexer on the Sherline machines seemed a much neater, compact, and more easily used arrangement.

In approaching this project, I tried to make it as simple as possible while still achieving the desired functionality. For that reason, the index pin is not spring loaded, and neither is it threaded. The pin is simply a locating device and does not lock the spindle for machining operations. You will note

the large knurled knob on top of the tool post. This is a brass-tipped screw that bears tightly on the spindle locking it after the desired hole is selected with the pin manually held in place.

The attached photos show the component parts of each major subassembly. The spindle is 3/8" drill rod with a threaded button on it's nose. The button is a Sherline part, but I don't know the model number or even how I came to have it. I suspect it came with one of the major accessories. It is threaded 3/4 x 16 TPI to match the lathe/mill's spindle and is attached to the indexer's spindle with a 10 x 32 tpi SHCS. I didn't modify the button in any way. While I suspect that others may prefer to machine their own threads to ensure concentricity, I suppose I got lucky. The button is dead on and for that reason I didn't remake the spindle.

The indexer's arm is an assembly of several small parts machined from 3/8" square CRS and the slotted face plate which was machined from 1/8" x 1/2" CRS. It has a shallow channel on the backside 3/8" wide that holds a captive cut-down Sherline t-nut. It, in turn, holds a short length of 10 x 32 TPI threaded rod that has been drilled through with a #38 drill for the index pin. The small knurled brass knob locks the assembly in place in alignment with the desired row of holes in the index plate, and the pin is used to select and locate the appropriate hole while the spindle locking knob is tightened.

The modifications to the 7600 should be self-evident from the photo. The threaded holes on the "arm" side of the post were drilled out and counterbored. Because of space limitations, the counterbores are a non-standard .250" and the heads on the matching 10 x 32 TPI SHCS were turned down to match.

The 3/8" vertical post mounting arrangement I used for this project is not an essential aspect of this project and I suspect that others probably won't follow suit. Using this approach introduced a minor complication in that due to the small size of the 7600 itself there is a bit of interference between the spindle rod and the mounting rod. This was quickly resolved by waisting the spindle

at the point of the interference. On close examination this is evident in the photo.

The idea of using the 7600 for off-center drilling and as the basis for the indexer emerged out of an ongoing dialog with Dan Pines concerning mutual shop problems and ways to solve them. I can't claim to be the sole "originator" of this approach, and I think it is appropriate that Dan's contribution to the origin of this accessory is recognized."

In response to my question about how to make an indexing plate if you don't already have an indexer, Jim answered as follows:

"An obvious limiting factor for persons wishing to make an indexer as per our correspondence is the availability of an appropriate index plate. I made my own as my shop is well enough equipped to do this. Many in the Sherline world are not so fortunate, as you well know. There may be entrepreneurial types that frequent the Yahoo forum who would be willing to make plates for prospective builders. There is also at least one readily available commercial product that can be adapted for this purpose.

<http://www.cartertools.com/cipk.html>

This 60-hole index plate may well be adequate for prospective builders without the means or ability to make their own. Perhaps there are other similar plates available as well, but I've not done a lot of research into this matter."

—Jim Knighton