

The Spencer 820 Rotary Microtome

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One gray fall day several years ago, I decided I should get a microtome. There must have been some kind of weird vibe in the air because when I checked the ads in the morning newspaper I saw

Microtome - \$60

and a telephone number. I called immediately, got directions and drove right over. The seller was a retired physician who did his own pathology and was clearing out his garage. I got the microtome with two knives for \$60. He also threw in eight Coplin jars, several hundred blank slides and several thousand cover slips, so essentially, I got the microtome for free.

He hadn't taken very good care of it, and at first I had to carve all of the accumulated paraffin and oil. Here it is after I initially cleaned it up:

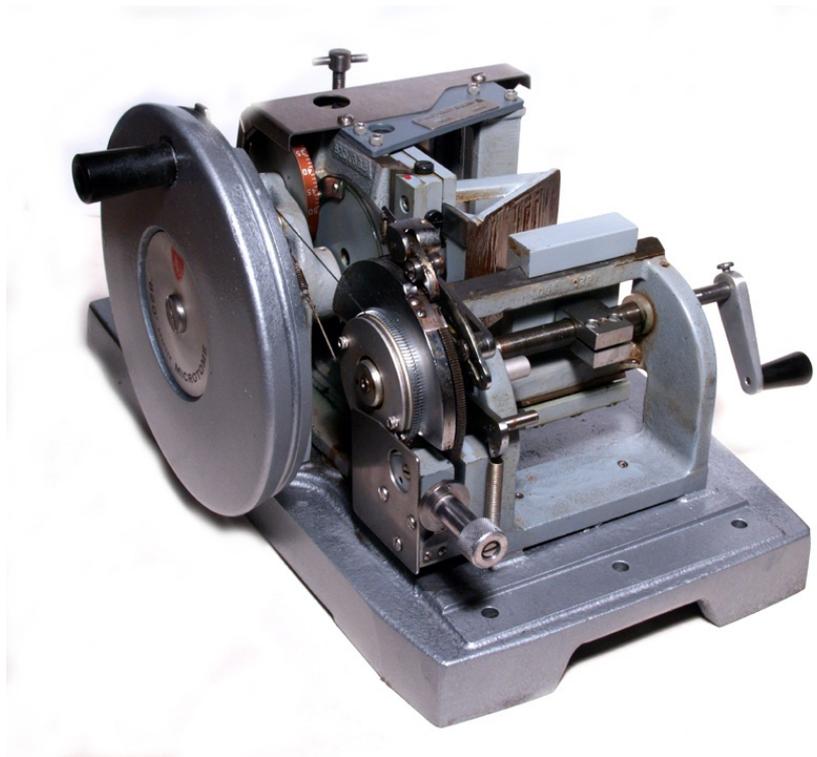
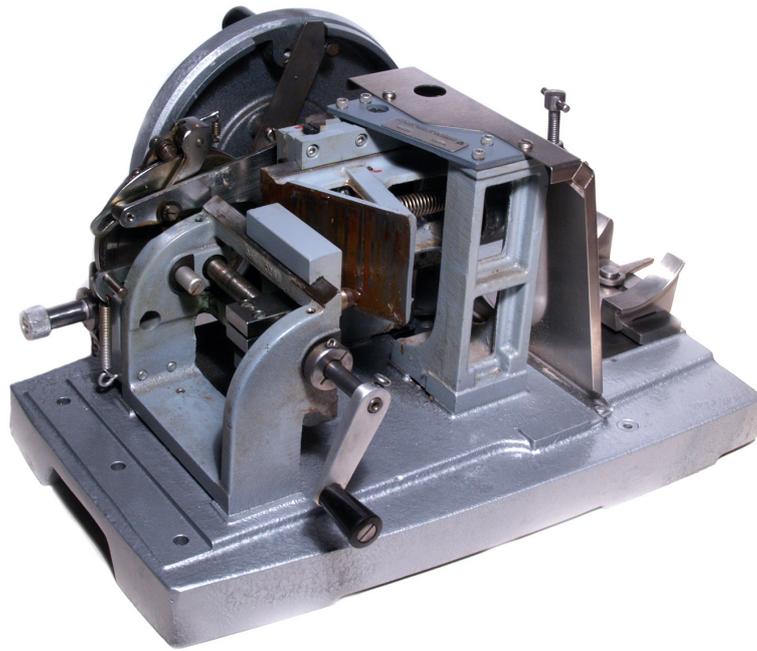


And here it is after de-rusting, buffing with wire brushes with a Dremel motor tool, buffing with steel wool and repainting.

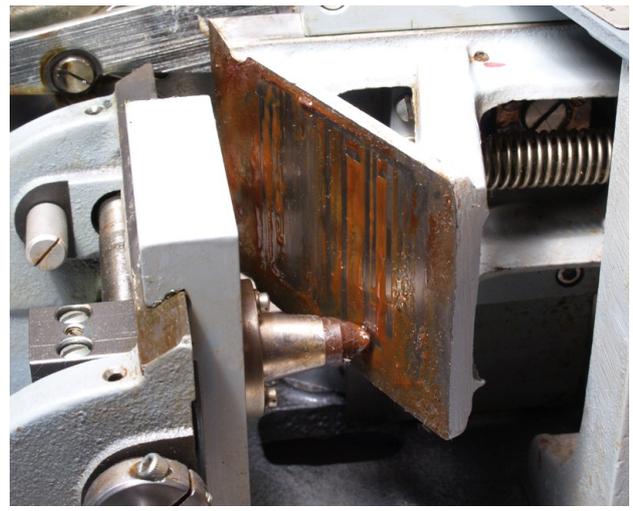
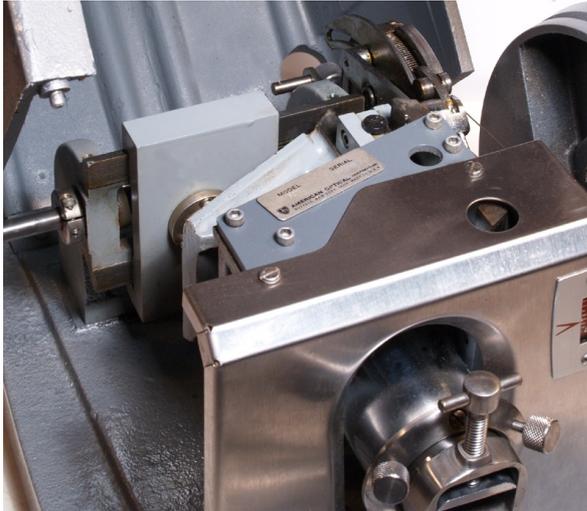


As near as I can find, The Spencer 820 Rotary Microtome came out in the late 1950s and is still widely used today. There have been some changes over the years, but the internal mechanics have remained pretty much the same. They are widely available on eBay for very attractive prices, but beware because they may have missing parts. For example, I saw one offered that didn't even have the knife holder assembly. Also, the shipping can be prohibitive, since the unit weighs 65 pounds (30 kilograms).

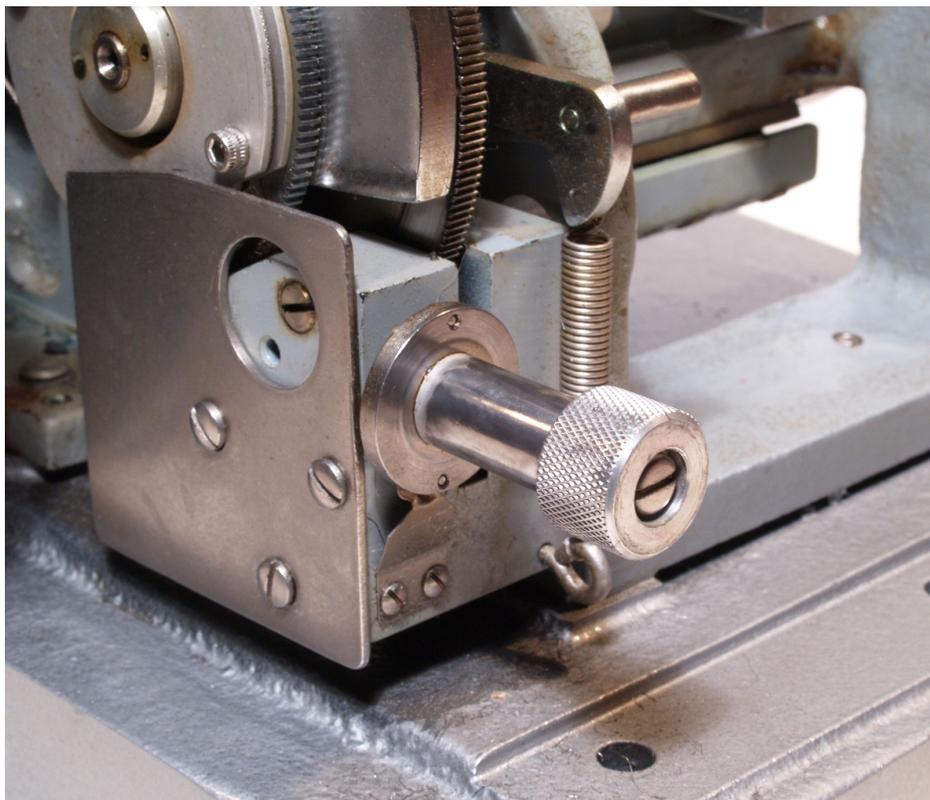
The inner workings are quite complex. The section feed has a range of 1 micron to 50 microns. Here are two views of the internal mechanics of the microtome:



When the drive wheel is rotated, a pin on a horizontal dovetail track moves across a greased wedge, pushing the wedge forward and ratcheting the specimen feed forward.



At the end of a single rotation of the drive wheel, the pin returns to its original position to advance the specimen forward for the next section cut.
At the rear of the microtome is the section thickness adjustment knob.



Its thickness setting is displayed on the front of the microtome at the feed indicator.



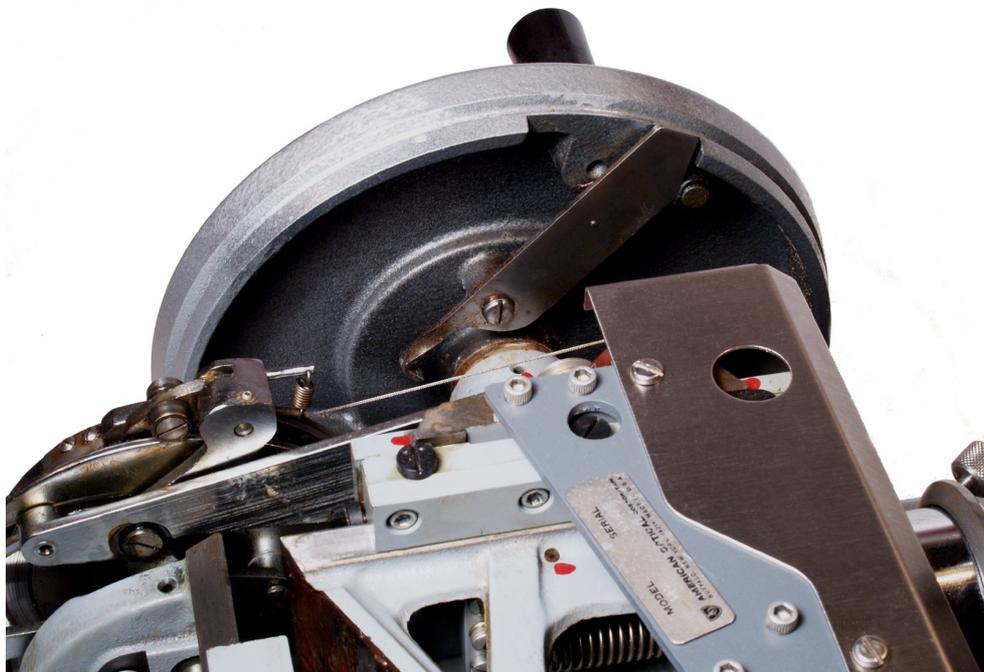
The mounted paraffin block is clamped into the object clamp which is secured into the drive mechanism with three knurled screws.



The clamp itself has a ball shape, enabling positioning the specimen block parallel to the cutting path by centering using the three screws.



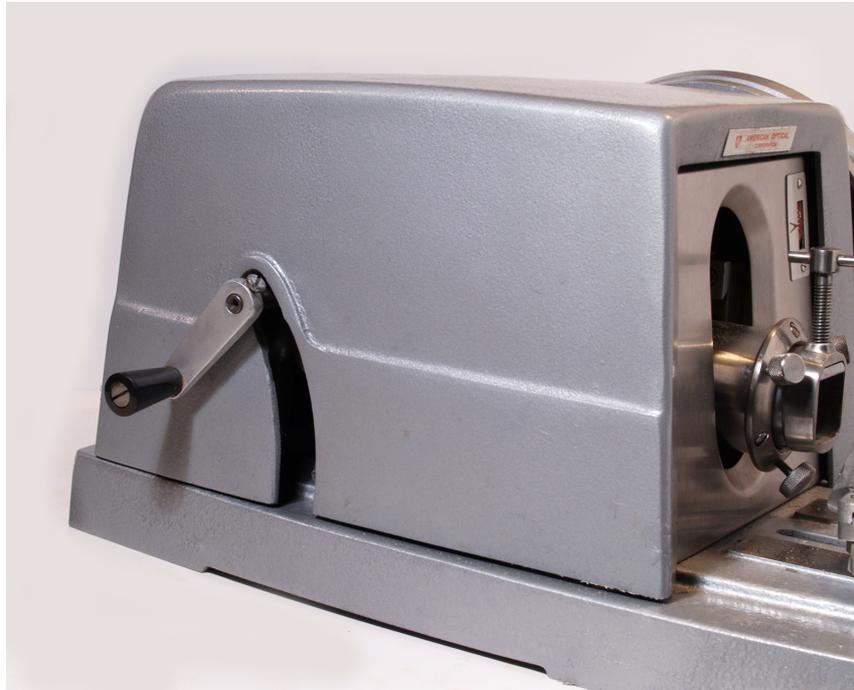
The object clamp and drive wheel can be locked into position for installing an object block into the object holder using the locking lever on the inside of the drive wheel.



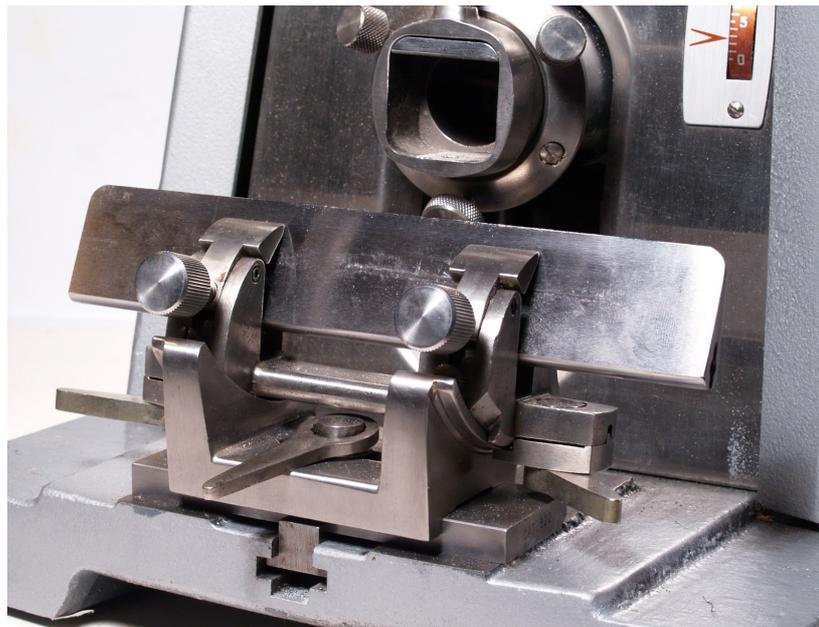
By throwing the lever into the position away from the operator and rotating the drive wheel, the drive wheel and object clamp will be

locked into position. Drawing the locking lever will unlock the drive wheel so sectioning can begin.

To the left rear of the microtome is a jogging crank that can be used to move the specimen block toward and away from the cutting path in large increments.



In the Spencer 820 Rotary Microtome, the knife remains stationary. The specimen is moved forward and up and down relative to the cutting path in the object clamp.



The design of the knife holder is quite elegant. At the top are the two clamps that hold the knife into position from left to right. This allows repositioning to fresh areas of the knife when a section already used has lost its edge.

Moving down, the two levers on each side just below the clamps are used to set the cutting angle of the knife. Loosening these levers allows the clamps to move in an arc on curved tracks. Once the desired cutting angle is set, these levers lock the angle into place. The lever in the center is a wrench that loosens the top portion of the assembly from the base block. When this bolt is loosened, the assembly can be positioned in two directions. The block holding the knife clamps can be shifted from left to right. In addition, the entire assembly can be moved forward and back in relation to the object clamp to position the knife relative to the specimen.

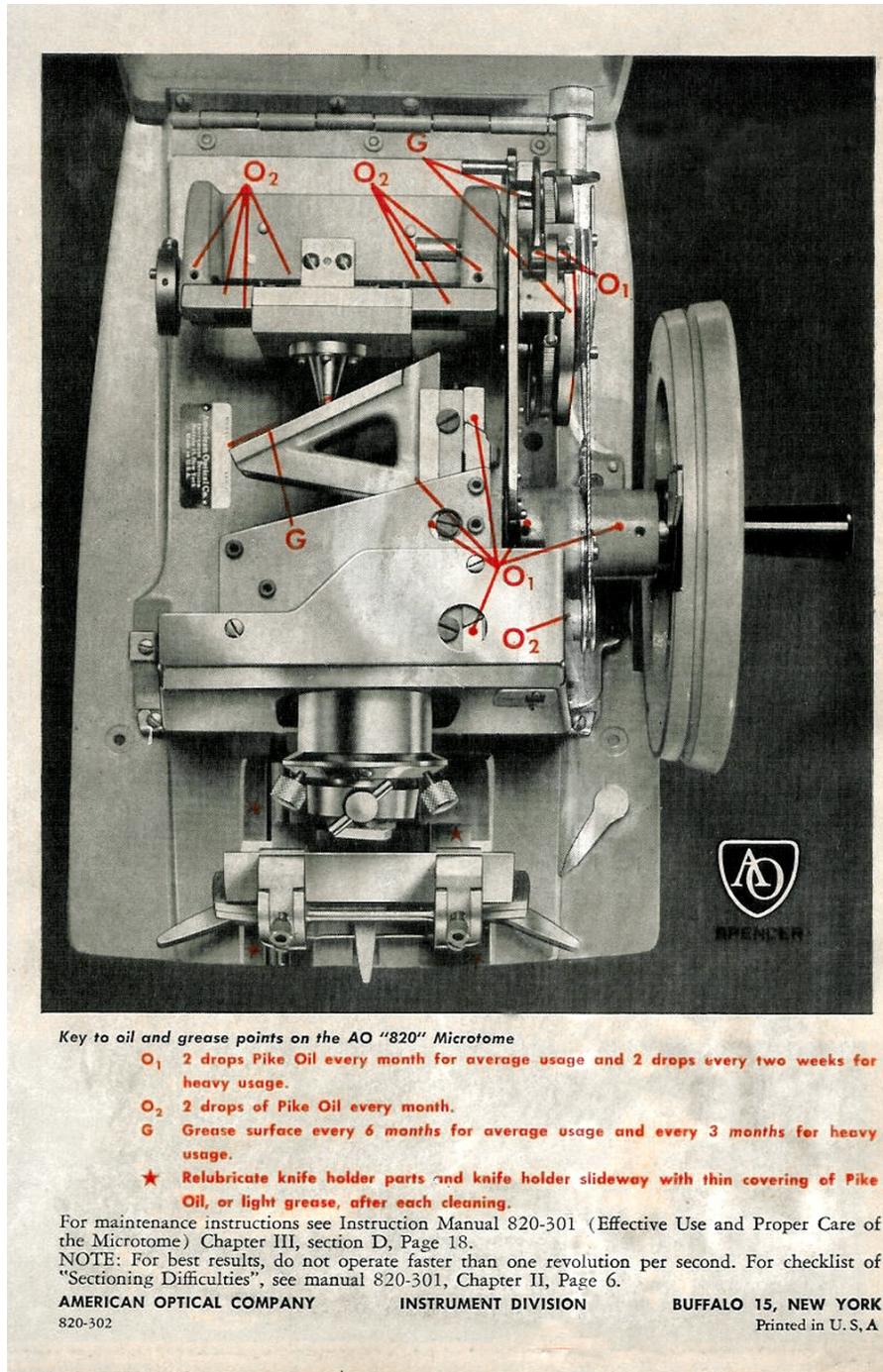
I have found a service here in the United States that provides professional knife reconditioning services – [C.L. Sturkey, Inc.](#) of Lebanon, Pennsylvania.

This is comparison photo of both of knives – one in very poor condition and the other reconditioned.



The turnaround time was about three weeks. The total cost was about \$90 USD, but considering knives such as these new sell for \$250-\$300 it is worth it.

Lastly,
On the inside top of the microtome cover is an illustration showing
user lubrication instructions.



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References (Links are to Acrobat pdfs hosted on P Sneeley's websites.)

[Effective Use and Proper Care of the AO Microtome](#)

[AO Rotary Microtome Model 820 Reference Manual](#)

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