BUILDING A CUSTOM ROSE ENGINE LATHE

By
Gary Smith

In January 2009 Vince Hellmann did a demo of his Rose Engine Lathe which I found very interesting. I was telling Bob Roehrig about it and he seemed to be interested in it also. We visited Vince to see his machine up close and then Mike Foydel invited us to his shop to see his engine. We both were hooked. In the next several weeks Bob built an MDF engine from plans and I started looking for parts that I might have lying around my shop and so my story begins.

I had to decide what I wanted to accomplish. First of all I would like to be able to work on larger turnings. I would shoot for it to accept a turning up to 18″ in diameter and 24″ long and have as many cams as would fit on a 20″ shaft that I found in my shop. I would like it to be able to tilt at least 1½″ and pump up to 2″. It would have to have a tail stock to steady long pieces. It would be built mostly

out of wood. I didn't realize what I was getting into.

I built an 18″ by 48″base while I was still looking for parts. A friend of mine cut a 1″ x 8″ thread on the shaft that I had found and I started going to my local plastics fabricator and going through their scrap for material to make the cams out of. I built the saddle for the head stock shaft and mounted it with 1″ bearings that I had taken off a large blower. I determined I could put 21 cams ¼″ thick spaced ¼″ apart on the shaft. The shaft is set up to accept extra cams if new ones are designed. The cams will be 8″ diameter as I can draw them on my computer and print them on a standard sheet of paper. The cams were designed after looking at other Rose Engines on different web sites. The cams were put together to form a drum then put on the head stock shaft. The next was to mount the head stock and saddle so it would tilt and pump. A ½″ steel shaft was mounted to the base in bearings. The saddle was attached with linear bearings to the shaft. So far so good, it will tilt and slide. Next was to make a drive system. I turned several pulleys from plastic to drive the head stock shaft with a hand crank. After several unsuccessful attempts to come up with a successful arrangement I decided to try a rotisserie motor. I found one on the internet with a speed of 3 rpm. This was a little fast so I would have to gear it down. Large diameter pieces would have to run less than 1 rpm. I turned more pulleys and made a belt from ¼″ Urethane. After testing the motor drive system I

found the Urethane belt had too much stretch and would jump over some of the lobes on some of the cams. Problem, after some thought, I decided it would have to be a v-belt drive. I could use a ribbed belt but finding pulleys would be difficult. The problem was solved by using a 4 ribbed belt and turning the pulleys from solid surface material. It worked very well and no jump. The drive system has 2 sets of pulleys. One set will run at about 1 ½ rpm and the other at a little less than ¾ rpm. I can reverse the rotation by turning over the motor. It would have 2 speeds forward and 2 reverse.

Next was to build the tower for the rubbers which rub on the cams and tilt the head stock. After testing I decided it was too tall. I didn't allow for the thickness of the rubbers. After building another tower it was working great.

Now to figure out the cross slide that would hold the cutting head. I didn't have any idea how to start. As luck would have it Mark Kotlenshy, a member of the local club had brought several sets of CNC linear bearings to the meeting for anyone who could use them. He gave me a set and then I was off and running. Everything seemed to fall into place. The X,Y,Y1,Z slide would be adjustable with cranks driving a ½" x 20 tpi threaded rod. One turn of the crank would move the carriage 50 thousands with no play. The X axis would travel left and right. The Y axis would travel from front to back but would rotate 45 deg. The Y1 axis would also rotate and float and can be

made stationary. The Z axis would be able to tilt from 0 to 45 deg. in each direction.

The next project was to figure out the cutting frame. After working on a prototype I realized I would have to find a motor to drive it. I thought of a sewing machine motor but not enough power. I thought of using my Foredom® tool also short on power. Then I remembered I had an old die grinder and could use router bits for cutters. It would work but it wasn't reliable. Luck struck again. Harbor Freight had them on sale.

Now it was time to make a paper chuck and pen holder. Easy, I cut an 18″ disk from ¾″ ply wood and mounted it to a face plate and the pen was spring loaded and would mount to the Y1 slide. At this point I glued up a blank for an 18″ platter and 8″ by 18″ tall vase out of scrap as test pieces.

The tail stock was next which was mounted to the saddle carriage. It has a #2 MT to accept a standard revolving center.

It was time to make a special cam that would tilt to the maximum of 1 ½″. This was done with solid surface material. Another cam was made to pump the system to 2″. I'm looking to make a sine wave design that will repeat 4 times in 1 rotation.

It has been a year since I started this project. I don't think it will ever come to an end as there will always be more cams and improvements to be made. Many thanks to all who gave me help and encouragement on this project. Hope you have enjoyed reading about my adventure.

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