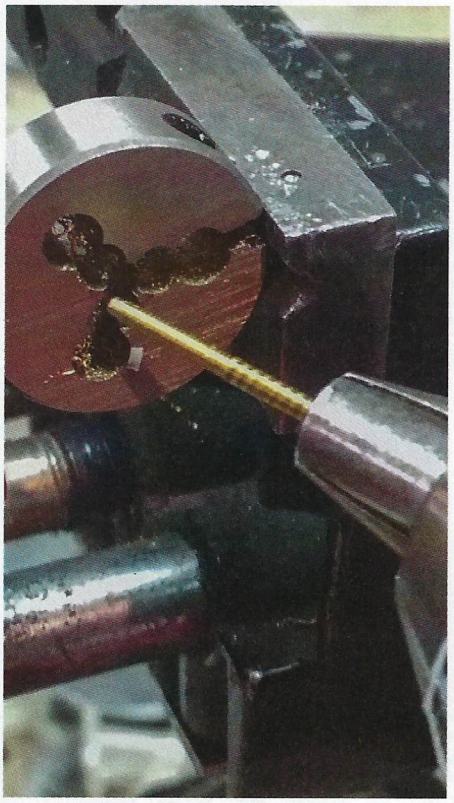


Cutting threads on the 1/16 brass rod.

Bending the U-bolts around the key stock.

All of the components to build the working jack.

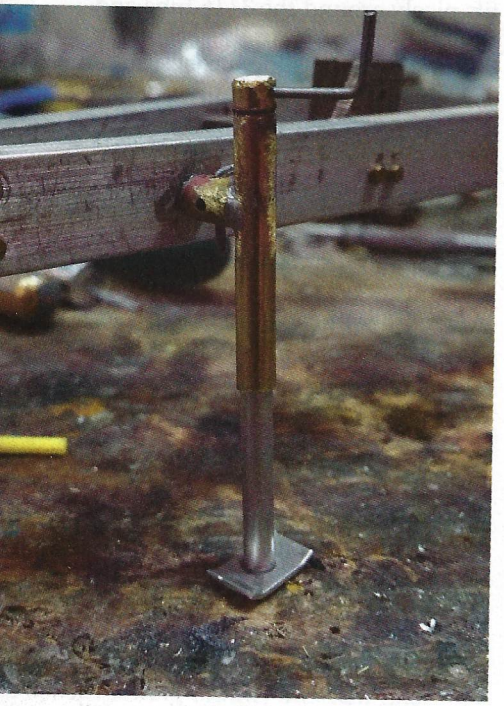
RETURNING TO A DMI RIPPER

Welcome back to all my fine readers. Again this month, I will do my best to share a little of my knowledge about custom toy building. The project this month takes us back a few years. You may remember a pair of columns I did about a Gottman Toys DMI ripper that a friend sent me to repair. In the columns, I took you through how I was using 3-D printing to not only repair the ripper, but take the detail to the next level.

After the second column, I put the ripper aside and did not touch it again. I had gotten completely burnt out on the project. Every step I took forward took me back three steps and I just had enough of the project. But I had to finish the ripper for my friend one way or another, so I set a goal to have it completed for the Gateway Mid-America Toy Show in St. Louis, Mo., in February and I was indeed able to finish the ripper and deliver it to him there.

With the ripper on display in our room at the show, it drew LOTS of attention. I think I could have sold it 20 times. After getting home from the show, I was complaining that all I seem to do is build parts and toys for others, but never build myself anything anymore. Then the light bulb went on. I was going to finish my own DMI ripper with the details I wanted to add.

With my plan laid out, I knocked off an inch or so of dust from my ripper, and set it on the bench. One of the problems with my friend's ripper was that the mounts for the disc blades on the Gottman piece broke, so I had drawn 3-D replacement parts, but even those broke. The 3-D parts just were not strong enough. They had the detail I wanted, but not the strength. So I used the 3-D parts as a pattern and spun cast the parts out of zinc,



Finished working jack.

which was plenty strong. Also, the disc mounts were made to be mounted on the beam using U-bolts, just like the real ripper, so this gives me the first task.

With my disc blade mount built, I removed the casting marks and warpage around the edges of the ripper's disc frame. With my 12-inch disc sander, I cleaned the frame, with a consistent width from one end to the other. Once that was completed, I needed to build the U-bolts. With 16 mounts, that meant 32 bolts, plus a few spare bolts just in case.

To build the U-bolts, I needed a plan. The mounts I had cast were designed to work best with 0-80 bolts to hold them in place, but there really isn't a readily available rod the correct diameter to cut 0-80 threads in brass or aluminum. The closest I found was piano wire, but it is too difficult to consistently cut threads into that wire. My next best solution was using 1/16 brass rod, which had a diameter of 0.062. In real scale, that 0.007 difference would be 0.112, just about 1/8 inch and having a bolt that is 1/8 too big or too small would not work.

With my plan of using 1/16 rod, I next needed to cut 40 rods to the overall length of 1.25 inches long and then thread both ends before bending the rod into the U-shape. Using my side cutters, I had 40 rods cut in no time. Using my Dremel, I cleaned up the ends by trimming the V-shape the side cutter left on the rod and then I slightly rounded the edges to make starting the rod in the die easier.

I next needed to cut some threads. When you purchase a die, there is a screw in the side of the die to adjust the major/minor diameter, or basically the ability to have the correct size thread for the nut to be installed. If it is too small, the threads will not hold and if it is too large, the nut will be very tight or may not start at all. The Walthers brand dies I use always seem to have the screw turned in so tight that I sometimes need to drive a flat screwdriver into the die to get the major/minor diameter large enough to match to the 0-80 nuts.

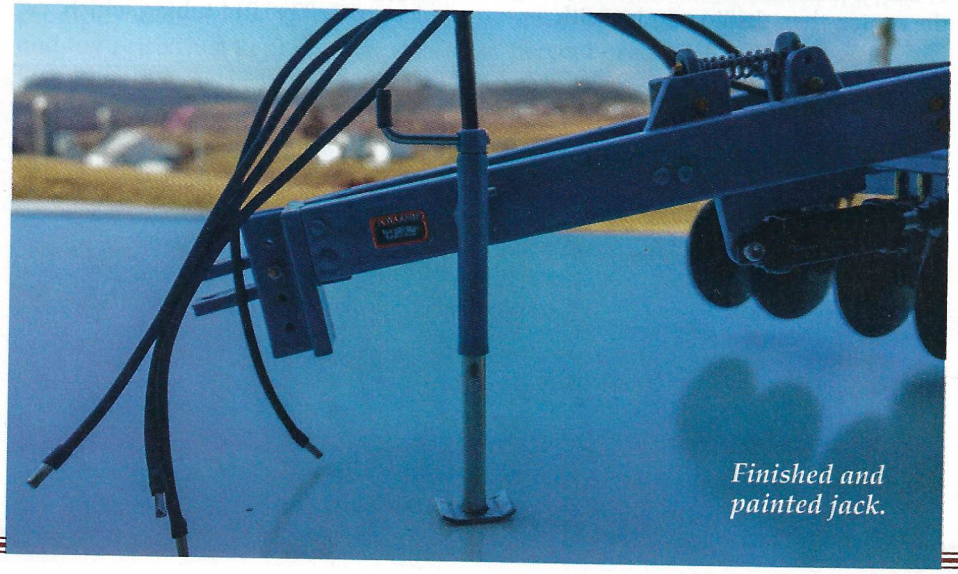
Once I had my die set so that the nut was fitting correctly, I installed the die in my Dremel vise, being careful to have the adjustment screw on the side, hoping this would put less stress on the die and keep the diameter open. With the die held tight, I then used my variable speed cordless drill to install one of the 1/16 rods. I carefully and slowly pushed the rod into the die. With constant and steady pressure, the die started cutting and the 1/16-inch rod had some nice 0-80 threads cut into one end. I flipped the rod and cut the second side. Only 39 more rods or 78 more threads to cut!

The next project is bending the U into the bolts. To accomplish this, I installed a steel 1/4x1/4 key stock in my vice which is trimmed down to 0.225 for the correct width the bolts need to be. With each bolt, I centered the rod on the key stock and held it in place with a vise-grip and bent the rod around the shape of the key stock.

At first, I used my fingers to make the initial bend then finished it with a second vise-grip, but that led to some seriously sore fingers. So I then used a small hammer to make the initial bend and followed with the vise-grip until all 39 were bent. Of the 39, two broke, so there are still five spares!

Now we head to the next added detail, which is a working jack. Building a working jack may seem like a bit of a challenge, but I've built one before and it makes a nice feature. One of the worse parts is the threaded rod, which we just mastered 80 times already!

First, I needed to find three sizes of tube that would telescope into each other and slide nicely. I came up with a 5/32x0.014 aluminum tube, which a 1/8 brass rod would fit into perfectly. Next, I found some 3/16x0.014 brass tube which fit nicely around the aluminum tube and finally some 7/32x0.014 which fit around the 3/16 tube. I was also going to need a piece of 1/2 x1/4x0.014 aluminum flat stock for the jack base and some 0-80 brass nuts, both in the larger 5/32 hex diameter and the smaller 3/32 hex diameter. I cut the 3/16 brass tube at 1.25 inches and the 5/32 aluminum tube to 1.50 inches to build the main



Finished and painted jack.

The completed DMI ripper.

jack assembly, but the height you want your jack will vary.

I then drill and tap two pieces of 1/8-inch brass rods by clamping them into my vise and carefully drilling down the center and then tapping them. With the rods drilled and tapped, I apply a small amount of glue to the outside of the rods and install them into the aluminum tubes, allowing me to screw the base to one end of the tube and have the height adjustment on the other. With the rods glued in place, I then use the 1/2x1/4 aluminum flat stock, marking the center, then drilling and it with a countersunk hole, allowing it to be bolted to the bottom of the aluminum tube with a 0-80 countersunk bolt.

I now focus on the top half of the jack. I start by soldering one of the larger diameter 0-80 nuts inside of the 3/16 brass tube to represent the top of the jack. I then drill the center to 0.062 so the 1/16 rod will slip through the hole. With this completed, I take a 1-inch-long piece of the 1/16-inch brass rod and thread one end about 1/4-inch and then the opposite side about 1/2 inch.

With the rod threaded, I install a small-diameter 0-80 nut on the 1/4-inch threaded side and install it into the jack's top half through the nut that was soldered earlier and then slide a flat washer and finally a nut on to hold the "screw" in place. With the screw in place, I install a second 0-80 nut on the top. I install a 3/16 section of the 3/16 pipe around the nuts and tight against the washer at the base and ever so carefully place solder in this pipe, filling the entire pipe and bonding it to the top half of the jack screw, but not soldering everything. If all works well, the top should still spin freely.

With the top soldered onto the jack and spinning freely, I then slip the aluminum tube into the 3/16 brass tube and start the jack screw into the brass rod and we have a working jack.

The next step is building the pivot for mounting the jack to the side of the ripper. This is much like the jack build. I solder a larger-diameter nut into the 3/16 brass tube and follow that with a 0.062-diameter drill, followed by drilling the frame of the ripper with a 0.052 diameter drill and tapping the frame, eventually bolting it to the side of the frame. I then use a piece of 7/32x0.014 tubing which fits nicely around the 3/16 tube and solder it to the side of the jack. With this completed, I slide the jack onto the 3/16 tube on the side of the ripper and drill the holes for the pivoting action, followed by bending a piece of 1/16 rod at a 90 degree angle to use as a pin. To build the handle, I drilled the side of the jack top and threaded it with 0-80 threads, but this time I use 1/16 aluminum rod to build the handle first by carefully threading one end and bending the opposite end to create the handle.

There are still a few more details I need to build, like the hydraulic hose mount. At this point, the entire machine needs to be taken apart, cleaned and painted. I paint it with PPG/Omni base coat/clear coat paints using the blue, black and white colors before I start back to final assembly. If all goes well and you have some tough calluses on your fingers from installing all of those 0-80 nuts, a very nice highly detailed DMI ripper will eventually show.

I hope you learned a few things here that you can use in your own project. You may not be building a DMI ripper, but you could use these tips on many of your own builds. It may have taken me three or four years to finally finish this project, but sometimes a little time to clear your head on a project is needed.

As always, thanks for reading. For parts used on this project and many other parts, as well as past "Down to Detail" columns, visit www.chuckysprecisionpullersandparts.com.

TF

Living just northwest of Dyersville, Iowa, in the heart of farm country and farm toy replica country, Chuck Steffens has found a niche in the toy world, building high-detailed replicas in his spare time. He shares his experiences with Toy Farmer *readers, hoping to lead other collectors to personalize one of their own tractors. Comments or suggestions can be directed to csteffens@wildblue.net.*