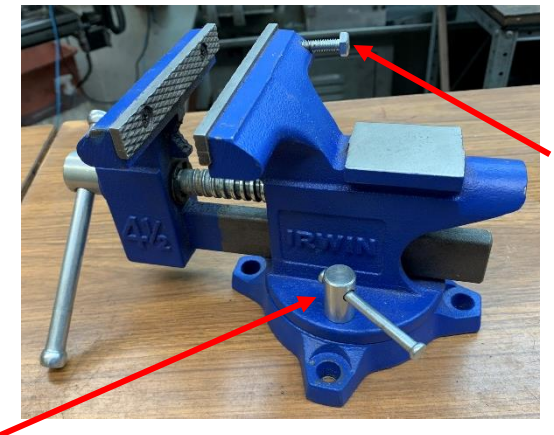
Irwin Vise Rework, Version 1.0

By R. G. Sparber

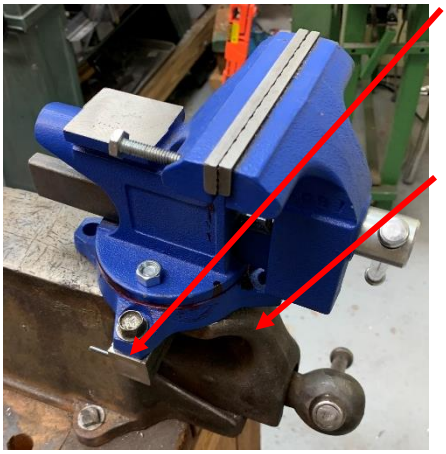
Have you priced used bench vises lately? Decent ones on eBay go for more than $500!

When my big Enco vise cracked, I installed a no-name vise with a big anvil on top. The anvil was lightweight but useable. Disappointedly, the vise jaws were narrow and shallow. It is acceptable for some work, but I needed a wider and deeper vise for lighter-duty use.



While at Lowe's, I found a $40 Irwin vise that looked promising.

After adding a jack screw to the fixed jaw, I installed a 1-inch by 1-inch steel bar to the base so it could be clamped into my big vise.



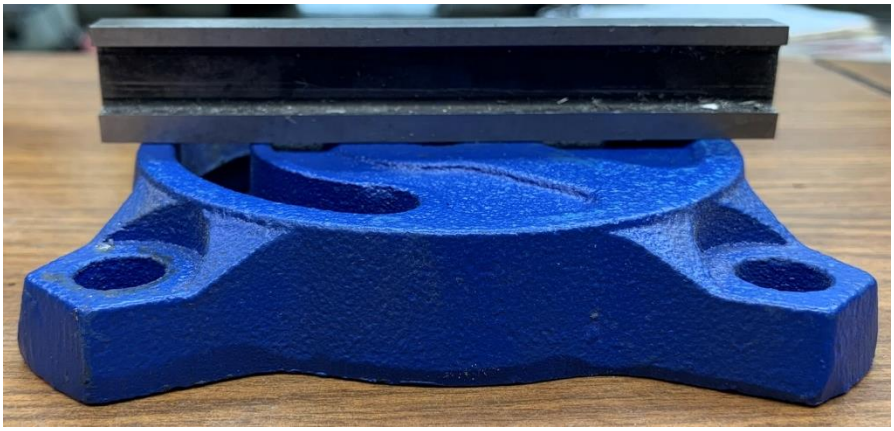
I quickly discovered that the pivot clamp was ineffective. It didn't take much torque on the jaws for the vise to pivot.

No matter how much I tightened the pivot clamp, the vise would slip. What made this particularly annoying is that I hardly ever need to pivot the vise.

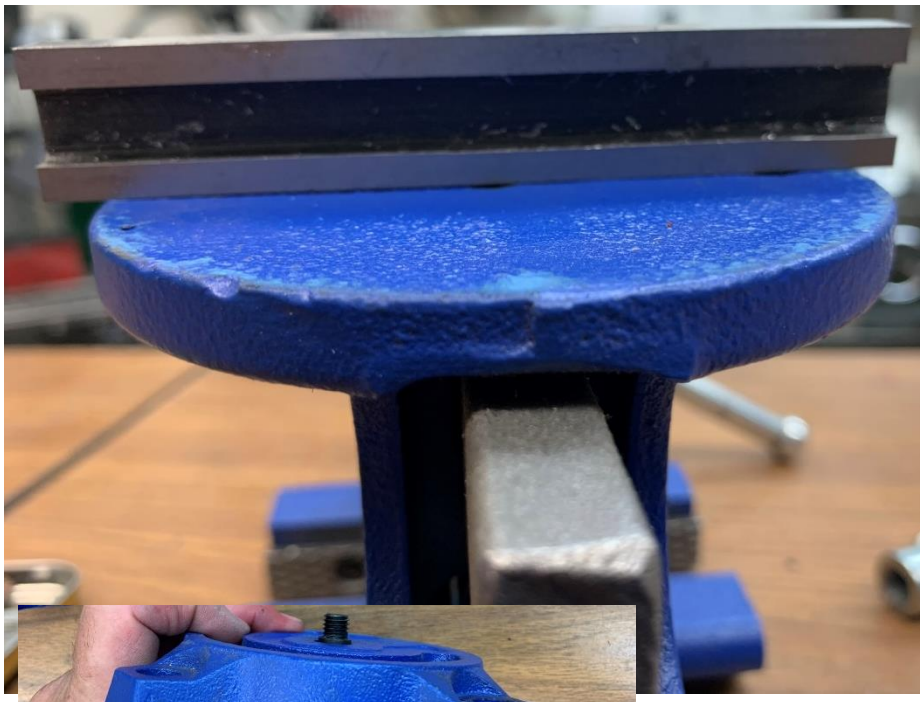
Looking at the bottom, I saw some “wishful thinking.” This arrangement can old prevent pivoting if four things are true:

1. the base’s top surface is dead flat
2. the bottom of the vise is dead flat
3. neither of these parts deforms under pressure
4. the pivot clamp is snug

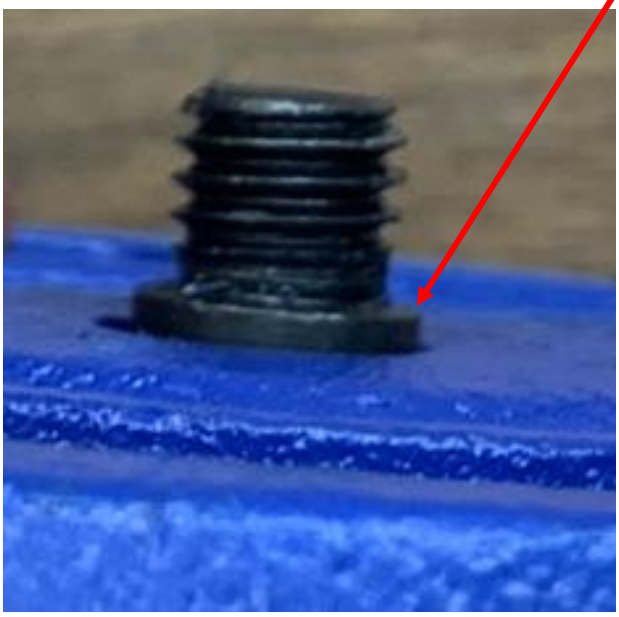
Time to take a closer look.



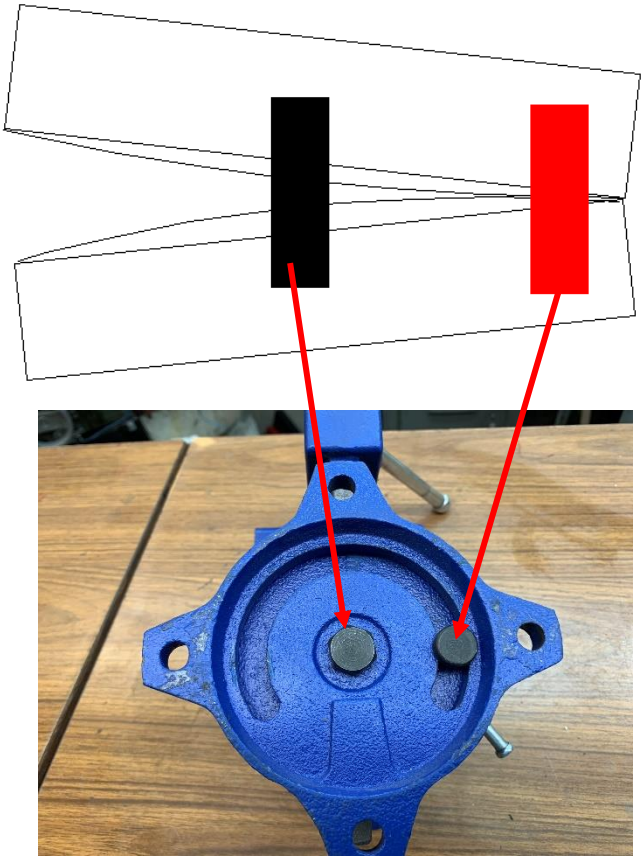
Resting a parallel on the top of the base showed me it was higher in the center than at the edges.



The bottom of the vise was worse. Again, the center was the high point.



The pivot bolt's shoulder was about 1/16th of an inch above the base. The top of this shoulder contacts the vise casting, making it impossible to snug the two castings together.



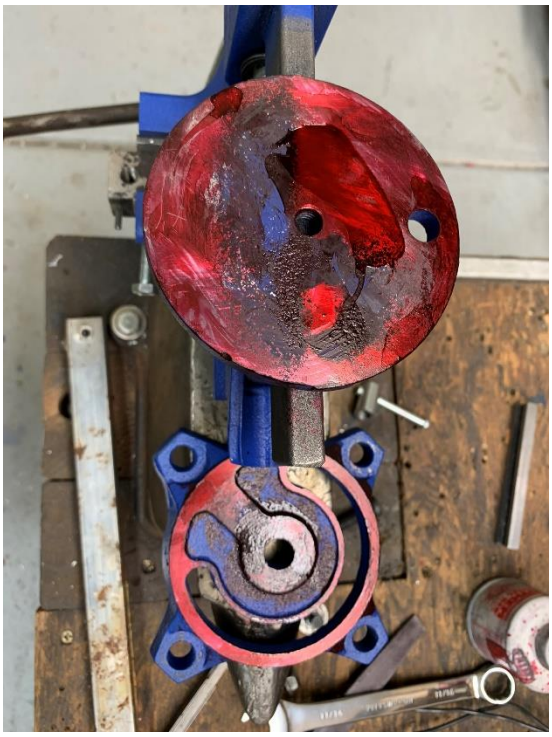
These errors tell me that when the clamping bolt, in red, is secured, the two castings make contact around it. The rest of the interface opens up. We get a tiny crescent of contact with the rest of the base to vise interface in the air. No wonder it can't hold.

The play in the pivot clamp, in black, determines where this tiny contact area exists. Even if there were no play, the contact area would still be a small patch between the pivot and clamping bolts.

Even if these surfaces were dead flat and the pivot bolt snug, the clamping bolt could only apply force on its side. That would be a significant improvement, but it could still slip.

I decided to flatten the surfaces and then add a second clamping bolt.

First, I put each casting on my belt sander to remove the highest points. Those points were small in area, so the abrasion quickly removed them. As the flat surfaces grew, my progress slowed. Eventually, I ran out of enthusiasm—time to test my progress.



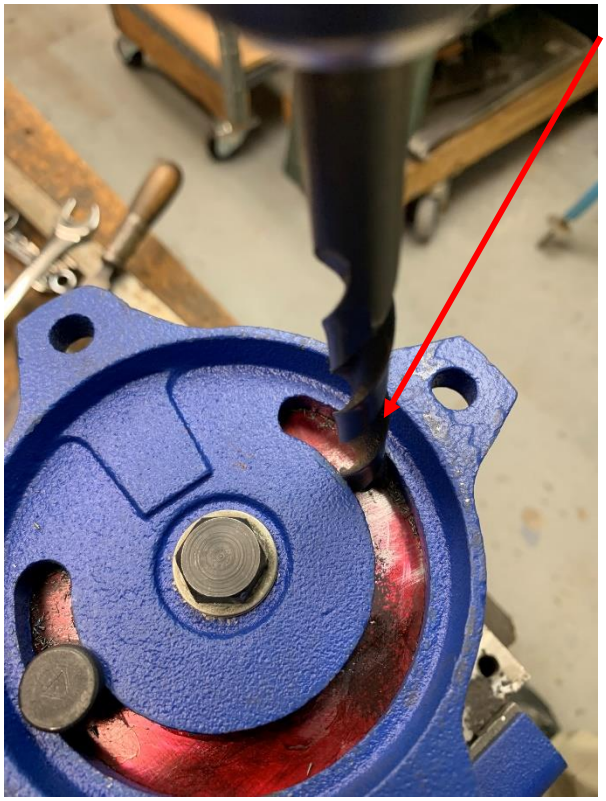
I painted both casting's mating surfaces with red Dykem, assembled the vise using the pivot bolt, and turned the base by hand with the vise held in the jaws of my big vise.

When dismantled, I could see where the Dykem had scraped off. These were my high spots.

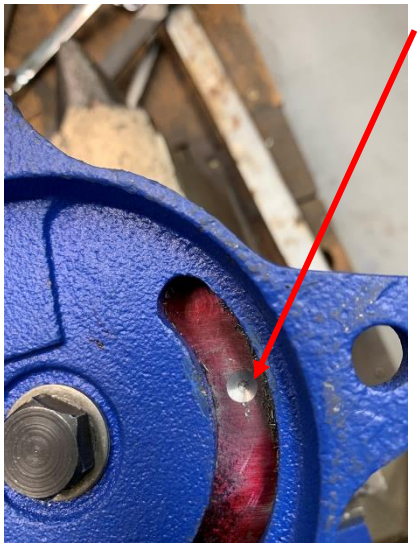
After a few more passes on the belt sander, I finished the job with a flat hand file. I declared success when the gap was under about five thou.

It would have been simple to mount the base casting on my mill to properly true up that surface. The vise casting would have been more challenging to fixture. I decided to continue with my plan and only escalate to milling the surfaces if the vise continued to slip. Yes, I understand that cast iron does not bend much, but a little *should* be ok.

I added a thin washer under the head of the pivot bolt to eliminate its play. With this bolt tight, it was difficult to pivot the vise by hand. That was fine with me.



I roughly located the hole for the second locking bolt using a drill that was a close fit to the slot.



I drilled down about 0.05 inches to give my 3/8-16 clearance drill a good starting point.

The hole came out shifted but still usable.

A 3/8-16 carriage bolt fit nicely. The original bolt was close to 3/8 but was metric. I replaced it with a second carriage bolt.

With the mating surfaces almost flat, the pivot bolt tight, and now having two clamping bolts tight, the vise no longer turns as I put torque on the vise jaws.

If I need to pivot the vise in the future, I'll loosen the first clamping bolt, remove the second clamping bolt, and loosen the pivot bolt a little.

The metric clamping bolt with its wimpy handle went into my metric fastener junk drawer. I will likely repurpose it someday.

I welcome your comments and questions.

If you want me to contact you each time I publish an article, email me with “Subscribe” in the subject line. In the body of the email, please tell me if you are interested in metalworking, software plus electronics, kayaking, and/or the Lectric XP eBike so I can put you on the right distribution list.

If you are on a list and have had enough, email me “Unsubscribe” in the subject line. No hard feelings.

Rick Sparber
Rgsparber.ha@gmail.com
Rick.Sparber.org