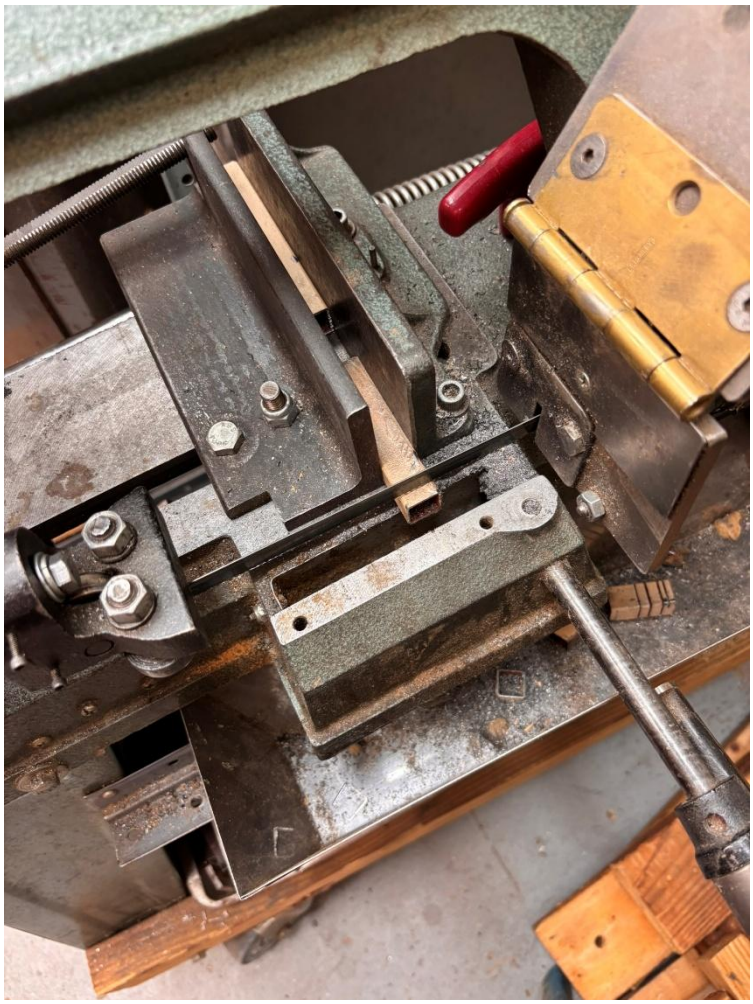
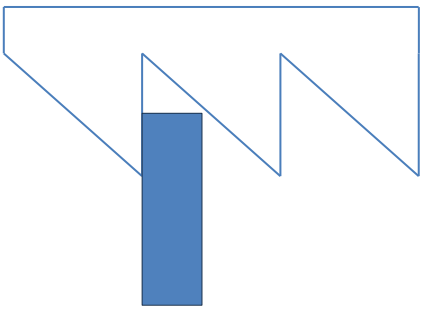
Horizontal Bandsaw Blade Feed Brake, Version 1.0

By R. G. Sparber



Sawing stock with inconsistent thickness can be a problem on my horizontal bandsaw. Here's square tubing in my vise. The blade does fine along the top, where more than 3 blade teeth contact the stock at the same time.

Trouble begins when we reach the sides of the tubing. We no longer have 3 teeth resting on the stock at the same time. If the blade's downward feed rate isn't controlled, we can end up with stock near the tooth root.



The tooth must either shear off the stock or the bandsaw will protect itself by letting the blade fall off the wheels.

The key parameter here is the chip thickness. If too thin, we waste time sawing the stock. If too thick, we pop the saw blade off. Chip thickness depends on the speed at which the teeth pass over the stock and the downfeed rate. Ideally, an automatic system will control both parameters to generate a constant chip thickness regardless of stock geometry. I don't choose to get this fancy right now, but I still ponder the idea[2].

I keep the blade speed constant and manually control the downfeed rate. It works until my mind wanders. Then the blade pops off.

There is a crude down feed control that you can see in the above picture – a spring. It does not work well. Tighten it too much, and the blade does not feed into the stock. Too little, and the blade pops off.

Many superb hydraulic piston downfeed designs exist, but I've never made any of them. My gut told me they were overly complicated for my needs. I tried a friction-based downfeed scheme and found it unreliable.

Then I hit upon an old friend – magnets.

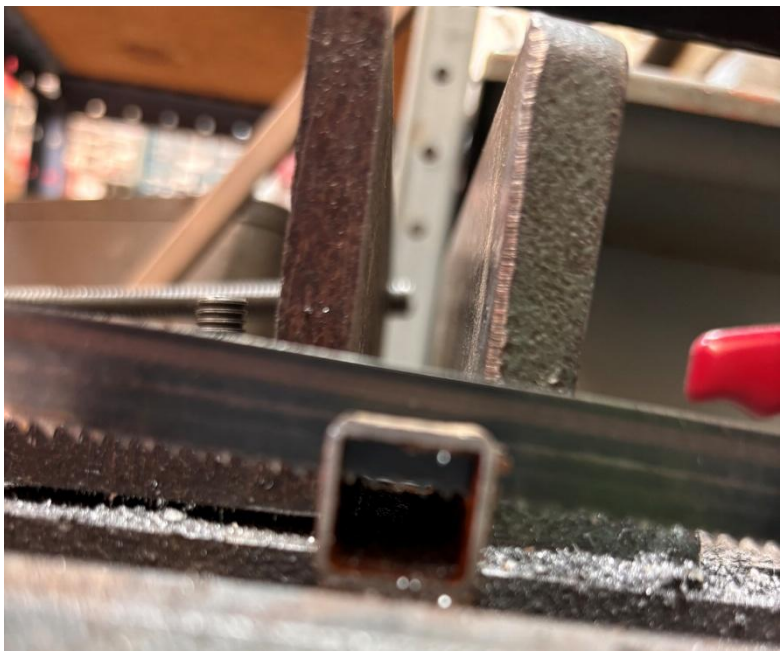
I have a few neodymium magnets from J & K Magnetics that come with a countersunk hole in the middle. I secured them to the frame of my bandsaw arm by drilling and tapping 6-32 holes and using flat-head screws that sit below the face of the magnets.

[2] If I monitor the blade speed and downward feed rate, I should be able to keep the chip thickness constant as stock thickness varies. Arduino based sensors are available to do these tasks. The software would be trivial. However, is it really worth it?

Place a steel bar on these magnets, and it holds the arm up.

When the motor runs, it vibrates. This vibration causes the steel bar to break free of the magnet microscopically for an instant, then settle back into place. The result is reduced friction.

With the motor running, the arm slowly falls until the blade contacts the top of the square tubing. Then the vibration decreases, and the downward feedrate is set by the blade cutting the stock.



When the blade cuts thinner stock, vibration increases and the downward feedrate increases, both due to the cutting action and reduced friction between the magnets and the bar.

It would be so nice if the increased vibration increased friction between the magnets and the bar. Alas, that is not how it works. However, the slowing is enough to prevent the blade from popping off[3]. My desire for elegance has given way to my need for simplicity.

I can roughly control the downward feedrate by selecting steel bars of different thicknesses. The bar shown here is about ½" thick. Going thicker has no effect. Below about 1/16", there is little braking effect plus the bar tends to bend. The bending can be solved by forming a U. The base of the U contacts the magnets, and the flanks of the U provide stiffness.

I welcome your comments and questions.

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[3] I repeated made cuts with and without the bar to verify that this arrangement was reliable.