Tool Resurrection
Kalamazoo 7A Band Saw

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Continuing the theme of "contribute-or-read-about-what-I've-been-doing", what follows is a brief description of bringing a tool back from the dead followed by probably more than you ever wanted to know about calculating pulley sizes.

Figure 1: Before

Some time back, I was gifted with the remains of what was once a pretty decent horizontal band saw (Fig.1) - A Kalamazoo 7A. I have no real idea of just how old this saw is but there doesn't appear to be anyone selling a copy on the Internet. It is a massive beast - over 200 pounds of approximately 1/4" plate. Compared to the Harbor Freight units, this is a tank.

I've been threatening to get it working for a couple of years and finally did it. I stripped it down to components, wire-brushed and/or washed away years of accumulated grime and rust and slapped (and that is the correct term) a coat of more-or-less matching paint on it - Lowes 'maybe-I'll-dry-one-of-these-days" enamel. What was amazing is that everything still worked - not just the steel but the bearings as well as the hydraulics (Ok, they leak a bit but just a few drops a day) (Fig.2).

Figure 2: After

The only real problem centered on the absence of the motor and the fried on-off switch. I cobbled together a new switch and a new auto-off mechanism, but I still needed to get the saw cutting as close to specified speeds as possible. While I've added a coolant system, blade life is enhanced if the saw runs to specs. The details are given in Fig.3.

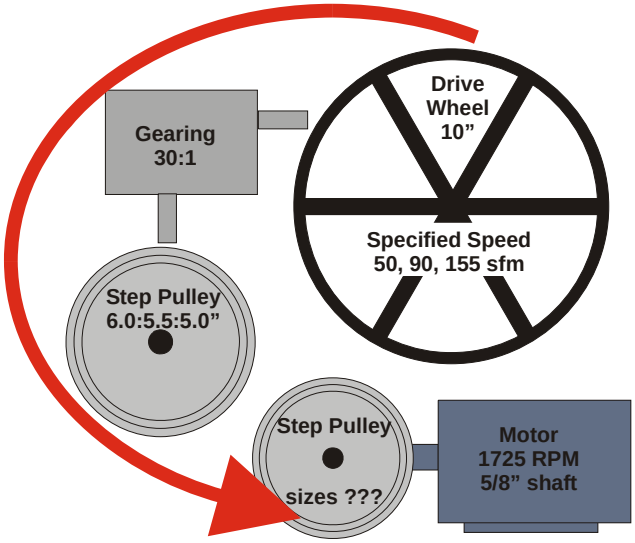

Figure 3: Pulley & speed specifications

Start with the low speed of 50 sfm. Convert that to inches and divided by the circumference of the drive wheel gives the rpm of the drive wheel, i.e., $50*12/10\pi = 19.1$ rpm. Multiply that by the gear ratio (=30:1) and divide by the rpm of the motor, i.e., $19.1*30/1725 = 0.322$ which is the ratio of the largest pulley on the saw to the matching pulley on the motor. Since the large pulley is 6" in diameter, then it needs to be driven by a 6 * 0.322 or a 2" pulley.

If we represent the speeds as S_i = 50,90 & 155; the saw's pulley sizes as P_i = 6, 5.5, & 5.0", and N_i as the needed sizes then

$$(S_i*12)/31.42) * 30/1725)*P_i = N_i$$

with a bit of algebra, the equation is:

$$P_i * S_i * 0.00664 = N_i$$

So I need a pulley with a 2.0, 3.25, & 5" steps. A quick Goggle search found on Amazon.com a reasonable match: Chicago Die Casting #146; 5/8" Bore, 3 Step V-Groove Pulley, 2", 3" & 4" Steps for $13.50

Now - don't you want to send in something?!