Air cylinder replacing counterweight spring on 4 x 6 bandsaw.

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There has been some discussion of replacing the spring that controls the downward cutting force on the cheap 4 x 6 bandsaws sold by Harbor Freight and others. It has been suggested that a hydraulic cylinder with a flow control valve to keep the saw from coming down too fast would be a good replacements. I replaced the spring with an air cylinder and a flow control valve.

The adjustable counterweight spring controls the force that the blade puts on the workpiece, but it does nothing to control the speed at which the saw frame moves. A hydraulic cylinder with a flow control valve would do just the opposite. It would control the speed that the saw frame moves, but it would not limit the force that the blade imparts on the workpiece.

The air cylinder I found does both. The pressure in the cylinder controls the downward force, and the flow control valve controls the speed at which the frame lowers. Because the flow control valve has an integral check valve, you can lift the saw as fast as you like.

By adjusting the air pressure in the cylinder you can control the force the saw exerts on the workpiece. By adjusting the flow control valve you can control the speed at which the saw frame comes down. I have the regulator set at 80 psi, and it seems to work about right. At 100psi, the saw frame does not come down at all.

Here are the parts I used:

Part Number	Description	Source	Price
HC9952	1.065 Dia. x 2” Stroke Bimba air cylinder with flow control/check valve/swivel fitting	C&H Sales Company	15.00
HCA 9253	Clevis	C&H Sales Company	1.50
32872	Pressure Regulator	Harbor Freight	9.95
SW 9904	Pressure Switch	C&H Sales Company	10.00

Several of the parts I used came from C & H Sales in Pasadena, CA. C & H sells surplus electronic, optical and mechanical equipment and parts. Their phone number is 800 325 9465. Be sure and ask for a catalog. (I see they have a $30 minimum order. If anyone needs me to stop in and buy the parts, let me know.)

The air cylinder must have been made for an application just such as this. It has a fitting that includes an adjustable flow control valve, a check valve, and a swivel fitting already installed. The diameter is appropriate for the application and the stroke is the minimum stroke that will work.

I used the clevis listed above, but it would be very easy to make a replacement from a piece of ½” square stock. Drill and tap 5/16-24 in the end, and cross-drill 21/64” for the bolt. As it was, I had to drill out the cross hole from ¼” to 21/64”.

I mounted the cylinder on a piece of 1/8” x 2” flat bar scrap. The two holes in the cylinder mounting block are tapped ¼-20 in the back, and are counterbored for #10 Allen head cap screws in the front. The #10 screws simply pass through the ¼-20 threads. I tapped the flat bar 10-32 and drilled a 21/64” clearance hole for the pivot bolt.

The position of the cylinder pivot is critical. There is virtually no extra stroke, and if you place the pivot in the wrong place, the cylinder will bottom out before the saw reaches the vertical position. The pivot needs to be as low on the saw as possible. (It actually wants to be horizontally aligned with the bolt in the end of the saw’s lever arm.) Assemble the clevis to the cylinder rod, using a lock nut, and adjust it to center of the clevis’ travel on the rod. Put the clevis on the bolt that is on the bottom of the saw’s lever arm. Open the flow control valve so the cylinder moves freely. Pull the cylinder to its maximum stroke, and mark the hole position for the pivot on the thicker part of the saw base casting at the bottom. Drill and tap 5/16-18 through the casting centered vertically in the thicker part of the casting.

With this mechanism the saw is now dependant on an air supply. While I have listed a pressure switch in the parts list, I have not installed it yet. However, without air pressure, the saw blade has the full weight of the saw frame on it, so I intend to wire the pressure switch in series with the motor switch so the motor will not work without air pressure.

I’m not happy using bolts for pivots, and I wish the cylinder pivot point were in line with the cylinder bore. If anyone can come up with a better way to mount the cylinder, I would like to know about it. I will probably make a better pivot pin for the end of the rod, (or use a shoulder bolt) and replace the clevis with a solid block.