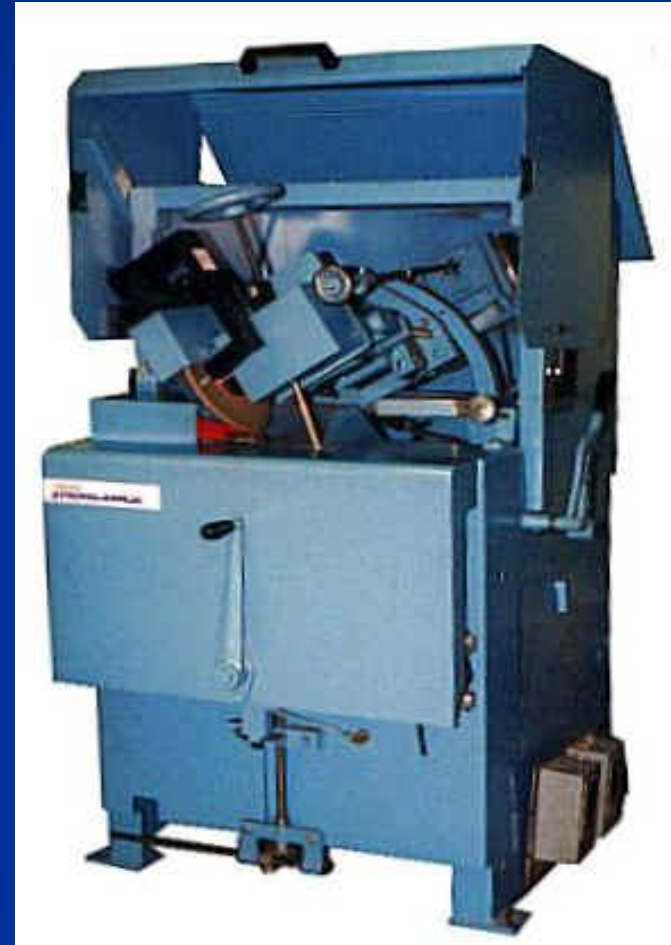


# Armstrong #4 Grinder Maintenance / Rebuilding



First, some History

*Armstrong*

Manufacturing Company

Established in 1902, Portland Oregon USA

# E.P. Armstrong: The Man Behind the Machinery

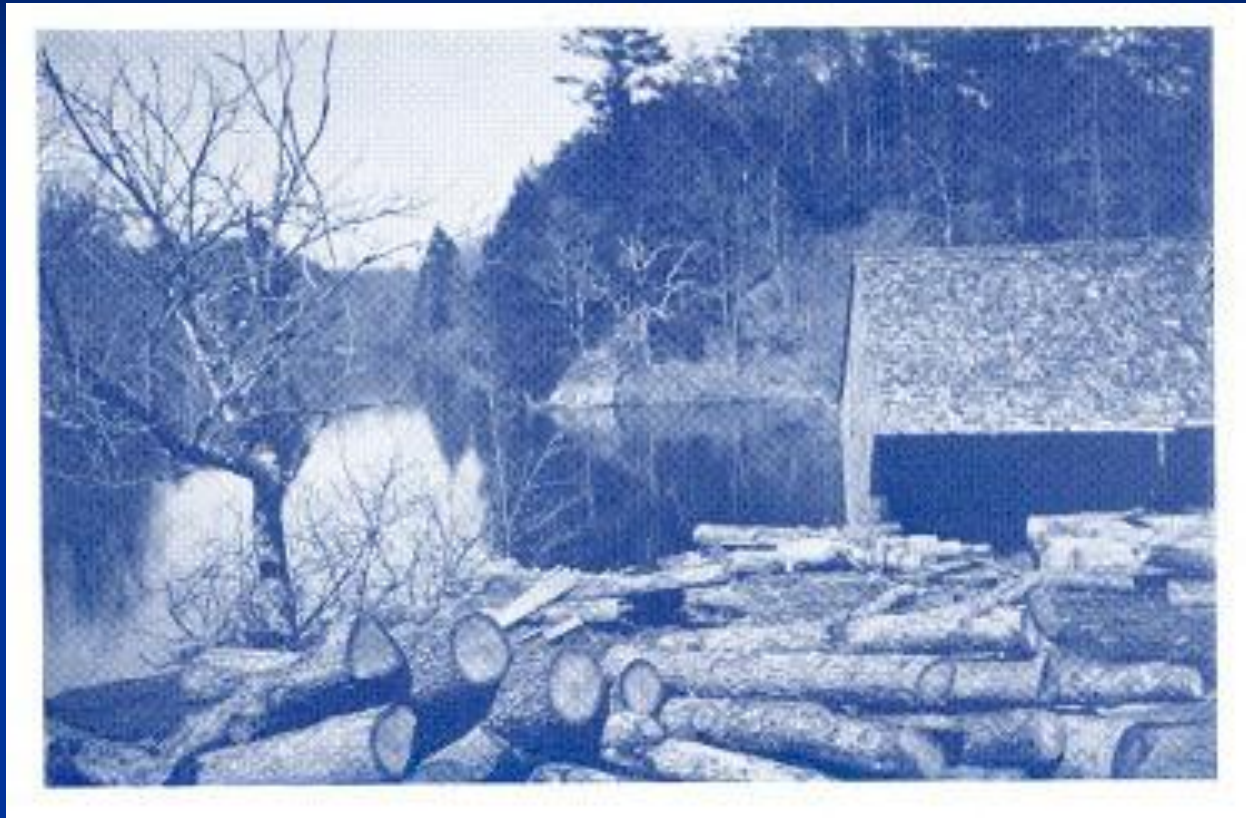


- Born in 1865, (the year the civil war ended in the U.S.), in the village of Haydon Bridge England, Edward would wait until 4 years of age to move to Connecticut and help his father in his wagon spoke factory.

# Necessity is the Father of Invention

- While Edward and his brother were quite young they installed a set of spoke machinery. The machine consisted of a 30-inch bolting saw with 36 teeth fed by hand. The hard work led Edward to experimenting with number of teeth and feed speeds. Working out these fundamental savings was the beginning of Edwards life work.

In the beginning, *he filed*



*E.P. gained some of his early experience as a filer at the Ed Brooks Mill at Stafford Springs, Connecticut.*

# Armstrong Heads West

Portland,  
Oregon



Connecticut

At 22, after helping rebuild the Ed Brooks mill due to a fire, Armstrong traveled through 14 states over the course of 17 years where he observed every size and type of saw used.

# Standard Box and Lumber Filing Room



*E.P. Armstrong (at left) in the file room at Standard Box and Lumber Company in Portland, Oregon. Note the flat belt running overhead that powered the machinery in the file room.*

# Armstrong Equipment Outweighs Filing



Armstrong's growing sideline business prompts him to hand over his head filing position to his 14 year old son.

*The sawmill of the Standard Box and Lumber Company was located near the East end of the old Burnside Bridge. E.P. balanced his time between head filer at the mill and designing and building tools for other filers.*



E.P. opens a small jobbing machine shop and names it *Armstrong Mfg. Co.*



The first factory of the Armstrong Manufacturing Company general machine works was located in downtown Portland.

# E.P.'s son Harry joins *Armstrong*

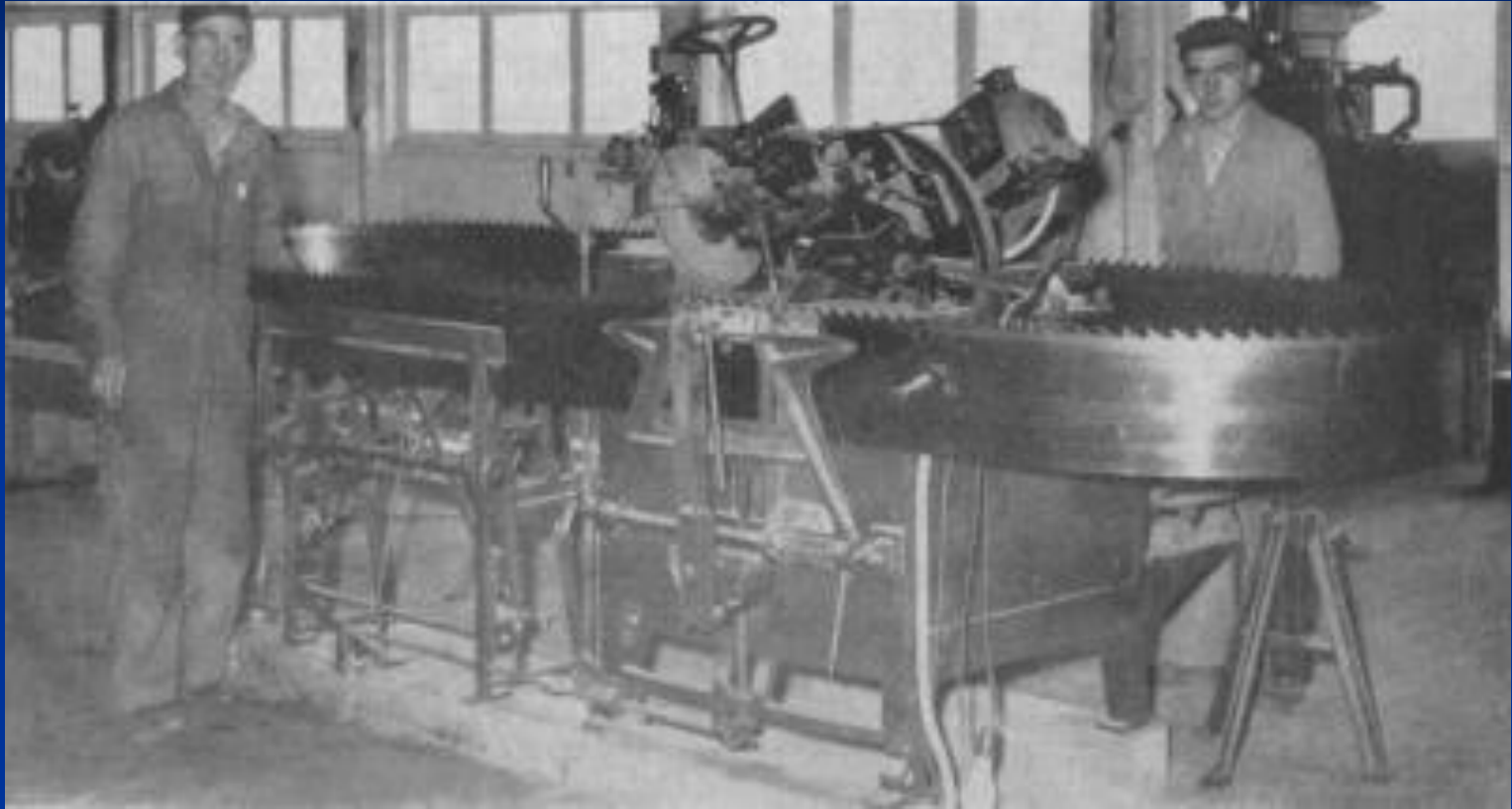


Harry left the Standard Box & Lumber Company, when the mill burned in 1915, to join his father in the business. They delivered swages, shapers and spare parts to filers locally on foot, walking to the 30 sawmills that lined the Willamette river just within the city limits of Portland.

*Left: E.P. busily at work at his drafting table, designing tools and parts.*

*Right: Son Lloyd spent most of his time managing the day-to-day business of the company.*

# One of the First #4s was Built in 1924



**#4 Armstrong grinder  
from the 1950's**

# Rebuilding the #4 Grinder

Starting with a stripped machine, one of the first things to do is identify whether or not the machine has received the “**longer link**” upgrade.

Longer carriage links help alleviate “old wheel new wheel” syndrome. (loosing the hook line)

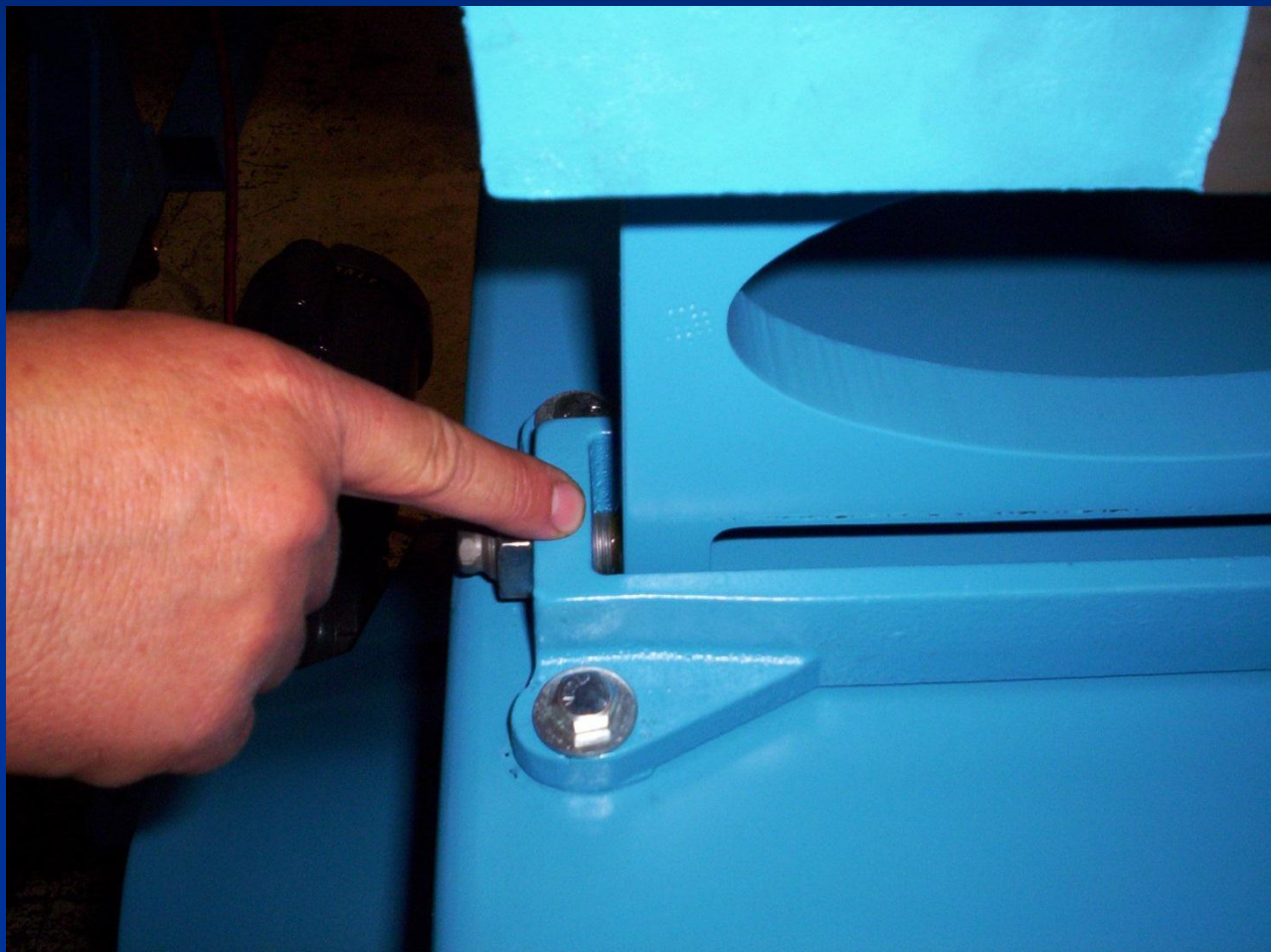


Oval cutout,  
Not a Cast Part

# Saving your Hook Line

- NEW LONGER LINKS
- Since 1980, NEW LONGER LINKS (Part No. 461), for the Nos. 4 and 4-21/22 sharpeners have allowed additional wear on the grinding wheel while maintaining the hook and tooth shape. The 3/4" longer links are completely interchangeable with old-style, Part No.341.
- Overall height of the new links is 8 3/16"

**Make sure to even out the links**



# Always replace bushings when replacing cone screws

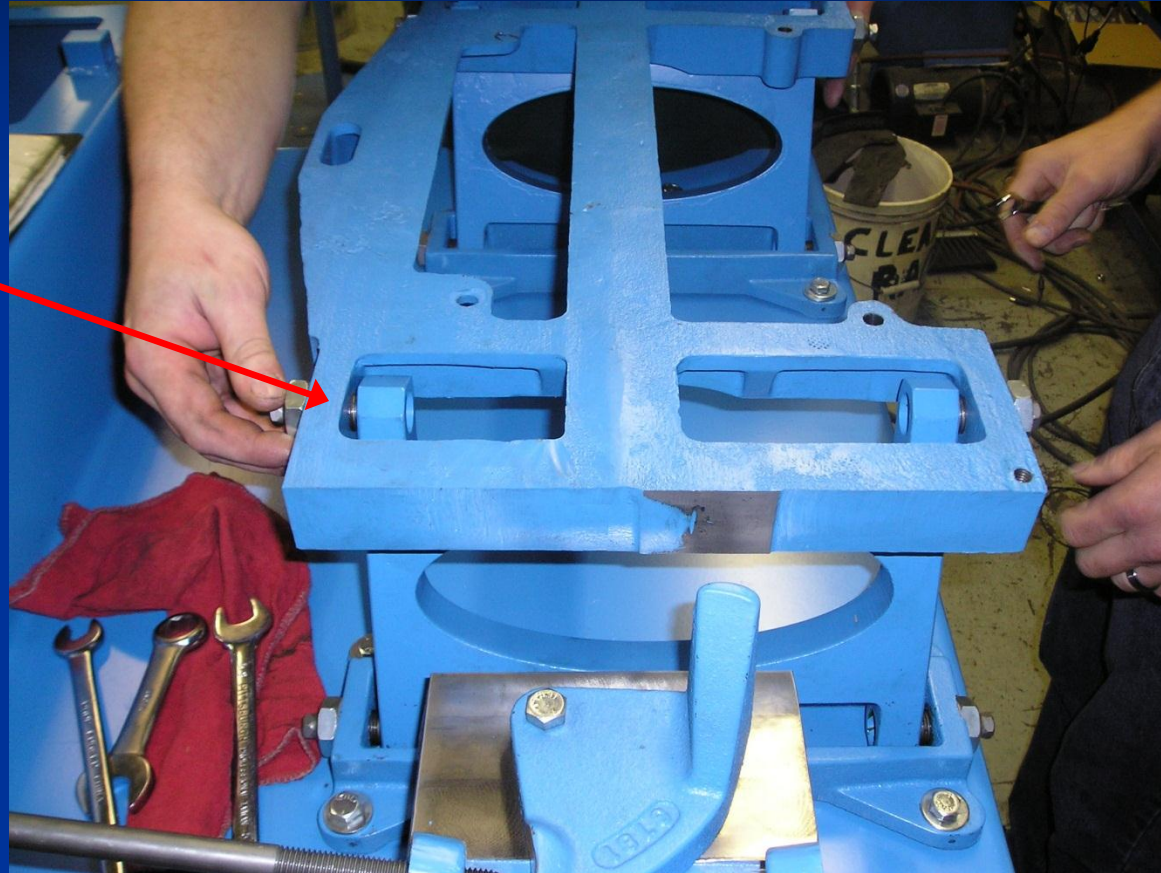


Bushings

Install new Cone screws and Bushings. Don't forget to add a small amount of grease to the bushings.

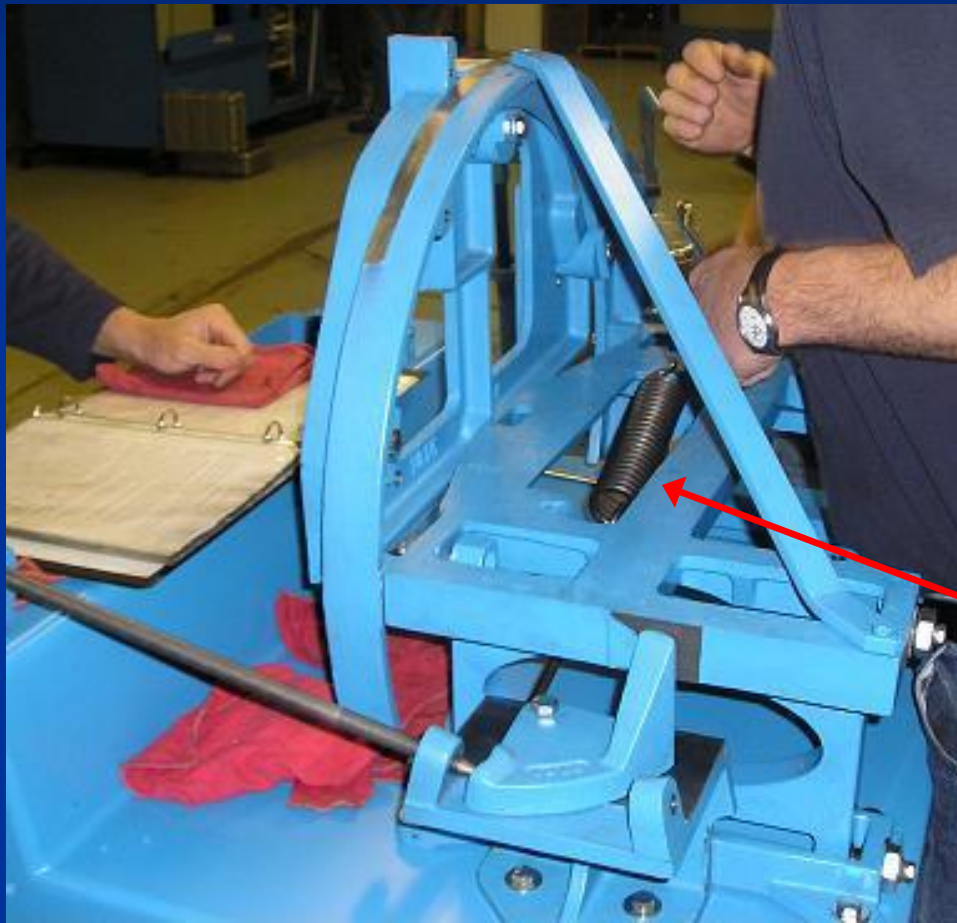


# Install Rocker Arm Base



Keep the clearance gaps even when installing the rocker arm base

# Install Graduated Circle

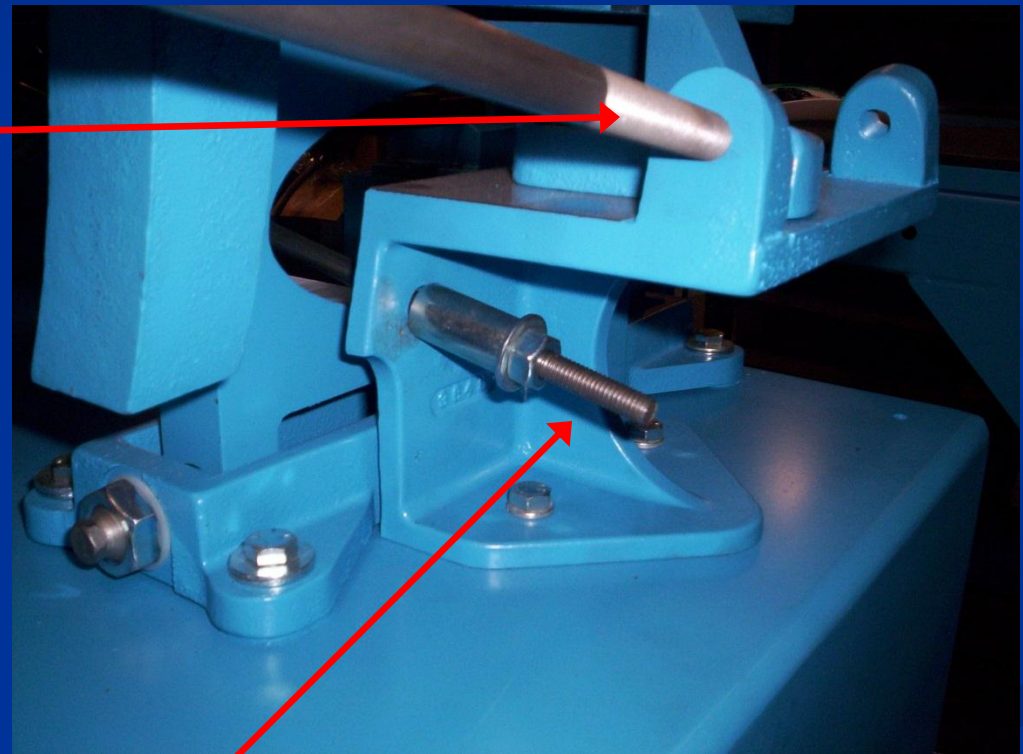


Be careful installing the spring

# Face Infeed Spring

Face infeed threaded shaft

Tension Spring until 1.5”  
is protruding beyond  
the locking nut.



1.5 inches here

# Checking faceplate mounting surface

This will be used to adjust the rocker arm carriage to ensure that both are parallel to each other.



# Rocker arm carriage alignment



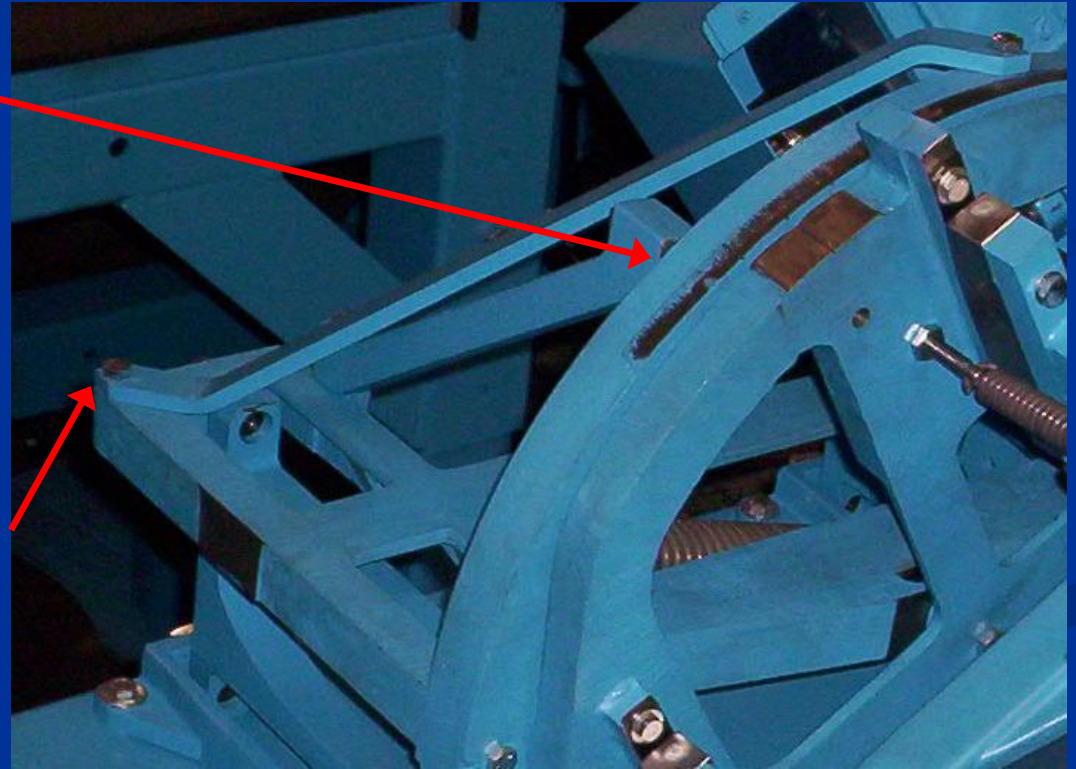
If the angle does not match that of the face plate, the back brace may need to be adjusted. This is done initially at the factory, but is good to check after years of use.

Also check the surface of the “V” guide while apart

# Rocker Arm Carriage Vertical Adjustment

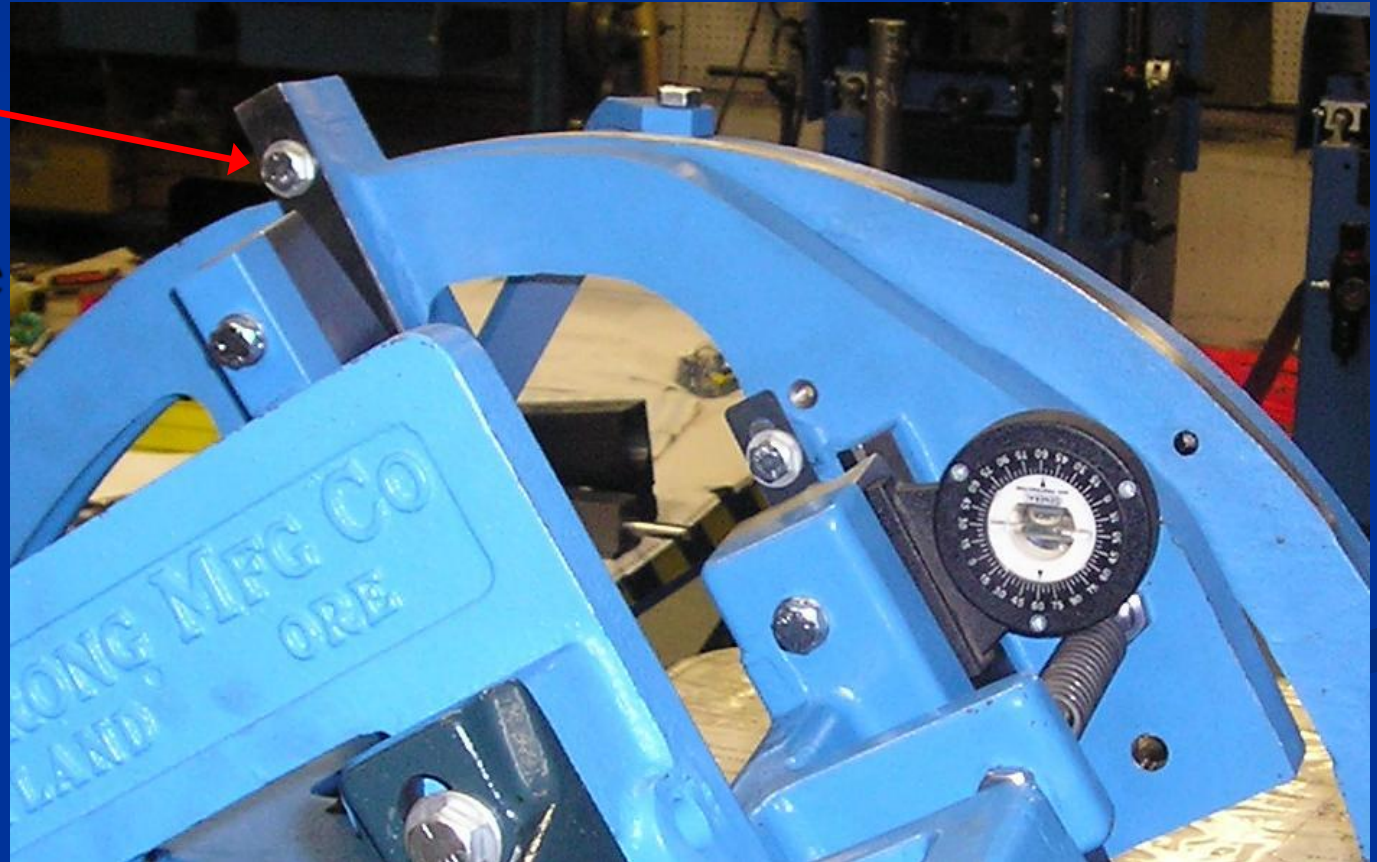
If the rocker arm carriage needs to be adjusted, the face of this brace may need to be ground, or shimmed to match the angle of the face plate base.

There should be enough clearance in the other braces holes to account for changes.

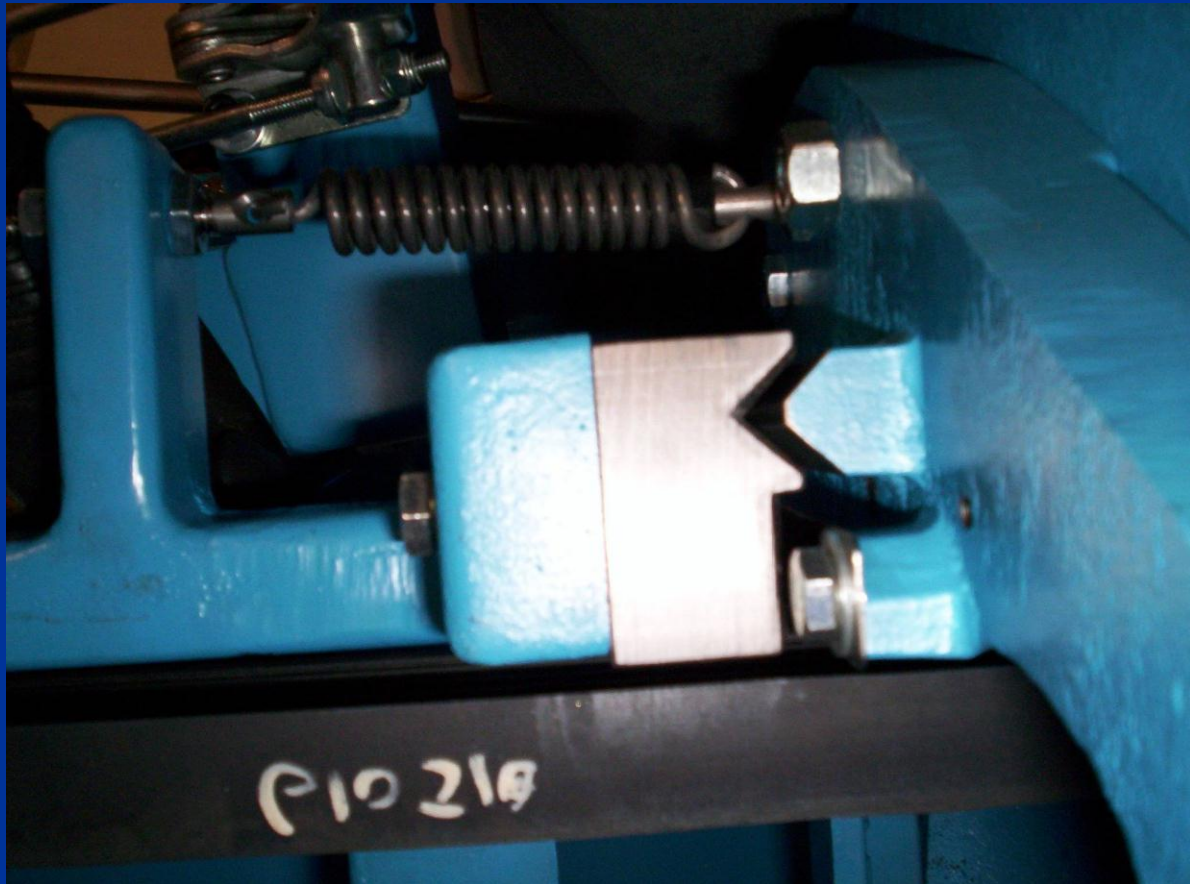


# Running true in the Vee Guide

If there is uneven motion on the Vee, then the hanging straps will need to be adjusted.



You may need to stand on the machine and use a flashlight to verify that the Vee is not rubbing on one side more than the other.

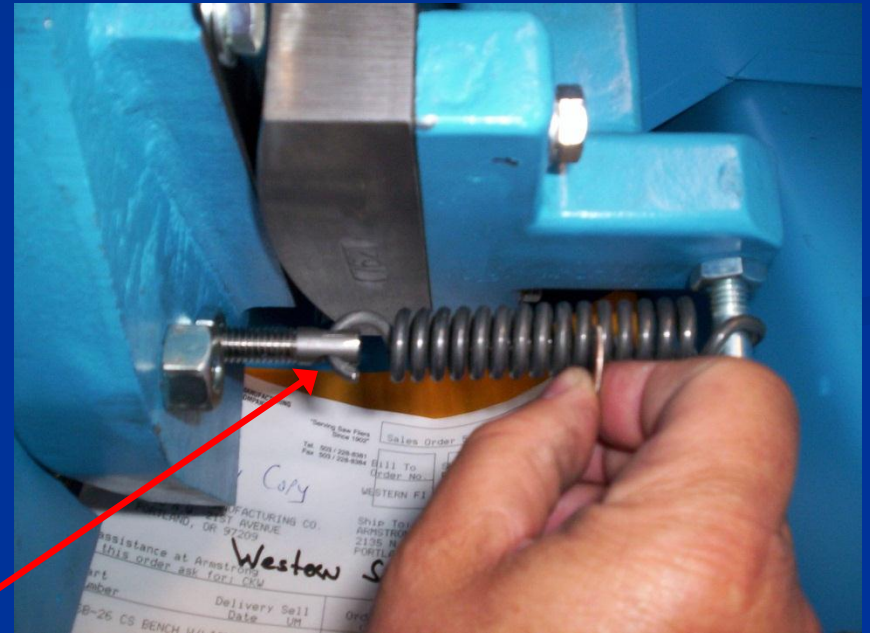




# Rocker Arm Spring Tension

Set the spring tension with the rocker arms in a neutral position. Shown is a US dime going between the coils. 20 to 30 thousandths is appropriate.

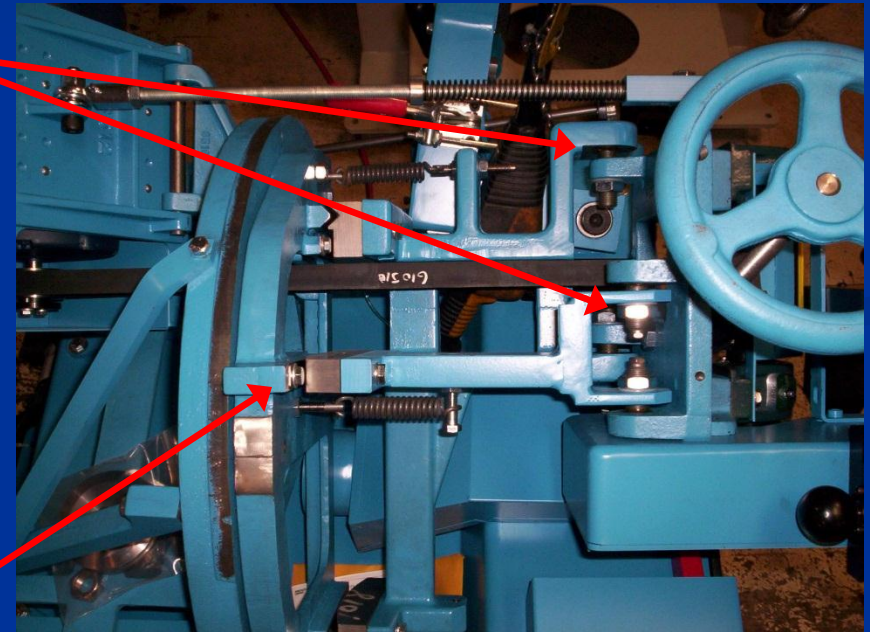
Check the eye for wear



# Replace Rocker Arm Cone Screws

Replace cone screws and bushings on rocker arms. Again, remember to even up all clearance gaps.

If they are over tightened the rocker arms may pull away from the hanging straps

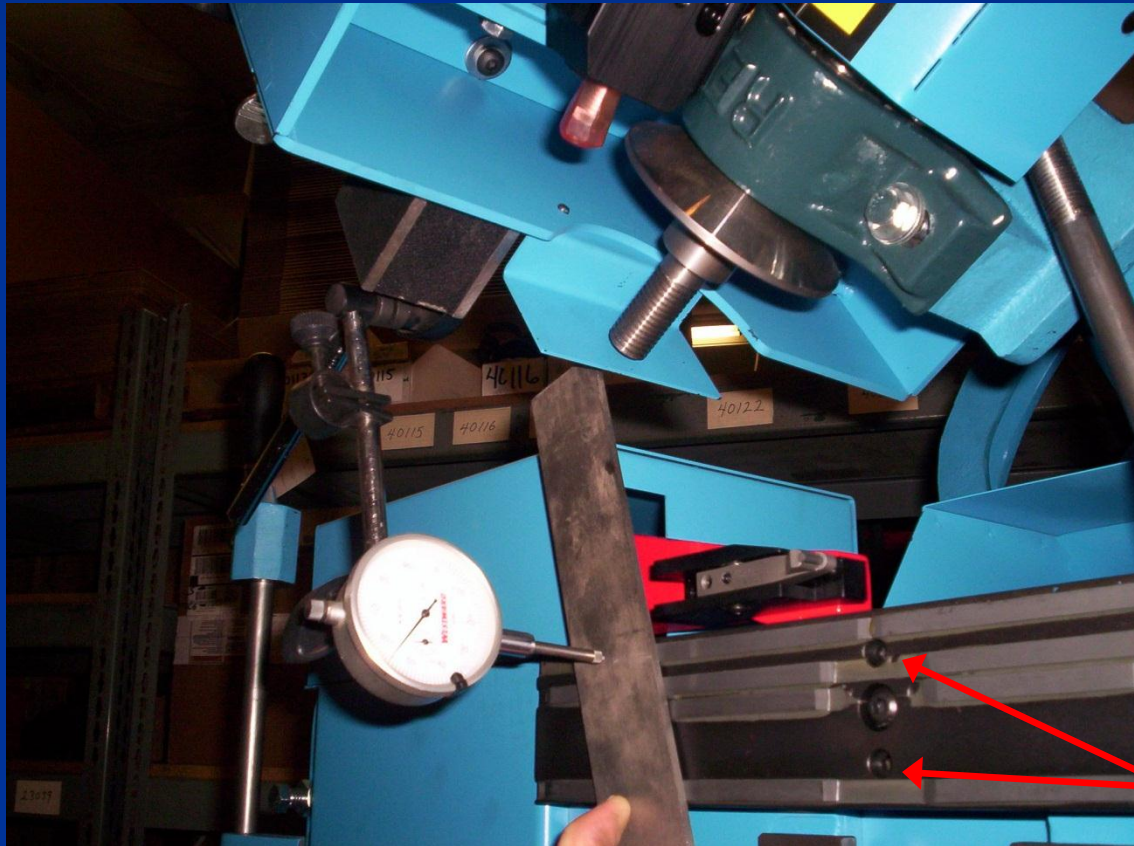


# Adjustment of Faceplate

Although apparently simple looking, the faceplate requires a minimum of 3 adjustments to assure a saw runs correctly. This first one is verifying that it is slightly proud of the saw carriage. Make sure the straight edge is firmly against the top and bottom carbide insert.



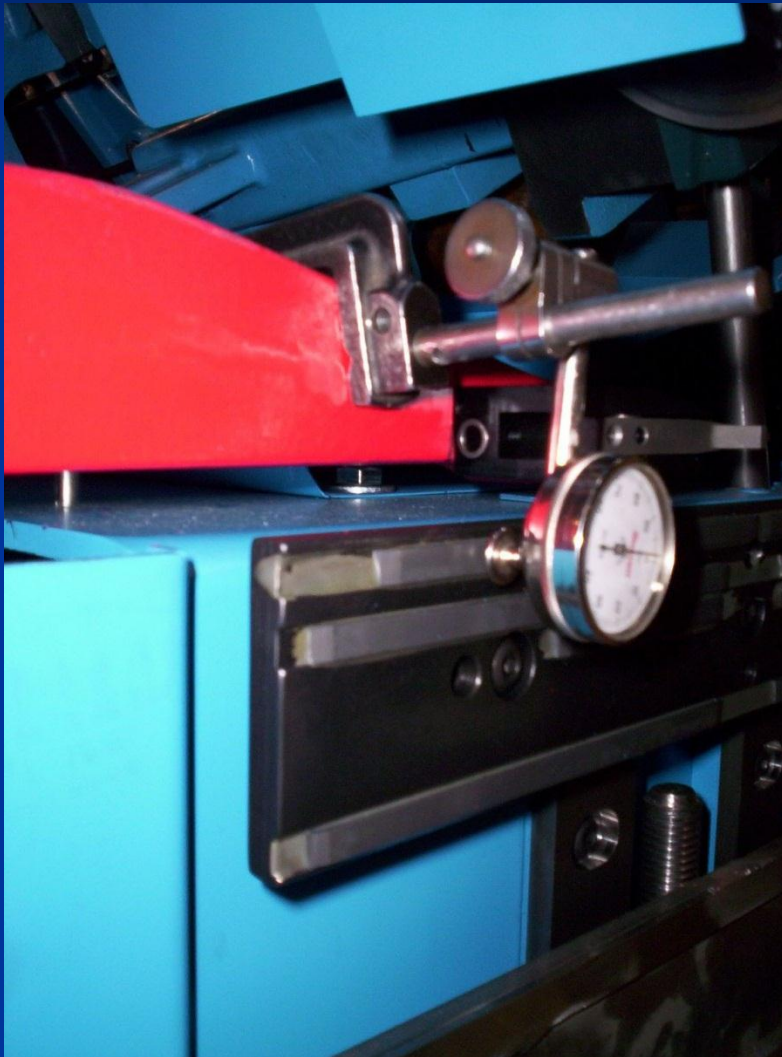
# Vertical Adjustment



Using a magnetic base and a dial indicator, cycle the head up and down to check for vertical runout. The runout should not exceed a few thousandths.

Adjust these screws to level.

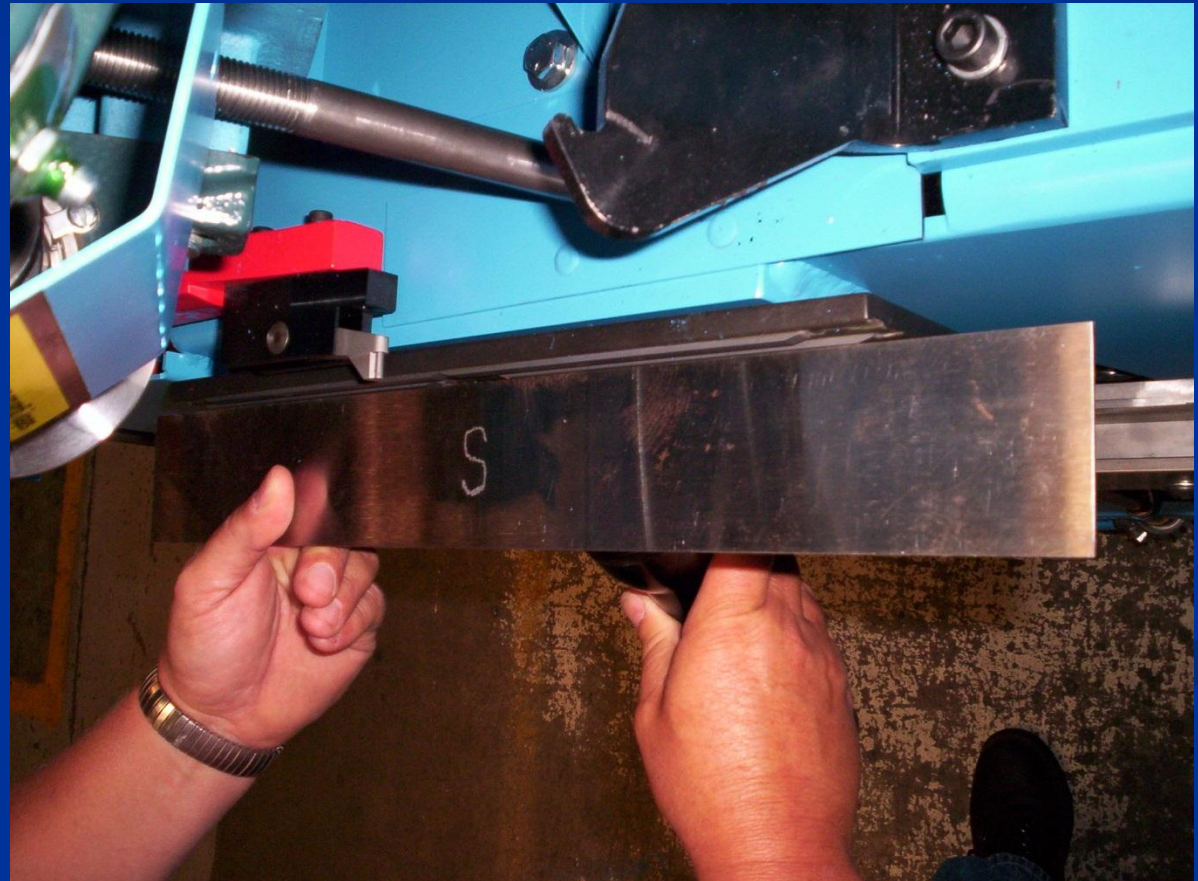
# Linear Runout



Attach a dial indicator to the feed arm to check for runout on the saw entry side of the faceplate. Use the adjustment screws so that the dial is reading  $\sim 0.001$  growth by the end of the stroke

# Truing the other half of the Faceplate

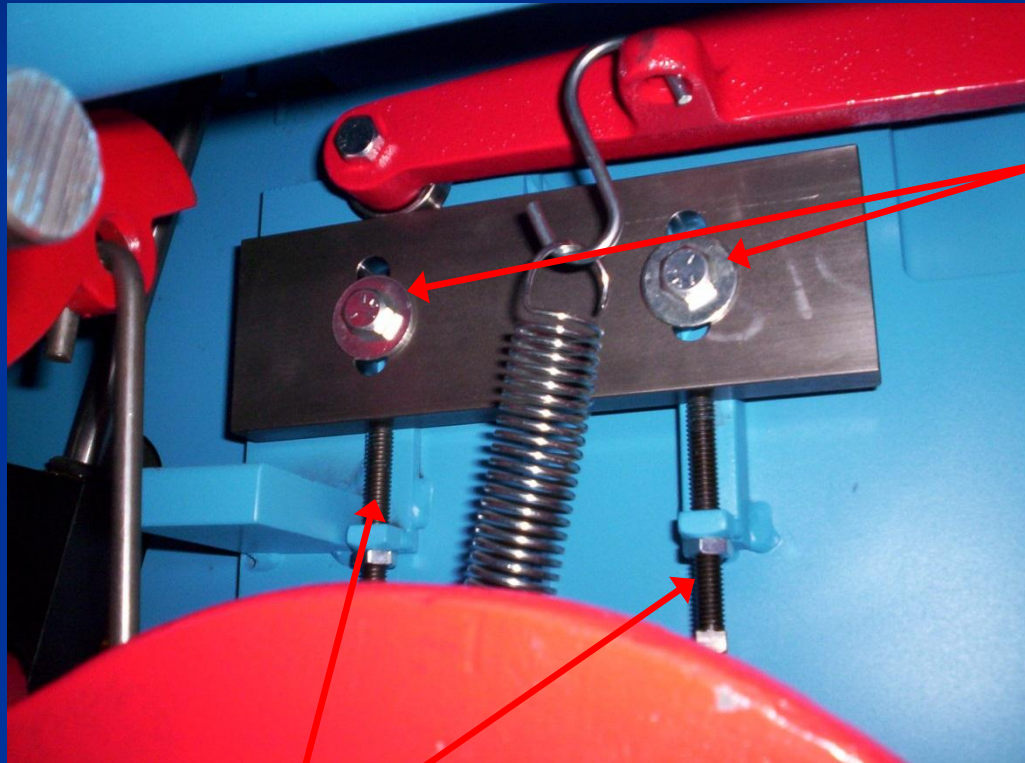
Using a straight edge and a flashlight, adjust the outfeed side of the faceplate. The light showing through from the bottom should be equal all the way across the carbides.



# Faceplate and Stand Height

The faceplate should now be set up to push the saw out 0.002” inches over its full length. This ensures that the feed finger helps hold the saw against the faceplate. The saw should also be running uphill ever so slightly. 1/16” between the first post bracket and the saw carriage is sufficient. This ensures that the saw does not lift up off of the carriage while feeding. *(Feed finger will slide down the face a fraction to help hold down the saw.)*

# Check the Feed Arm Cam Follower Base

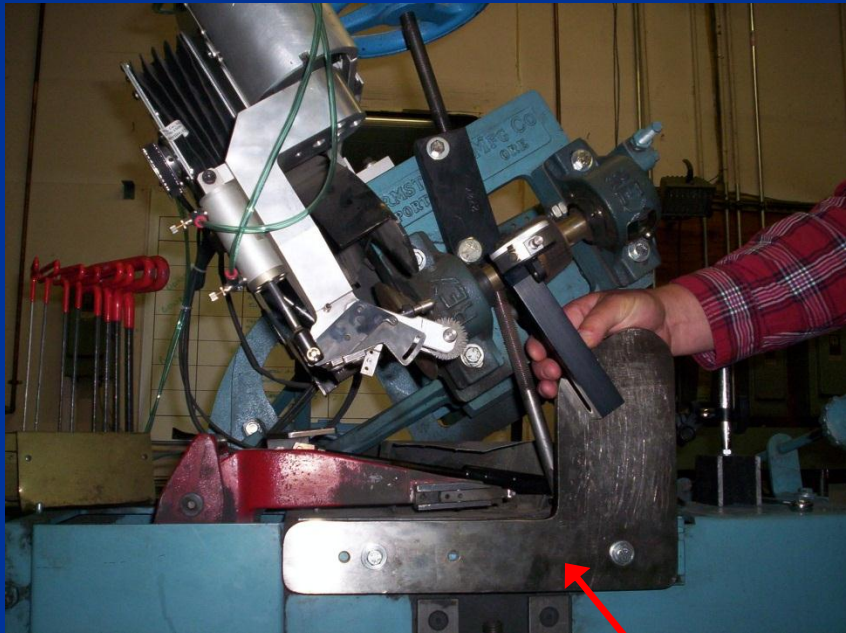


The base rail has two locking bolts, and two adjustment bolts. Adjustment of this base will affect the horizontal plane that the feed finger moves along.

Jacking / adjustment screws (they have a square head)



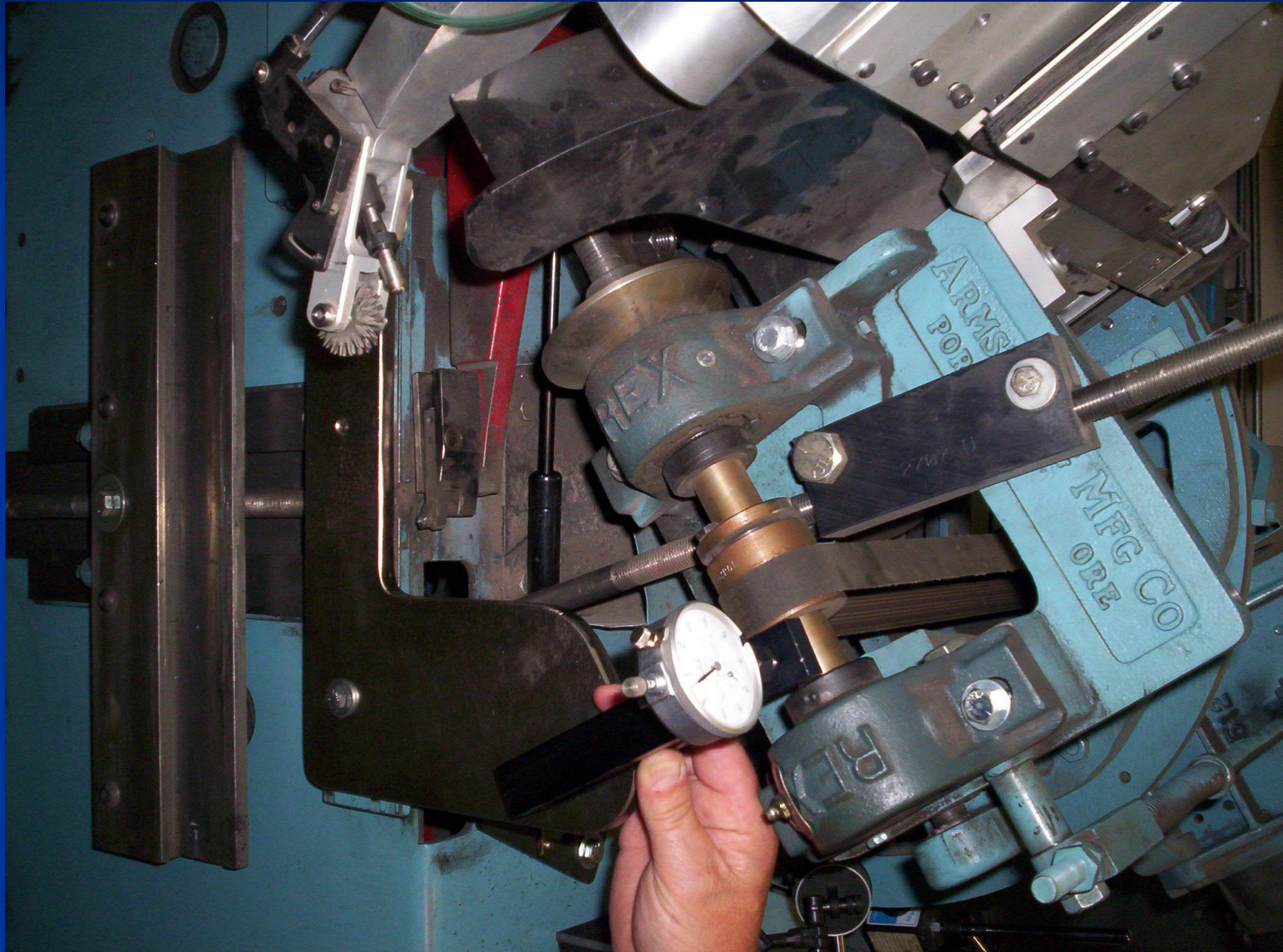
# Arbor Alignment



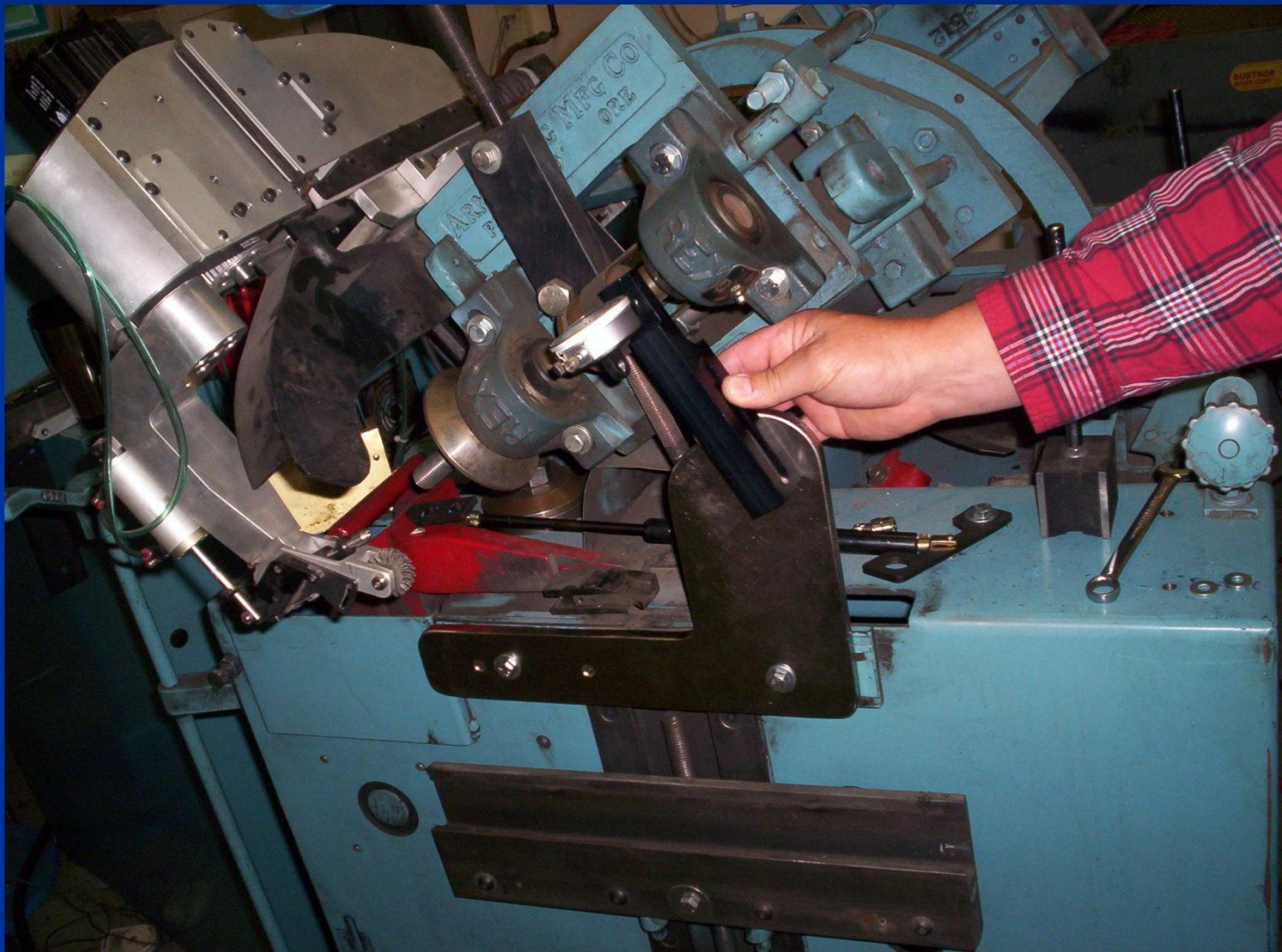
Removing two of the four bolts that hold the face plate, mount the Armstrong Arbor Alignment gauge.

Gauge

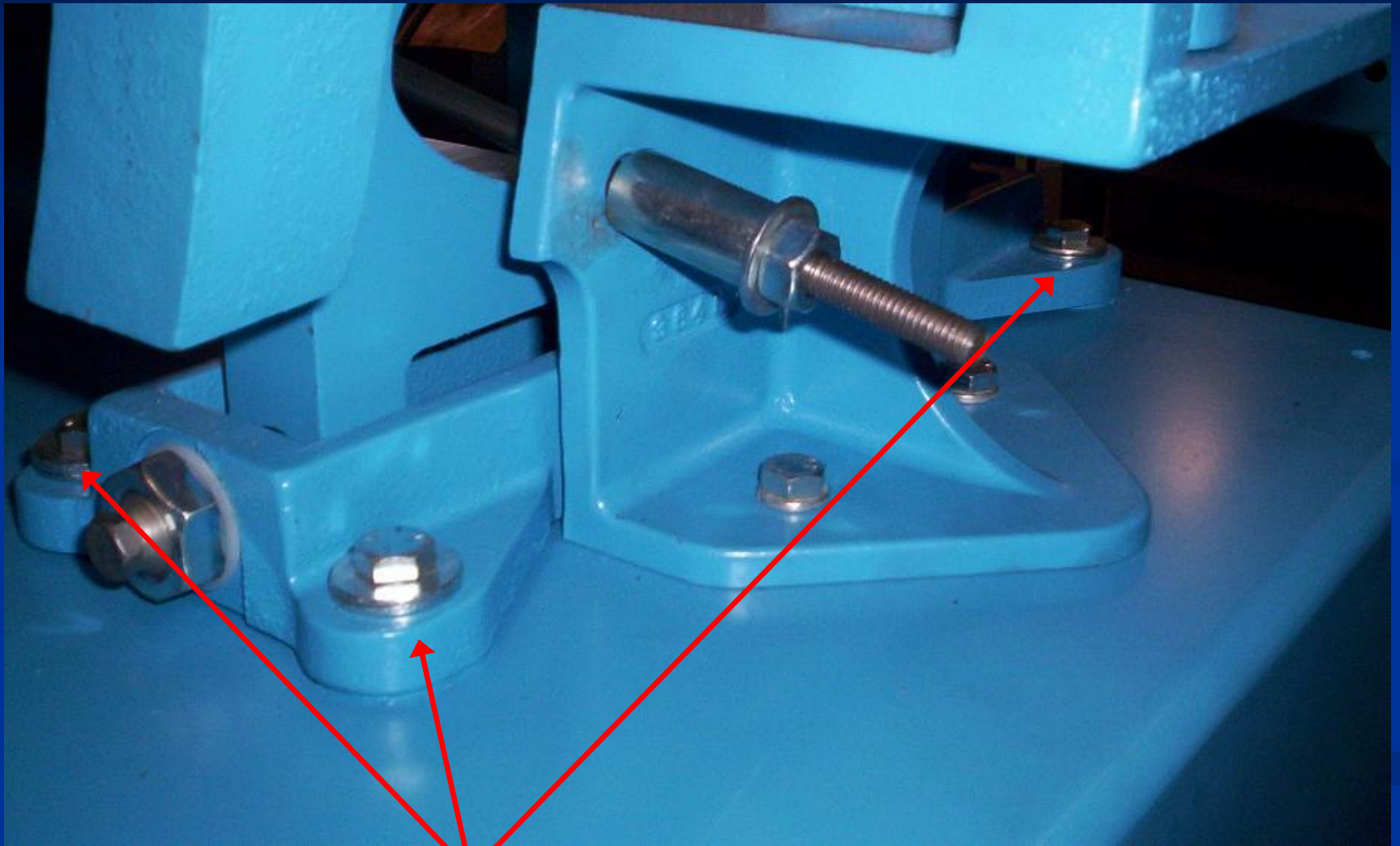
# Zero out the Dial Indicator



Check both sides of the Arbor and adjust  
to the gauge saw you are running



# Adjust the base, not the Cone Screws



Make Adjustments Here

# Worn Cast Iron Cams

- Worn Cams, and Cam followers, especially between two machines can cause problems with a changing gullet shape. New UHMW cams last substantially longer and also help minimize initial grind “gumming” in.
- If the cam has a 1-2mm groove, or the cam follower has worn down and has sharp edges, the cams and follower should be replaced

# Cam Timing

- Older Cast Iron Cams have a raised 1 inch “bar” in the casting that usually comes painted White.
- Use a tape measure and the floor for initial timing
- UHMW Cams have timing hole
- Run a small round bar through both cams, and adjust initially by making the bar parallel to the cam shaft.
- Fine tuning requires stepping the machine through a cycle by hand.