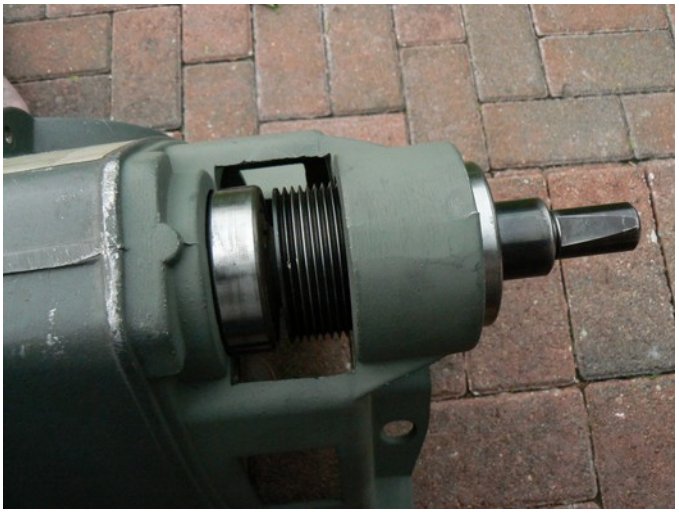
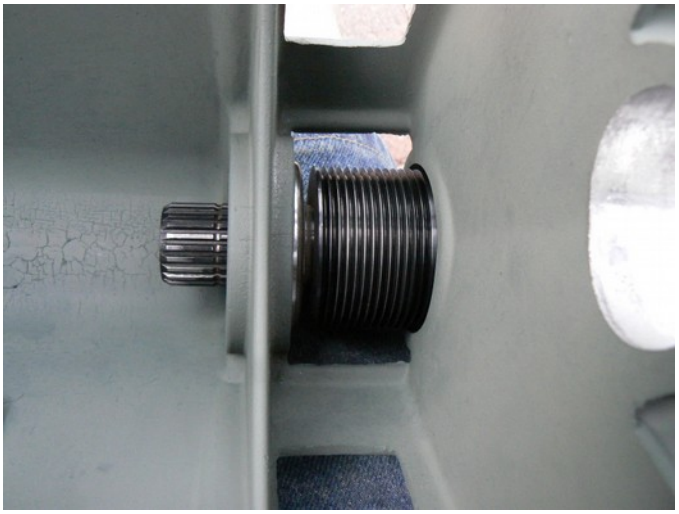
Headstock Reassembly

Upper Shaft

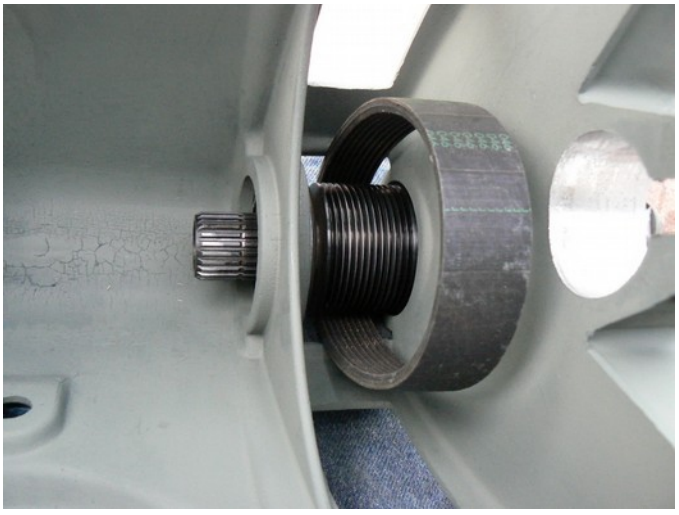
The first two pix do not include the drive belt(poly-v/gilmer) so as the more clearly show the progress.



Slide the drive shaft front bearing with the splined shaft first THROUGH the rear bore. The drive belt should be positioned so that the front bearing passes through the belt.



Continue pushing the drive shaft and bearings into the front bore. RESIST the temptation to FORCE it. Gentle tapping should be all that is required. If it gets 'stuck', back it out and start over.



This pix shows the shaft ALMOST all the way in with the drive belt around the pulley.

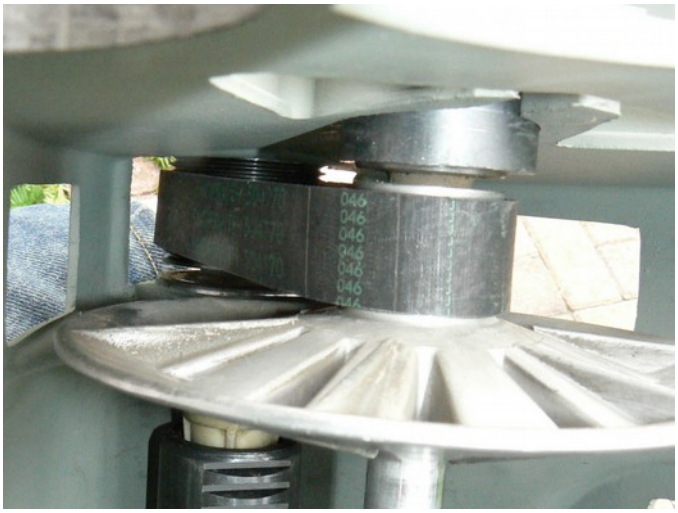
Make sure the shaft and bearings are seated all the way into the headstock. The back edge of the rear bearing should just clear the front edge of a groove at the back of the bore. Start the retaining spring into this groove. Start with the end and rotate it around while applying pressure so the end inserted does not come out.

This shows the retaining spring completely installed. Make sure the entire spring seats into the groove.

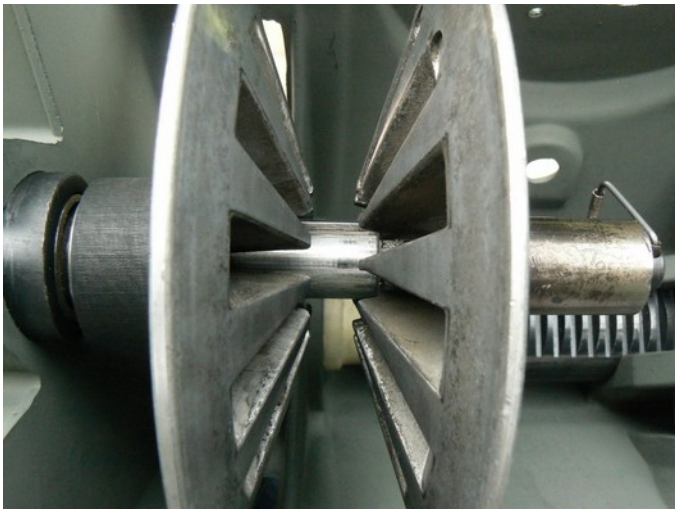
Headstock Reassembly Idler Shaft

Position the bearing eccentric bushing onto the idler shaft bearing with the adjusting slot facing the end AWAY from the pulley. From the INSIDE of the headstock Slip the Drive belt(poly-v/Gilmer) onto the grooved/cogged pulley. For THIS vintage Poly-V belt the belt should be positioned so as to just cover the third GROOVE of the pulley on the drive shaft(upper)(there should be two GROOVES showing on the end of the drive pulley facing the quill handle etc.).

Rotate the eccentric bushing so the 'fat' side is towards the bottom of the headstock, and slide all this into the bore.

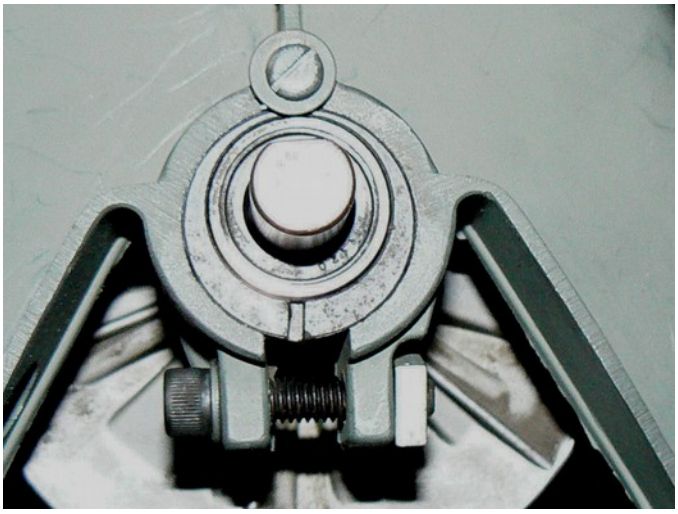


Notice the groove in the center of the bearing. This groove allows the set screw which has a cone shaped end to position the bearing in the eccentric sleeve and secure it. DO NOT overtighten this setscrew as it might apply too much pressure on to the bearing.



Slide the Control sheave onto the idler shaft. The shaft has a key and the sheave has a keyway slot which must be aligned. This would be a good time to lubricate the control sheave/shaft. Finally slip the Motor belt over the control sheave/shaft.

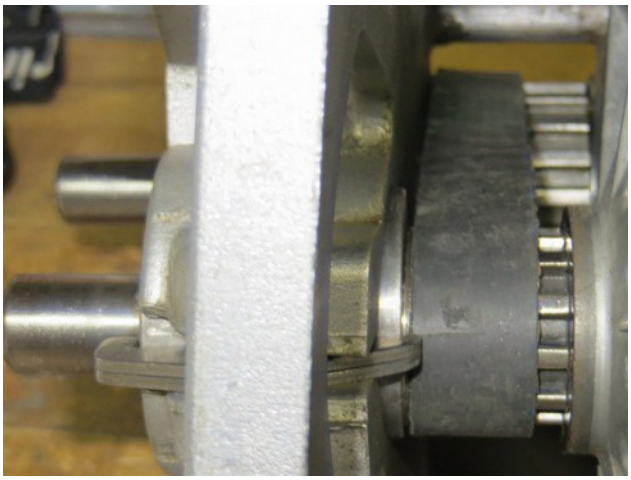
Check the alignment of the drive belt from pulley to pulley. SOME later Mark V require positioning the poly-v belt one more groove towards the rear.



If there was a screw/washer at the top of the idler shaft bore replace it and tighten. Snug the bolt securing the eccentric bushing. If adjusting the drive belt tension now, rotate the eccentric bushing until slight pressure deflects the drive belt about 1/4". This pix shows the eccentric bushing before tensioning drive belt.

From billmayo
Just a quick note: I always replace the eccentric bushing washer with a body washer (larger OD) to prevent the bearing from moving outward from the eccentric bushing. Some eccentric bushings have no set screw or the set screw can loosen over time.

Gilmore drive



from billmayo

Sometimes the Gilmer belt will be positioned to far to the back of the headstock so the back of the Gilmer belt tries to ride up on the Gilmer clutch pulley housing. This will fray and damage the Gilmer belt. I investigated the reason and found that the 2 clips holding the eccentric bushing may set the eccentric bushing with the idler shaft too far back in the headstock. I seat the eccentric bushing against the longer leg of the clips and move/tap the idler shaft with the Gilmer belt forward while hand turning the quill shaft the same direction (important) as the motor does. This is with the eccentric bushing bolt and set screw still loose. I go for about 1/16” to 1/8" gap between the Gilmer belt and the drive sleeve pulley shoulder. I tighten the eccentric bushing set screw and adjust the Gilmer belt of 1/16"-1/8" deflection and tighten the eccentric bushing bolt (not too tight, I normally just flatten the lock washer). This may set the Idler Shaft Bearing any where for 0” to ¼” deep into the eccentric bushing. I make sure the Gilmer belt stays tracking really close to the Idler Sheave pulley shoulder. I use a ¼” Knurl-Grip Cup Point Set Screw to securely hold the Idler Shaft bearing within the eccentric bushing for both the Gilmer and Poly-V Drive systems. Do not use the cone point set screw that came in the eccentric bushing for the Gilmer Drive system. This cone point set screw can deform the Idler Shaft Bearing resulting in noise and failure.

I operate the headstock for some time to may sure the Gilmer belt is not touching or creeping toward the drive sleeve pulley shoulder.

You must have some way to keep both the eccentric bushing and the idler shaft bearing within the headstock. For many years on the "A" headstock, I had drilled and tapped a 10-24 hole in the headstock casing above the eccentric bushing. I used a 3/4" body washer with a 10-24 screw and star washer. This is the same setup that the "B" & "C" headstock casings use to hold the eccentric bushing . Recently I have gone back to using the original metal brackets under the eccentric bushing and offset the idler shaft bearing inside the eccentric bushing for the proper belt clearance on the drive sleeve.

From JPG

As I unnerstan what Bill is saying:

But first realize the following:

The clips position the eccentric bushing in the casting.

The setscrew positions the bearing in the eccentric bushing.

I defer to Bill's experience with the set screw type.

With the clips positioning the eccentric bushing in the casting, there is no way to adjust the bushing location.

However the positioning of the bearing in the bushing can be adjusted if the pointed set screw and the groove in the bearing are ignored. By using a cup set screw the bearing can be positioned further into the casting away from the inside end of the bushing.

I have encountered this same problem(once), but I believe I made sure the main shaft bearings were installed tight to the steps on the shaft and the main shaft pulley positioned closer to the quill end and the bearings as far into the casting as possible. I think this was possible only because the pulley was **not** the clutch type.

IIRC the inner bearing was being positioned too far back by the inner retaining ring being improperly installed.

I do not recall if the inner bearing protruded from the casting as far as yours.

Regardless, the belt does not want to ride against the **clips**.

The thought occurred to me while posting above, that the earlier bearings may have not had the groove and the pointed set screw was a later change when the groove was added. That would validate your 'solution'.

I believe your experience with encountering non-grooved bearings establishes credibility to this 'theory'.

I am curious why **two** clips were used unless it was to minimize side play.

From billmayo

I believe two clips were used on the Gilmer Drive machines as I found one clip can flop sideways and become somewhat unhooked on the back of the eccentric bushing. The clips are loose fitting under the eccentric bushing. My solution some times was to use washers on each side of a single clip to keep it some straight up to hold the eccentric bushing. Many Gilmer headstocks I was rebuilding had no clips installed when I disassemblied them so I went to doing the drill and tap a 10-24 screw hole above the eccentric bushing. I found that sometimes this placed the Gilmer belt too forward on the Gilmer clutch pulley than I thought proper but lived with it.

The over tightening of the cone point set screw in the eccentric bushing can cause ticking, noise, over heating and failure of the idler shaft bearing. This was very true for the idler shaft bearing with no groove which was installed on some headstocks and was a replacement part for years. I found the use of the ¼” Knurl-Grip Cup Point Set Screw solved these problems. I actually use different lengths of this type set screw for all my arbors, way tubes and other locations. Yes, I do have to file the ridges this set screw makes on some shafts but found the security and peace of not having a loose set screw was worth the effort for me. I replace this set screw after a few uses as the knurl part of the tip will be flatten or worn off.

There is no stupid question whenever you do not know an answer. The speed control quadrant along with the motor belt keeps the idler shaft from going into the headstock. The motor belt is the part that tries to force the idler shaft to exit from the headstock casing if the eccentric bushing set screw or bolt loosens at any time.

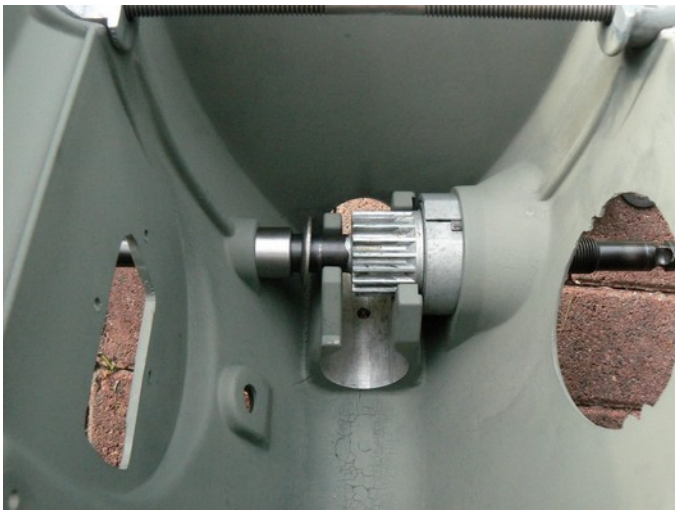
From JPG
The exiting of the bearing/eccentric out the back is the critical failure to prevent. That would allow the pulley to open up too far and then the belt would drop too low and get jammed in the sheave vanes.

IIWM, I would always use the clips(period).

I have learned from this discussion(courtesy of Bill) about the non-grooved eccentrics. The clips design makes far more sense now.

Headstock Reassembly Quill/feed (A)

This shows the sequence the various parts are assembled onto the quill feed shaft. Early Mark 5 did not have the flat washer between the retaining ring and the first serrated washer.[3/21/2012]



Slide the quill feed shaft into the headstock. The spring housing goes into the larger headstock hole. Slip the cup washer and sleeve on to the shaft at the other end. Notice the orientation of the cup washer. The 'flat' outer circumference faces the casting 'ears'.(faces right in the pix) The sleeve has a keyway in the inside which must align with a key on the shaft.

Notice the index mark and feed stop are at the 'top' of the 'larger' hole. Slip the retaining ring onto the shaft and into the groove.

Slip the spring washer and wing nut onto the 'other ' end of the quill feed shaft and lightly snug it up.

From rustysaw
The info sent is really helpful to me,it is nice to see a picture of parts to understand what it looks like before I try to take it a part. In the first picture it show's a retainer clip and a large washer. I don't have these part's on my unit, how important are these part's to move the quill. I am going to take unit apart this week.

From JPG
Those two parts are 'hidden' inside/under the 'dial'. The retaining ring does just that and provides a stop for the 'large' flat washer which provides a surface for the inside keyed/serrated face washer to press against when the wing nut is tightened. They only contribute to the 'stop' function.

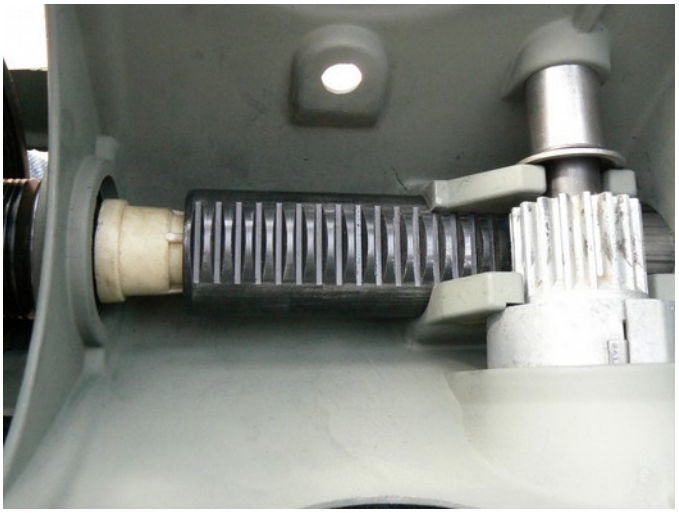
Headstock Reassembly Quill/feed(B)

Note the positioning of the quill spring housing is incorrect. The index mark should point towards the set screw.

Slide the washers etc. onto the shaft. The flat washer first, ONE of the keyed washers with a 'knurled' surface facing OUT, followed by the dial/indicator, a second keyed washer with the 'knurled' surface facing IN and finally the quill feed stop 'wingnut'. Notice the 'knurled' surface of the keyed washers face the dial/indicator. The orientation of the dial/indicator may be random. Snug up the quill feed stop wingnut.

Sight down into the setscrew hole and align spring housing with previous marks left by the setscrew. You may need to loosen the wingnuts to orientate the housing etc.
Insert the setscrew and tighten securely.

Slip the nylon quill shaft/upper shaft coupler onto the upper shaft. Start the coupler onto the upper shaft by aligning the splines with the coupler. Apply sufficient further force to expand a spring inside the coupler which will cause the coupler to 'snap into place' in a groove in the upper shaft.



1) Place a hub/handle onto the quill feed shaft(either side).

2) Loosen BOTH wingnuts.

3) Advance the handle about 1 1/2 turns in the direction of quill advance(TOP towards the quill end of the headstock).

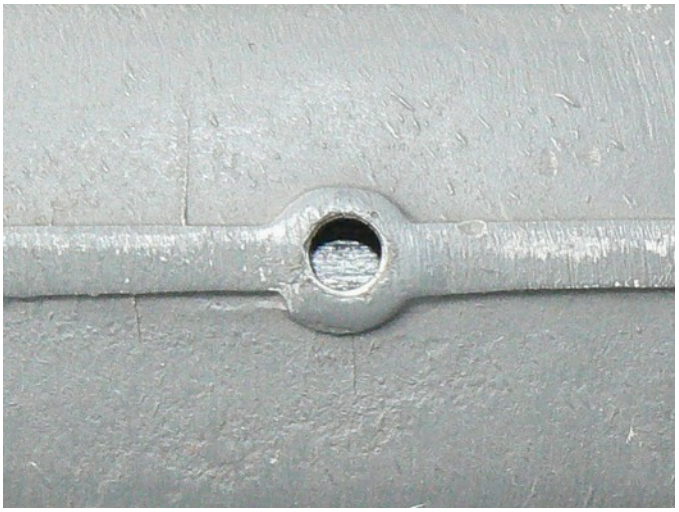
4) Tighten the quill lock wingnut.

5) Position the quill with the rack teeth towards the bottom of the headstock and gently start the quill into the quill bore. Gently push the quill until it stops against the quill feed gear. Do NOT allow the quill to become cocked in the bore. If it will not move with gentle pressure applied, back it out and start over(keep the quill feed handle under control at ALL times).

6) While HOLDING the handle so as to keep it from retracting, loosen the quill lock wingnut.

7) Simultaneously wiggle the handle and nudge the quill while slightly rotating back and forth the quill until it engages the gear and allows the quill to retract into the headstock.

Headstock Reassembly Quill/feed(C)



It does not show too well in this pix, but the keyway on the top of the quill needs to be centered under this setscrew hole.

Notice the projected end on the setscrew. This end MUST go into the keyway on the top of the quill. When inserting the setscrew, be careful so as to NOT drive the setscrew into the side/edge of the keyway.

Carefully drive the setscrew until it bottoms out into the BOTTOM of the keyway. Back the set screw out about 1/8 turn. Advance and retract the quill to verify the screw DOES limit the quill travel, but does NOT drag against the bottom of the keyway. Adjust the setscrew if needed. Notice the setscrew has a nylon insert plugged into the threads. This serves as a method to keep the setscrew from moving(it is not tightened).

If desired, now would be a good time to 'lube' the quill. The present philosophy is to WAX it. Extend the quill to max and lock it. Apply wax and allow to 'dry'. Buff it out. (it is much easier to buff it when back on the way tubes etc.). Clean any wax from the rack teeth with a stiff brush. I personally like to apply powdered graphite to the rack and gear. This requires 'rubbing it on'(a bit messy!).

Headstock Reassembly Speed Control(A)

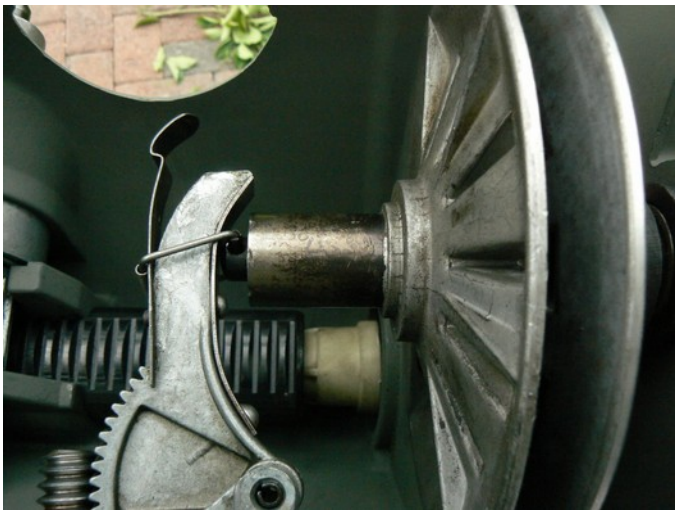
Before we begin I need to call your attention to the shape of the gear on the face of the speed control.

Notice that one side is beveled(top side in the pix). This beveled side should face out when installed on its 'shaft'. ALL the following pix show it 'upside down'. It was upside down(previous owner may have improperly installed it???) and I did NOT notice until putting the knob on which was after all the pix were taken. **This may be in error. I have 'discovered other M5/V with the beveled side down. At this point I believe it will work either way. Bevel on top does minimize potential interference with control handle.**

Notice that the screws are 'self threading'. If you reuse them, take care to start them into the existing 'threads'. Do NOT cause them to cut new threads. That would cause them to strip out(eventually). Notice the wide spring which is positioned between two projections. The outer ring is positioned in place before putting the speed control in position and screws inserted, but subsequent pix do not show the outer ring so as to show other details. The orientation of the outer ring may be random at this time(It will be set later).

Adjust the speed control all the way to the high speed stop. This is determined by the quadrant arm stopping against the stop screw. Notice the small spring located near the top(lower left in pix). Do not forget to install it before putting outer ring in place. The end with a sharp bend goes into a hole on the right and the straighter end slides in a groove on the left.

Headstock Reassembly Speed Control(B)



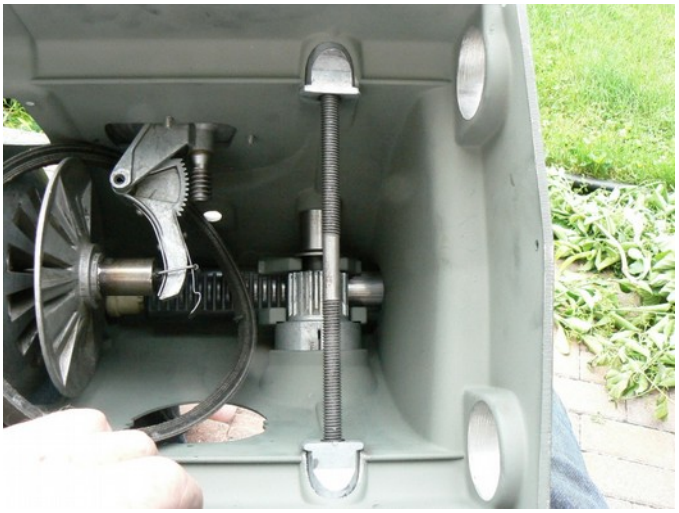
With the speed control set to the high speed stop position, from the inside of the headstock, slip the square shaped 'ring' over the quadrant arm. Depress the flat spring(with a step near the end) to get the loop onto the arm. NOTE: This pix was taken with the speed control set to slow. The square 'ring' slips over the quadrant arm when set to high speed.

Position the outer ring to indicate 'fast'. Notice the shaft on to which the knob attaches has a 'dimple' drilled into it. The knob set screw MUST be tightened into that depression. Slide the knob onto the shaft and feel the screw centering into the 'dimple' by rocking the knob back and forth. Tighten the set screw at the center/bottom of the 'dimple'.

Headstock Reassembly Carriage Lock

It does NOT include the step(s) necessary to reattach the carriage lock handle(wingnut) to the threaded shaft.

Adjust the wedge on the end with the wingnut so it is all the way towards the wingnut.



Position the wedge on the wingnut end against the inside of the headstock casting. Adjust the wedge on the OTHER end so as to also be against the inside of the headstock casting on the opposite side. Rotate both wedges so as to position the flat clamping surface away from the top of the headstock(the pix is from the bottom looking up). Snug the wingnut so as to position the wedges for later insertion of the headstock onto the way tubes.