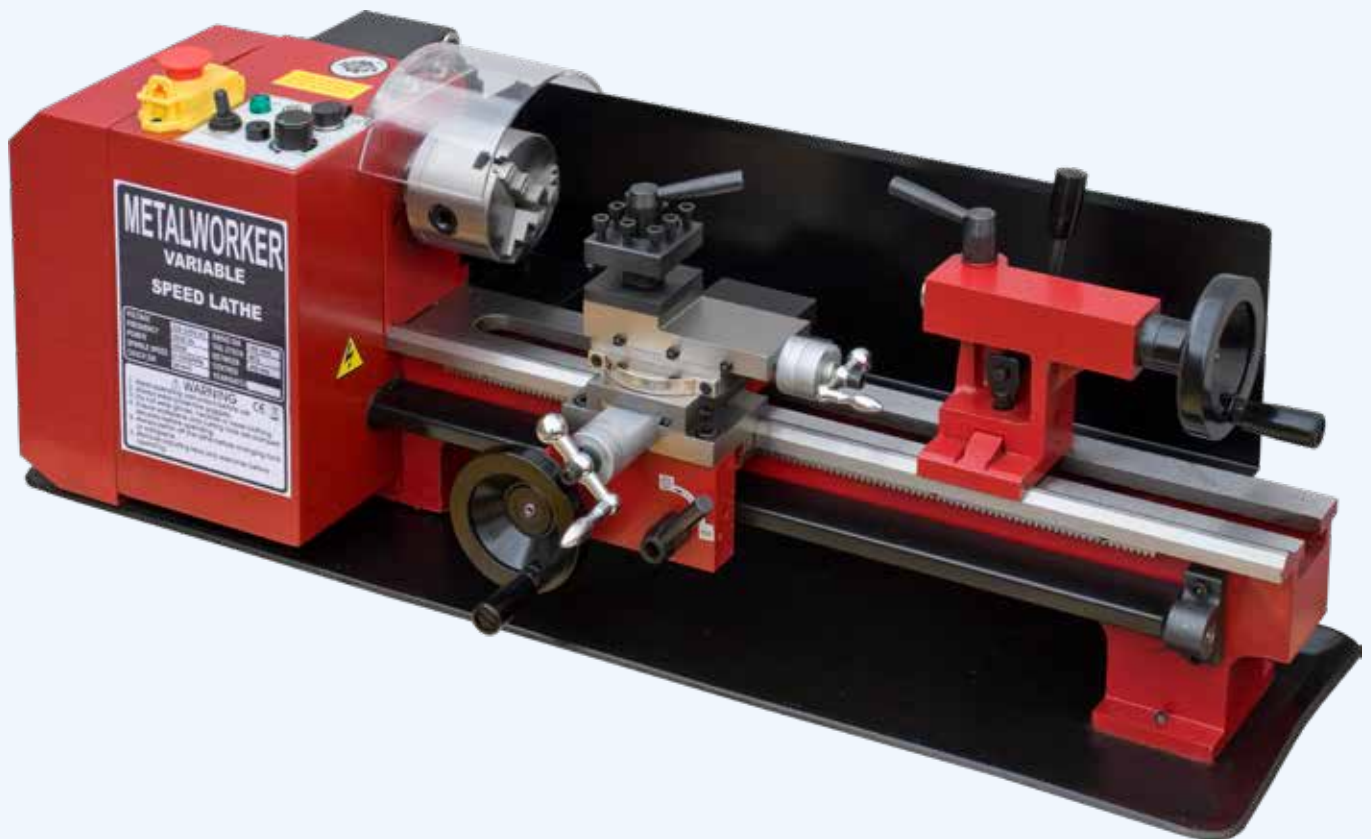


# SC3 Mini-Lathe



## Dismantling and Reassembly Guide

**A picture story book to help you dismantle and reassemble your Sieg SC3 Mini-Lathe**

## PLEASE READ THIS FIRST

The Sieg C3 Mini Lathe is currently one of the most popular small lathes available to model engineers today. The new Sieg SC3 takes the Mini Lathe to a higher level by employing a powerful 500W brushless motor and eliminating the 2 speed spindle gearbox.

The SC3 has a swing of 180mm (90mm centre height) and is 400mm between centres. The spindle has a through bore of 20mm and an MT3 taper whilst the camlock tailstock taper is MT2. The standard 80mm 3 jaw self centring chuck is mounted directly to the spindle flange which will also accommodate an 80mm 4 jaw independent chuck, an ER25 collet chuck or an ER32 collet chuck directly on its  $\varnothing$ 55mm register. A larger 100mm chuck may be fitted using one of our C3 (adaptor) backplates, but we do not recommend the use of a chuck larger than 100mm.

As mentioned earlier, power is provided by a 500w brushless DC motor which drives the spindle directly via a toothed timing belt and is electronically controlled to give a speed range of 100-2500 rpm.

The Sieg SC3 is available in both metric and imperial options and Standard indexable dials are fitted as standard to the cross slide and top slide. The machine is fitted with a socket for an optional spindle speed display and digital readouts are also an extra option.

This picture story guide is designed to help you dismantle, reassemble, lubricate and make the proper adjustments to your lathe.

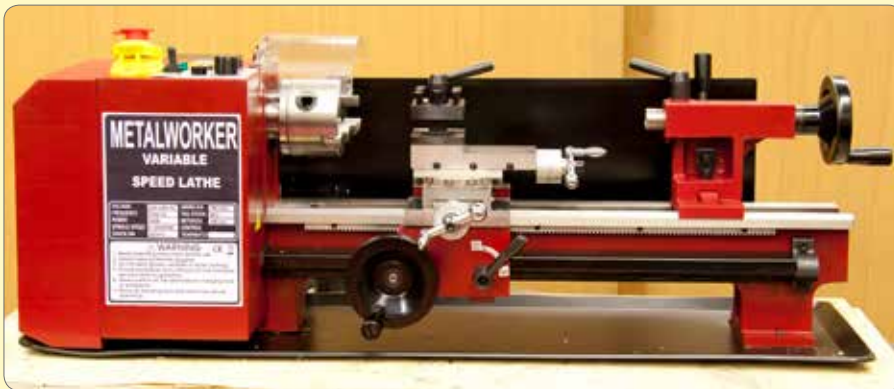
Before dismantling your SC3 mini lathe, you should read through the entire guide and assess that you have the required equipment and skills to complete the task. For instance, some operations require the use of a lathe and you can't use *your* lathe if its all in bits!

Although not expressly stated at each stage in this guide, every part is thoroughly cleaned in a paraffin type solvent before reassembly.

For lubrication, we recommend Molyslip HSB grease (ARC code: 170-100-10300), and a good quality lubricating oil such as Rock Oil HLP 32 Hydraulic Oil (ARC code: 170-150-00400). We do not recommend using automotive engine oil or 3-in-1 oil.

Please note that Sieg also manufacture the C2, C2A, SC2 and C3 mini lathes which are all smaller variations of the SC3 and will have some construction differences. There are also other factories in China making mini lathes similar to the C3 so these will be different again.

[Updated: 4/12/2017]



1. The lathe out of the box and we are ready to start work.



2. Remove the chuck guard.



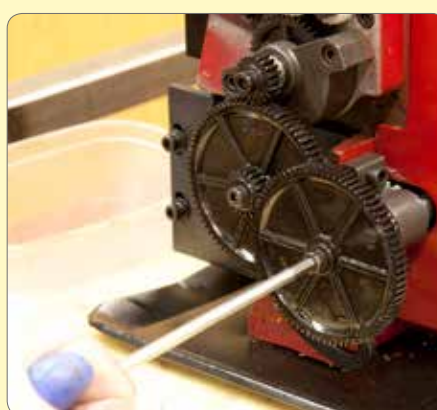
3. Remove the end cover.



4. Remove the rear splash guard..



5. Remove the tailstock.



6. Remove the leadscrew gear.



7. Remove the quadrant.



8. Remove the transfer gear bracket.



9. Remove the tumbler reverse lever assembly.



10. Remove the belt cover.



11. Remove the drive belt.



12. Remove the tool post.



13. Remove the detent plunger & spring from the compound slide.



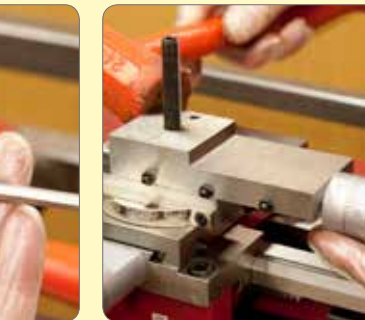
14. Remove the ball handle and spacer.



15. Tap the compound slide to remove the micrometer dial taking care not to lose the friction spring.



16. Remove the dial bracket.



17. Remove the compound slide & gib.



18. Remove the feed screw.



19. Remove the slide base.



20. Wind the cross slide off the feed screw.



21. Remove the cross slide & gib.



22. Remove the ball handle & washer.



23. Remove the micrometer dial & friction spring.



24. Remove the dial bracket.



25. Remove the cross slide feed screw.



26. Remove left hand and right hand lead screw carrier brackets.



27. Slide out lead screw.



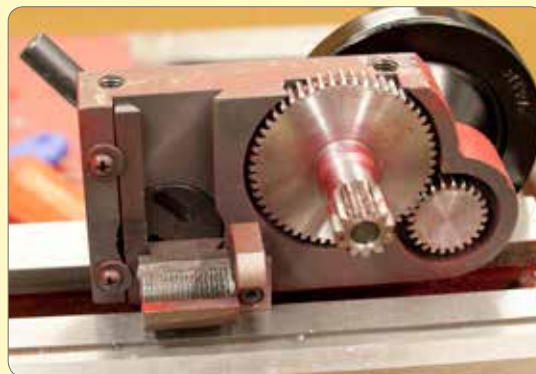
28. Undo the screws retaining the lead screw cover...



... and slide out the cover.



29. Undo two screws to remove the apron from the saddle.



30. Slide the saddle off the end of the bed.



31. Remove the screws holding the rack.



32. Remove the rack from the front of the bed.

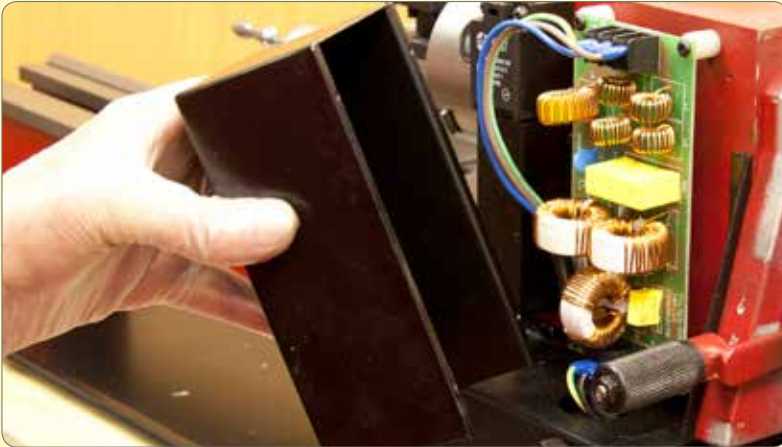


33. Remove the chuck from the spindle flange.

### **Dismantling the spindle**

Steps 34 to 77 include a bearing change from standard ball raced bearings to taper roller bearings. Switching to taper roller bearings will improve the machining accuracies and finish.

Since in many cases, taper roller bearings are not an essential upgrade, and because you will need access to another lathe, a hydraulic press and bearing separator you may wish to keep the standard ball races and skip forward to step 77.



34. Remove the power board cover.



35. Disconnect the mains leads.



36. Remove 4 screws retaining the control panel and lay it down beside the machine.



37. Disconnect the earth leads.



38. Disconnect power cables and guard switch wires.



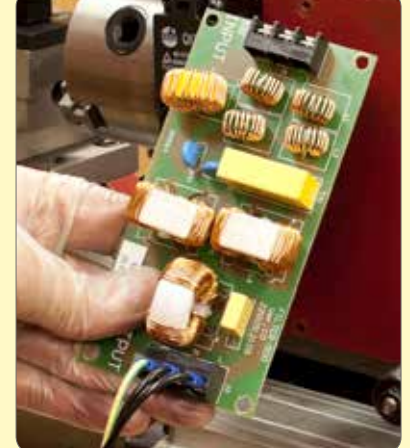
39. Remove the motor cover and pull power cables through from front of machine.

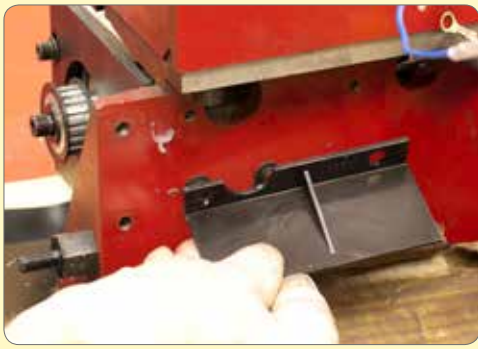


40. Remove motor end cover and mains cable



41. Remove the power board





42. Remove the leadscrew guard.



43. Remove the 2 hex socket and 2 hex head screws securing the head to the lathe bed.



44. The head may now be lifted clear of the bed.



45. Remove the front bearing cover screws.



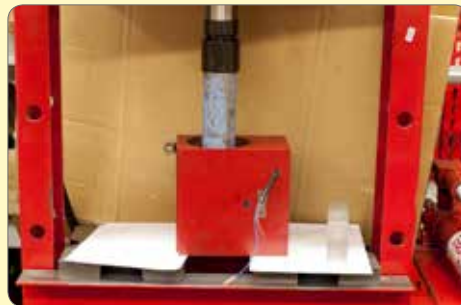
46. Remove lock nuts, gear, belt pulley, 2 spacers and the key from the spindle rear.



47. Remove the rear bearing cover.



48. Press out the spindle assembly.



49. Press out the rear bearing.



50. Spindle assembly removed.



51. Press or pull off bearing and remove bearing cover from spindle. Note the bearing fit. If the bearings are tight to remove, polish the spindle journals. The front bearing can be a press fit on the shaft but the rear bearing needs to be push fit to allow accurate preload adjustments to be made by the two C-nuts.



52. Polish the spindle and test the fit by using one of the old bearings (if not damaged).



53. Fit bearing cover and press on nose bearing.



54. Press front and rear outer bearing races into the head.





55. Re-fit the head and lock down.



56. Re-fit the leadscrew cover.



57. Grease the front race and rollers and assemble.



58. Fit the front bearing cover.



59. Grease the rear race and rollers and fit.



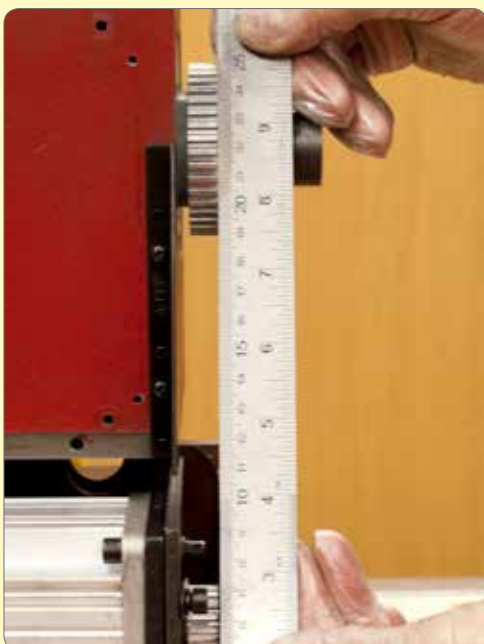
60. Fit the rear bearing cover.



61. Fit the key and plastic spacer.



62. Fit the spindle drive belt pulley.



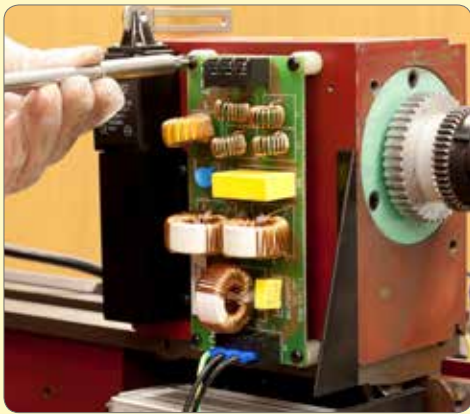
63. Check alignment of drive pulleys and adjust spacer behind spindle pulley if necessary.



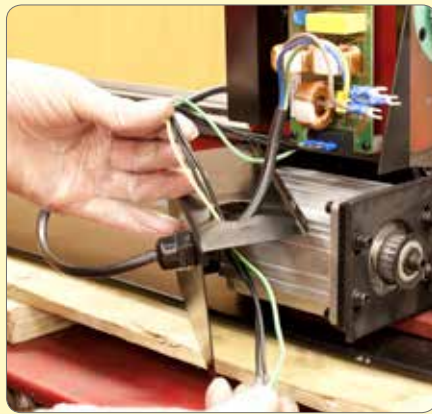
64. Fit the outer spacer and gear.



65. Fit the spindle C nuts, adjust out bearing backlash with minimum preload and only nip up the C nuts for the time being.



66. Fit the power board



67. Thread wires from bottom of motor board through motor cover and then through bed to front.



68. Fit motor cover.



69. Connect Mains In to top of board.



70. Fit power board cover.



71. Reconnect the earth wires to the head.



72. Fit the power wires to the emergency stop switch (noting correct orientation) and fit the guard switch wires.



73. Temporarily fit the belt cover and tumbler reverse lever assembly.



74. Check the gear alignment.



75. Adjust this spacer to correctly align the two gears.



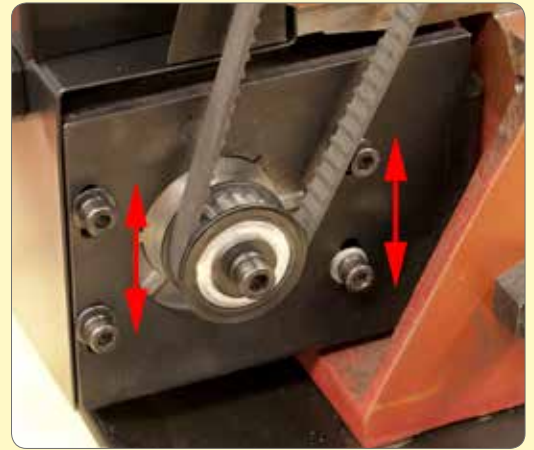




76. Remove the tumbler reverse assembly and belt cover again.



77. Fit the drive belt and adjust the belt tension.



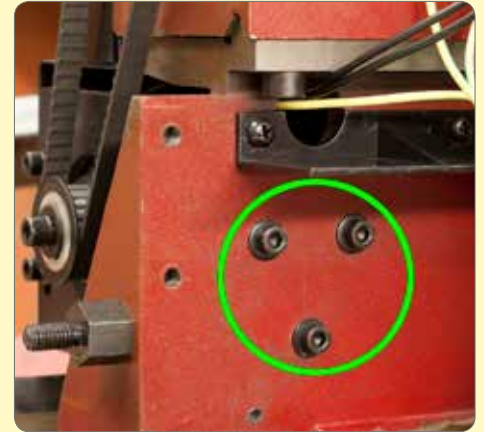
78. Belt tension adjustment screws.



79. When adjusting belt tension, it should twist easily through 90°



80. Run the spindle following the procedure below and check the belt is centred on the pulley. If not the motor angle may be adjusted by slackening these screws. Check the belt tension again.



### **Running the spindle for the first time:**

1. Follow the Start-Up procedure with the motor running forwards.
2. Run the machine at a low RPM. The machine should run smoothly with minimal noise and vibration. If not turn off the machine and investigate the cause of the problem.
3. Increase the speed and run for 10 minutes at a higher RPM.



81. After running the spindle to warm it up and settle the grease, check and adjust the preload again. Lock the C nuts when the preload appears to be OK. Take care not to overdo the preload as this could overheat and damage the bearings.



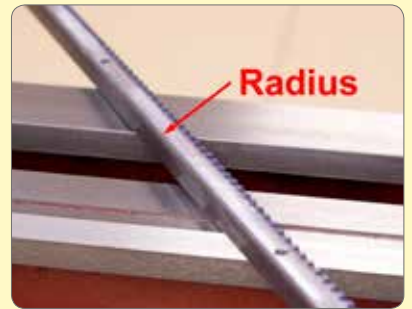
82. Re-fit the belt cover.



83. Scrape any paint off the bed shears.



84. Trial fit the rack to check if it seats well or rocks.



85. If necessary, radius top rear edge of the rack and trial fit again.



86. Drill and tap the fixing holes deeper if necessary.



87. Final fit rack making sure it seats properly in the corner.



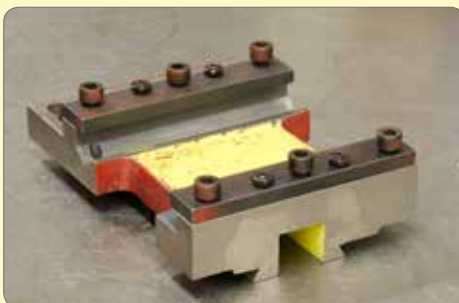
88. Place the saddle on the bed and check to see how it sits.

89. If it rocks, blue the bed and slide the saddle up and down to find the high spots.

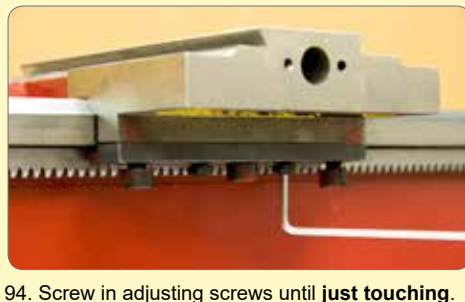
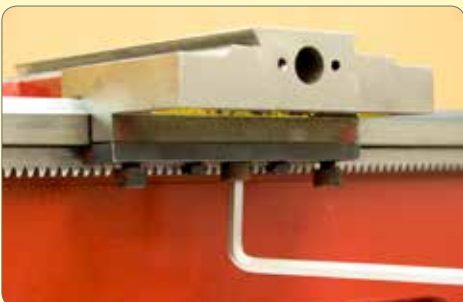
90. Scrape, file or stone down the high spots until the saddle sits flat on the bed.



91. Loosen shear plate adjusting screws below the level of the plate and loosely fit to saddle.



92. Oil bed and saddle and slide saddle onto bed.



94. Screw in adjusting screws until **just touching**.

95. Slacken the middle cap screw.

96. Screw in both adjusting screws 1/2 turn.

97. Pinch up middle cap screw.



98. Test slide saddle up and down the bed. There should be slight drag with no free play. Lightly pinch up remaining cap screws checking after each one and adjusting as required.

Carry out all the following adjustments to both the front and rear shear plates step by step.

93. Lightly pinch middle cap screw.



99. Oil and/or grease the gears and shafts, dovetail and half nut of the apron assembly. Check 1/2 nut dovetail is correctly adjusted by operating the lever.

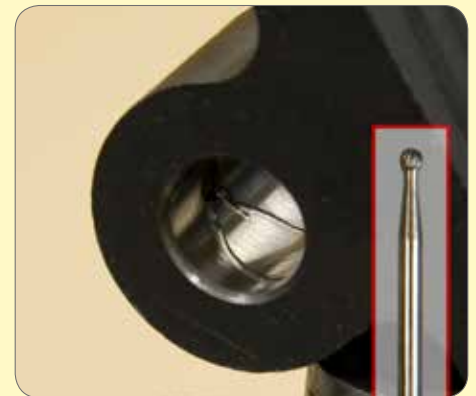
100. Temporarily fit the apron to the saddle.



101. The leadscrew brackets as they come on the machine. Notice there is no means of lubricating the bearing surfaces other than at each end of the bracket.



102. Drill oil holes through to the bore using a centre drill.



103. Finish off by cutting oil grooves in the bore using a Dremel and a 3mm ball end burr similar to the one shown in the inset. (ARC code: 060-030-00310 - Carbide Burr 3mm Ball)



104. Loosely fit leadscrew bracket & grease bore.



105. Grease end of leadscrew and feed through 1/2 nut and into bracket at headstock end.



106. Grease end of leadscrew and bracket bore and temporarily fix in place.





107. Slightly loosen apron fixing screws.



108. Lock 1/2 nut onto leadscrew and tighten apron fixing screws.



109. Unlock 1/2 nut and rack saddle up and down bed to check pinion has no tight spots on rack.



110. Return saddle close to leadscrew bracket and lock 1/2 nut. Remove bracket screws.



111. Check the bracket holes align with the holes in bed. If holes are misaligned, slot the bracket holes to correct and refix screws.



112. Move saddle to headstock end and lock 1/2 nut.



113. Check the bracket holes align with holes in bed. If the holes are misaligned, slot the bracket holes to correct and refix the screws.



114. Return saddle to tailstock end and lock 1/2 nut. Rock handwheel back and forth with finger over end of leadscrew to check for end float. Tap brackets in to remove end float.



115. Strip, clean, oil / grease and reassemble the tumbler reverse detent assembly.



116. Oil the tumbler reverse gear shafts.



117. Fit tumbler reverse assembly.



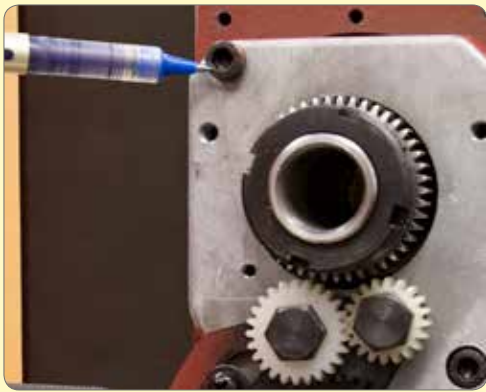
118. Check free play in gears: Forward...



... Neutral...



... and Reverse.



119. The mesh and neutral position can be improved by adjusting the position of the belt cover.



120. Oil the transfer gear shaft.



121. Grease the transfer gear shaft.



122. Fit the transfer gear assembly.



123. Oil the lower quadrant gear shaft.



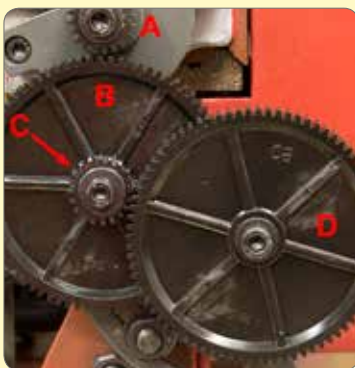
124. Temporarily fit the gear quadrant. DO NOT engage the gears.



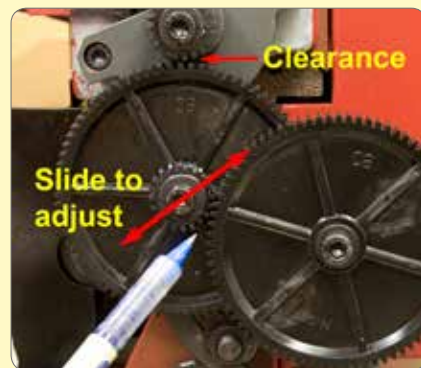
125. Check for correct gear alignment.



126. "Tweak" the lower quadrant bracket until the gears are in proper alignment.



127. Fit lead screw gear D.



128. Adjust backlash between gears C and D.



129. Engage quadrant and adjust backlash between gears A and B.



130. Very lightly grease gears.



131. Run spindle to check for noisy gear meshing and readjust backlash if necessary.

132. Engage 1/2 nut and power the saddle back and forth along the bed.



133. Fit end cover and front panel.



134. Remove right hand leadscrew bracket and fit screw guard.



135. Pinch up the guard screws.



136. Fit the leadscrew bracket with the 1/2 nut locked for position.



137. Wind the carriage up and down the bed to check guard clears and tighten the screws.



138. Temporarily fit the cross slide feed screw and bracket and check for backlash.

139. To reduce backlash, machine the rear face of the bracket.

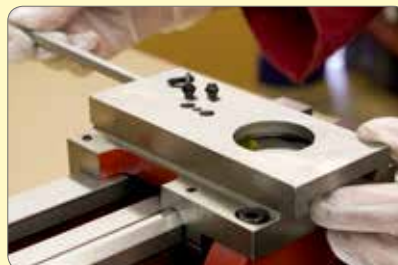
140. To increase backlash, machine a little from the recess. Remove the feed screw and bracket and put to one side.



141. Place cross slide on saddle and check for clearance in corners of dovetail.



142. Modify gib screws or replace with cone point screws.



143. Assemble cross slide and gib strip.



144. Fit adjusting screws lightly.



145. View gib strip to check if it's sitting correctly. If OK, disassemble.



146. Fit top slide base retaining plate.



147. Drop in gib strip and lubricate all ways.





148. Assemble onto saddle.



149. Fit adjusting screws and adjust so slide can be moved back and forth easily by hand.



150. Grease / oil the feed screw and bracket.



151. Assemble onto the saddle.



152. Fit the handle.



153. Slacken the bracket screws, wind the slide right back and tighten the screws.



154. Wind the cross slide in and out. If there is any tightness, the feed screw nut will need adjusting.



155. The centre screw is for adjusting the position of the nut in an up/down direction and the two outside screws are for locking. Slacken all three screws for now.



156. Put finger pressure on handle and screw-in the adjusting screw until you can feel it just touching the nut and then  $+\frac{1}{4}$  to  $\frac{1}{2}$  turn extra.

157. Pinch up the cap screws equally while winding the slide in and out until handwheel turns freely and with minimum drag. Continue adjusting all three screws until the slide moves freely along its full travel.

158. If required, slacken and reposition bracket and return to adjusting the nut.



159. Make final adjustments to the gib screws for free movement of the handle with little drag.



160. Remove the handle again in order to fit the micrometer dial and friction spring.



161. Refit the handle assembly.



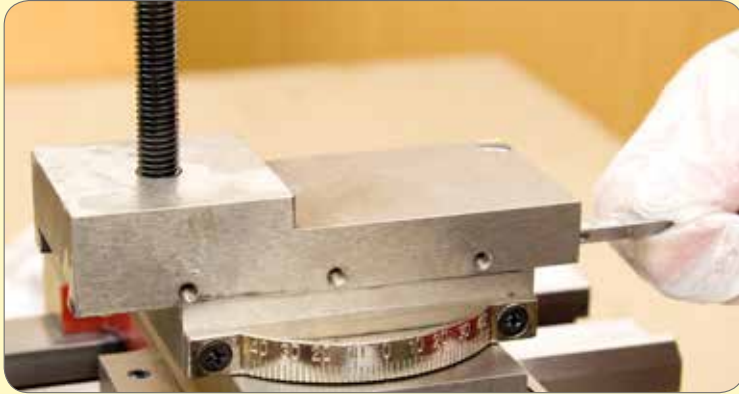
162. Fit compound base to cross slide.



163. Temporarily fit top slide to compound base and check for clearance in corners of dovetail.



164. Oil top slide assembly and fit.



165. Fit gib strip and adjusting screws making sure they engage in the gib strip dimples.



166. Adjust the screws so the slide will move back and forth easily by hand.



167. Oil / grease feed screw and fit. Oil / grease end of feed screw and bracket and fit.



168. Turn the feed screw to check it turns freely.



169. Assemble and fit the micrometer dial and friction clip to feed screw.



170. Fit the spacer and handle and wind the slide back and forth.



171. Measure backlash with a feeler gauge.





172. Backlash can often be reduced by turning a recess in the spacer to clear the shoulder on the end of the feed screw. The recess depth should be slightly less than the measurement taken with the feeler gauge to allow some clearance. Adjust for free movement with minimal backlash.



173. Final adjust the top slide gib to your preference and lock-off the screws.



174. Grease and fit the tool post spring and plunger and fit the tool post.



175. Fit the chuck & Guard.



176. Fit the tailstock.



177. Fit the rear guard.



## The Completed Machine

