

SERVICE CALL

Perhaps one of the most avoided service chores on your Super 7 or ML7-R lathe is the task of replacing the secondary/headstock drive belt. Naturally we understand your reluctance to tinker with the headstock, after all logic tells us "don't disturb the spindle - it may not perform as well again if we take it apart". However, having had the opportunity to appraise your workmanship over the years, we think that your reluctance is ill-founded, and that this task is well within your capabilities.

Below we have endeavoured to give a step-by-step guide which we hope will simplify the procedure. Please note these instructions apply in particular to the current Super 7 lathes fitted with the cone clutch and ML7-R lathes fitted with the additional 30/040 countershaft clutch unit. The instructions with regard to removing the countershaft will, therefore, not apply to standard ML7-R lathes and pre-1958 Super 7 lathes which will be fitted with an expanding mandrel clutch unit.

Many problems have occurred in the past as a result of your misconception of the headstock spindle bearing arrangement. Your task will be very much simplified if you visualise the headstock arrangement as two units: The spindle, complete with angular bearings locked in place as one unit, and the headstock fitted front bush and castillated adjusting collars as the other.

Axial movement (end float) is controlled by a pair of angular contact bearings, mounted back to back (the face of an angular contact bearing is the open end). These bearings are designed to carry the heavy end loads applied by such operations as drilling. For angular contact bearings to work effectively they have to be pre-loaded - this is achieved by a shim being inserted between the outer races of the bearings. The inner races abut to a shoulder on the spindle 21 through a spacer and is adjusted via the gear 37 and the collar 33.

Radial Clearance - the final adjustment to ensure maximum spindle precision and rigidity is achieved by sliding the whole spindle unit (complete with angular contact bearings) in or out of the tapered front bush. This movement is controlled by the two adjusting collars 74A and 74B, and it is important to ensure that the two collars are always finally locked together which ensures that the pre-loading shim is fully effective. The principle of the tapered bronze bearing is that it needs to be set in such a way to give just sufficient clearance for a film of oil to support the spindle whilst running. Fine tuning may be carried out by adjusting the locking collars by small increments.

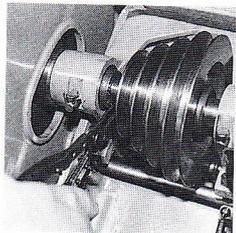
Requirements: - You will need to provide the following equipment to carry out the belt changing.

- 1/8" & 5/32" A.F. Allen keys
- 1/4" BSF spanner
- 'C' Spanner
- Circlip pliers (Part No. 78008)
- Scriber
- 12" steel rule
- No. 1 Hide/Copper mallet
- Screwdriver
- White spirit or turps substitute
- Paint brush
- Newspapers
- New headstock 'V' belt

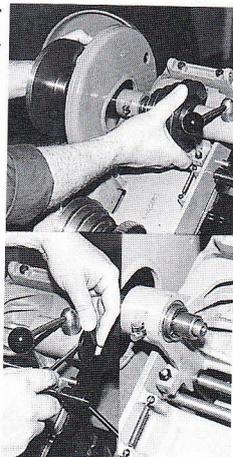
It is important to use white spirit or turps substitute for cleaning purposes. You must not use paraffin as it encourages rusting and on no account use thinners as they will adversely affect the paintwork of the lathe.

Countershaft

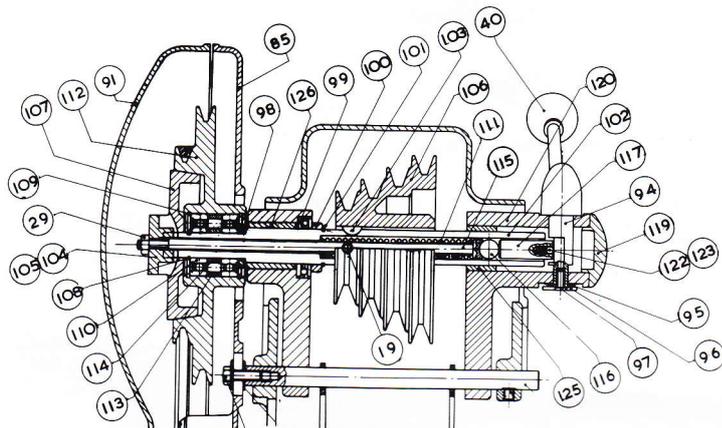
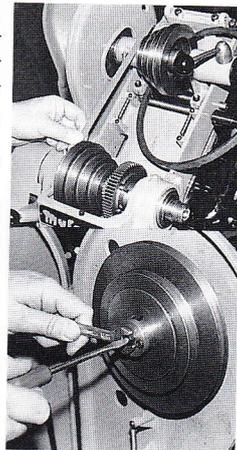
- 1 Cut the old headstock V belt and discard.
- 2 Remove the primary belt drive.
- 3 Move the clutch operating lever to the engaged position 40. There must be some free play (see 17).
- 4 Release the 1/4" BSF socket set screw 19 in the cone pulley 106.
- 5 Slide the cone pulley to the right.
- 6 Using a pair of right angle external circlip pliers (part No. 78008) remove the circlip 101 from its groove and slide it along the shaft until it almost touches the woodruff key 103.
- 7 With the key facing upwards, start to withdraw the countershaft 102 to the left until the circlip 101 almost touches the collar 100. Slide the cone pulley 106 to the



- right and remove the woodruff key 103.
- 8 Supporting the cone pulley 106 in your right hand, take hold of the twin Vee pulley 112 with your left hand and gradually start to ease the whole countershaft assembly out of the swing head 120. The countershaft need only be withdrawn enough to remove the cone pulley 106. Try to keep the circlip on the shaft.
- 9 Invariably the push bar 117 and 3/16" dia. steel ball 123 will have been left behind in the right hand bearing housing of the swing head bracket 120. By removing the end cap 119 with a screw driver, these items can be recovered and refitted into the end of the countershaft 102, with the



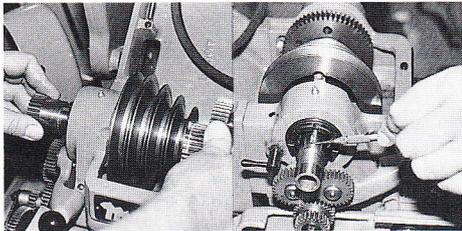
- ball facing outwards. Replace the end cap.
- 10 Carefully clean and dry all the parts and wash down the inside of the housing, using newspaper to collect the excess spirit. Dry down thoroughly.
- 11 Fit the new V belt (70001) to the pulley. **Ensure that the pulley is the right way round.**
- 12 Line up the cone pulley with the countershaft.
- 13 Take hold of the twin Vee pulley and feed the countershaft back into the cone pulley until the woodruff key slot is just to the right of the circlip.
- 14 With the woodruff key slot fully exposed, refit the woodruff key, line up with the keyway in the cone pulley and slide the pulley over the key.
- 15 Using the cone pulley, push the circlip back into its groove.
- 16 With a 12" steel rule, line the countershaft cone pulley up with the cone pulley on the spindle and secure by locking the 1/4" BSF socket set screw 19.
- 17 Check the adjustment of the clutch - there needs to be about 1/4" free play at the ball handle when the clutch is in the engaged position 40. Adjustment is carried out by releasing the 1/4" BSF hexagon lock nut 29 and by screwing the push rod 115 "in" or "out" as required. Relock the hexagon lock nut.



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Spindle

- 18 Release the 2BA cap head screw **34** in the adjusting collar **33**.
- 19 Unscrew and remove the adjusting collar **33**.
- 20 Remove the 30T gear **37** from the spindle **21**.
- 21 Remove the woodruff key **22A** from the spindle **21**.



22 Release the 1/4" BSF socket set screw **8** in the 60T backgear assembly **80**.

23 Position the spindle so that the keyways **22A** and **22B** face upwards. This is very important as it is impossible to remove the woodruff key **22B** whilst the spindle is in-situ. With the keyways facing upwards, woodruff key **22B** will clear the front bush as the spindle is withdrawn from the headstock.

24 Using a no. 1 **hide** mallet drive the spindle out of the headstock from left to right.

25 Remove the cone pulley **2** and backgear assembly **80** from the headstock.

26 Carefully clean and dry all the components you have removed with either white spirit or turps. substitute. Also clean inside the headstock area and dry thoroughly.

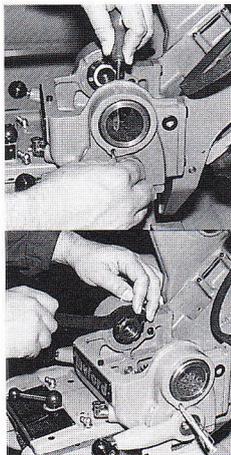
27 Remove the 2BA socket set screw **26** from underneath the front of the bronze spindle bearing **62**.

28 Using a suitable tool, depress the lubrication wick so that it is well below the bearing surface of the front spindle bearing. Secure the wick in position by pinning with a scribe through the tapped hole **26**.

29 Using a 'C' spanner, turn the inside bearing adjusting ring **74B**, one turn anti-clockwise (when viewed from the spindle nose).

30 Turn the outside bearing adjusting ring **74A**, one turn anti-clockwise (when viewed from the spindle nose).

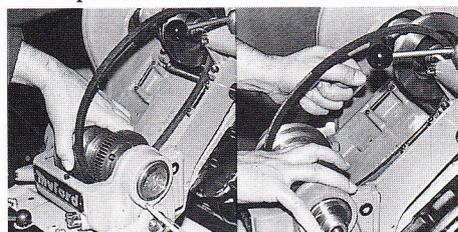
31 At this point it will be easier if the V belt is moved to the extreme right of the countershaft (the belt should rest on the shaft itself and not the cone pulley). Fit the cone pulley assembly **2** onto the new V belt, ensuring that the cone pulley is the right way round.



32 The cone pulley assembly **2** and the 60T backgear assembly **80** with the woodruff key slot at the top, should be fitted into place between the front and rear bearings of the headstock.

33 Feed the spindle back into the headstock, remembering to make sure that the woodruff keyways face upwards.

34 Replace woodruff key **22A** in the spindle.



35 Refit 30T gear **37** to the spindle.

36 Refit adjusting collar **33** to the spindle.

37 Engage backgear.

38 Using the allen key for the 2BA head screw **34**, as a lever, tighten the adjusting collar **33** as tight as possible.

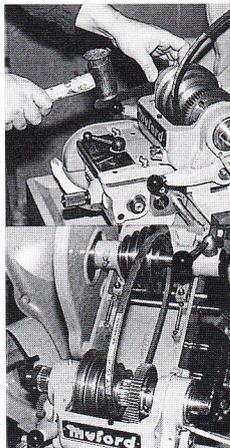
39 Disengage backgear.

40 Lock up the 2BA cap head screw **34** to secure the adjusting collar **33**.

41 Using the 'C' spanner, turn the outside bearing adjusting ring **74A**, two turns clockwise (when viewed from the spindle nose).

42 Turn the inside bearing adjusting ring **74B** approximately 330 deg. (7 slots) clockwise.

43 Make sure there is **no** tension on the V belt, place the middle finger of the right hand on the 60T backgear and rotate the spindle. Whilst gently rotating the spindle continue to turn the inside bearing adjusting ring **74B** clockwise until you start to feel the spindle drag in the front bush.



44 If, by mistake, you overtighten the bearing adjusting ring **74B** causing the spindle to lock - slacken the adjusting ring **74B** by half a turn and using a hide mallet tap the spindle **21** towards the tailstock (left to right). Return to 43.

45 Turn the outside bearing adjusting ring **74A** approximately one turn anti-clockwise until it locks. Give the 'C' spanner a **sharp wrap** with the mallet.

46 By sliding the 60T backgear assembly **80** in the appropriate direction, set the cone pulley **2** with approximately 0.005" end float. Lock the backgear **80** with the 1/4" BSF socket set screw **8**.

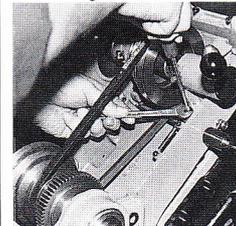
47 Remove the scribe pinning the lubrication wick and replace the 2BA socket set screw **26**.

48 Check the alignment of the two cone pulleys and re-adjust the countershaft pulley if necessary.

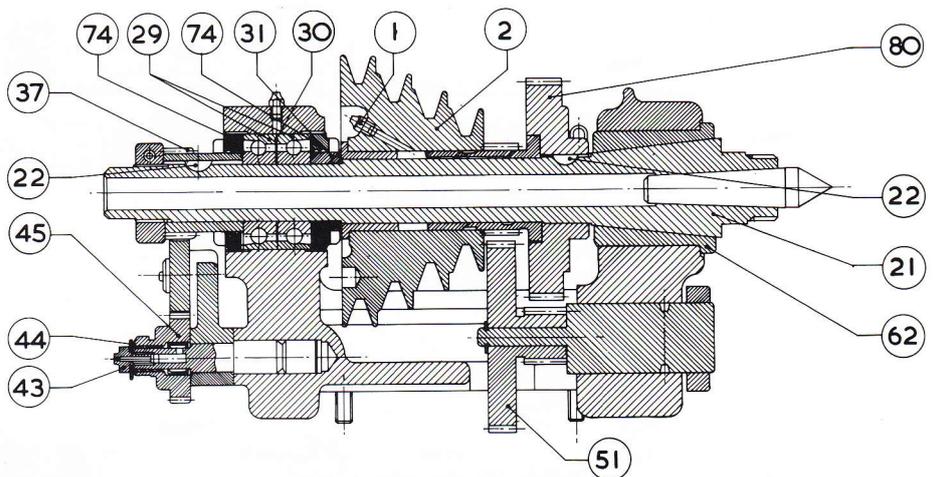
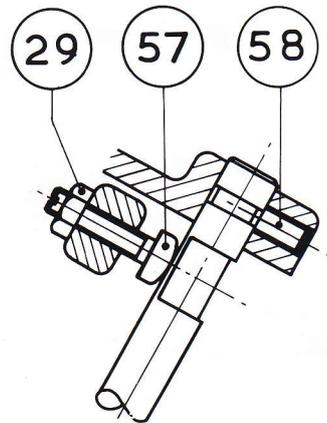
49 Place the belt onto the countershaft pulley.

50 Adjust the belt tension by releasing

the two 1/4" BSF hexagon nuts **29** and turning the two adjusting screws **57** in the appropriate direction.



51 Replace the primary drive belt and if necessary re-adjust for tension.



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