## METHOD OF CHECKING PRE-LOADING OF SPINDLE

1. Move belt on pulley in headstock so that it does not interfere with the rotation of the spindle.

2. Fasten catch plate to spindle of machine.

3. Make a loop approx 1″ dia. at both ends of a length of string approx. 4ft. long.

4. Attach one loop to cut out of catch plate and wind string round periphery.

5. Hook spring balance on loop at free end.

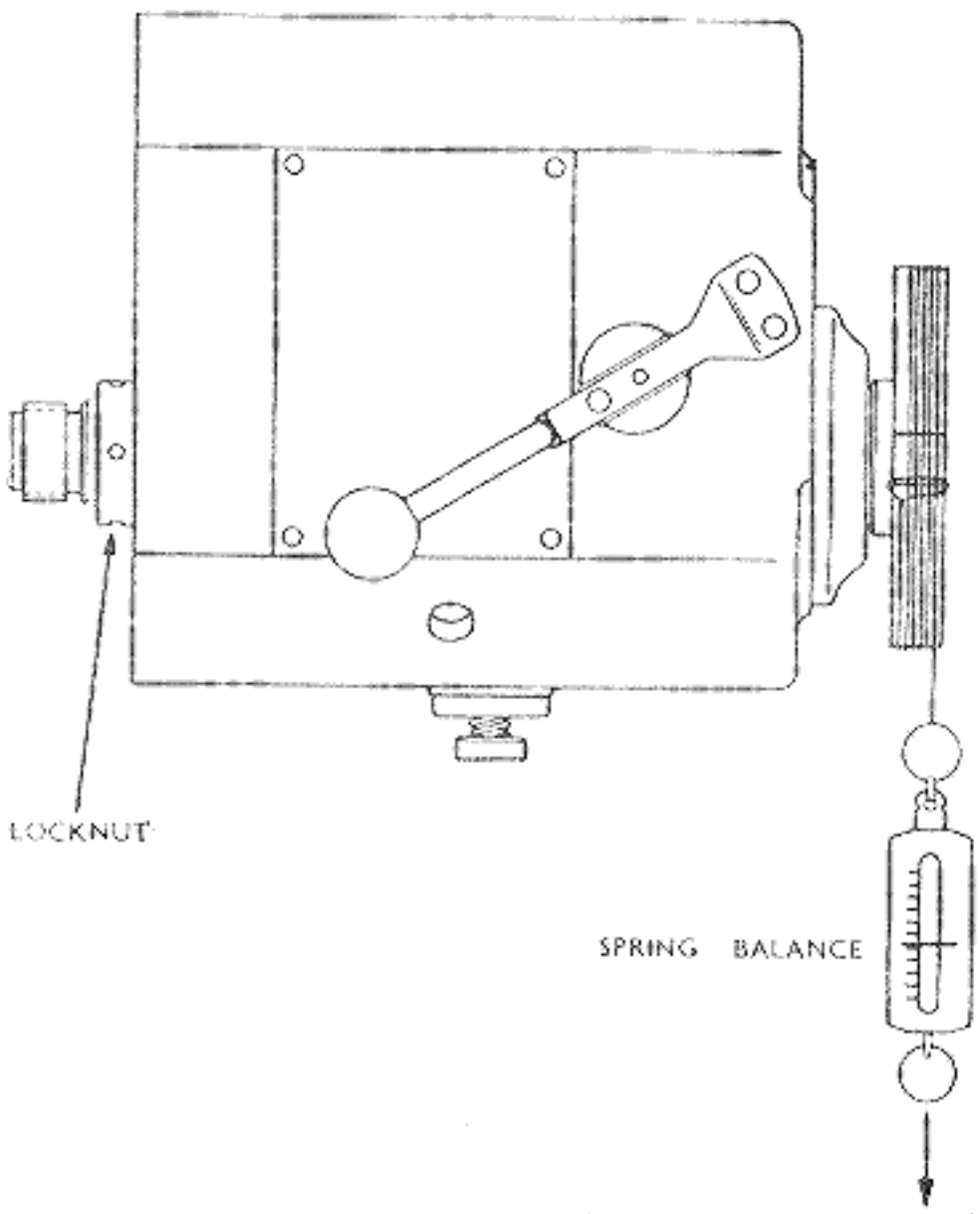
6. With the spring balance held horizontally walk backwards holding the balance and note the reading in pounds whilst the spindle is rotating.

7. Multiply this balance reading by the radius of the catch plate (usually $2\frac{9}{16}$″) and this will then give loading of spindle in "pounds inches".

8. The pre-loading of the spindle varies with the speed and nature of work. For speeds up to 1400 r.p.m., between 1 and 2 lb. in. is usually satisfactory. For speeds 1400 to 2000 r.p.m. or over, between 1 and $1\frac{1}{2}$ lb. in. Do not exceed 2 lb. in. (i.e. approx. 1 lb. balance reading).

   N.B. Overgreasing of spindle bearings will increase loading and should be avoided.

9. Any adjustment can be done by tightening or slackening the locknut at the end of the spindle. When slackening, it may be necessary to gently tap the locknut end of the spindle with a hide or rubber mallet to release the pre-load after slackening the locknut.



# INSTRUCTIONS FOR DISMANTLING HEADSTOCK AND FITTING NEW BEARINGS

(see line drawings on page 11)

## MARK II HEADSTOCK

1. Disconnect mains supply to machine.
2. Remove the rear sheet steel guard and top plate from the headstock.
3. Slacken off the screw securing back gear shaft (655), slide out shaft and remove the complete back gear sleeve (656 and 657).
4. Remove the screw and spring securing plunger (673) in lever body.
5. Slacken the screw securing pivot pin (672) in gear lever (654), remove pin and then the gear lever. If fitted, release switch locking screw (683) before removing lever.
6. Remove screwed pin (678) from gear shifter spindle (669) and lift out gear shifter boss (670).
7. Take out gear shifter bar (668) and shoes (667) etc.
8. Slacken the screws holding spindle locknut (666) in position and unscrew locknut.
9. Remove the front and rear covers (102 and 103), also spacing washer (166) from rear of spindle.
10. Using a soft hammer, gently tap spindle at rear until it is driven out through front of headstock so that cone of rear bearing can be removed.
11. Lift spindle sliding gear (663) out of spindle keyway and draw spindle out through front of headstock. It is advisable to have keyway at bottom to avoid burrs being thrown up on spindle. Make sure the sliding gear is free from drive pins (660) when withdrawing spindle.
12. Remove cone of front bearing from spindle.
13. Using a hardened pin (or pins) in the knock-out holes inside the headstock remove the bearing cups (outer races) from front and rear housings.
14. Place new bearing cups in their housings and gently press or tap home (see note i.).
15. Gently drive cone (inner race) of new front bearing on spindle.
16. Place spindle in headstock and replace the sliding gear (663) pulley (659) and spacing washer (664).
17. Gently drive cone (inner race) of new rear bearing on spindle and secure with spacing collar (166) and locknut (666) (see note i.).
18. Lightly smear bearings with grease before replacing front and rear covers (102 and 103).
19. Slacken locknut (666) and finger tighten to remove end play.
20. Rotate spindle by hand to expel all excess grease from rollers.
21. Tighten the locknut a fraction more to give slight pre-load to the spindle assembly and lock in position. Refer to method of checking pre-load.
22. To complete assembly, reverse dismantling procedure 1 to 7.

## MARK I AND BENCH HEADSTOCK

1. Disconnect mains supply to machine.
2. Remove the sheet steel guard from headstock.
3. Slacken the grub screw which locates back gear shaft (164) with ball spring, also the grub screw in back gear handle (94) and push back gear shaft out through front of headstock. This will allow back gears (104) and (105) to be removed.

4. Remove gear shifter [illegible] by slackening grub screw. Withdraw eccentric (108) and headed bush (153) by removing countersunk screws from bush and pulling eccentric outwards.
5. Remove front and rear covers (102 and 103).
6. Slacken off and remove locknuts (119) and spacing washer (166) from rear of spindle.
7. Using a soft hammer, gently tap spindle at rear until it is driven out through front of headstock so that cone of rear bearing can be removed.
8. Lift spindle sliding gear (107) out of spindle keyway and draw spindle out through front of headstock. It is advisable to have keyway at bottom to avoid burrs being thrown up on spindle. Make sure that sliding gear is free from drive pins (196) when withdrawing spindle.
9. Remove cone of front bearing from spindle.
10. Using a hardened pin (or pins) in the knock-out holes inside the headstock, remove the bearing cups (outer races) from front and rear bearings.
11. Place new bearing cups in their housings and gently press or tap home (see note i.).
12. Gently drive cone (inner race) of new front bearing on spindle.
13. Place spindle in headstock and replace the sliding gear (107) pulley (250 on bench models, 602 on Mark 1) and spacing washer (117).
14. Gently drive cone (inner race) of new rear bearing on spindle and secure with spacing collar (166) and locknut (119) (see note i.).
15. Lightly smear bearings with grease before replacing front and rear covers (102 and 103).
16. Slacken locknut (119) and finger tighten to remove end play.
17. Rotate spindle by hand to expel all excess grease from rollers.
18. Tighten the locknut a fraction more to give slight pre-load to the spindle assembly and lock in position with other locknut. Refer to method of checking pre-load.
19. To complete assembly, reverse dismantling procedure 1 to 4.

## NOTES

(i) It is essential that bearings and all parts are kept clean and free from dirt. Precision 3 bearings are identified by a copper dot which indicates the high point of any bearing run-out. The dots on the two bearing cups and cones should be aligned with each other to give the best results.

(ii) When removing and fitting new bearings it will be found easier if the headstock is completely removed from the lathe bed. The two clamps beneath the headstock must first be released with a box wrench and any electrical wiring disconnected. The headstock can then be removed from the end of the lathe bed.

## INSTRUCTIONS FOR REMOVAL OF CARRIAGE ASSEMBLY

1. Unclamp tailstock and slide off end of bed.
2. Wind carriage unit down to tailstock end of bed.
3. Remove gib strip from rear of saddle.
4. Remove the two securing screws fastening the leadscrew bracket (tailstock end) to the bed and slide bracket off end of leadscrew.
5. Supporting leadscrew by hand, slide carraige unit off end of bed.
6. Replace leadscrew bracket to support leadscrew.

If it is desired to remove the apron assembly only, proceed as 1 above, then remove the carriage locking screw from the saddle and the two screws securing the apron to the saddle and then as 4, 5 and 6 above.