

Chapter 6

Frame, suspension and final drive

Contents

Drive chain – removal, cleaning and installation	15	Sprockets – check and replacement	16
Drive chain and sprockets – check, adjustment and lubrication	see Chapter 1	Sidestand – check	see Chapter 1
Footrests, brake pedal and gearchange lever – removal and installation	3	Sidestand – lubrication	see Chapter 1
Forks – disassembly, inspection and reassembly	7	Sidestand – removal and installation	4
Forks – oil change	see Chapter 1	Sidestand switch – check and replacement	see Chapter 9
Forks – removal and installation	6	Steering head bearings – freeplay check and adjustment	see Chapter 1
Frame – inspection and repair	2	Steering head bearings – inspection and replacement	9
General information	1	Steering head bearings – lubrication	see Chapter 1
Handlebars and levers – removal and installation	5	Steering stem – removal and installation	8
Handlebar switches – check	see Chapter 9	Suspension – adjustments	12
Handlebar switches – removal and installation	see Chapter 9	Suspension – check	see Chapter 1
Rear shock absorber – removal, inspection and installation	10	Swingarm – inspection and bearing replacement	14
Rear suspension linkage (TRX and XTZ models) – removal, inspection and installation	11	Swingarm – removal and installation	13
Rear sprocket coupling/rubber damper	17	Swingarm and suspension linkage bearings – lubrication	see Chapter 1

Degrees of difficulty

Easy, suitable for
novice with little
experience



Fairly easy, suitable
for beginner with
some experience



Fairly difficult,
suitable for competent
DIY mechanic



Difficult, suitable for
experienced DIY
mechanic



Very difficult,
suitable for expert DIY
or professional



Specifications

Front forks

Fork oil type

1996-on TDM models	Suspension oil 01
All other models	10W fork oil

Fork oil capacity

1991 to 1995 TDM models	395 cc
1996-on TDM models	515 cc
TRX models	483 cc
XTZ models	669 cc

Fork oil level*

1991 to 1995 TDM models	151 mm
1996-on TDM models, TRX models and XTZ models	130 mm

Fork spring free length

1991 to 1995 TDM models	
Standard	427 mm
Service limit	406 mm
1996-on TDM models	
Standard	505 mm
Service limit	500 mm
TRX models	
Standard	385 mm
Service limit	381 mm

XTZ models	
Standard	544.5 mm
Service limit	517 mm

Fork tube runout limit	0.2 mm
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*Oil level is measured from the top of the tube with the fork spring removed and the leg fully compressed.

6•2 Frame, suspension and final drive

Rear suspension

Shock absorber spring free length

TDM models	
Main spring	144 mm
Sub spring	69 mm
TRX models	220.5 mm
XTZ models	240 mm
Swingarm – XTZ models	
Side clearance	0.4 to 0.7 mm
Bearing spacer length (right-hand)	90.95 to 91.10 mm
Bearing spacer length (left-hand)	80.95 to 81.10 mm
Washer thickness	1.9 to 2.0 mm

Final drive chain

Chain size

TDM and TRX models	525
XTZ model	520

No. of links

TDM model	114
TRX model	110
XTZ model	112

Chain freeplay and lubricant

see Chapter 1

Chain stretch limit (10-link length)

1991 to 1995 TDM models	150 mm
1996-on TDM models	159 mm
TRX models	155 mm
XTZ models	150 mm

Torque settings

Footrest bracket bolts – TDM and TRX models

30 Nm

Footrest bracket bolts – XTZ models

Front	45 Nm
Rear	20 Nm

Brake pedal pivot bolt – TRX models

35 Nm

Handlebar holder clamp bolts – TDM models

23 Nm

Handlebar holder clamp bolts – XTZ models

20 Nm

Handlebar retaining bolt – TRX models

23 Nm

Handlebar holder positioning bolt – TRX models

10 Nm

Handlebar holder clamp bolt – TRX models

17 Nm

Fork clamp bolts

TDM and XTZ models

23 Nm

TRX models

 Top yoke

23 Nm

 Bottom yoke

30 Nm

Fork top bolt

TDM models

24 Nm

TRX and XTZ models

23 Nm

Fork damper rod bolt – TDM and TRX models

30 Nm

Fork damper rod bolt – XTZ models

62 Nm

Steering stem nut

1991 to 1995 TDM models

110 Nm

1996-on TDM models

108 Nm

TRX models

110 Nm

Steering stem bolt (XTZ models)

80 Nm

Rear shock absorber mounting bolt nuts – TDM models

64 Nm

Rear shock absorber mounting bolt nuts – TRX models

40 Nm

Rear shock absorber mounting bolt nuts – XTZ models

35 Nm

Suspension linkage bolt nuts – TRX models

48 Nm

Suspension linkage bolt nuts – XTZ models

59 Nm

Swingarm pivot bolt nut

TDM and XTZ models

90 Nm

TRX models

125 Nm

Rear brake torque arm nuts – TRX models

30 Nm

Front sprocket nut

70 Nm

Rear sprocket nuts

TDM and TRX models

60 Nm

XTZ models

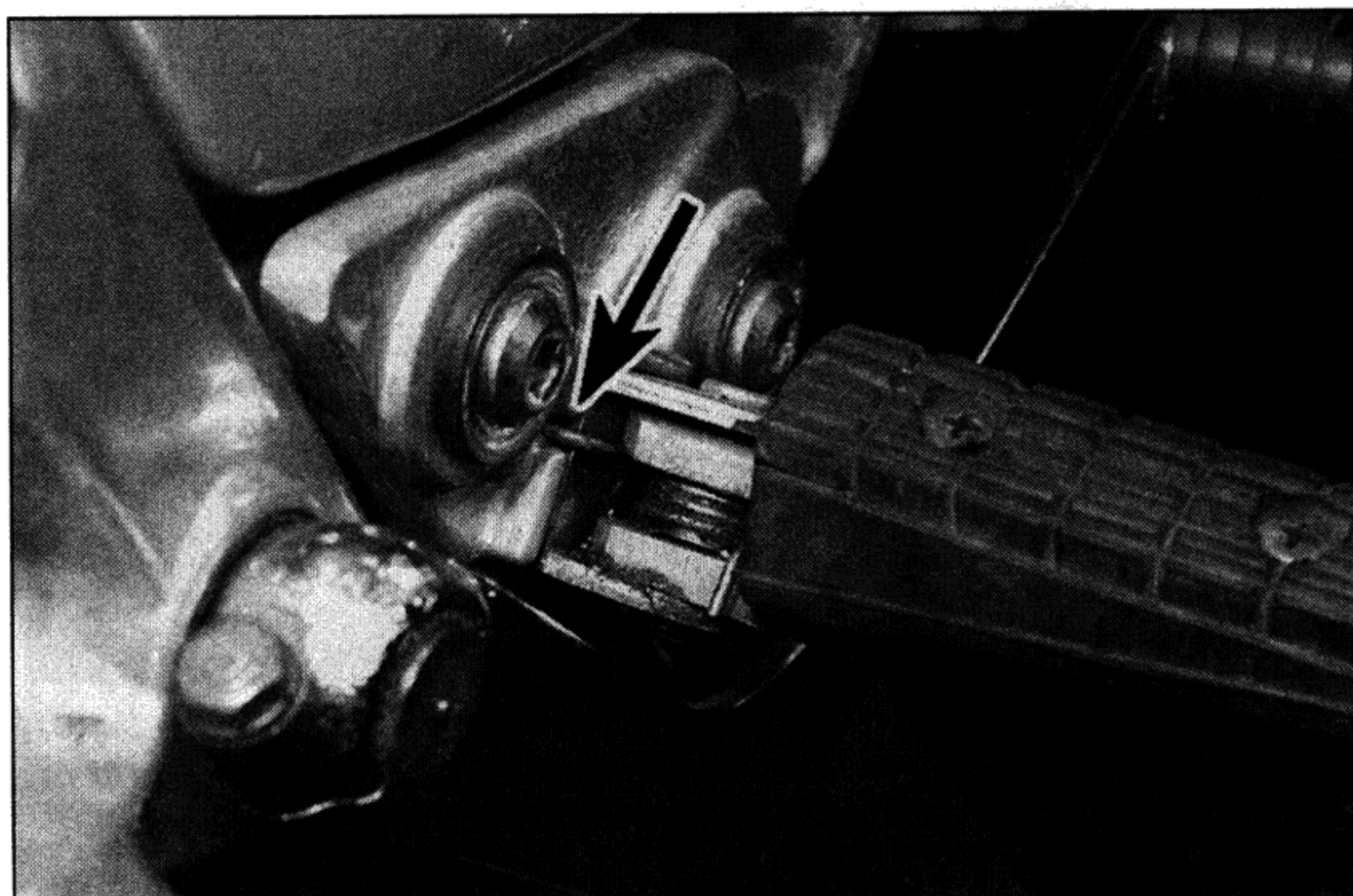
55 Nm

Gearchange linkage arm pinch bolt

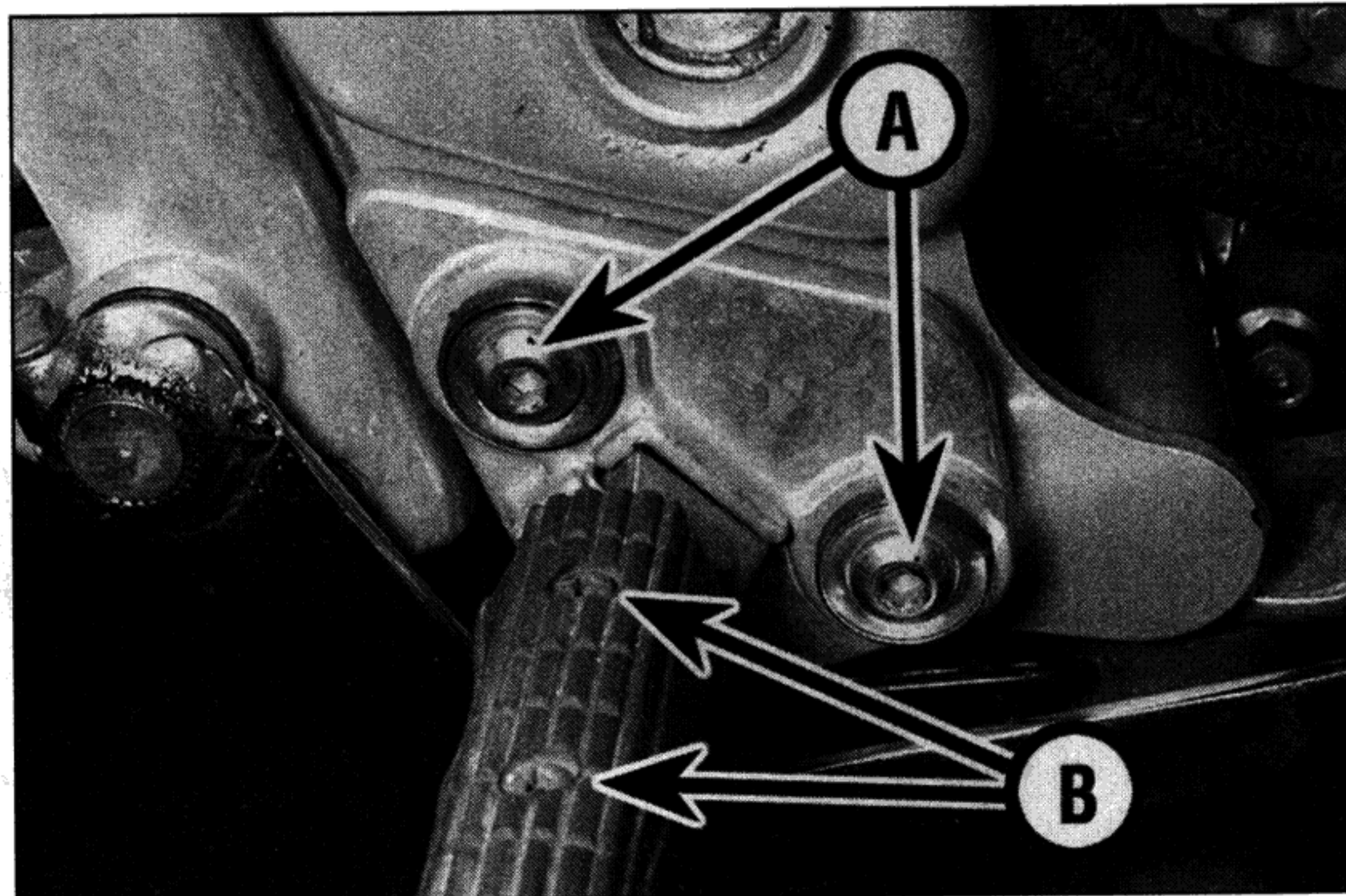
12 Nm

Outer sprocket cover bolts

5 Nm



3.1a Note how the spring end (arrowed) locates



3.1b Footrest bracket bolts (A), footrest rubber screws (B)

1 General information

TDM models use a twin spar box-section aluminium frame which uses the engine as a stressed member.

TRX models use a trellis-type steel tube frame which uses the engine as a stressed member.

XTZ models use a cradle-type steel frame.

Front suspension is by a pair of oil-damped telescopic forks. On XTZ models, the forks have a conventional damper system, while TDM and TRX models have a cartridge damper. On TDM and TRX models the forks are adjustable for pre-load and rebound damping.

At the rear, an aluminium swingarm acts on a single shock absorber, on TRX and XTZ models via a three-way linkage. The shock absorber is adjustable for spring pre-load on all models, for rebound damping on TDM models, and for both rebound and compression damping on TRX models. On TRX models, the shock absorber has a remote reservoir.

The drive to the rear wheel is by chain.

2 Frame – inspection and repair

1 The frame should not require attention unless accident damage has occurred. In most cases, frame renewal is the only satisfactory remedy for such damage. A few frame specialists have the jigs and other equipment necessary for straightening the frame to the required standard of accuracy, but even then there is no simple way of assessing to what extent the frame may have been over stressed.

2 After the machine has accumulated a lot of miles, the frame should be examined closely

for signs of cracking or splitting at the welded joints. Loose engine mount bolts can cause ovaling or fracturing of the mounting tabs. Minor damage can often be repaired by welding, depending on the extent and nature of the damage. This is, however, a job for a frame specialist, especially where an aluminium frame is concerned.

3 Remember that a frame which is out of alignment will cause handling problems. If misalignment is suspected as the result of an accident, it will be necessary to strip the machine completely so the frame can be thoroughly checked.

3 Footrests, brake pedal and gearchange lever – removal and installation



Footrests

Removal – front footrests

1 On TDM models, remove the rubber cap from the back of the footrest bracket, then unscrew the nut and separate the footrest from the bracket, noting how the return spring end locates in the bracket (**see illustration**). For easier access to the nut, first unscrew the

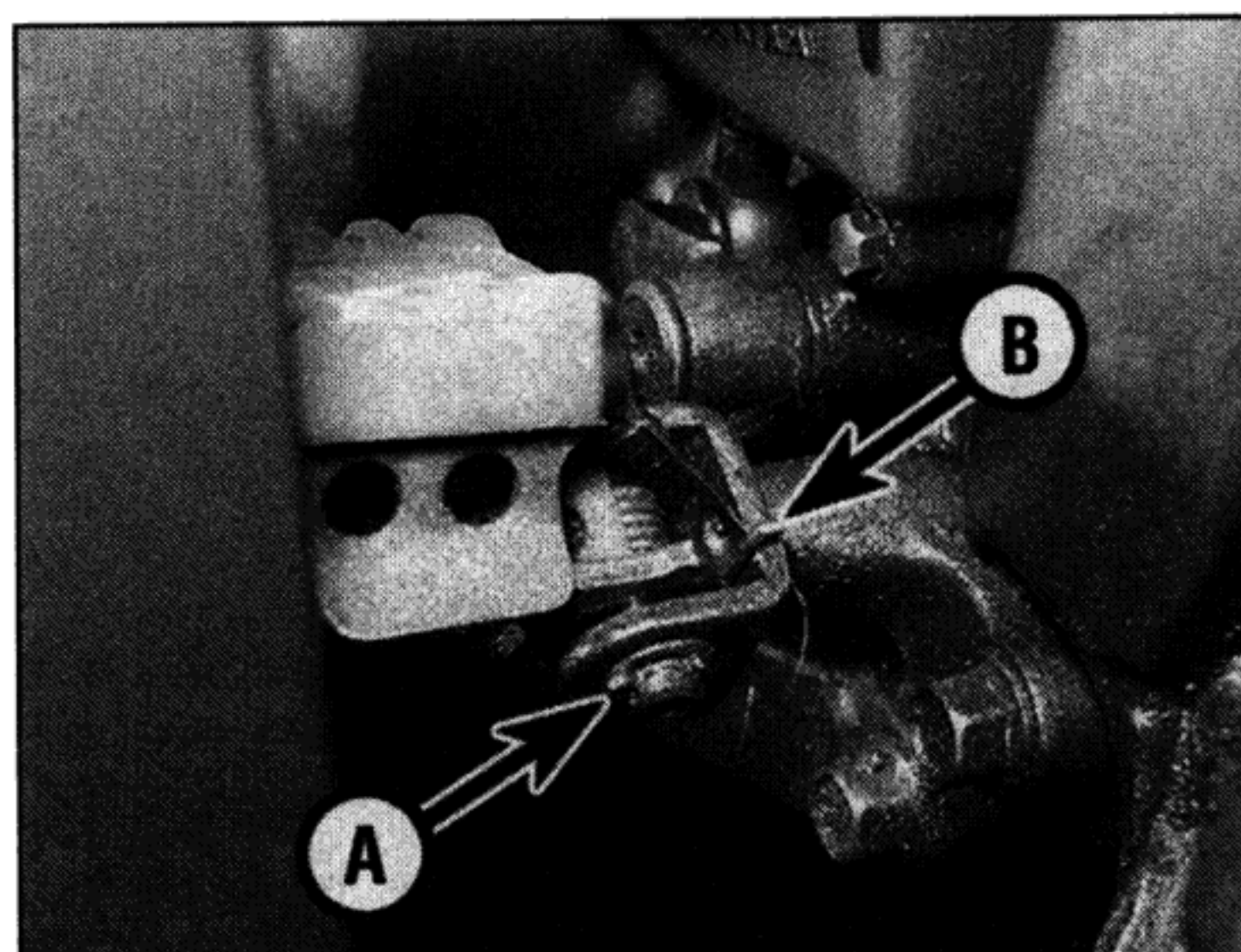
two bolts securing the bracket and remove it (**see illustration**). The footrest rubber can be renewed by removing the two screws that secure it to the footrest.

2 On TRX models, unscrew the nut from the back of the footrest bracket and separate the peg from the bracket. The footrest rubber can be renewed by removing the two screws that secure it to the footrest. For easier access to the nut, first remove the brake pedal or gearchange lever (see below), then unscrew the bolts securing the footrest bracket and displace it.

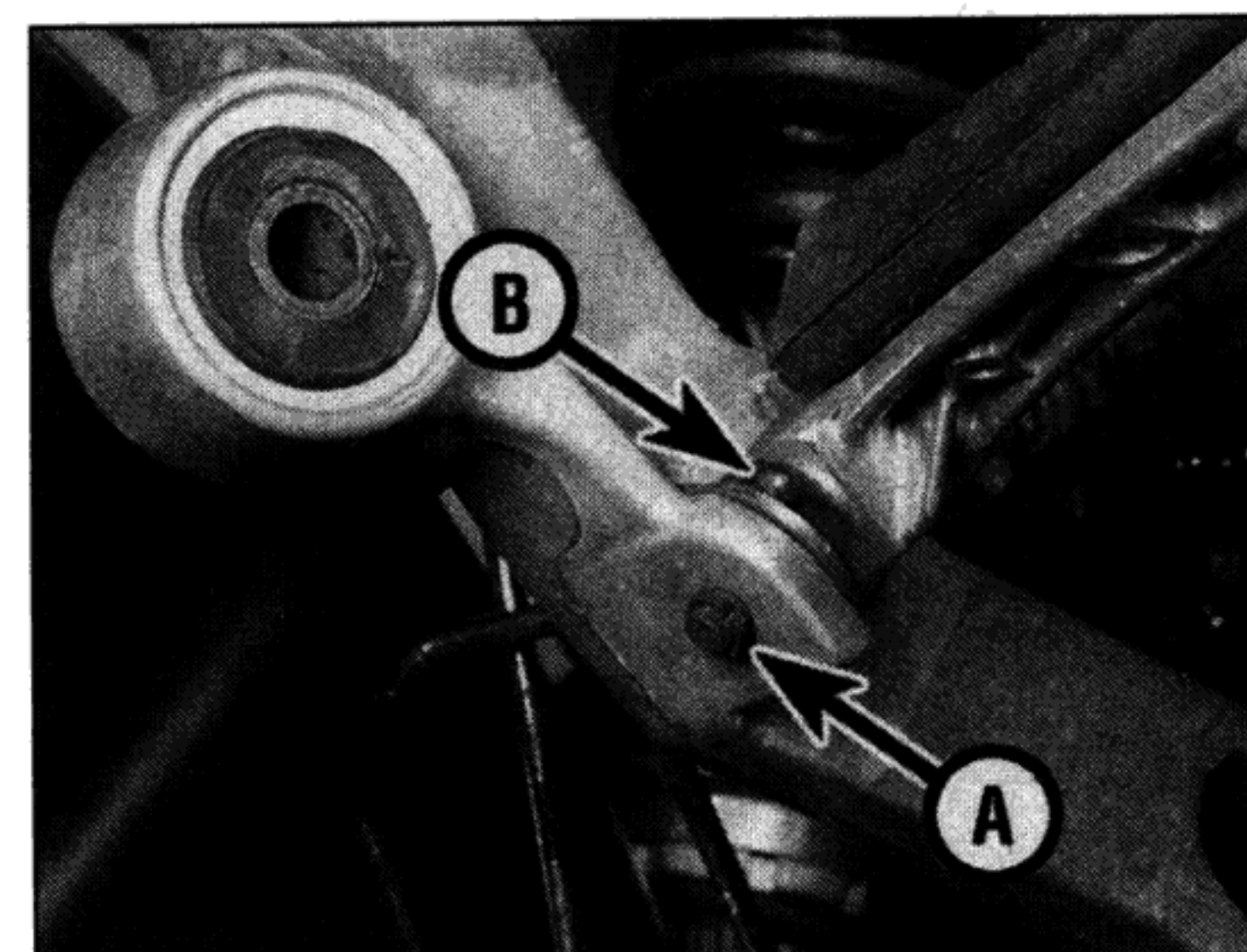
3 On XTZ models, remove the split pin and washer (where fitted) from the bottom of the footrest pivot pin, then withdraw the pivot pin and remove the footrest (**see illustration**). Note the fitting of the return spring. The footrest rubber can be renewed by removing the two bolts that secure it to the peg.

Removal – rear footrests

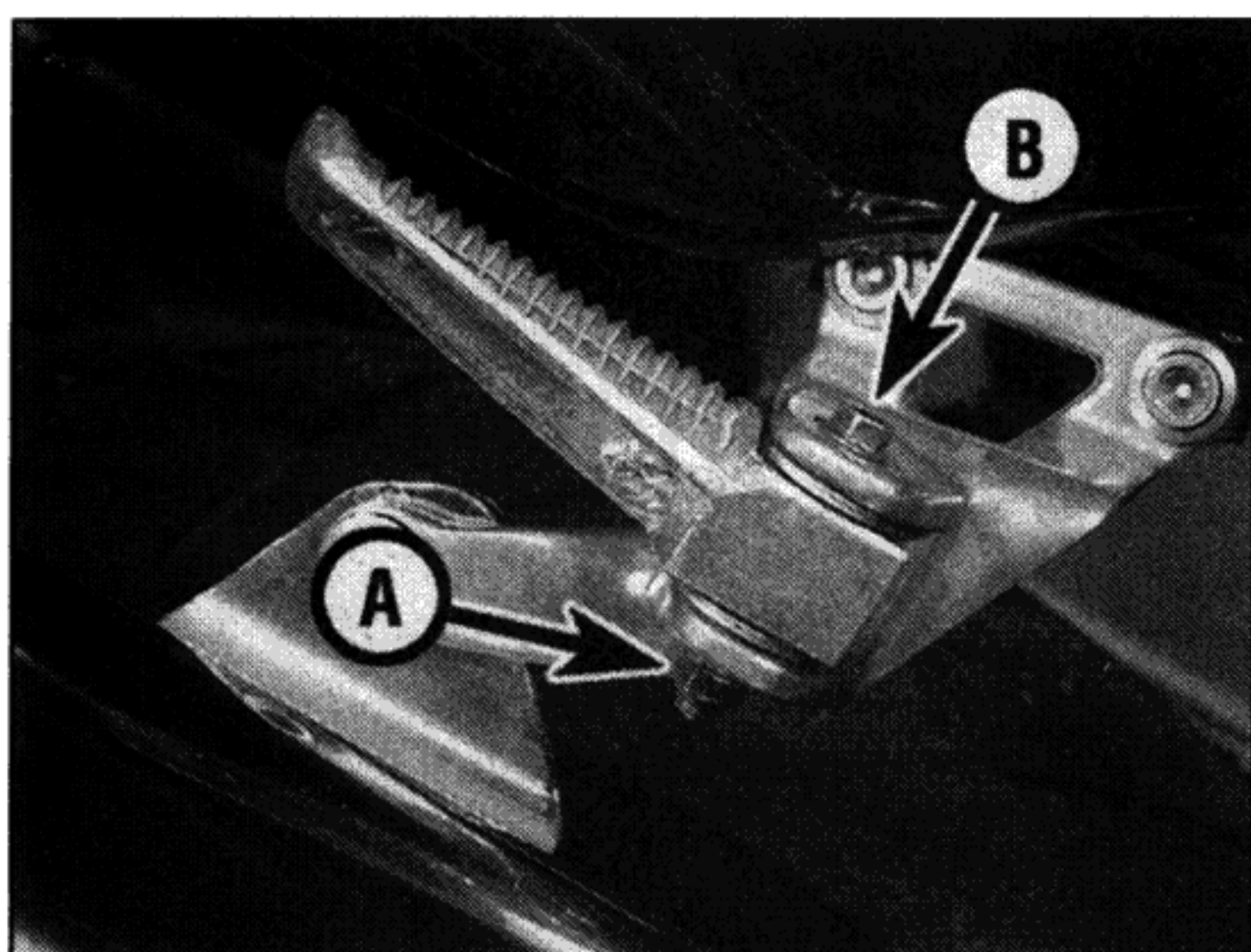
4 On 1991 to 1995 TDM models, remove the split pin from the bottom of the footrest pivot pin, then withdraw the pivot pin and remove the footrest (**see illustration**). Note the fitting of the detent plate, ball and spring, and take care that they do not spring out when removing the footrest. Also note the collar for the pivot pin. The footrest rubber can be



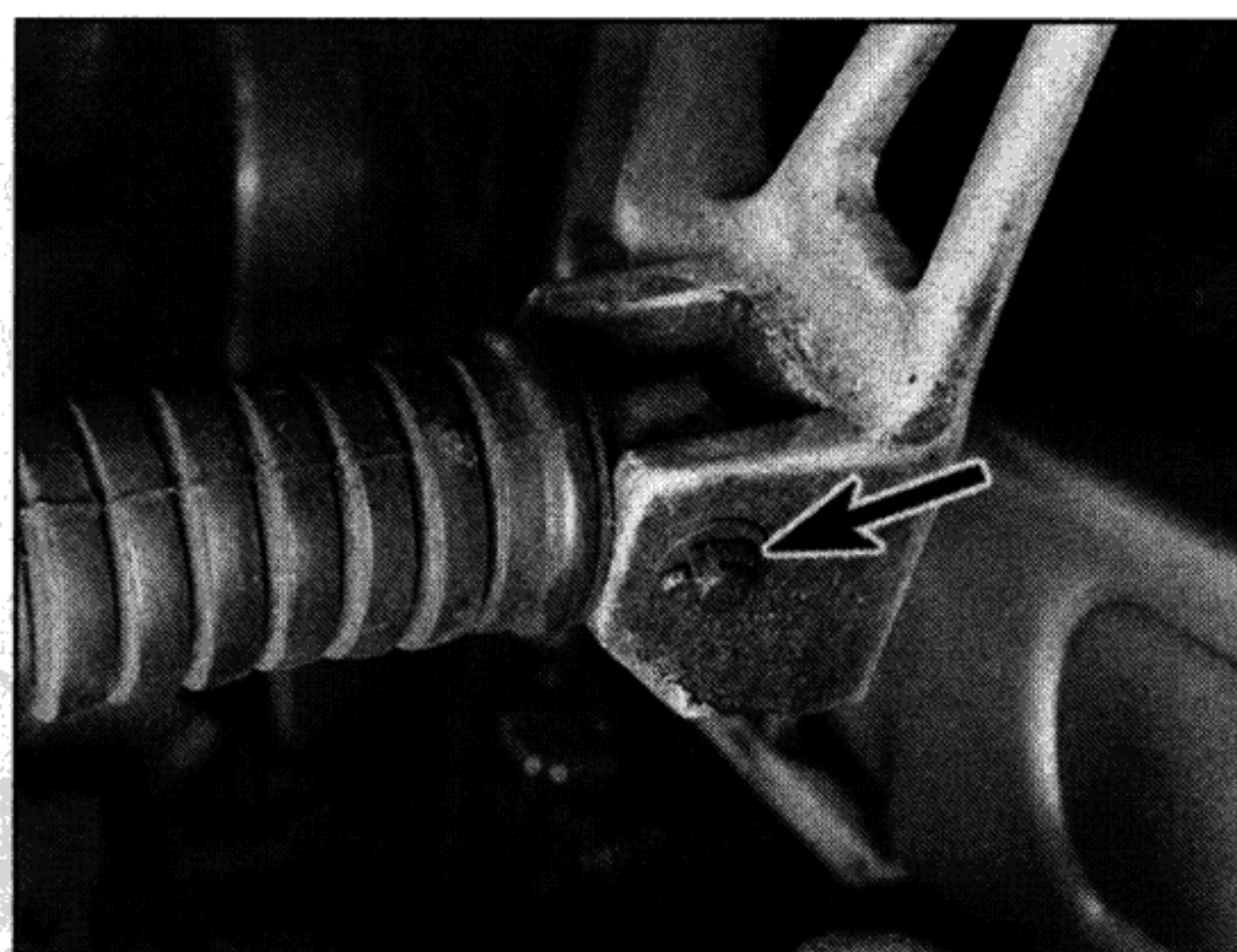
3.3 Remove the split pin (A) and withdraw the pivot pin, noting how the spring ends locate (B)



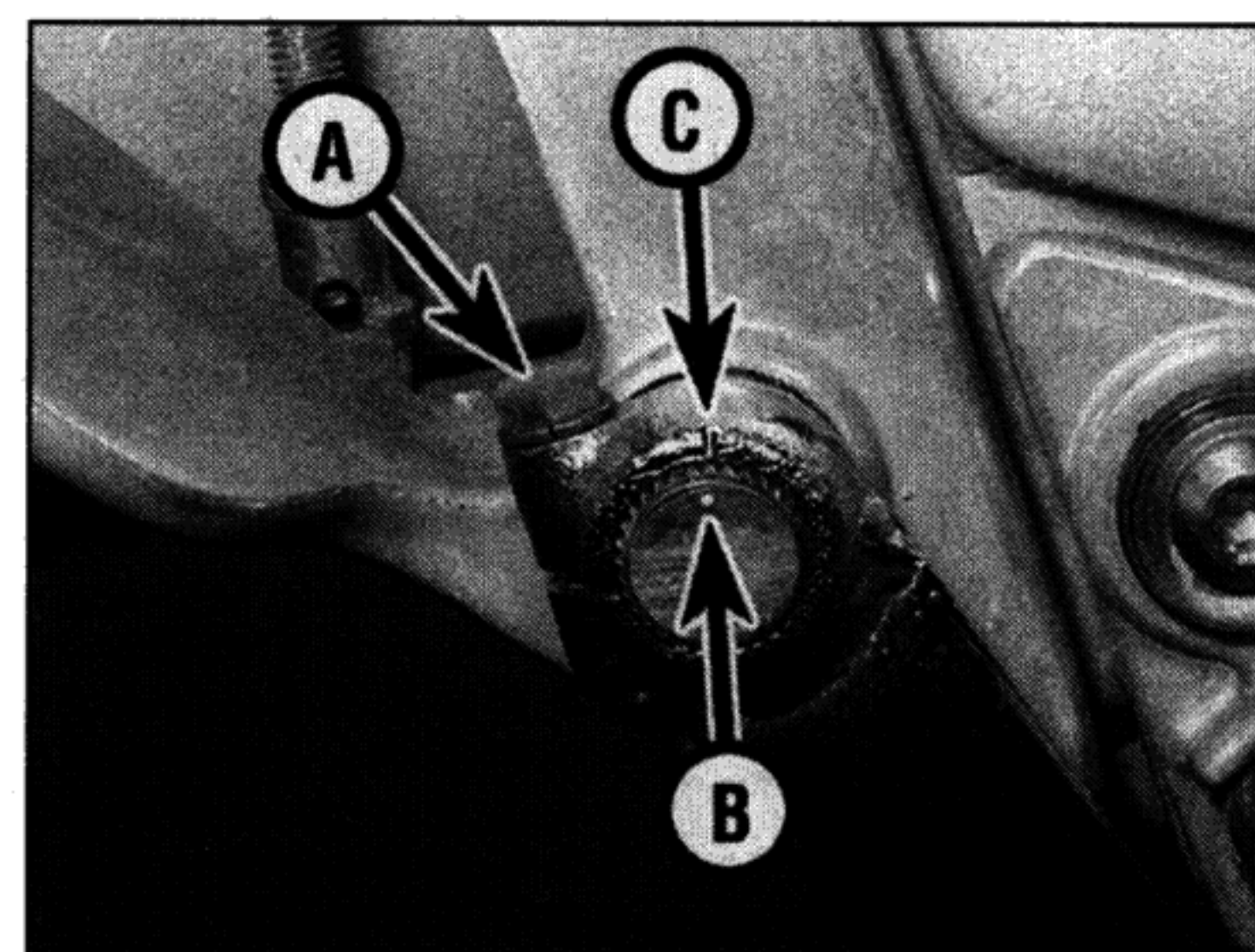
3.4 Remove the split pin (A) and withdraw the pivot pin, noting how the detent plate and ball fit (B)



3.6 Unscrew the nut (A) and withdraw the bolt (B)



3.7 Remove the split pin (arrowed) and withdraw the pivot pin



3.9a Remove the pinch bolt (A) and slide the pedal off the shaft. Note the alignment of the punch mark (B) with the notch (C)

renewed by removing the two screws that secure it to the footrest.

5 On 1996-on TDM models, unscrew the nut from the bottom of the footrest pivot bolt, then withdraw the bolt and remove the footrest. Note the fitting of the detent plates, ball and spring, and take care that they do not spring out when removing the footrest. Also note the collar for the pivot bolt. The footrest rubber can be renewed by removing the two screws that secure it to the footrest.

6 On TRX models, unscrew the nut from the bottom of the footrest pivot bolt, then withdraw the bolt and remove the footrest. Note the fitting of the detent plates, ball and spring, and take care that they do not spring out when removing the footrest (**see illustration**). Also note the collar for the pivot bolt.

7 On XTZ models, remove the split pin and washer (where fitted) from the bottom of the footrest pivot pin, then withdraw the pivot pin and remove the footrest (**see illustration**). The footrest rubber can be renewed by removing the washer and drawing the rubber off the footrest. If it is stuck fast, slit it with a sharp knife.

Installation

8 Installation is the reverse of removal. On TDM and TRX models, if removed, tighten the front footrest bracket bolts to the torque setting specified at the beginning of the chapter.

Brake pedal

Removal

9 On TDM models, note the alignment of the notch in the top of the pedal with the punch mark on the shaft, then unscrew and remove the pinchbolt and slide the arm off the shaft (**see illustration**). If required, unhook the brake pedal return spring and the brake light switch spring from the bracket on the inside of the pedal shaft, then remove the split pin from the clevis pin securing the master cylinder pushrod to the bracket (**see illustration**). Remove the clevis pin and separate the pushrod from the bracket, then draw the shaft assembly out of the frame.

10 On TRX models, unhook the brake pedal return spring and the brake light switch spring from the bracket on the pedal. Remove the split pin from the clevis pin securing the brake pedal to the master cylinder pushrod (**see illustration**). Remove the clevis pin and separate the pushrod from the pedal. Unscrew the pedal pivot bolt and remove the pedal. If required, remove the screw securing the spring bracket to the inside of the pedal and remove the bracket.

11 On XTZ models, unhook the brake pedal return spring and the brake light switch spring from the bracket on the pedal. Remove the split pin from the clevis pin securing the brake

pedal to the master cylinder pushrod. Remove the clevis pin and separate the pushrod from the pedal. Remove the split pin holding the pedal pivot in the frame and remove the pedal. Discard the split pin as a new one must be used.

Installation

12 Installation is the reverse of removal, noting the following:

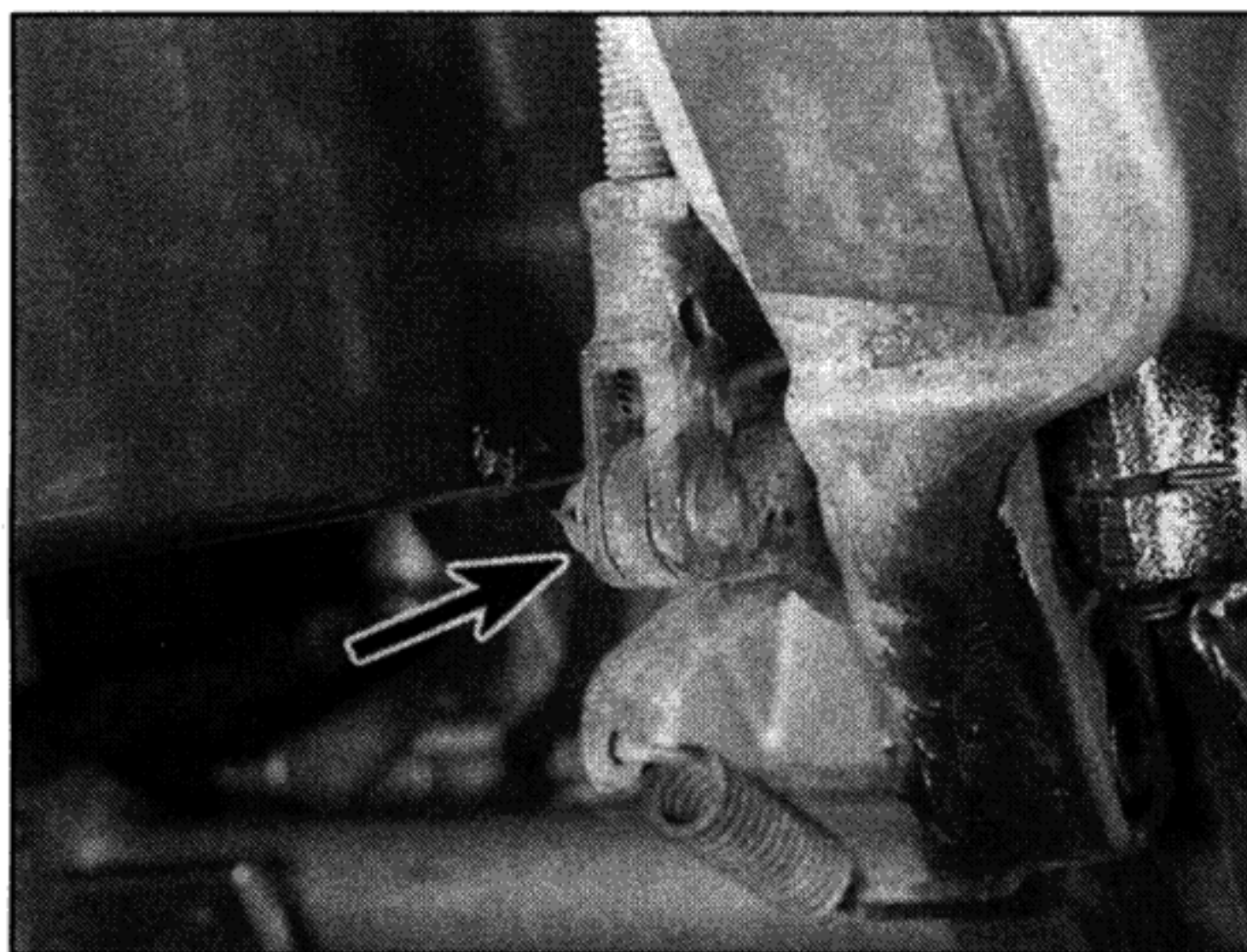
- Apply molybdenum disulphide grease to the brake pedal pivot, or on TDM models, the unsplined section of the shaft.
- On TRX models, tighten the pedal pivot bolt securely.
- Use a new split pin on the clevis pin securing the brake pedal to the master cylinder pushrod, and on XTZ models on the brake pedal pivot.
- Check the operation of the rear brake light switch (**see Chapter 1**).

Gearchange lever

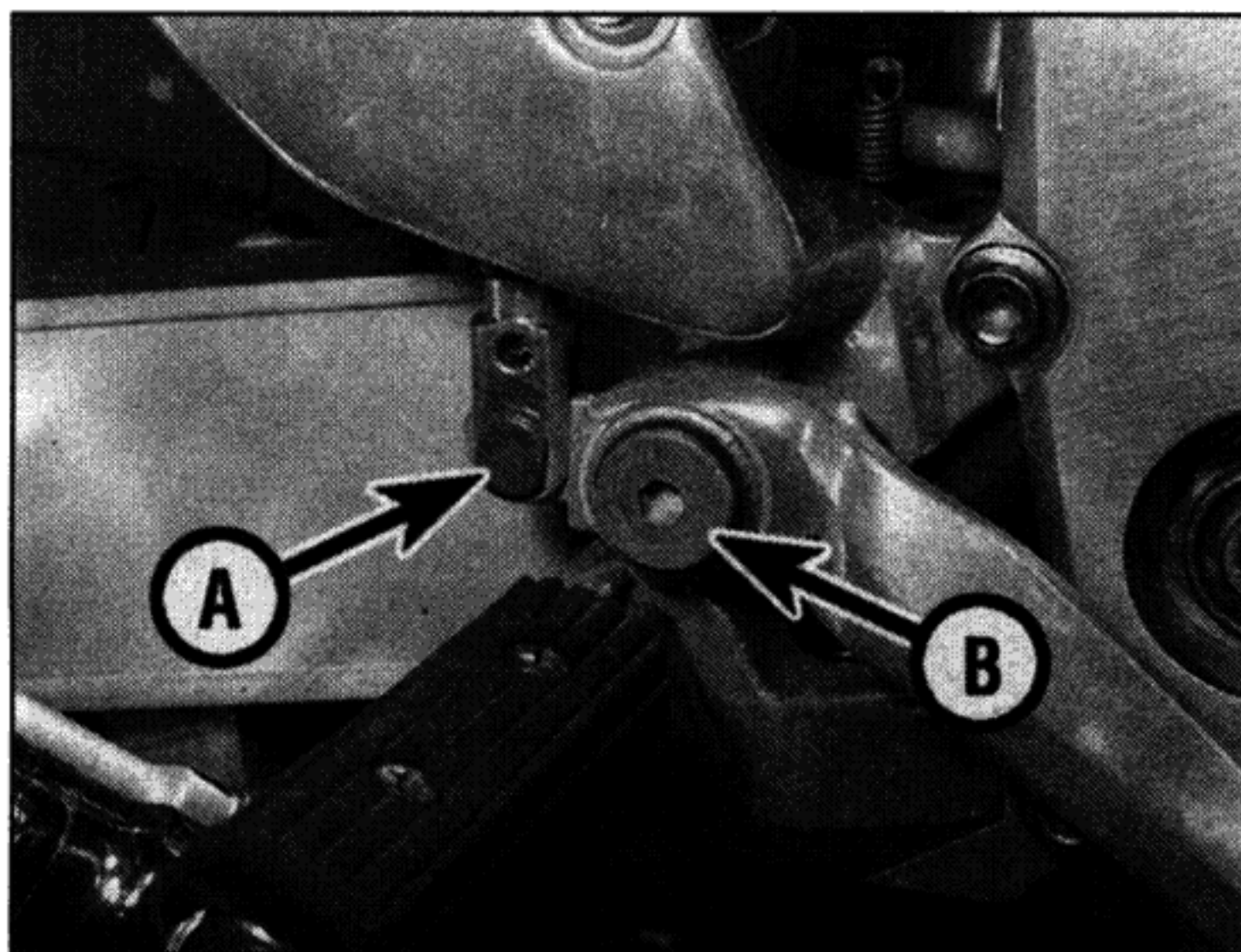
Removal

13 On TDM and XTZ models, unscrew the bolts securing the outer front sprocket cover and remove the cover (**see illustration**).

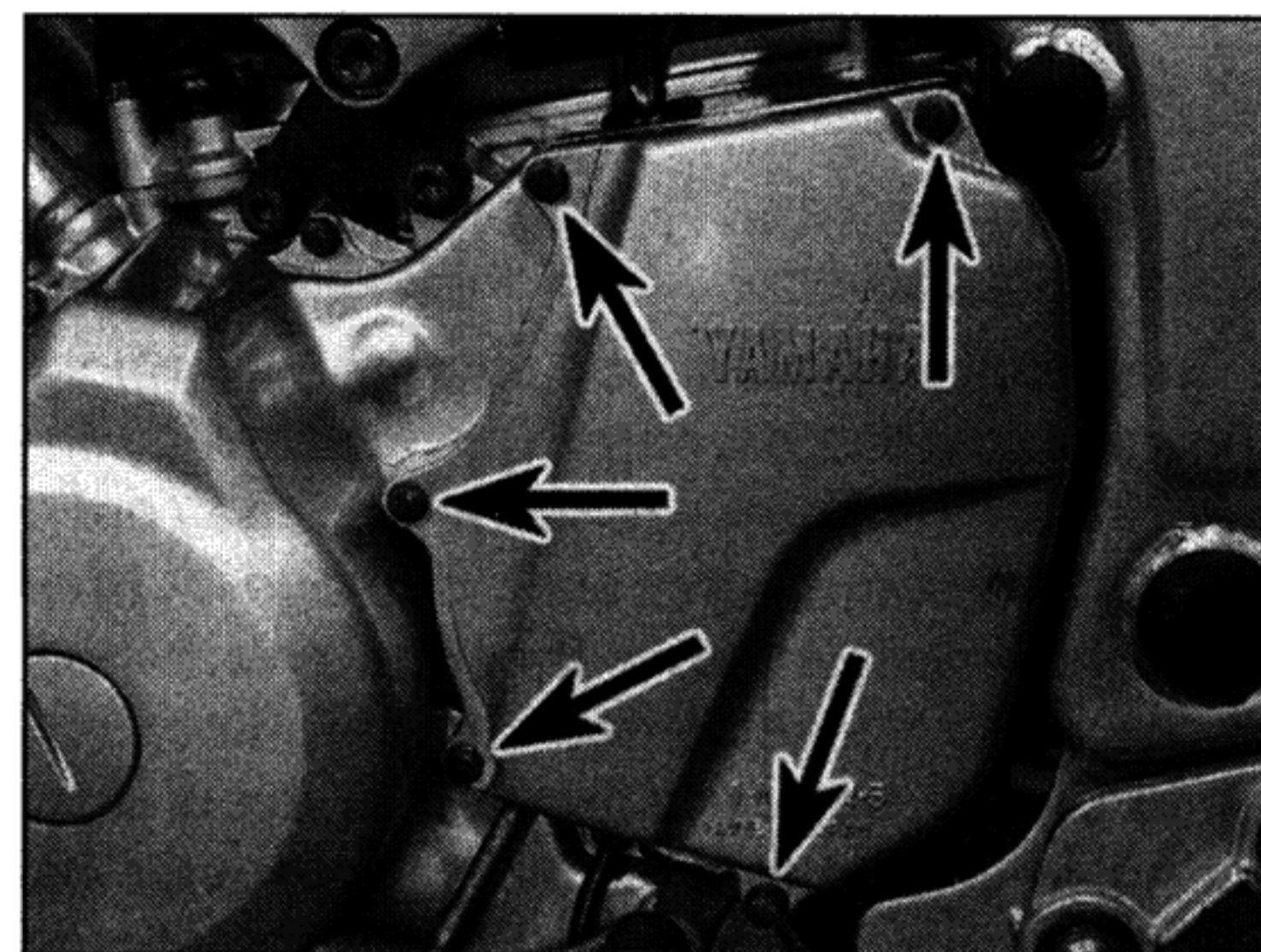
14 To remove the lever on its own, slacken the gearchange lever linkage rod locknuts, then unscrew the rod and separate it from the



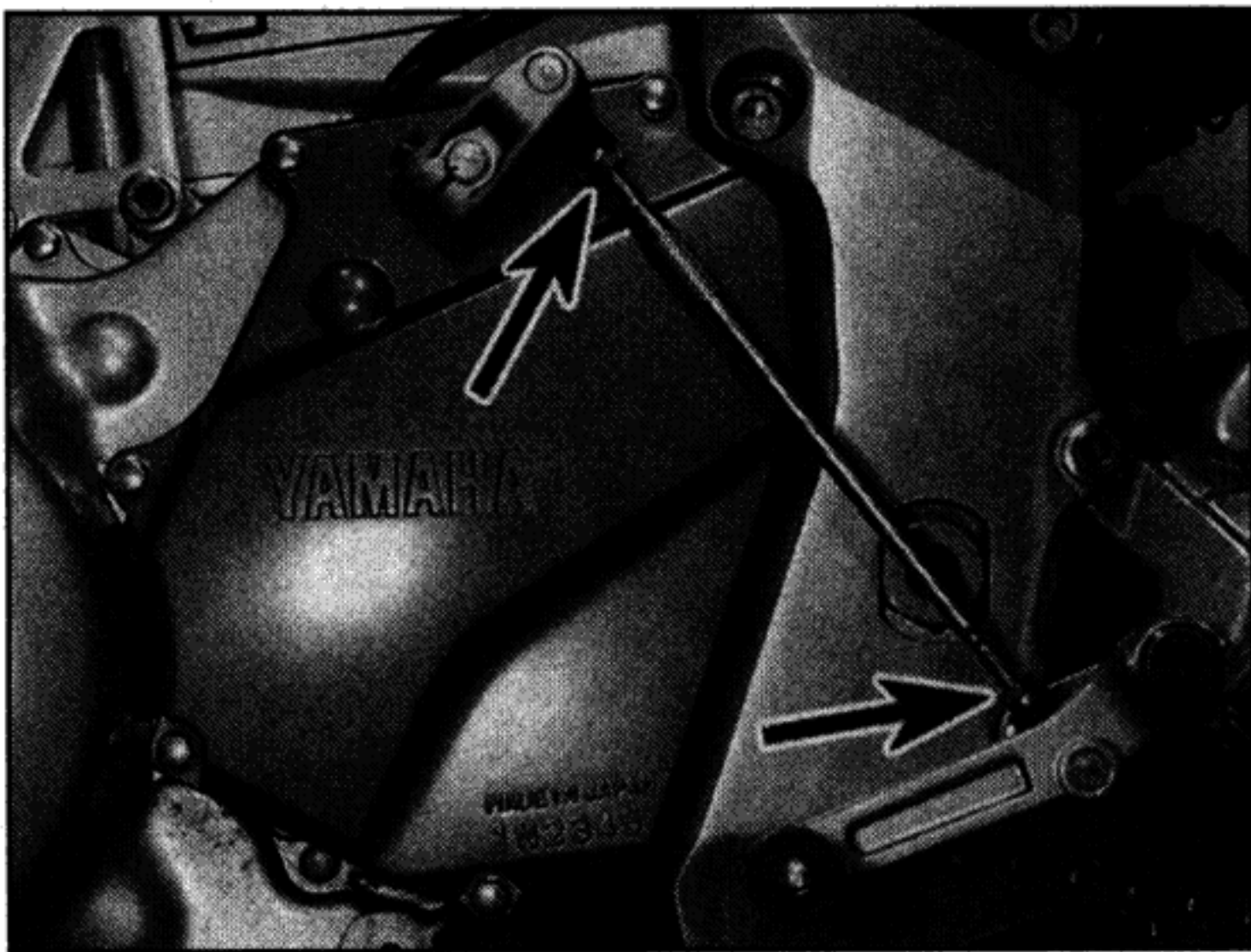
3.9b Unhook the springs and separate the pushrod from the bracket (arrowed)



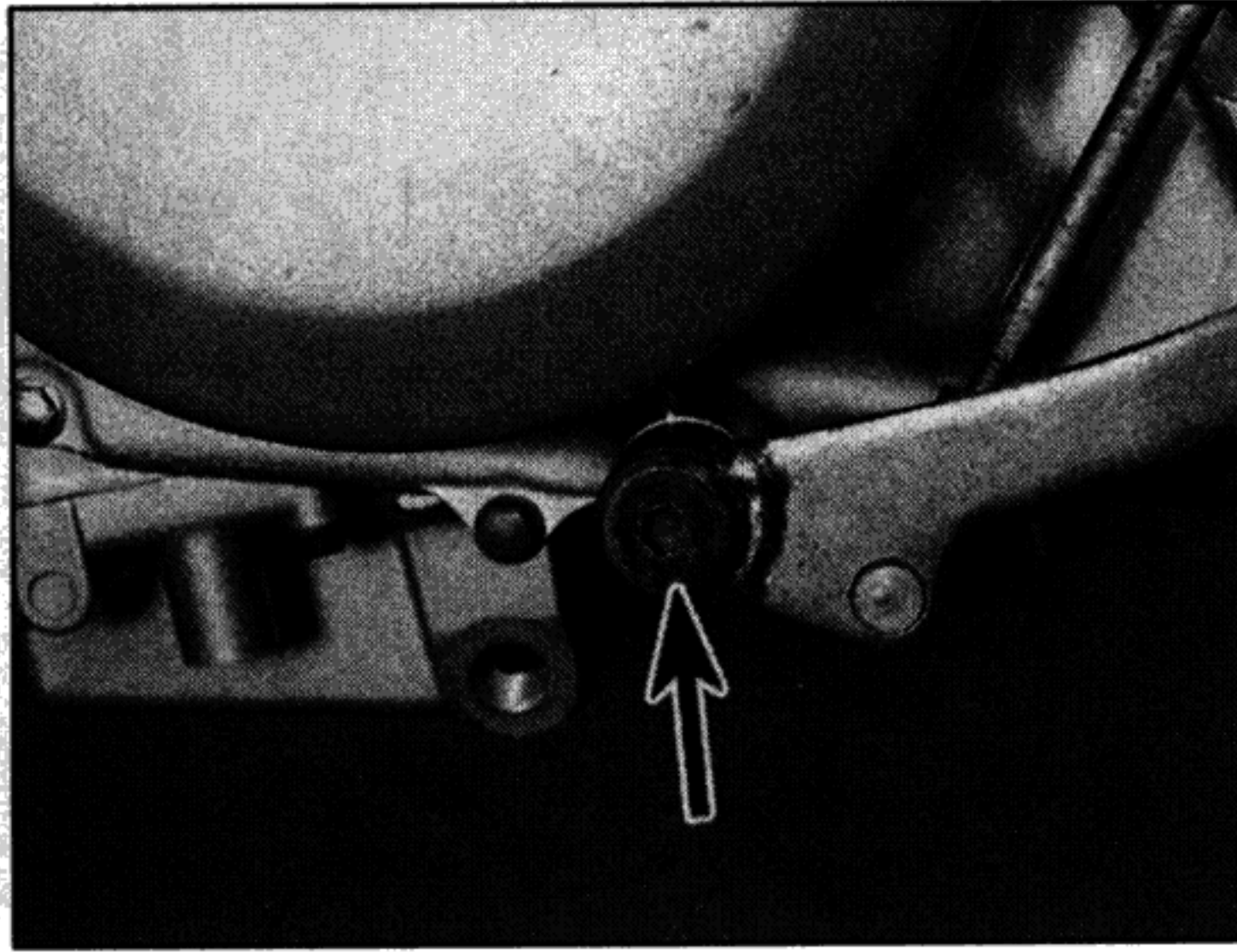
3.10 Unhook the springs at the back, then remove the clevis pin (A) and unscrew the pivot bolt (B)



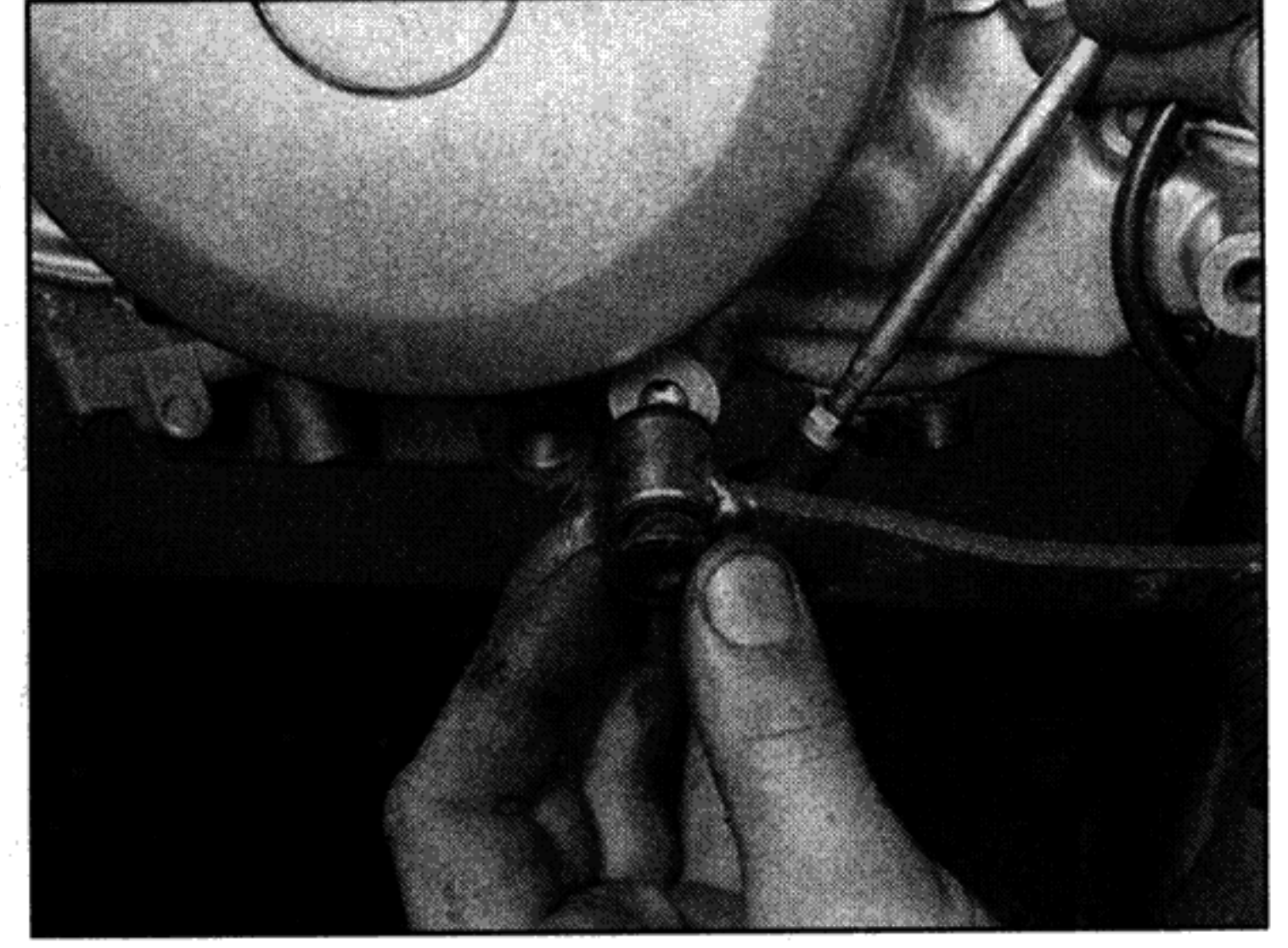
3.13 Sprocket cover bolts (arrowed)



3.14a Slacken the locknuts (arrowed) and thread the rod out of the lever and arm



3.14b Unscrew the pivot bolt . . .



3.14c . . . and remove the lever, noting the washers

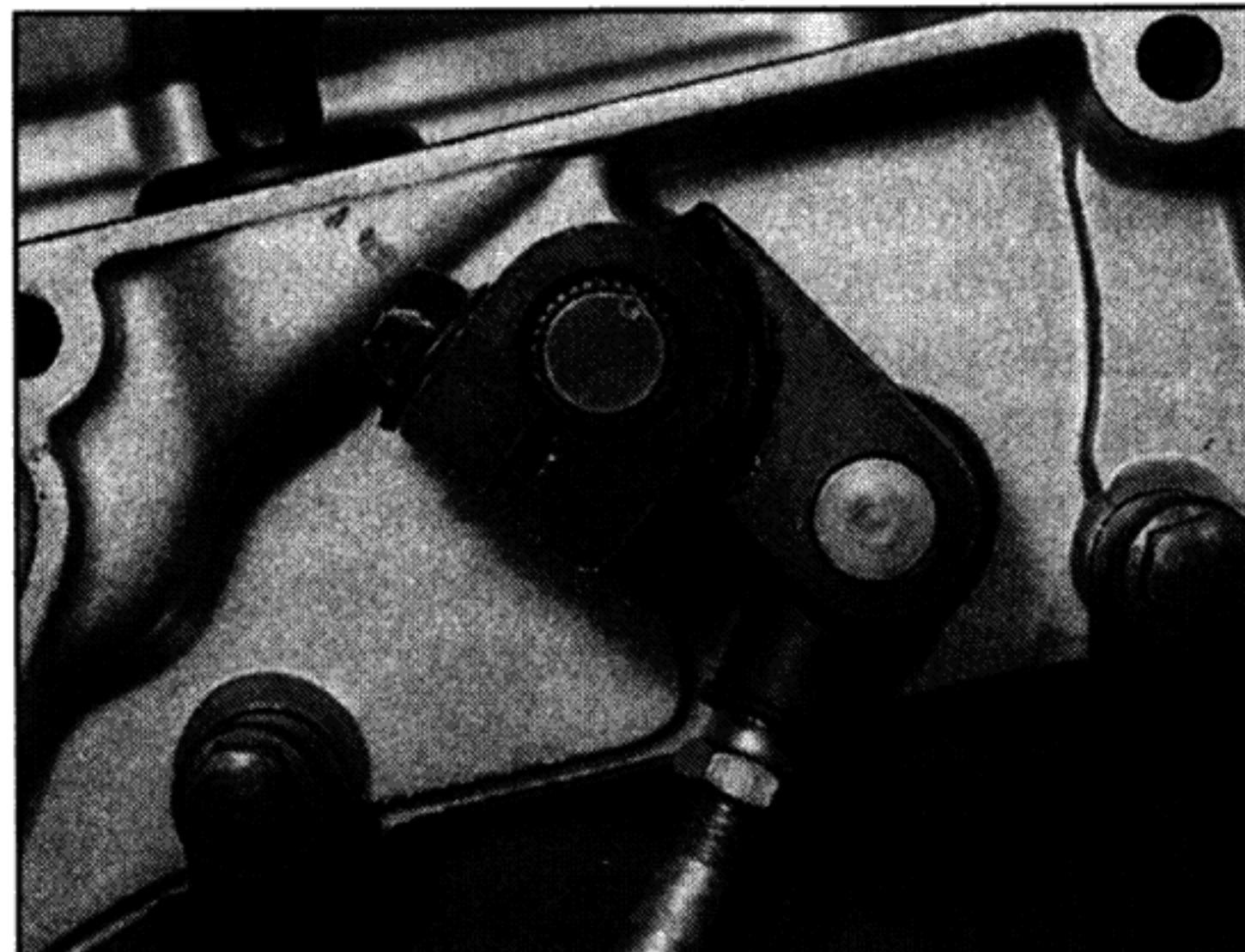
lever and the arm (the rod is reverse-threaded on one end and so will simultaneously unscrew from both lever and arm when turned in the one direction) (see illustration). Note the how far the rod is threaded into the lever and arm as this determines the height of the lever relative to the footrest. Unscrew the pivot bolt and remove the lever, noting the arrangement of the washers (see illustrations).

15 To remove the lever with the linkage rod and arm as an assembly, first note the alignment of the punch mark on the gearchange shaft with the slit in the linkage arm, then unscrew the linkage arm pinchbolt and slide the arm off the shaft (see illustrations). Now unscrew the lever pivot bolt and remove the lever and linkage assembly, noting how it fits (see illustrations 3.14b and c).

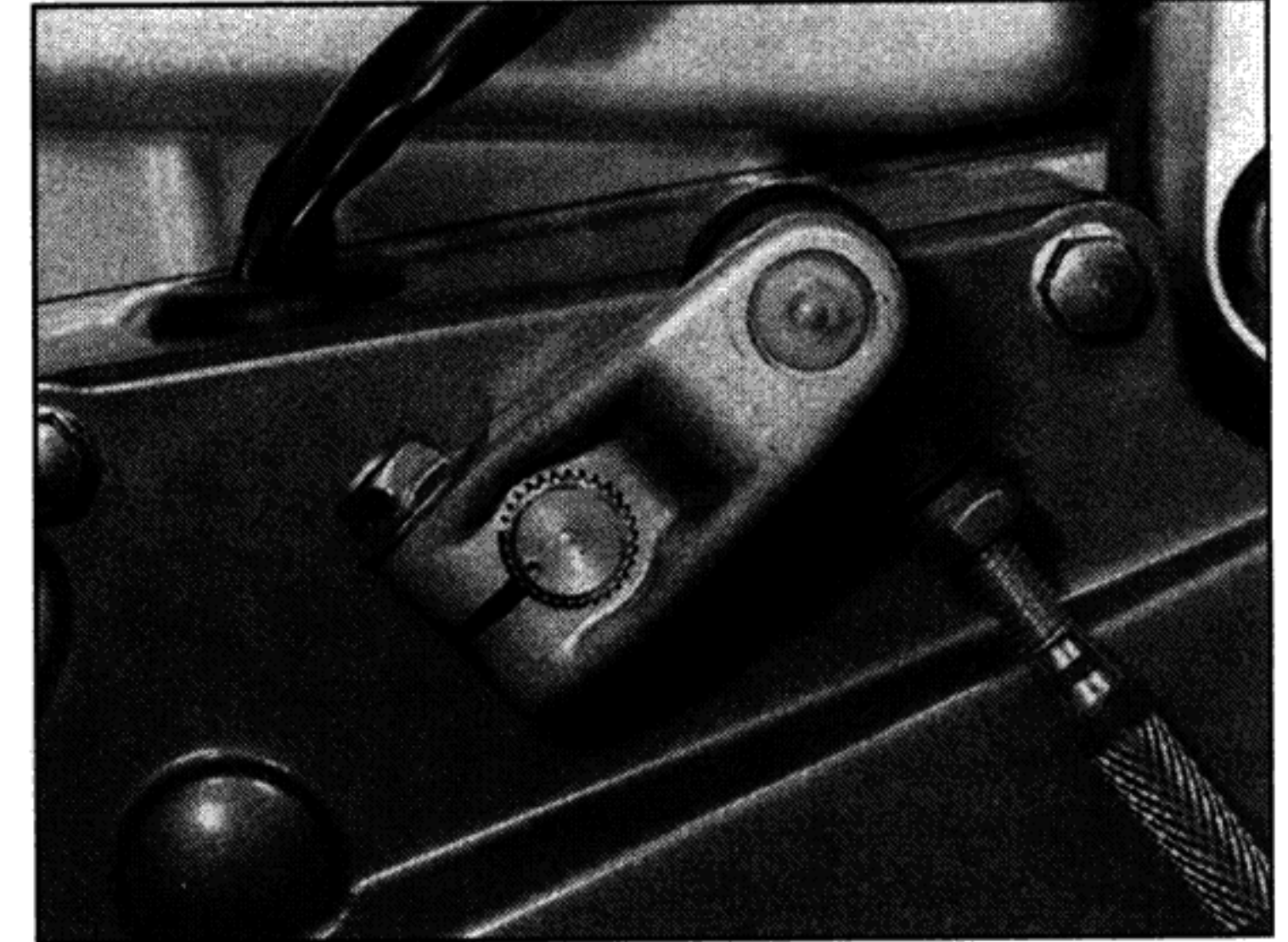
Installation

16 Installation is the reverse of removal, noting the following:

- Apply molybdenum disulphide oil to the gear lever pivot.
- Align the punch mark on the shaft with the slit in the clamp as noted on removal (see illustrations 3.15a and b).
- Tighten the gearchange lever pivot bolt securely.
- Adjust the gear lever height as required by screwing the rod in or out of the lever and arm. Tighten the locknuts securely (see illustration 3.14a).



3.15a Linkage arm/shaft alignment – TDM models



3.15b Linkage arm/shaft alignment – TRX models

4 Sidestand – removal and installation

- Support the bike using an auxiliary stand.
- On TDM and XTZ models, unhook the stand springs, then counter-hold the pivot bolt and unscrew the nut on the inside of the bracket (see illustration). Withdraw the pivot bolt and remove the stand, noting how it locates against the sidestand switch plunger.
- On TRX models, unhook the stand springs, then unscrew the retaining bolt (see illustration). Slide the stand off its pivot, noting how it fits. If required, counter-hold the pivot piece and unscrew the nut

securing it in the bracket, then withdraw the pivot.

4 On installation apply grease to the pivot and a suitable non-permanent thread locking compound to the bolt threads. Tighten the nut/bolt securely. Reconnect the sidestand spring and check that it holds the stand securely up when not in use – an accident is almost certain to occur if the stand extends while the machine is in motion.

5 Check the operation of the sidestand switch (see Chapter 1).

5 Handlebars and levers – removal and installation

Handlebars

Removal

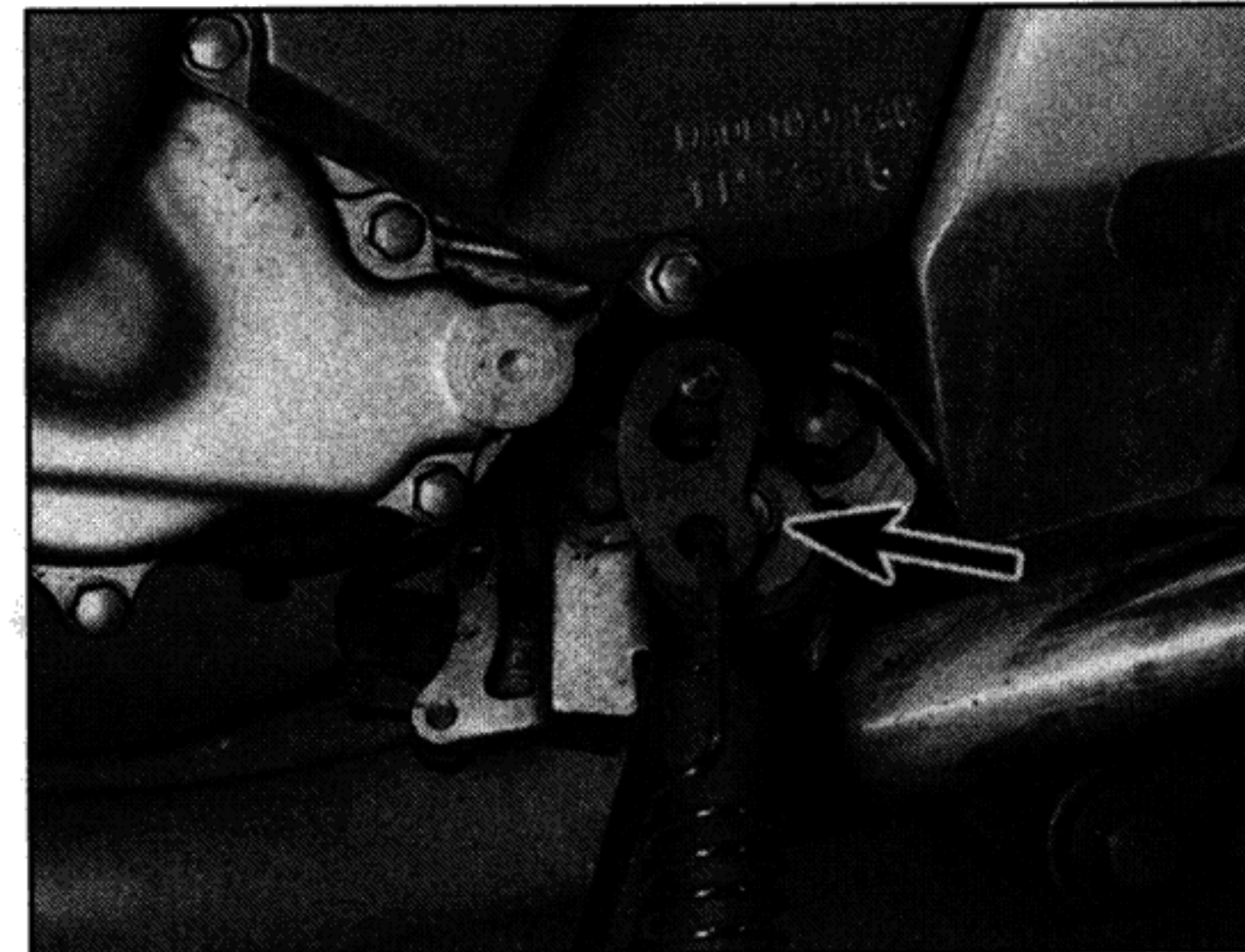
Note: The handlebars can be displaced from the top yoke without having to remove any of the lever or switch assemblies. On TRX models, the handlebars can be removed from the handlebar holders which clamp around the top of the forks, leaving the holders in place.

1 Displace the front brake master cylinder and reservoir (see Chapter 7). There is no need to disconnect the hydraulic hose. Keep the reservoir upright to prevent possible fluid leakage and make sure no strain is placed on the hydraulic hose(s).

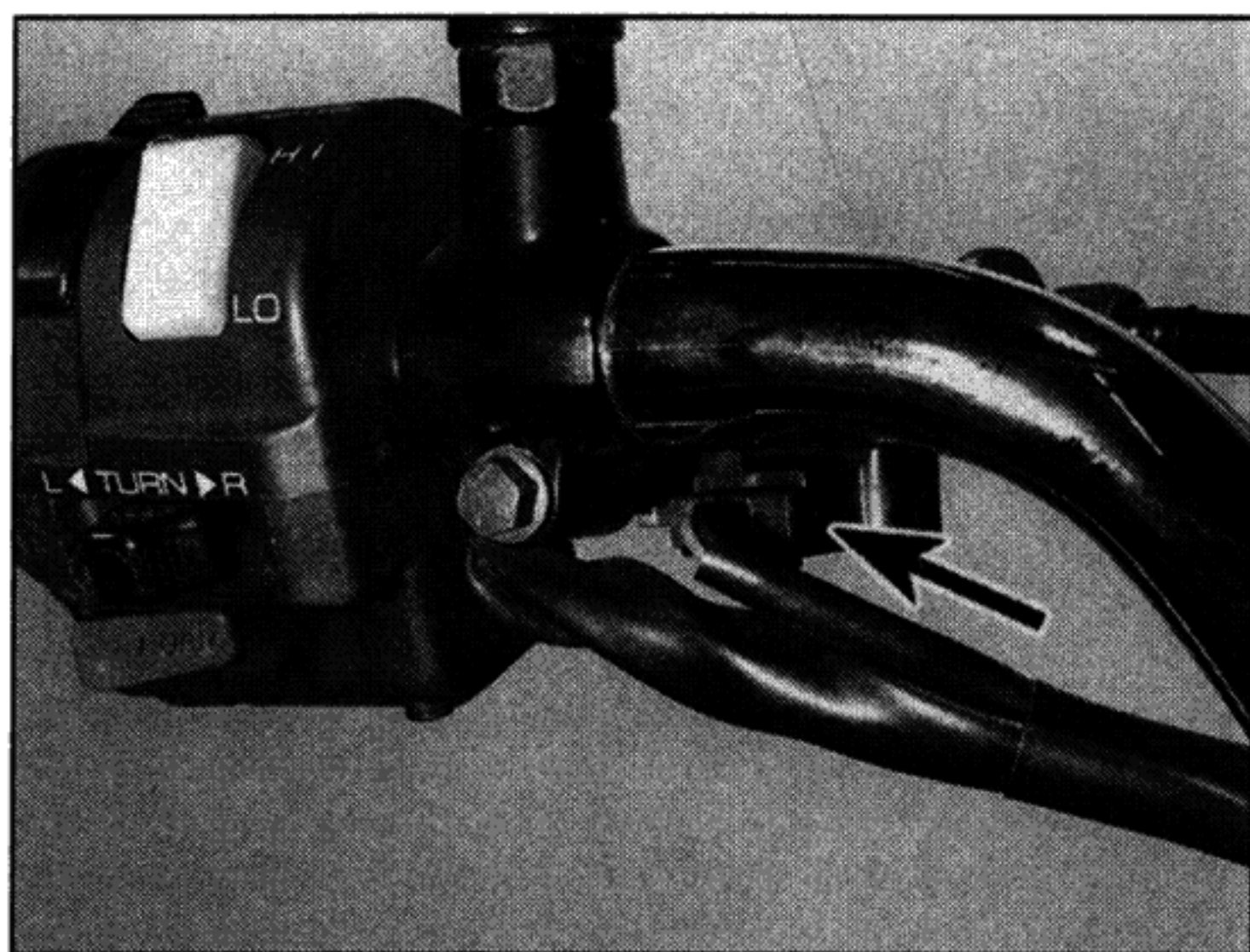
2 Displace the throttle cable housing from the handlebars (see Chapter 4). There is no need



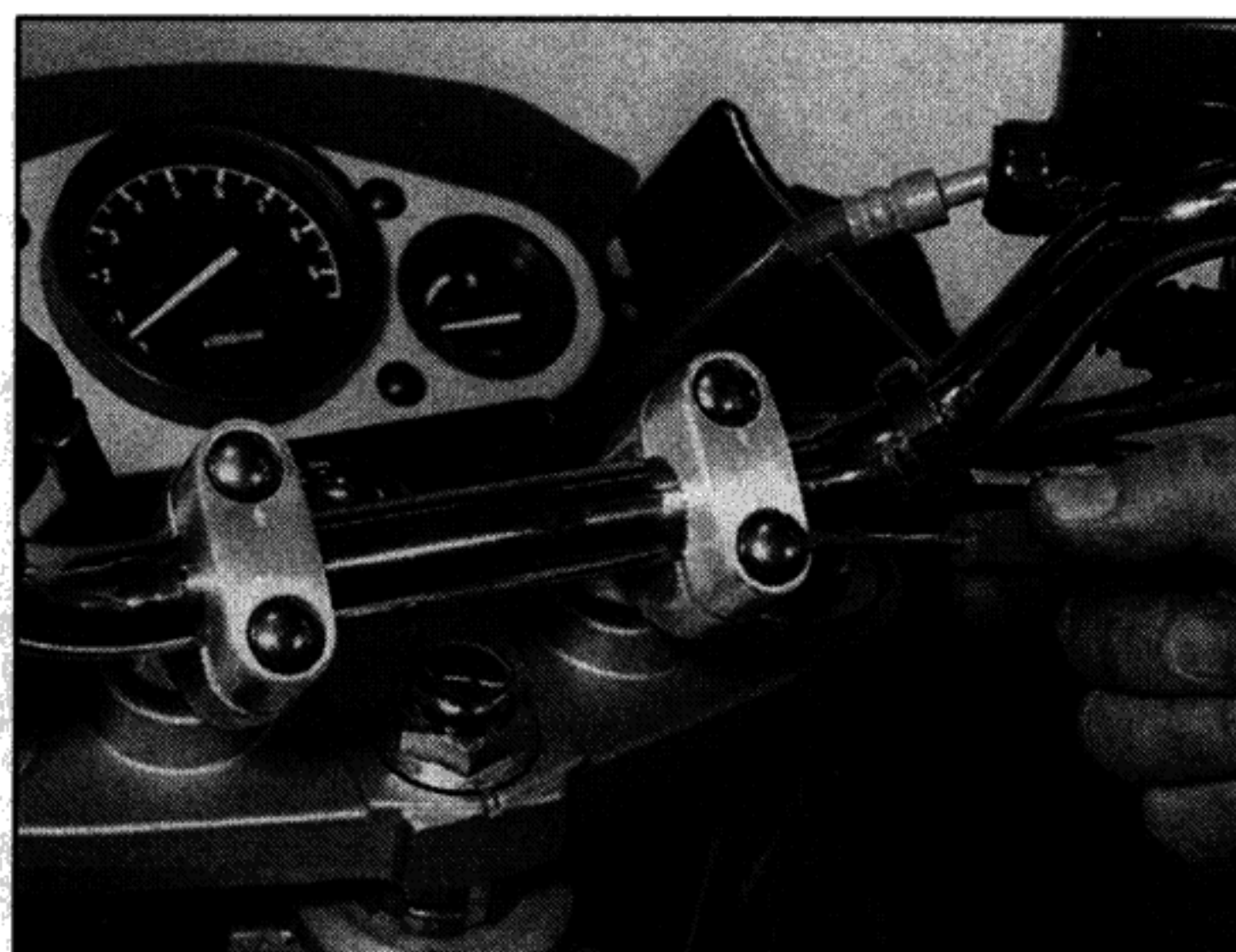
4.2 Sidestand pivot bolt (arrowed) – TDM models



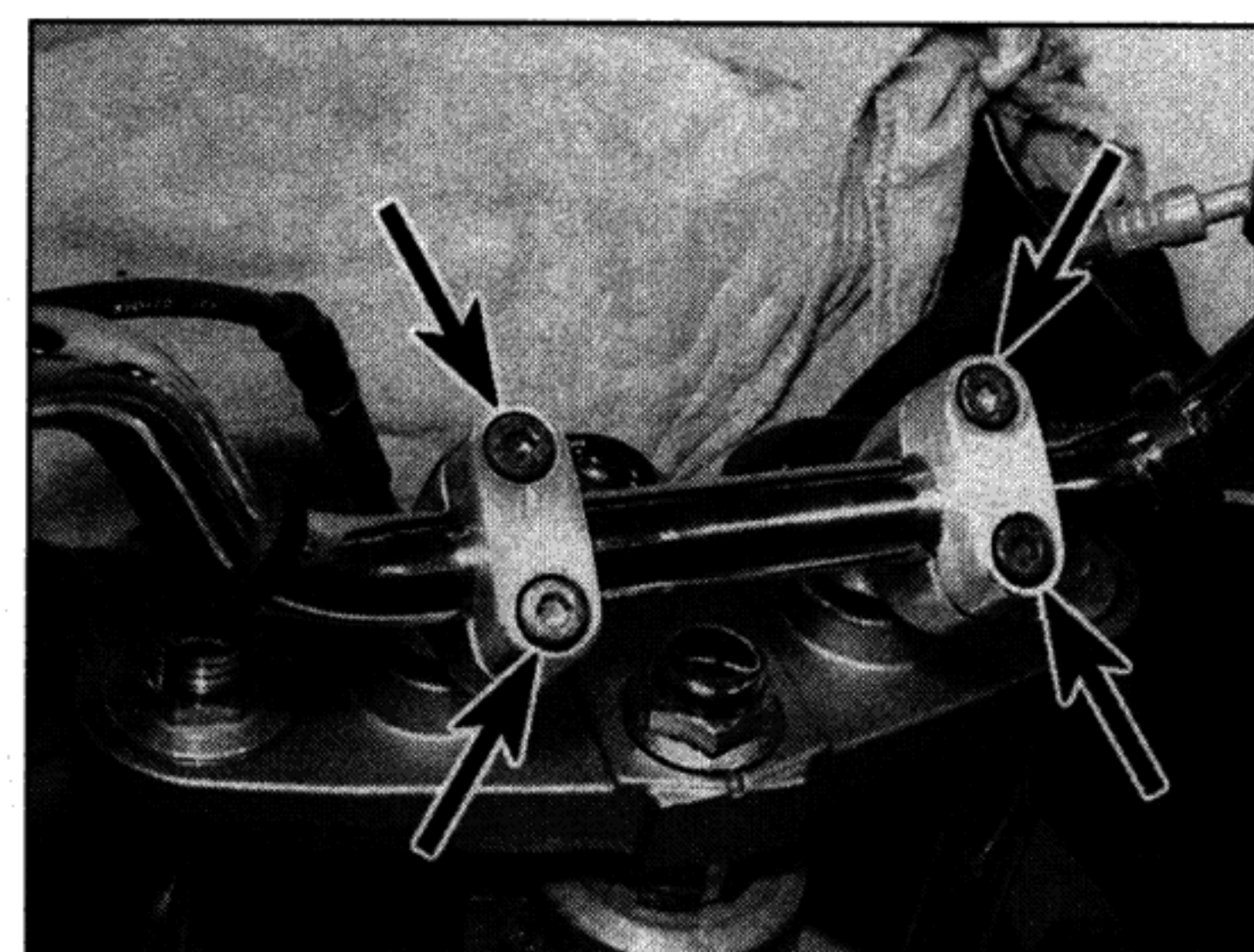
4.3 Sidestand retaining bolt (arrowed) – TRX models



5.3 Clutch switch wiring connector (arrowed) – TDM models



5.5a On TDM models, remove the blanking caps



5.5b Handlebar clamp bolts (arrowed) – TDM models

to detach the cables from the carburettors.

3 Either remove the clutch lever (see below), or detach the clutch cable from the lever (see Chapter 2). Disconnect the clutch switch wiring connector (see Chapter 9) (see illustration).

4 Displace the handlebar switches (see Chapter 9). There is no need to disconnect the wiring connectors.

5 On TDM models, lever out the handlebar holder clamp bolt blanking caps (see illustration). On TDM and XTZ models, unscrew the handlebar holder clamp bolts and remove the handlebars, noting how the choke knob fits, where appropriate (see illustrations).

6 On TRX models, to remove the handlebar

and leave the holder in place, remove the blanking cap from the inner end of the handlebar, then unscrew the retaining bolt and slide the bar out of the holder, noting how it locates (see illustration).

7 On TRX models, to remove the handlebar and holder together, remove the blanking cap from the holder positioning bolt, then unscrew the bolt (see illustration). Slacken the handlebar holder clamp bolt, then ease the handlebar holder up and off the fork.

Installation

8 Installation is the reverse of removal, noting the following.

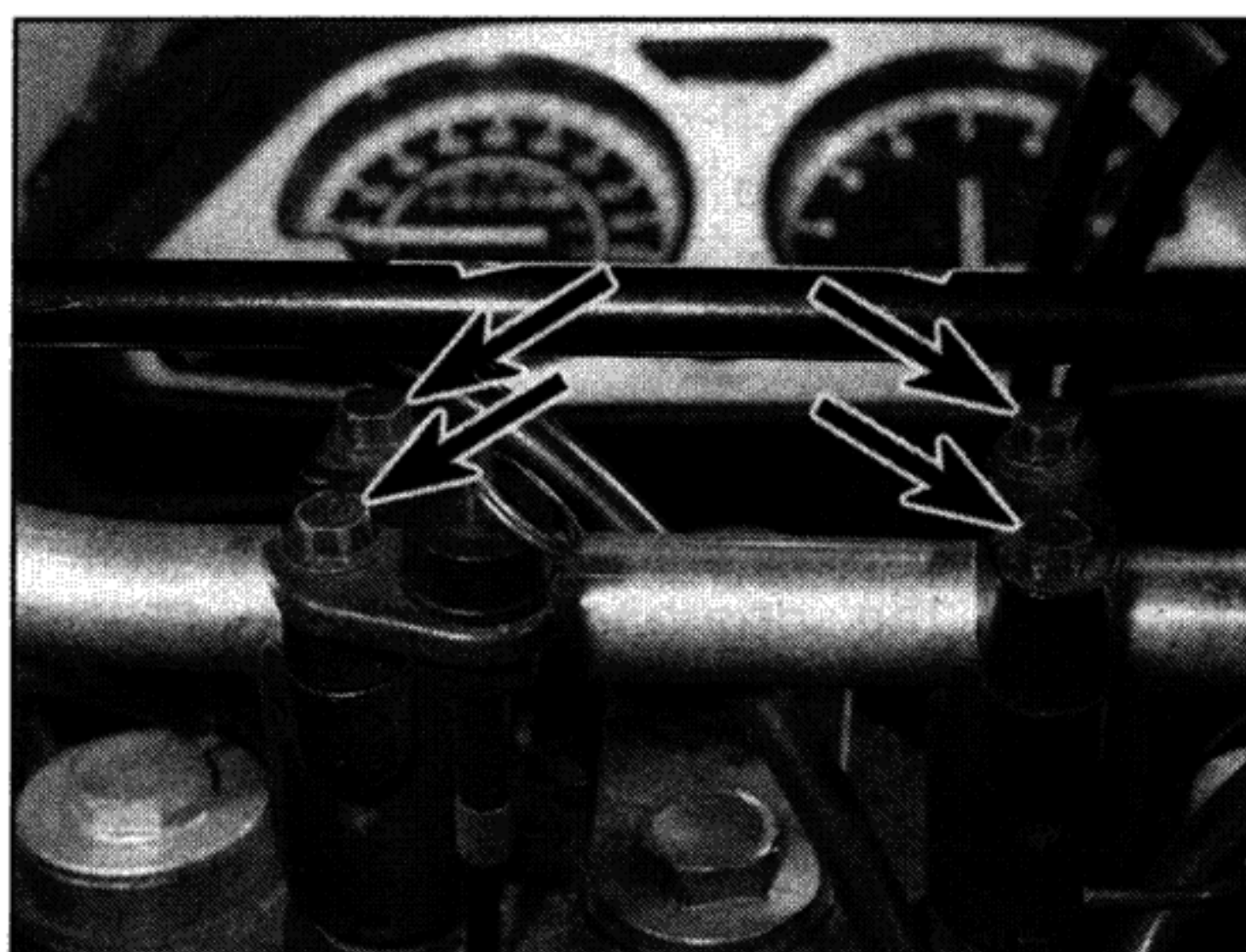
a) On TDM models, align the mark on the front of the handlebars with the mating

surfaces of the holder (see illustration).

Make sure the handlebars are centrally positioned. Install the holder clamp with the arrow pointing up, then tighten the front clamp bolt first, followed by the rear bolt, to the torque setting specified at the beginning of the Chapter (see illustrations).

b) On XTZ models, make sure the handlebars are centrally positioned. Install the holder clamp with the punch mark pointing forward, then tighten the front clamp bolt first, followed by the rear bolt, to the torque setting specified at the beginning of the Chapter.

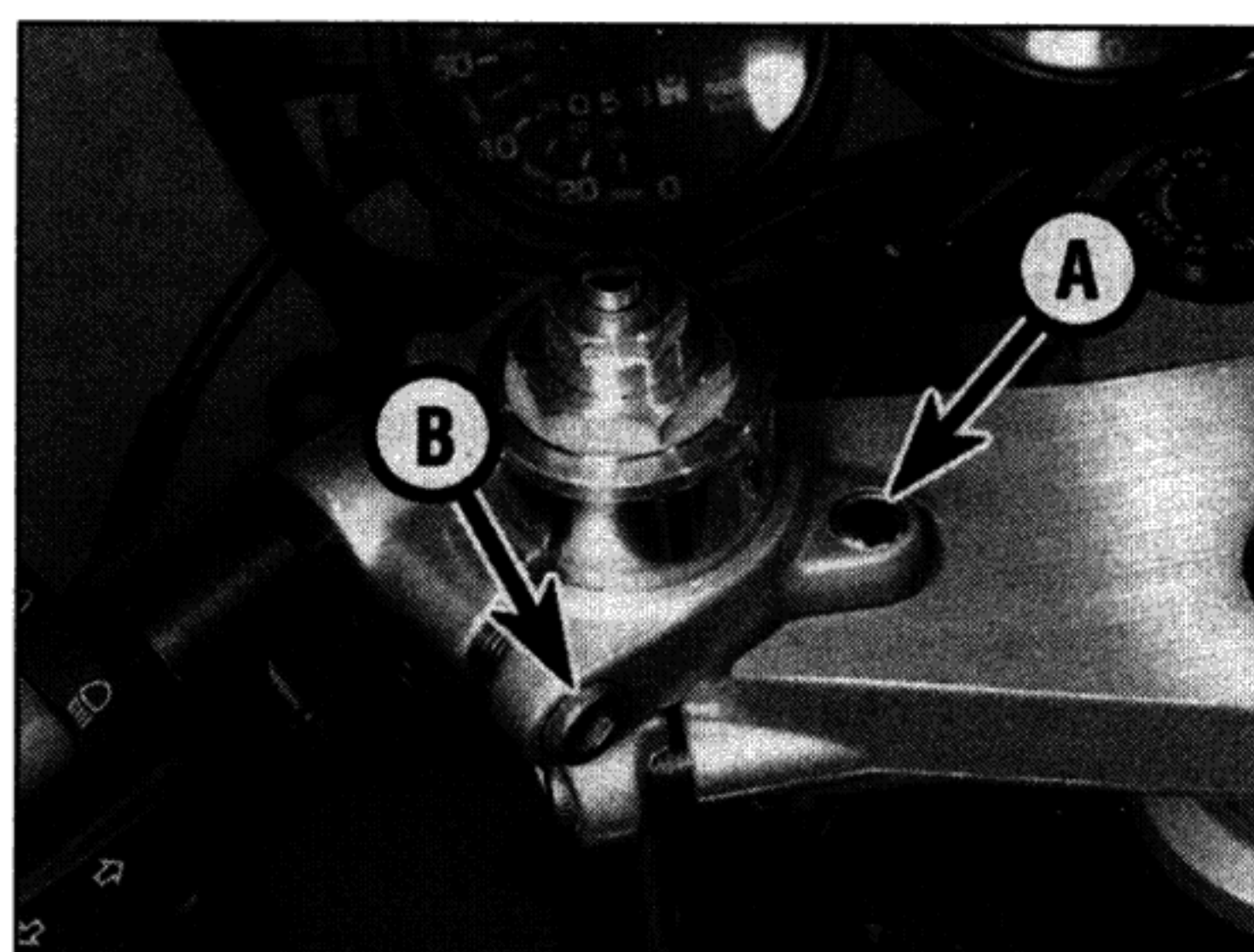
c) On TRX models, if separated, make sure the flat on the inner end of the handlebar



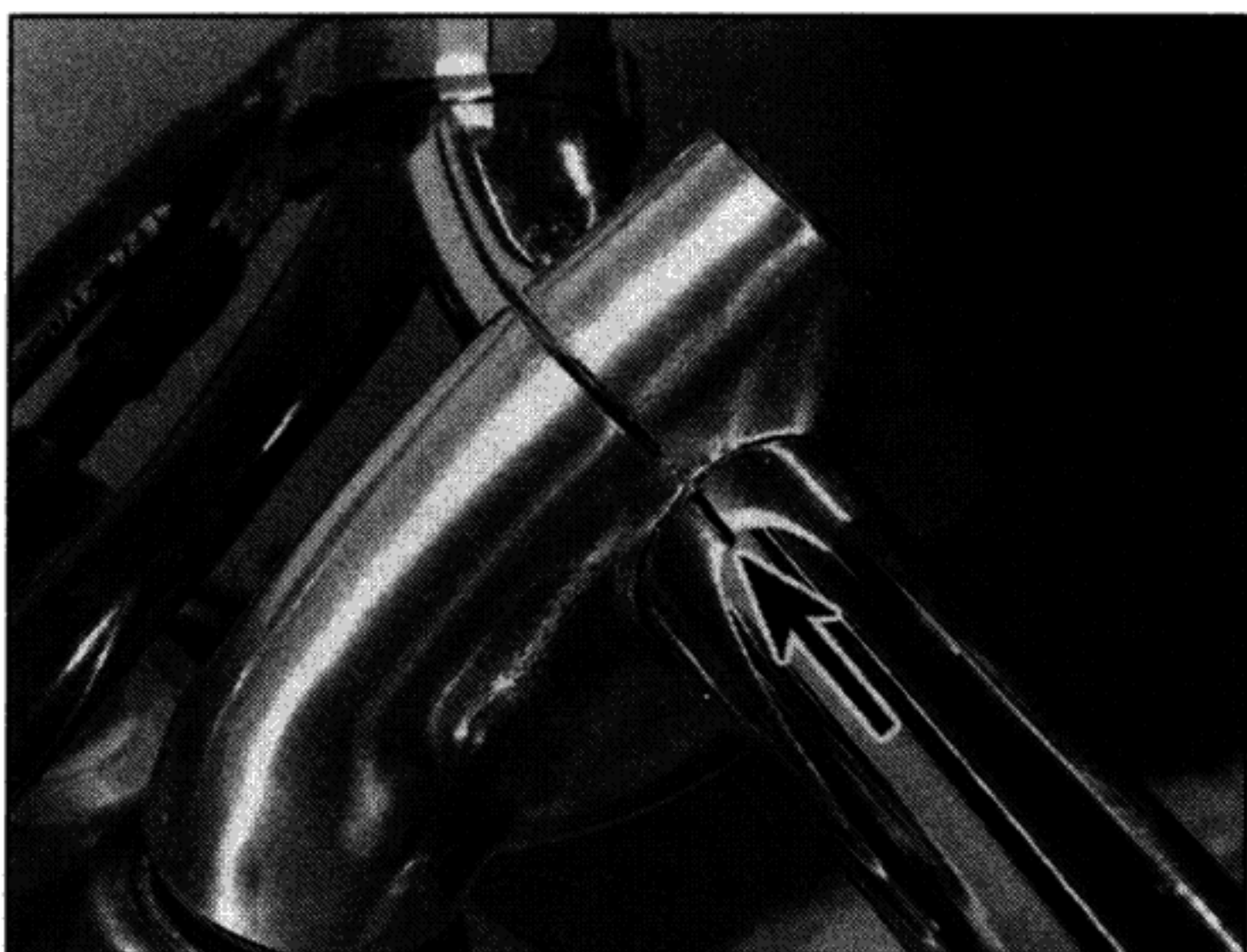
5.5c Handlebar clamp bolts – XTZ models



5.6 Remove the cap to access the bolt



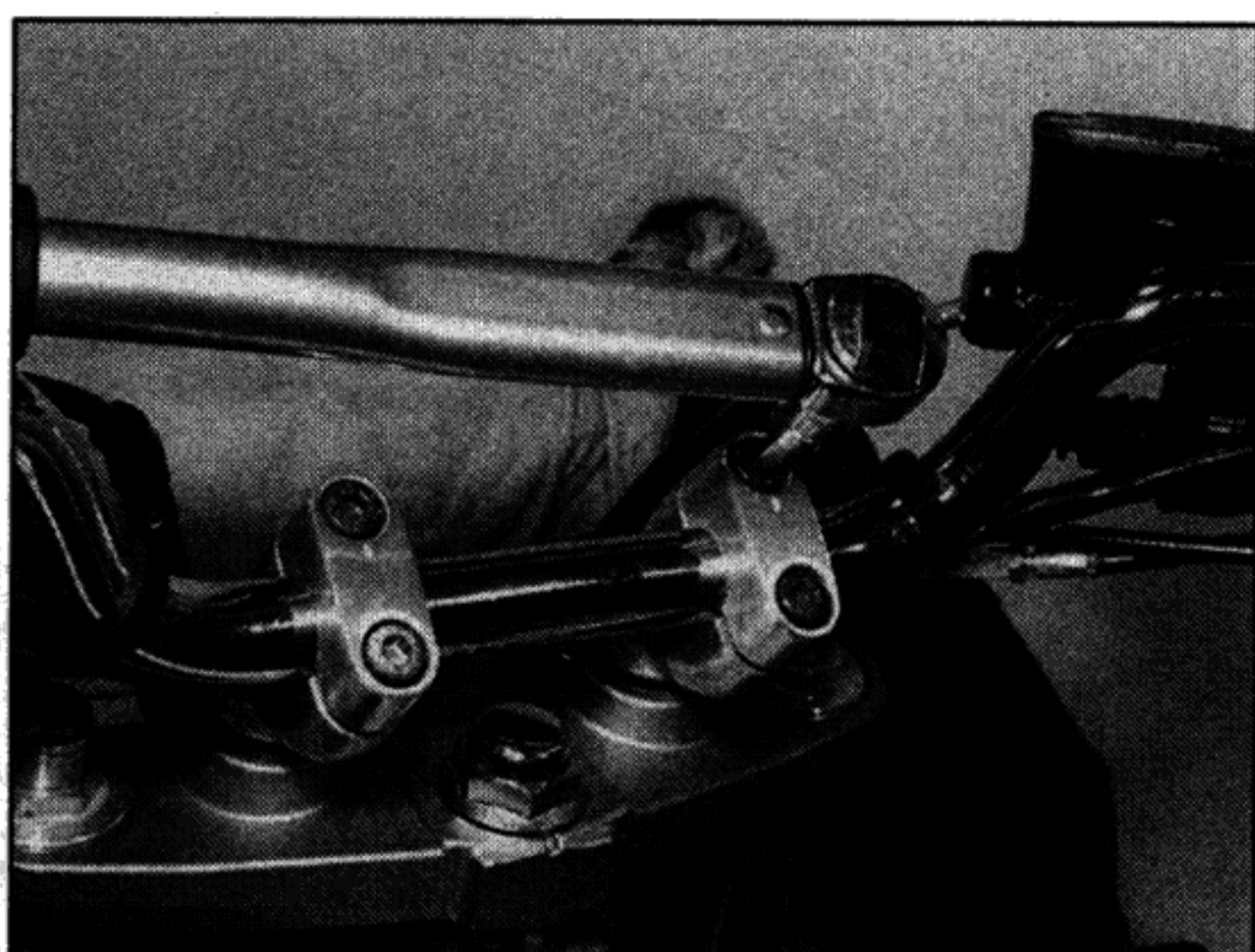
5.7 Remove the cap and unscrew the positioning bolt (A), then slacken the clamp bolt (B)



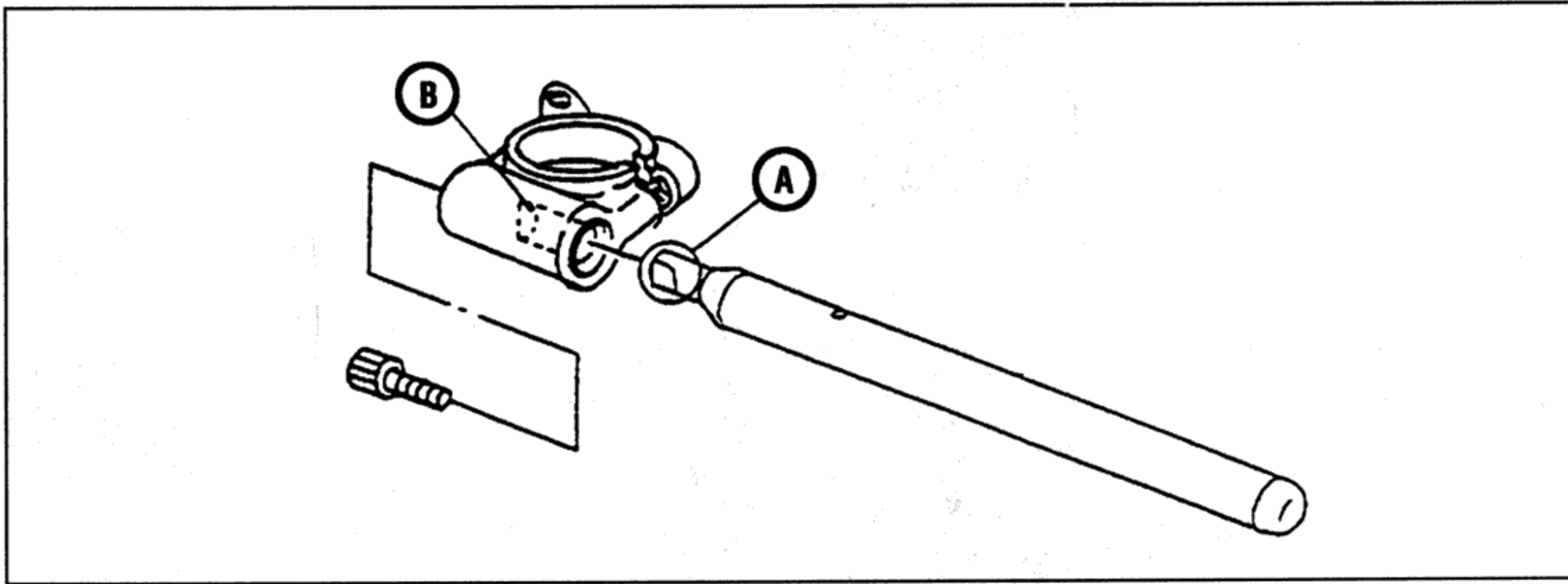
5.8a Align the mark (arrowed) with the clamp mating surfaces



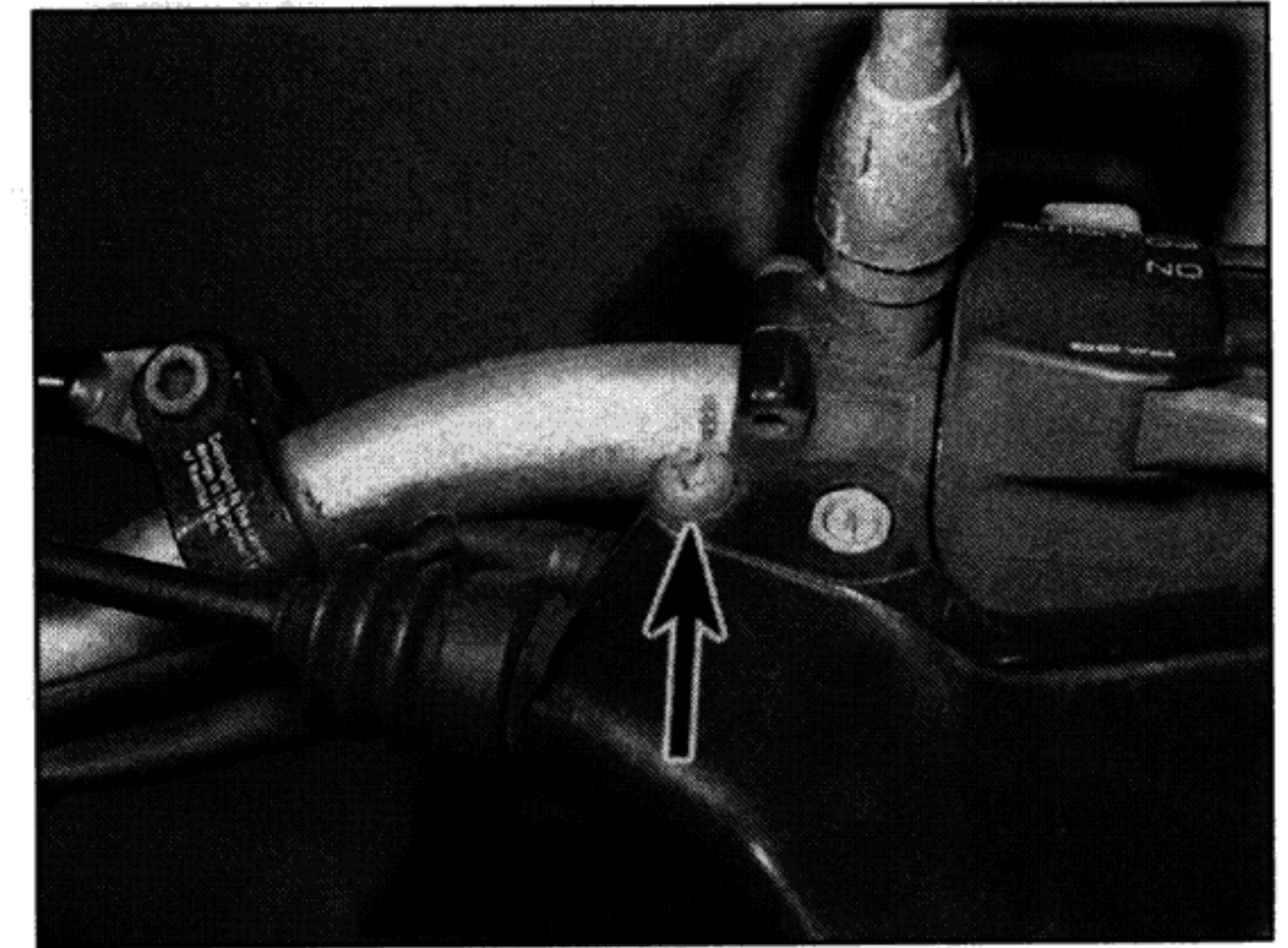
5.8b Fit the clamps with the arrow pointing up . . .



5.8c . . . and tighten the bolts as described to the specified torque



5.8d Ensure that the flat (A) aligns with the cut-out (B)



5.9 Handguard retaining screw – XTZ models

aligns correctly with the corresponding cut-out in the holder (see illustration). Tighten the retaining bolts, positioning bolts and clamp bolts to the torque settings specified at the beginning of the Chapter. Tighten the positioning bolt before the clamp bolt.

- d) Refer to the relevant Chapters as directed for the installation of the handlebar mounted assemblies
- e) Do not forget to reconnect the front brake light switch and clutch switch wiring connectors.

Clutch lever

9 On XTZ models, remove the hand guard (see illustration).

10 Slacken the clutch cable adjuster locking and thread the adjuster fully into the bracket to provide maximum freeplay in the cable (see illustration). Unscrew the lever pivot bolt locknut, then withdraw the pivot bolt and remove the lever, detaching the cable nipple via the slots in the adjuster and locking. On TRX models, note the collar for the pivot bolt.

11 Installation is the reverse of removal. Apply grease to the pivot bolt shaft, or on TRX models to the collar, and the contact areas between the lever and its bracket, and to the clutch cable nipple. Adjust the clutch cable freeplay (see Chapter 1).

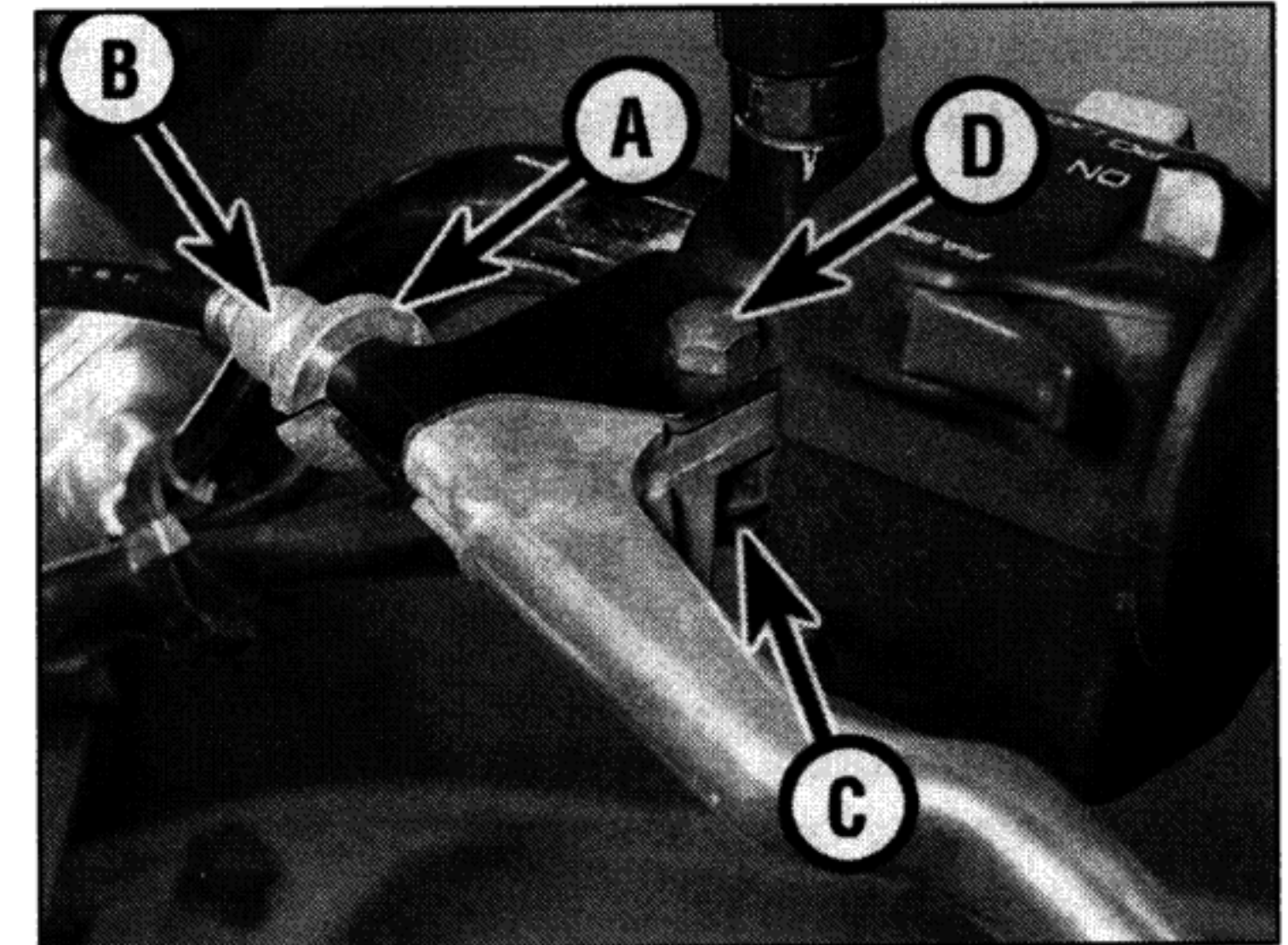
Front brake lever

12 On XTZ models, remove the hand guard (see illustration 5.9).

13 On TDM models, remove the cap from the end of the master cylinder pushrod in the lever, then remove the E-clip, the nut, the spring and the plate (see illustration).

14 Unscrew the lever pivot bolt locknut, then withdraw the pivot bolt and remove the lever (see illustration).

15 Installation is the reverse of removal. Apply grease to the pivot bolt shaft and the contact areas between the lever and its bracket. On TDM models, locate the master cylinder pushrod through the pivot in the lever, and install the plate, the spring, the nut, the E-clip and the cap.



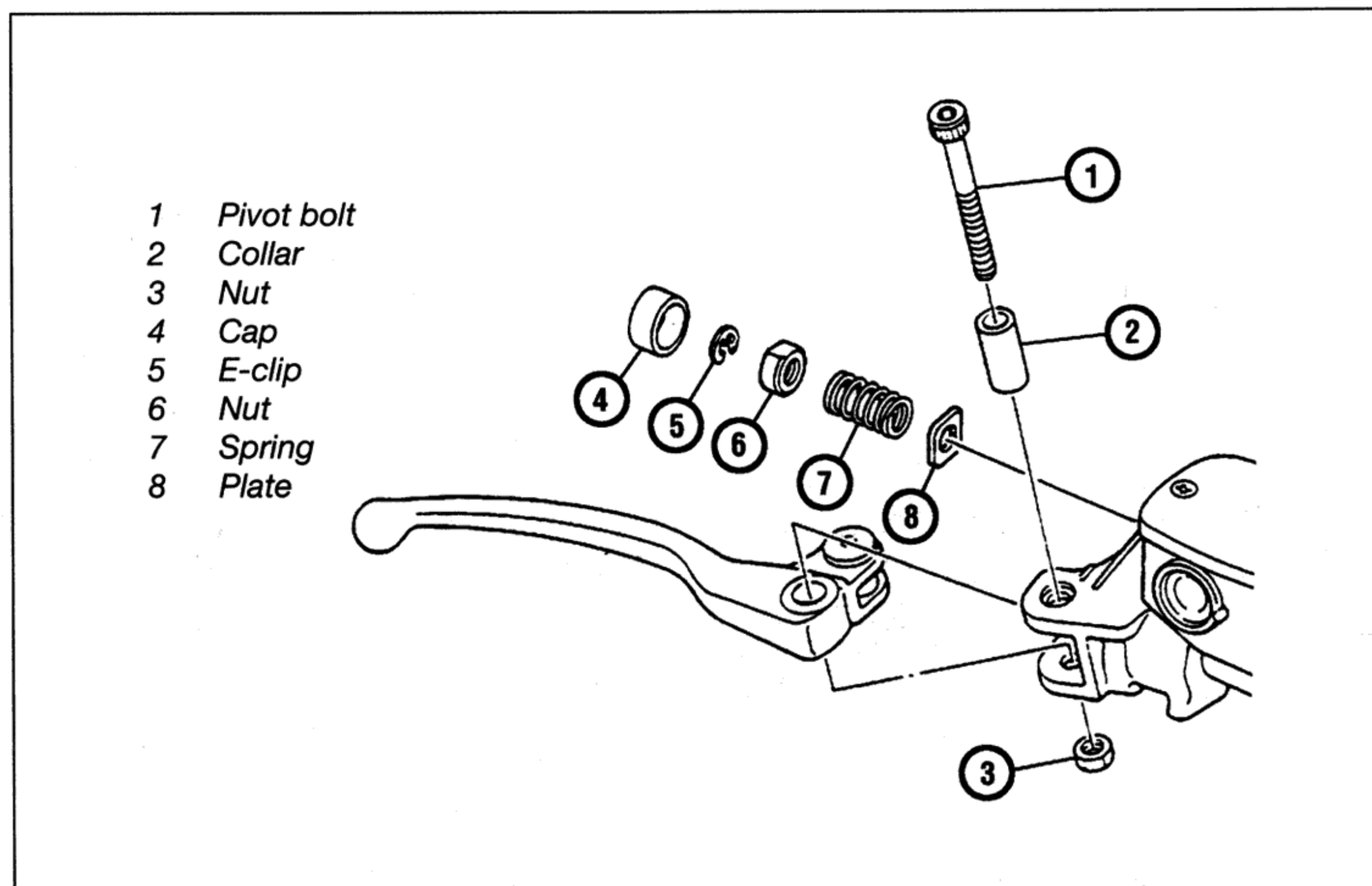
5.10 Slacken the locking (A) and turn the adjuster (B) fully in, then unscrew the nut (C) and withdraw the pivot bolt (D) to free the lever

6 Forks – removal and installation

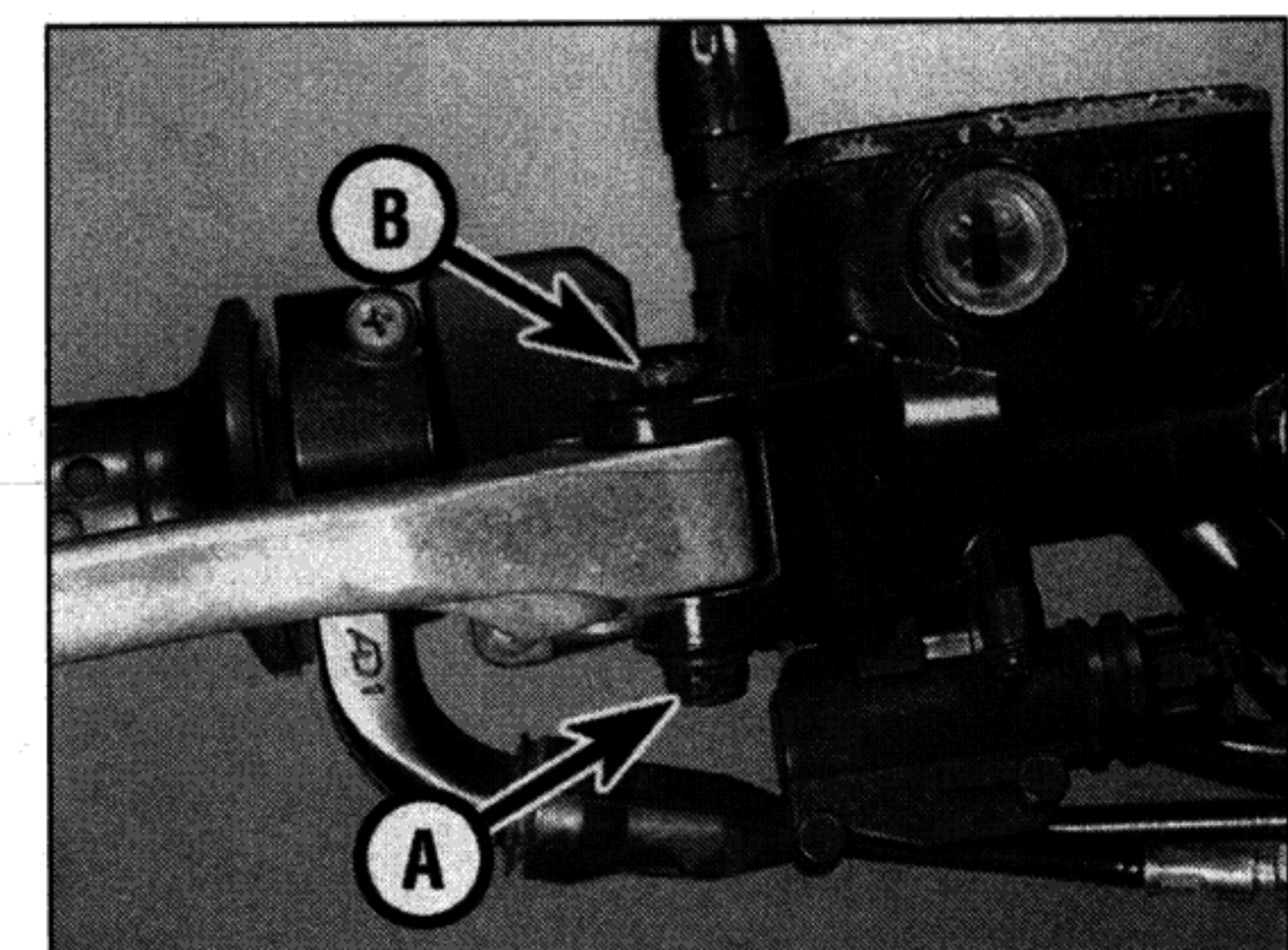
Removal

Caution: Although not strictly necessary, before removing the forks it is recommended that the fairing panels and/or fairing are removed (see Chapter 8). This will prevent accidental damage to the paintwork.

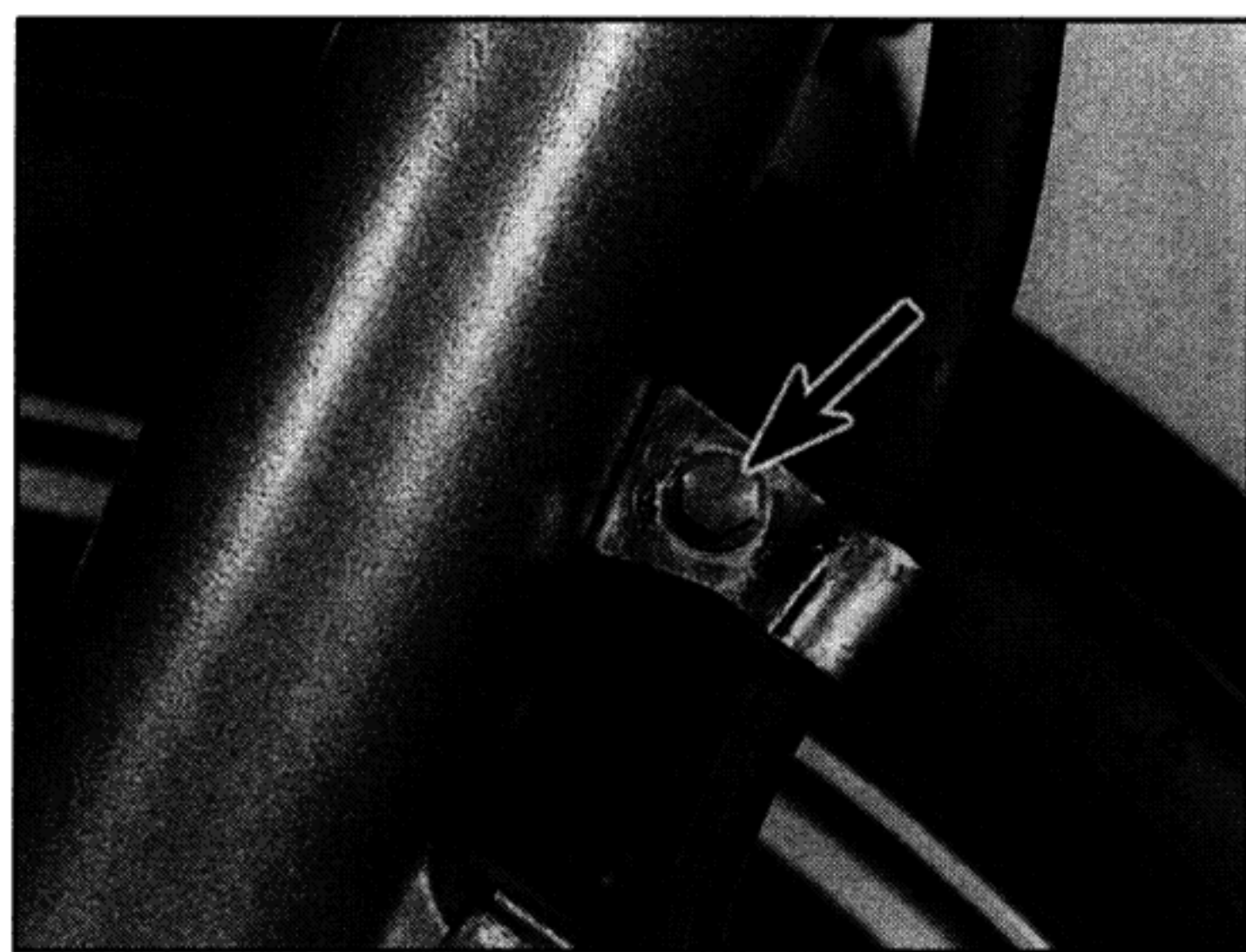
- 1 Remove the front wheel (see Chapter 7).
- 2 Remove the front mudguard (see Chapter 8).



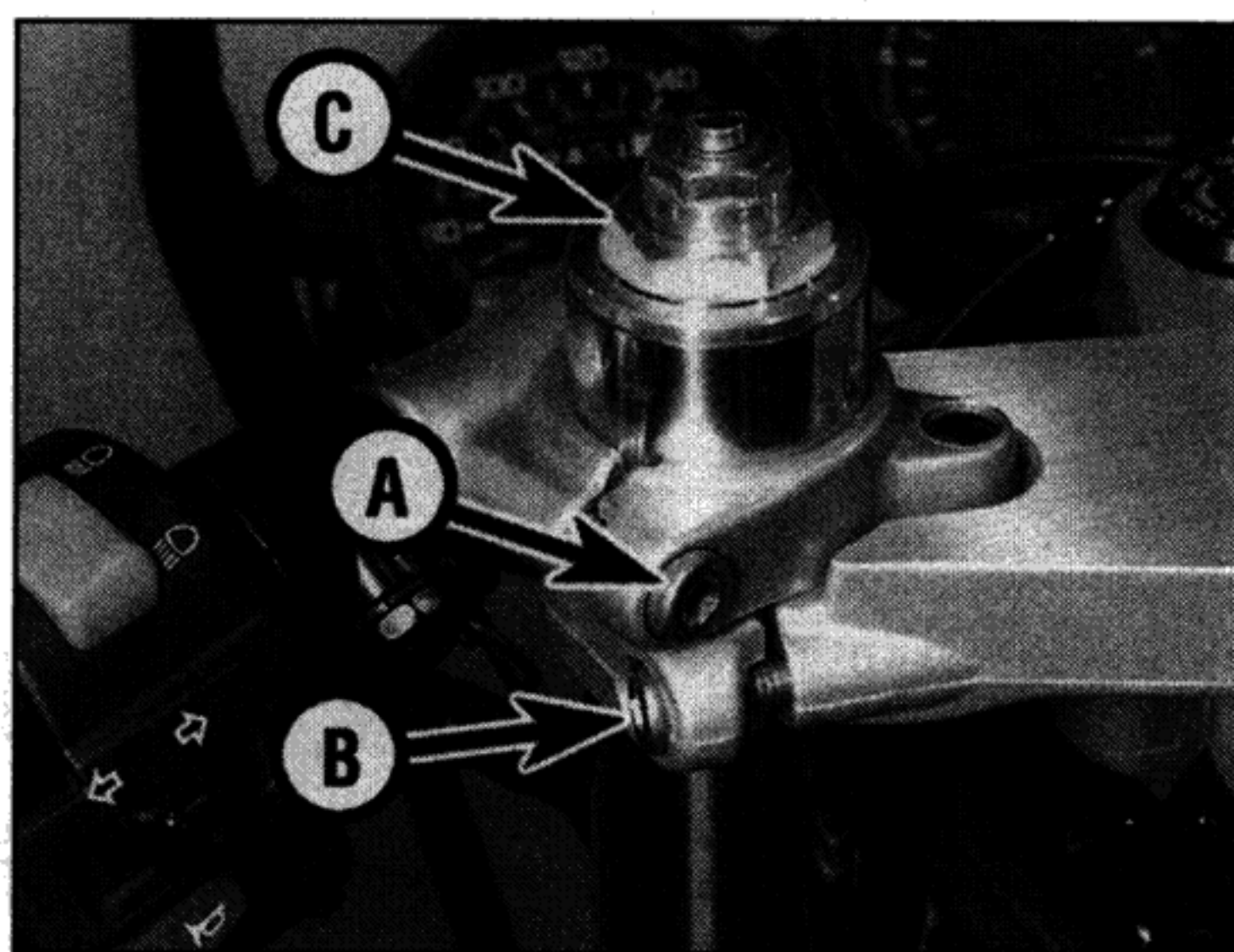
5.13 Brake lever components – TDM models



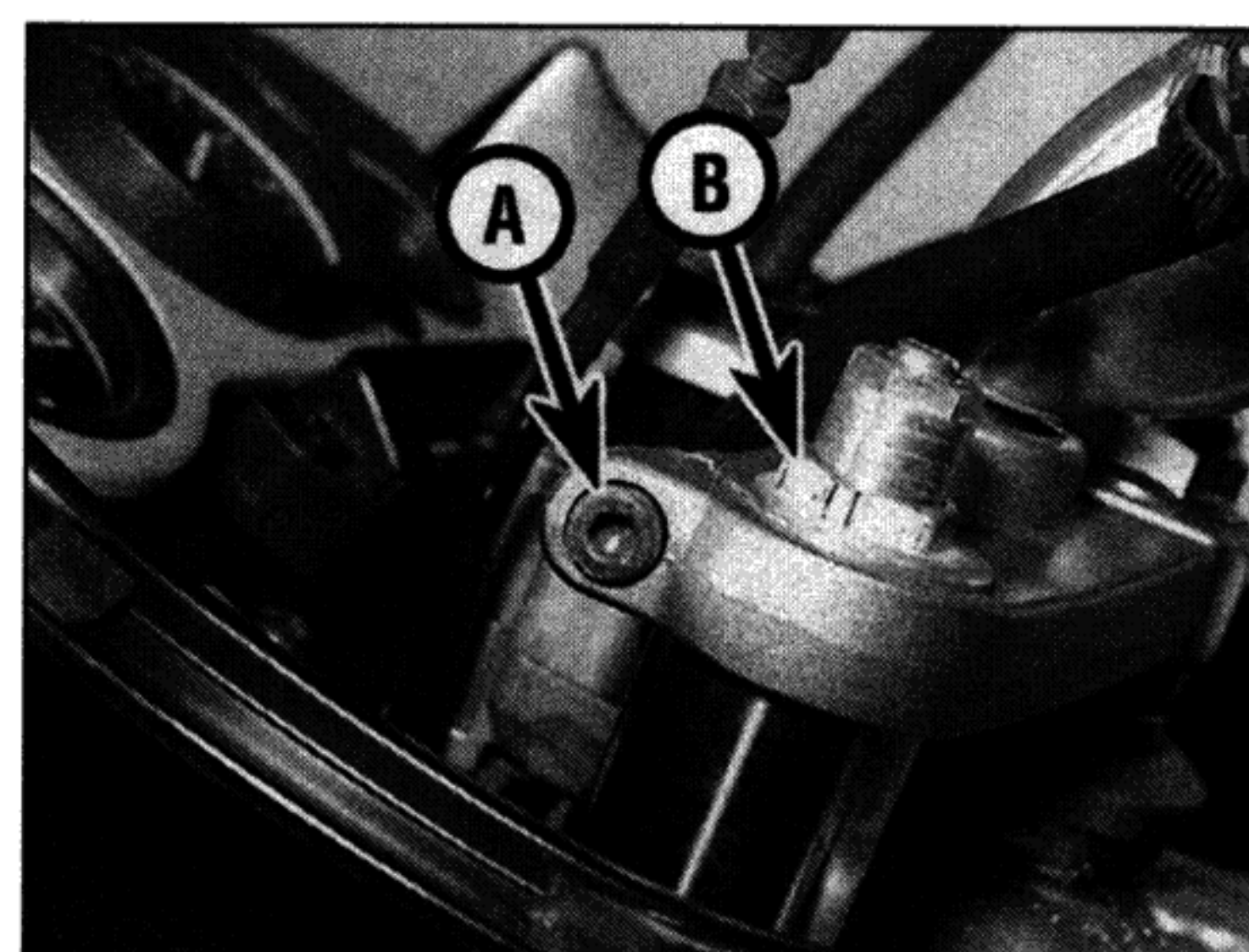
5.14 Unscrew the nut (A) and withdraw the bolt (B)



6.3 Brake hose clamp bolt (arrowed)



6.4 Handlebar holder clamp bolt (A), fork clamp bolt (B), fork top bolt (C)



6.5 Slacken the fork clamp bolt (A), and if required the fork top bolt (B)

3 Unscrew the brake hose clamp bolt from each fork slider (**see illustration**). If not already done, displace the front brake calipers (see Chapter 7). There is no need to disconnect the hydraulic hoses. Release the speedometer cable from any guides, and loosen any cable ties around the top of the fork tubes.

4 On TRX models, slacken the handlebar holder clamp bolts (**see illustration**).

5 Slacken the fork clamp bolts in the top yoke

(**see illustration**). If the forks are to be disassembled, or if the fork oil is being changed, it is advisable to slacken the fork top bolts at this stage.

6 Note the alignment or amount of protrusion of the tops of the fork tubes with the top yoke. Slacken but do not remove the fork clamp bolts in the bottom yoke, and remove the forks by twisting them and pulling them downwards (**see illustrations**).

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If the fork legs are seized in the yokes, spray the area with penetrating oil and allow time for it to soak in before trying again.

Installation

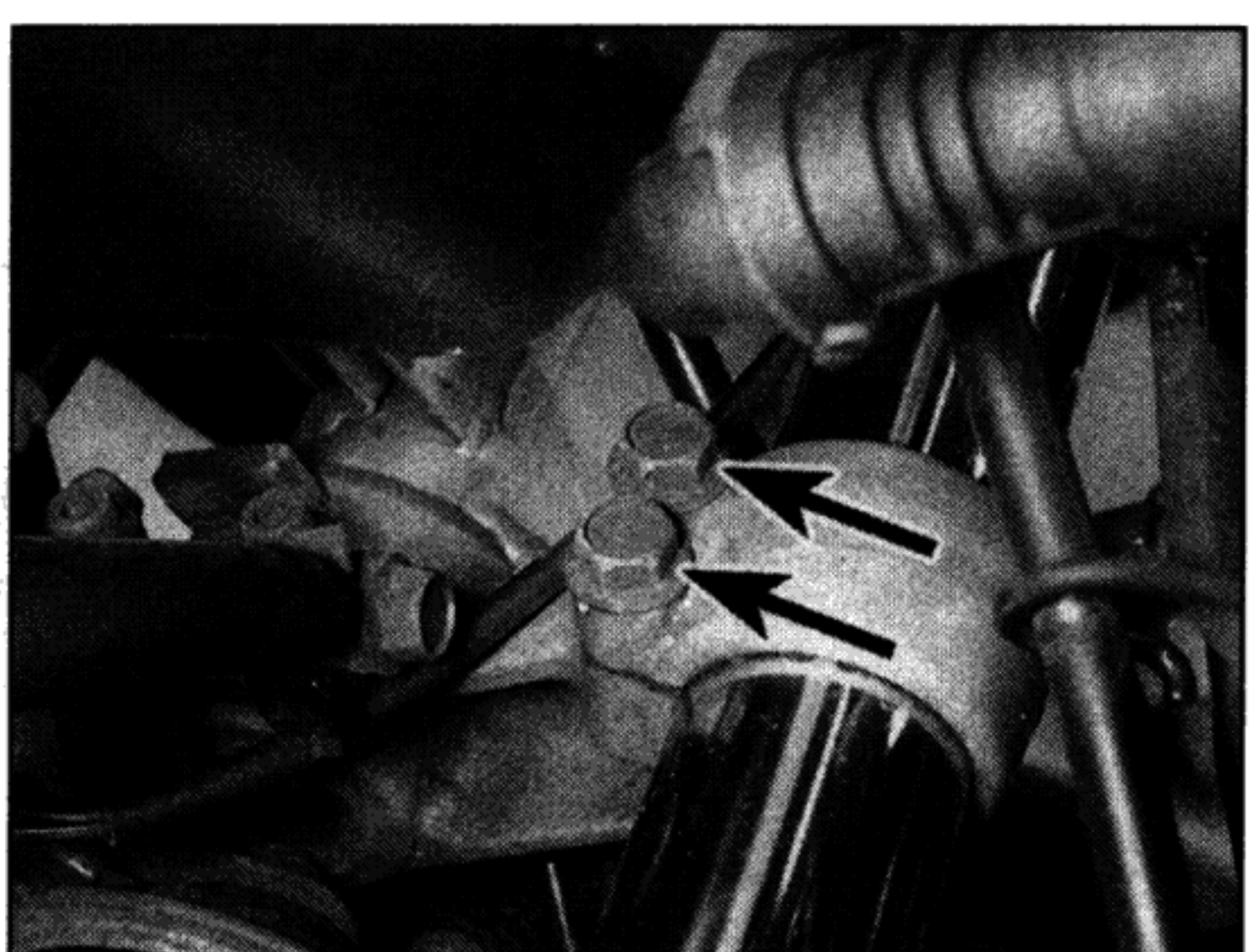
7 Remove all traces of corrosion from the fork tubes and the yokes. Slide the forks up through the bottom yoke, then install the wiring ties where appropriate onto the forks (**see illustration 6.6b**). Slide the forks up into the top yoke. Check that the amount of protrusion of the fork tube above the top yoke is as noted on removal and equal on both

sides. On TDM and XTZ models, the tops of the tubes should be flush with the top of the top yoke. On TRX models, the top of the fork tube should protrude 18.5 mm above the top of the handlebar holder.

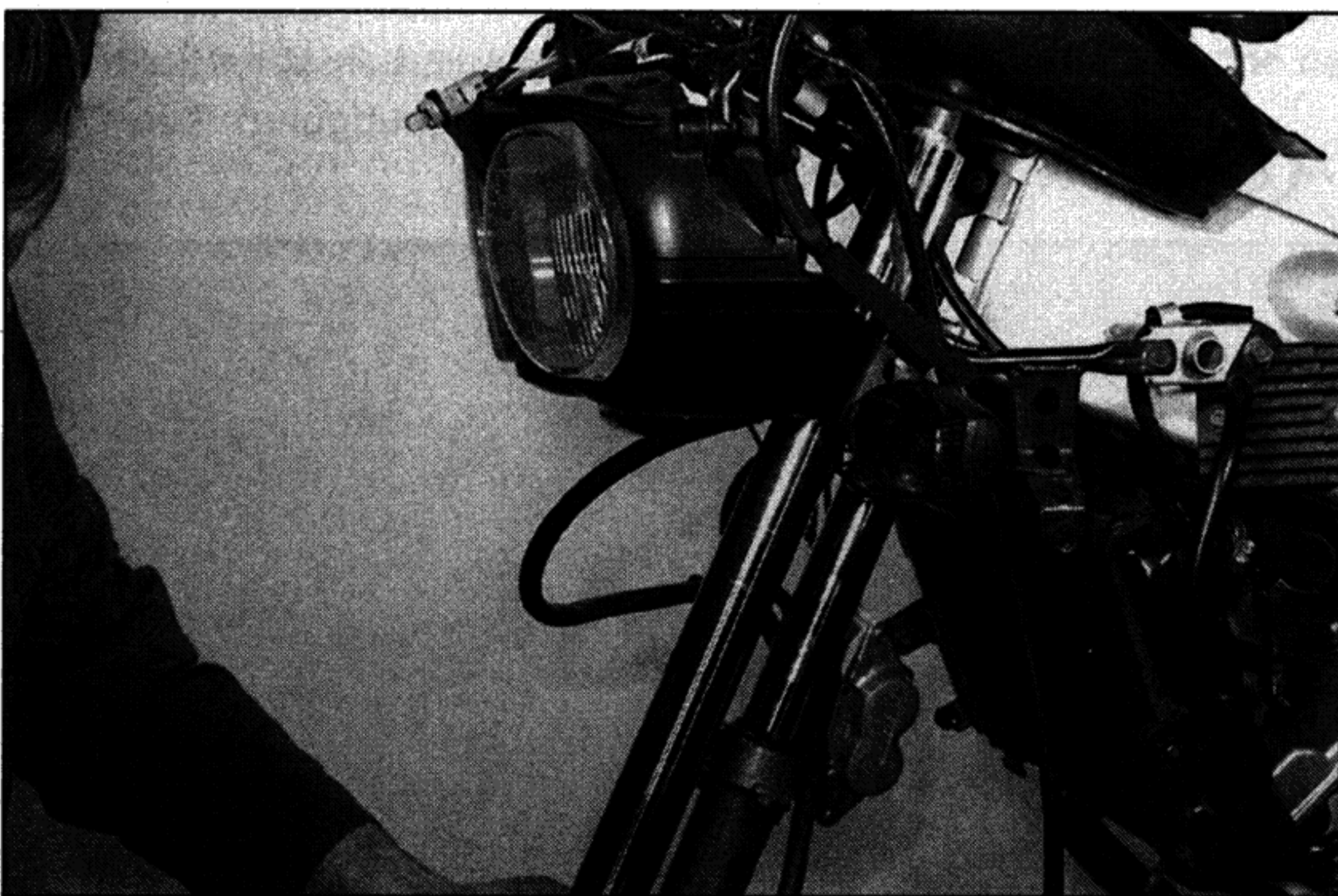
8 Tighten the fork clamp bolts in the bottom yoke to the torque setting specified at the beginning of the Chapter (**see illustration 6.6a**). If the fork legs have been dismantled or if the fork oil has been changed, the fork top bolts should now be tightened to the specified torque setting. Now tighten the fork clamp bolts in the top yoke, and on TRX models the handlebar holder clamp bolts, to the specified torque settings (**see illustration and 6.4**).

9 Install the front wheel (see Chapter 7), the front mudguard (see Chapter 8), and the brake calipers (see Chapter 7). Fit the brake hose clamps onto the mudguard (**see illustration 6.3**). On all models except the 1999 TDM, make sure the speedometer cable is routed through its guide(s). On 1999 TDM models make sure that the speedometer sensor lead is well secured by its ties.

10 Check the operation of the front forks and brakes before taking the machine out on the road.



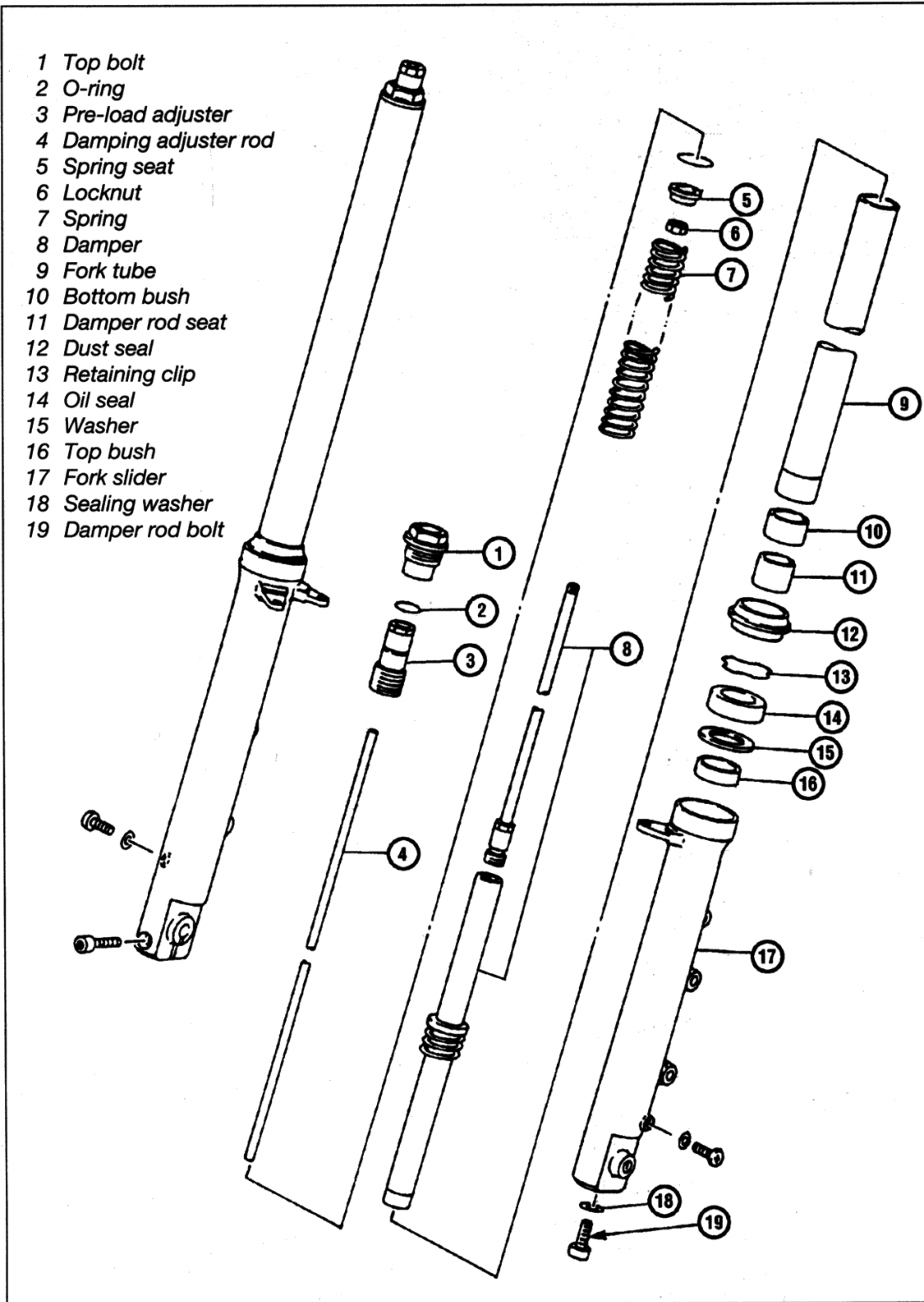
6.6a Slacken the bottom yoke fork clamp bolts (arrowed) ...



6.6b ... and remove the forks



6.8 Tighten the various clamp bolts to their specified torque settings



7.1 Front fork components – 1991 to 1995 TDM models

7 Forks – disassembly, inspection and reassembly

1991 to 1995 TDM models

Disassembly

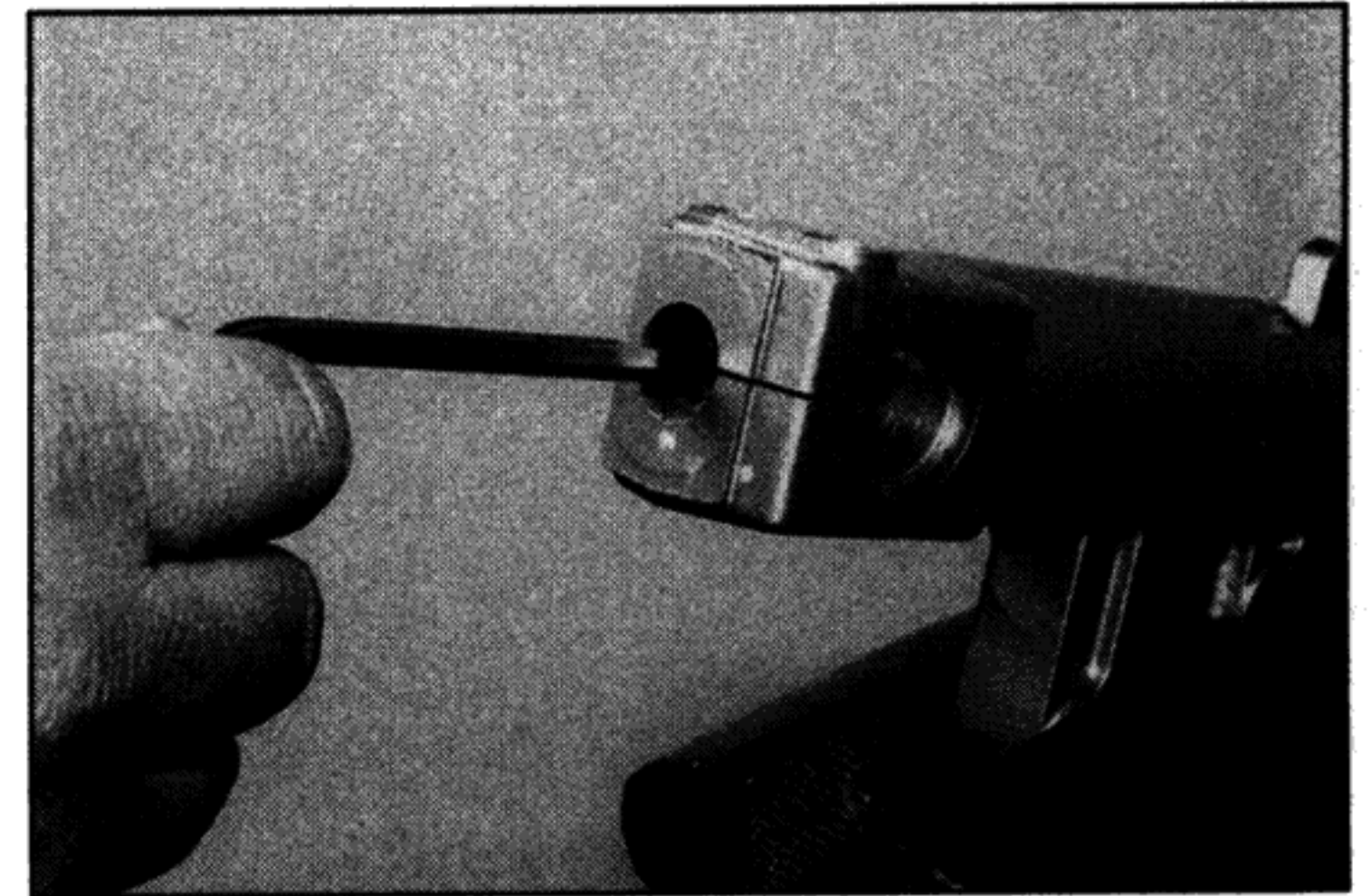
1 Always dismantle the fork legs separately to avoid interchanging parts and thus causing an accelerated rate of wear. Store all components in separate, clearly marked containers (**see illustration**).

2 Before dismantling the fork, it is advised that the damper rod bolt be slackened at this stage. Compress the fork tube in the slider so that the spring exerts maximum pressure on the damper rod head, then have an assistant slacken the damper rod bolt in the base of the fork slider (**see illustration**).

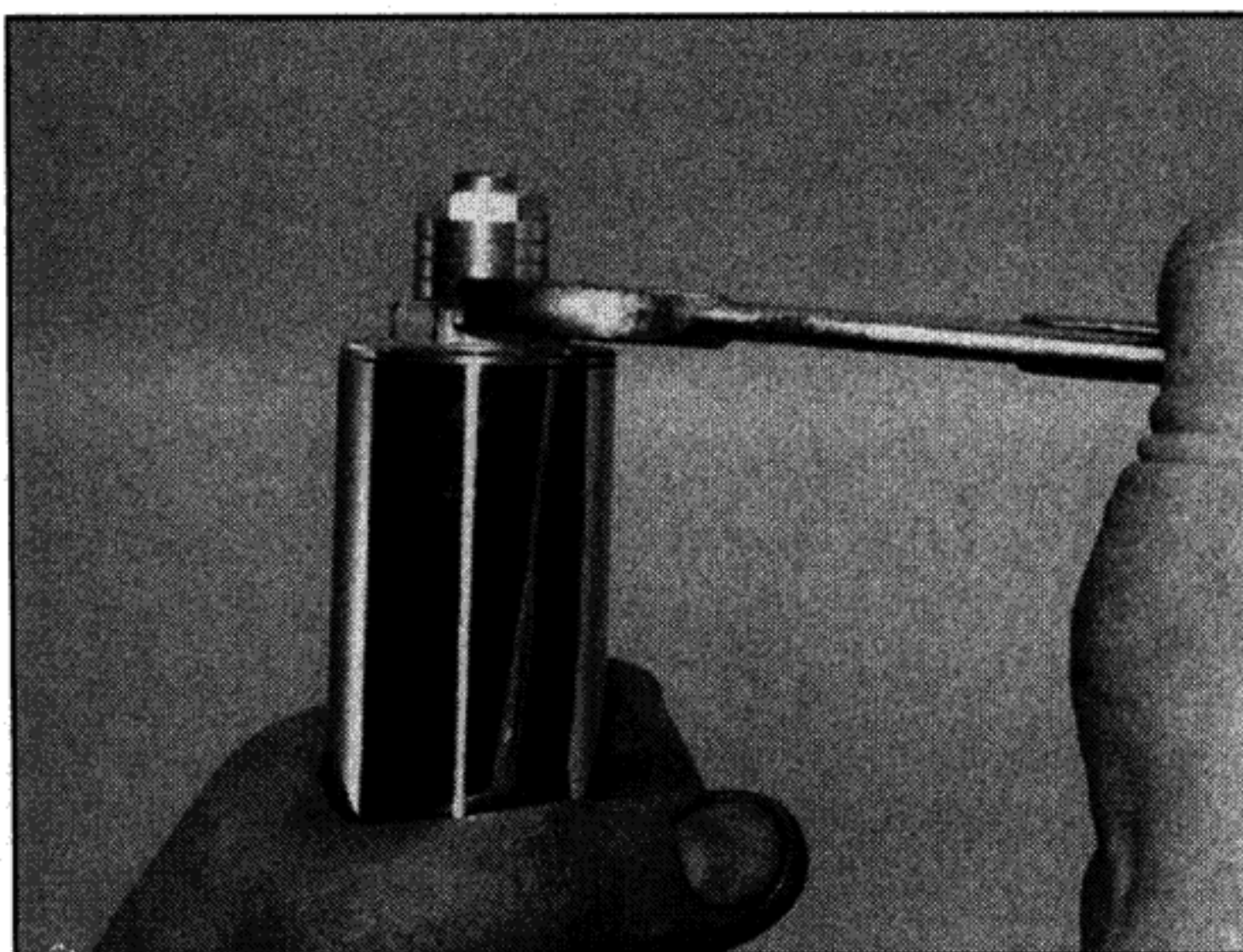
3 If the fork top bolt was not slackened with the fork in situ, carefully clamp the fork tube in a vice equipped with soft jaws, taking care not to overtighten or score its surface, and slacken the top bolt.

4 Unscrew the fork top bolt from the top of the fork tube (**see illustration**). The bolt can remain threaded on the pre-load adjuster, but remove it by holding the adjuster and unscrewing it if required (**see illustration**).

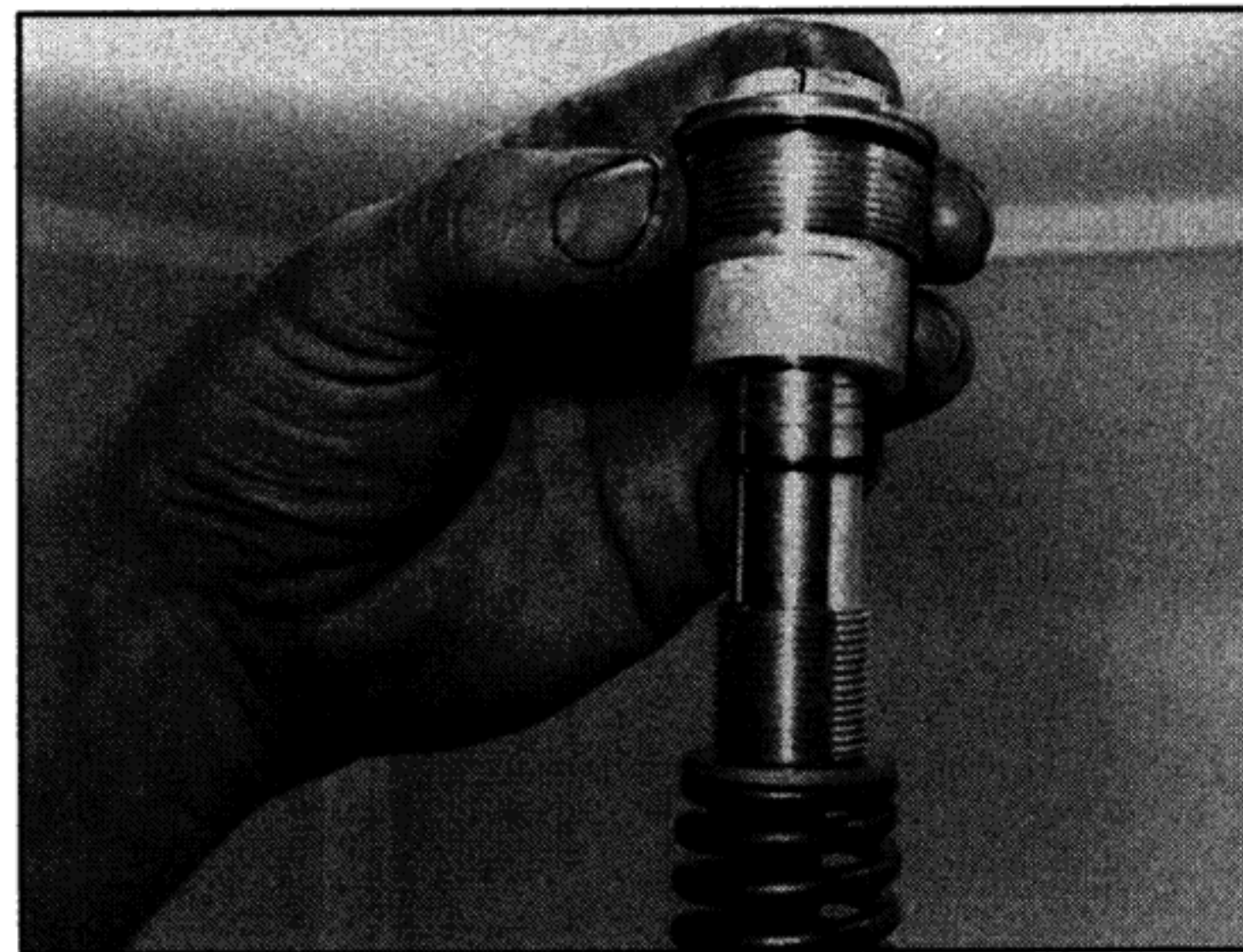
5 Carefully clamp the fork slider in a vice and slide the fork tube down into the slider a little way (wrap a rag around the top of the tube to minimise oil spillage) while, with the aid of an assistant if necessary, keeping the damper rod fully extended. Counter-hold the pre-load adjuster and thread the locknut to the base of its threads (**see illustration**). Now counter-



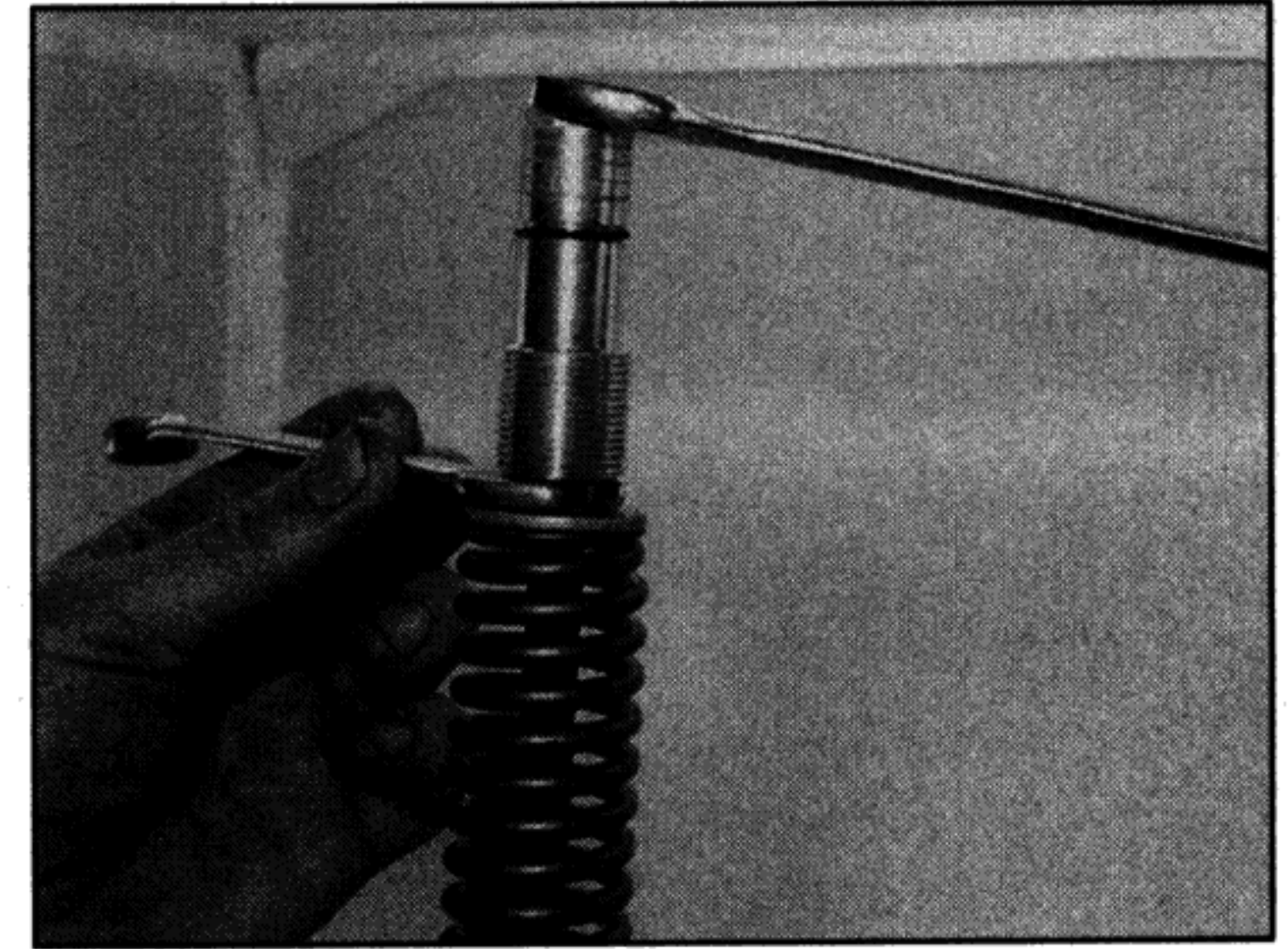
7.2 Slacken the damper rod Allen bolt



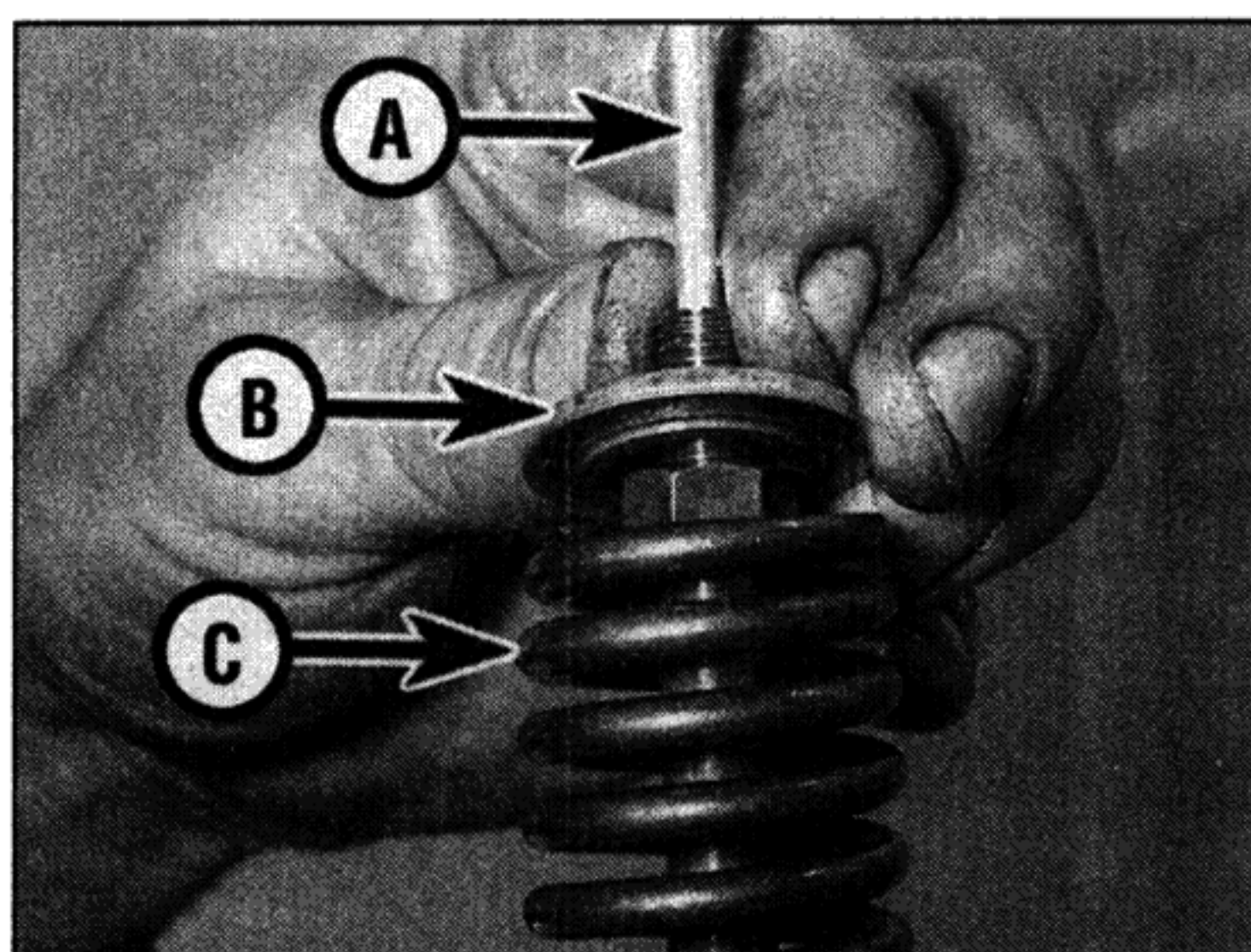
7.4a Unscrew the top bolt from the fork tube ...



7.4b ... and thread it off the adjuster if required



7.5 Remove the pre-load adjuster as described



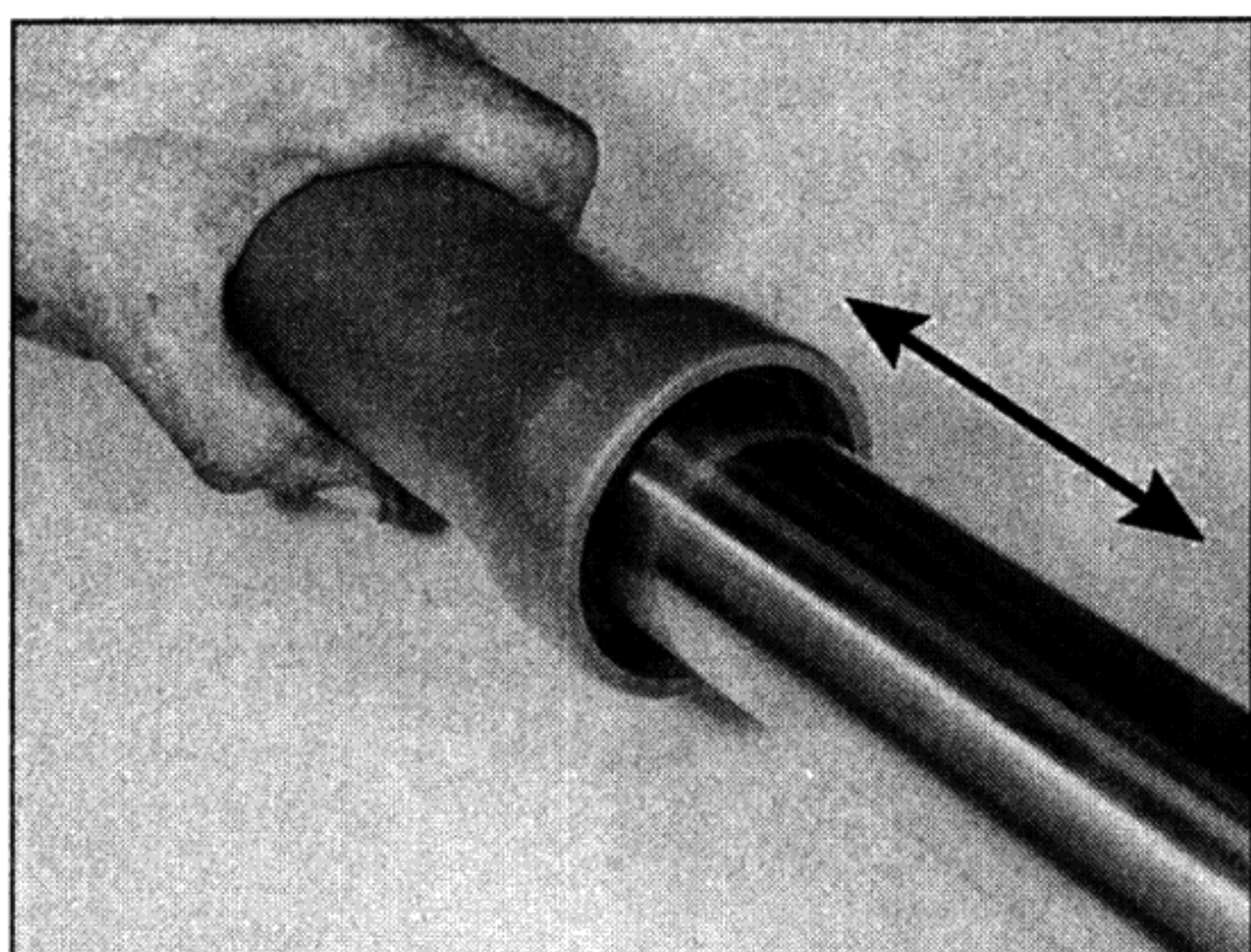
7.6 Withdraw the damping adjuster rod (A), then remove the spring seat (B) and withdraw the spring (C)

hold the locknut and thread the pre-load adjuster (with the top bolt if not removed) off the damper rod.

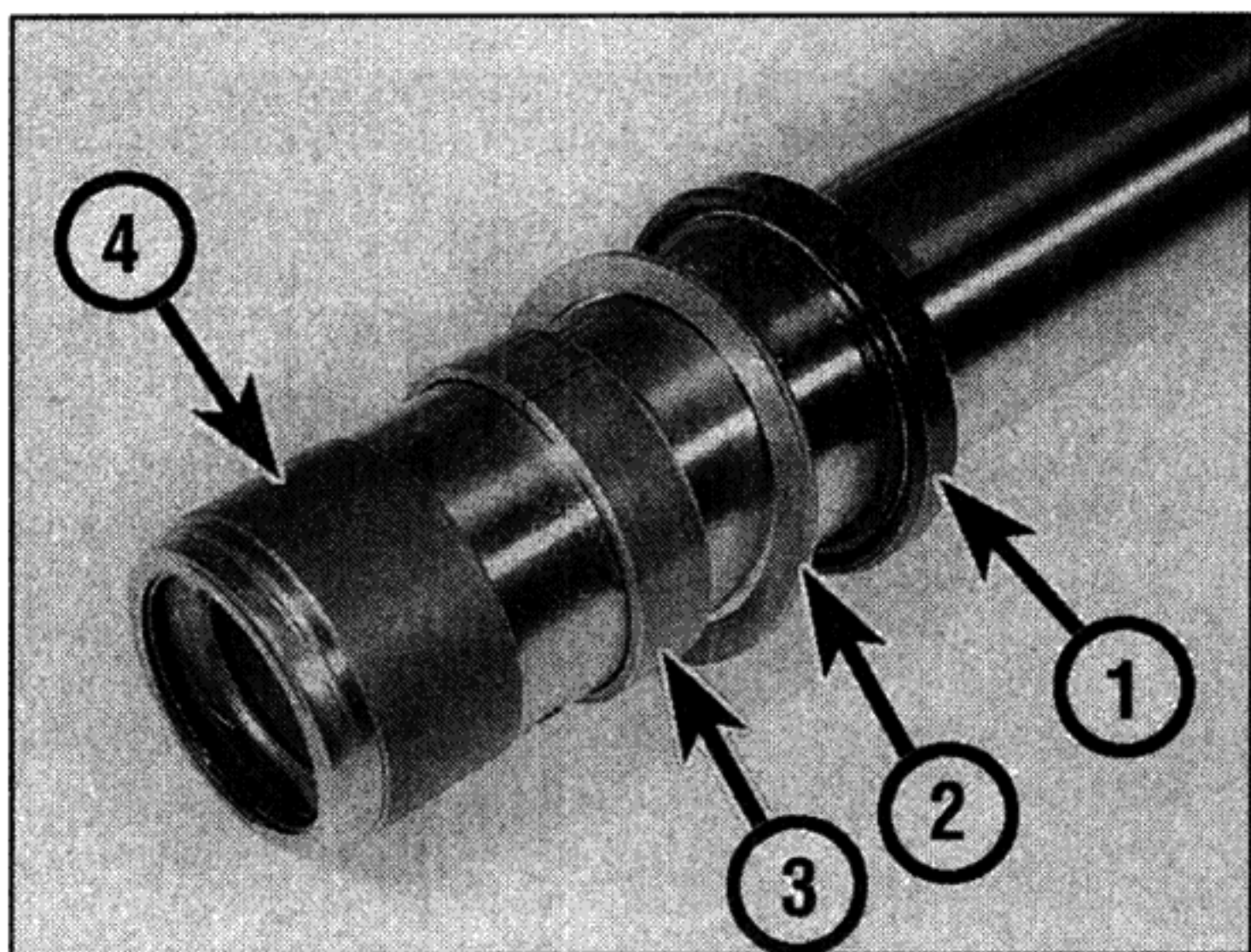
6 Remove the damping adjuster rod from the centre of the damper rod, then remove the spring seat and withdraw the spring from the tube, noting which way up it fits (**see illustration**).

7 Invert the fork leg over a suitable container and pump the fork and the damper rod vigorously to expel as much fork oil as possible.

8 Remove the previously slackened damper rod bolt and its copper sealing washer from the bottom of the slider. Discard the sealing washer as a new one must be used on



7.12 To separate the inner and outer fork tubes, pull them apart firmly several times – the slide-hammer effect will pull the tubes apart



7.13 The oil seal (1), washer (2), top bush (3) and bottom bush (4) will come out with the fork tube



7.10 Prise out the dust seal using a flat-bladed screwdriver

reassembly. If the damper rod bolt was not slackened before dismantling the fork, use the Yamaha service tool (90890-01447) to prevent the damper rod from turning. This tool is passed down through the fork tube and engages the damper rod head; a similar tool can be easily made in the home workshop.

9 Invert the fork and withdraw the damper rod from inside the fork tube (**see illustration 7.20a**).

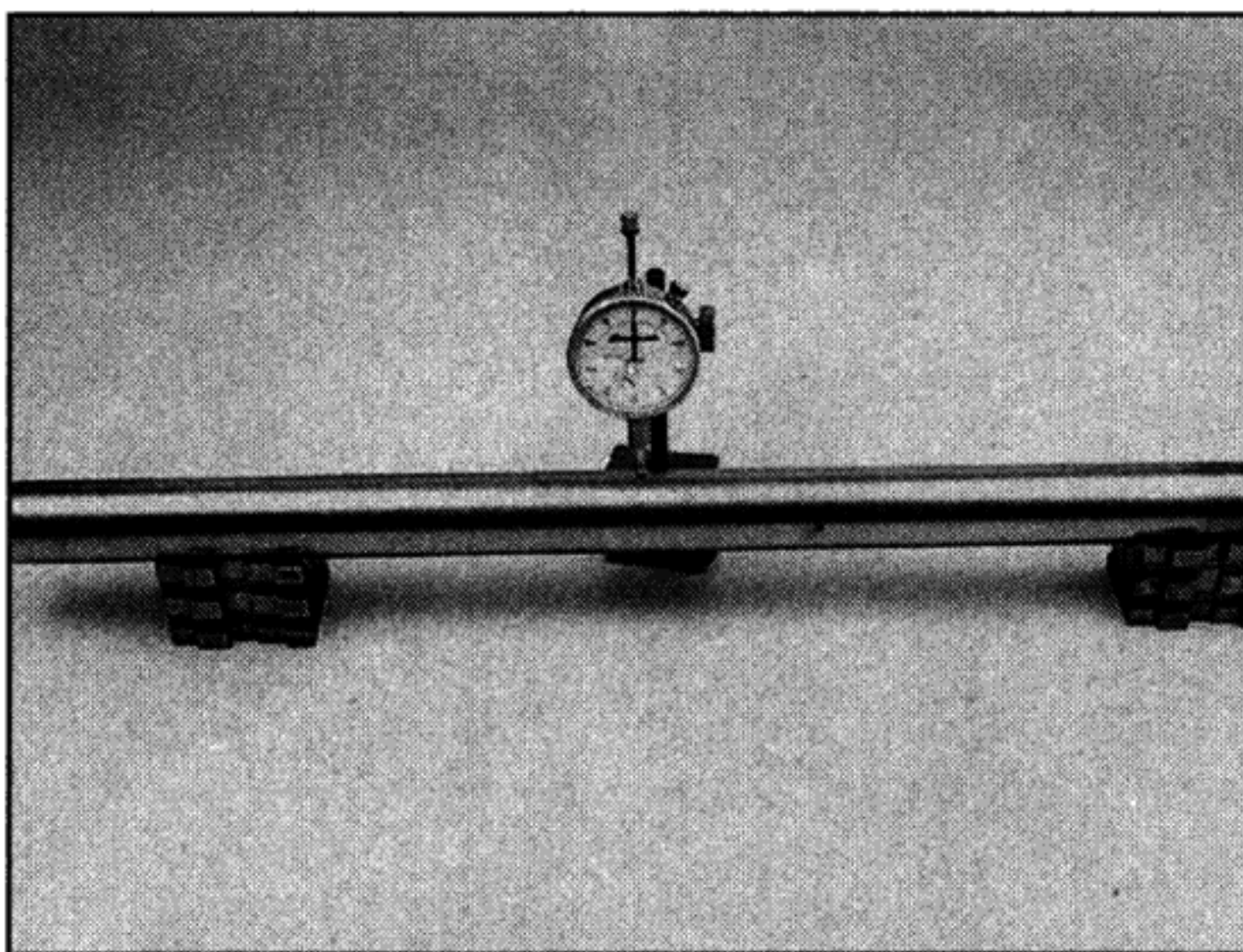
10 Carefully prise out the dust seal from the top of the slider to gain access to the oil seal retaining clip (**see illustration**). Discard the dust seal as a new one must be used.

11 Carefully remove the retaining clip, taking care not to scratch the surface of the tube (**see illustration**).

12 To separate the tube from the slider it is necessary to displace the top bush and oil seal. The bottom bush should not pass through the top bush, and this can be used to good effect. Push the tube gently inwards until it stops against the damper rod seat. Take care not to do this forcibly or the seat may be damaged. Then pull the tube sharply outwards until the bottom bush strikes the top bush. Repeat this operation until the top bush and seal are tapped out of the slider (**see illustration**).

13 With the tube removed, slide off the oil seal, washer and top bush, noting which way up they fit (**see illustration**). Discard the oil seal as a new one must be used.

Caution: Do not remove the bottom bush from the tube unless it is to be renewed.



7.16 Check the fork tube for runout using V-blocks and a dial gauge



7.11 Prise out the retaining clip using a flat-bladed screwdriver

14 Tip the damper rod seat out of the slider, noting which way up it fits.

Inspection

15 Clean all parts in solvent and blow them dry with compressed air, if available. Check the fork tube for score marks, scratches, flaking of the chrome finish and excessive or abnormal wear. Look for dents in the tube and renew the tube in both forks if any are found. Check the fork seal seat for nicks, gouges and scratches. If damage is evident, leaks will occur. Also check the oil seal washer for damage or distortion and renew it if necessary.

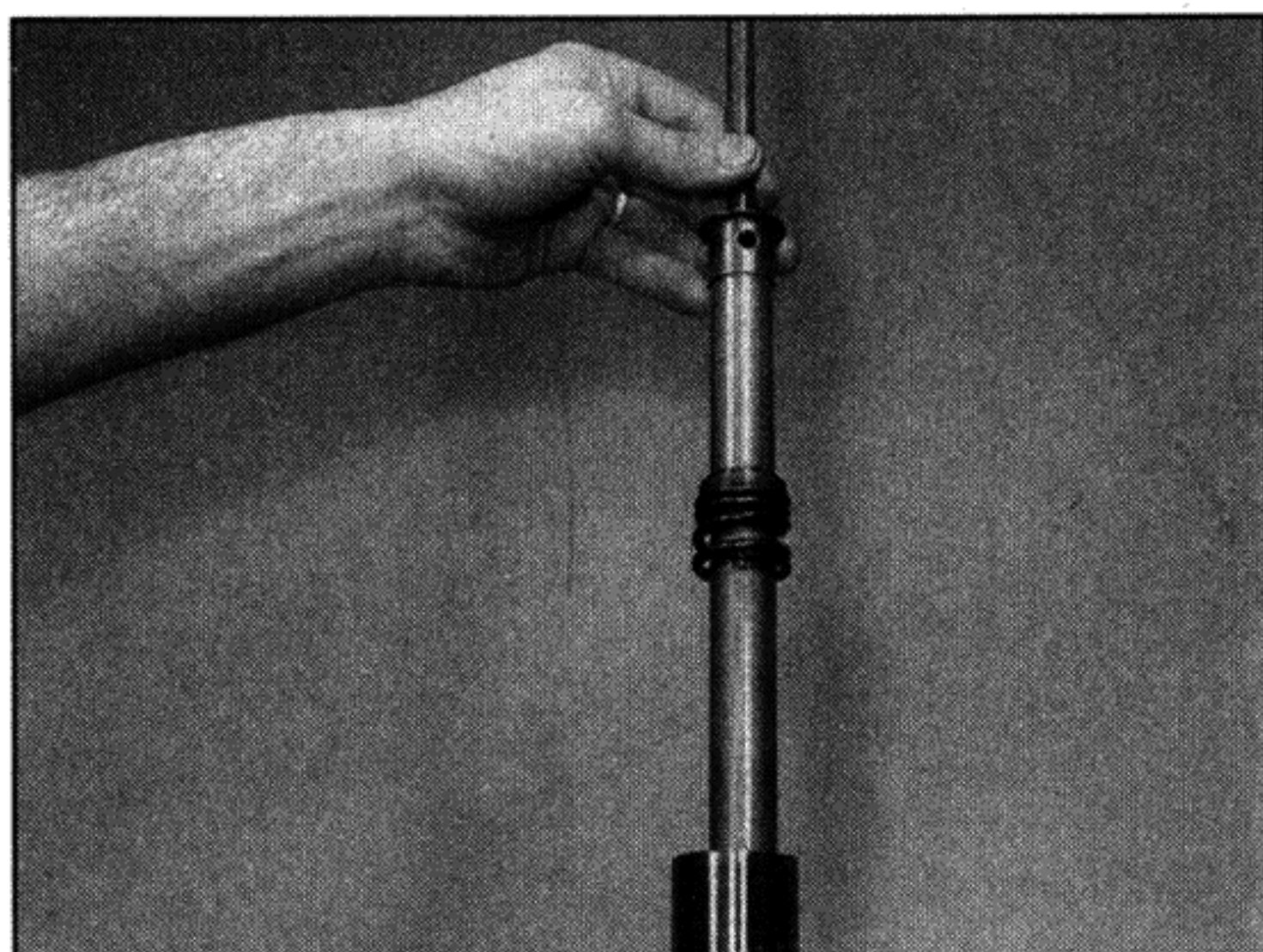
16 Check the fork tube for runout (bending) using V-blocks and a dial gauge, or have it done by a dealer (**see illustration**). Yamaha do not specify a runout limit, but if the tube is bent it should be renewed.

17 Check the spring for cracks and other damage. Measure the spring free length and compare the measurement to the specifications at the beginning of the Chapter. If it is defective or sagged below the service limit, renew the springs in both forks. Never renew only one spring. Also check the rebound spring on the damper.

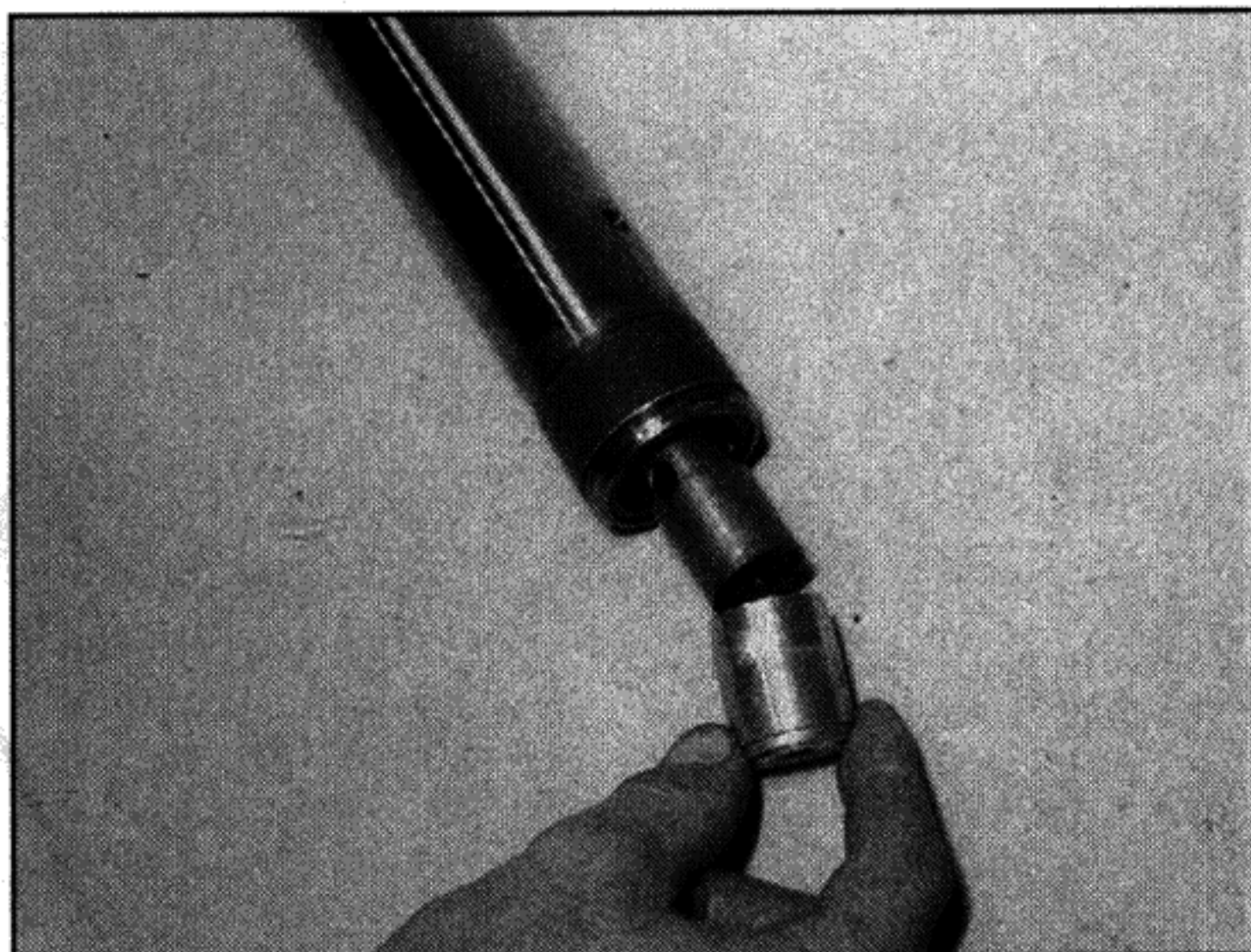
18 Examine the working surfaces of the two bushes; if worn or scuffed they must be renewed. To remove the bottom bush from the fork tube, prise it apart at the slit using a flat-bladed screwdriver and slide it off (**see illustration**). Make sure the new one seats properly.



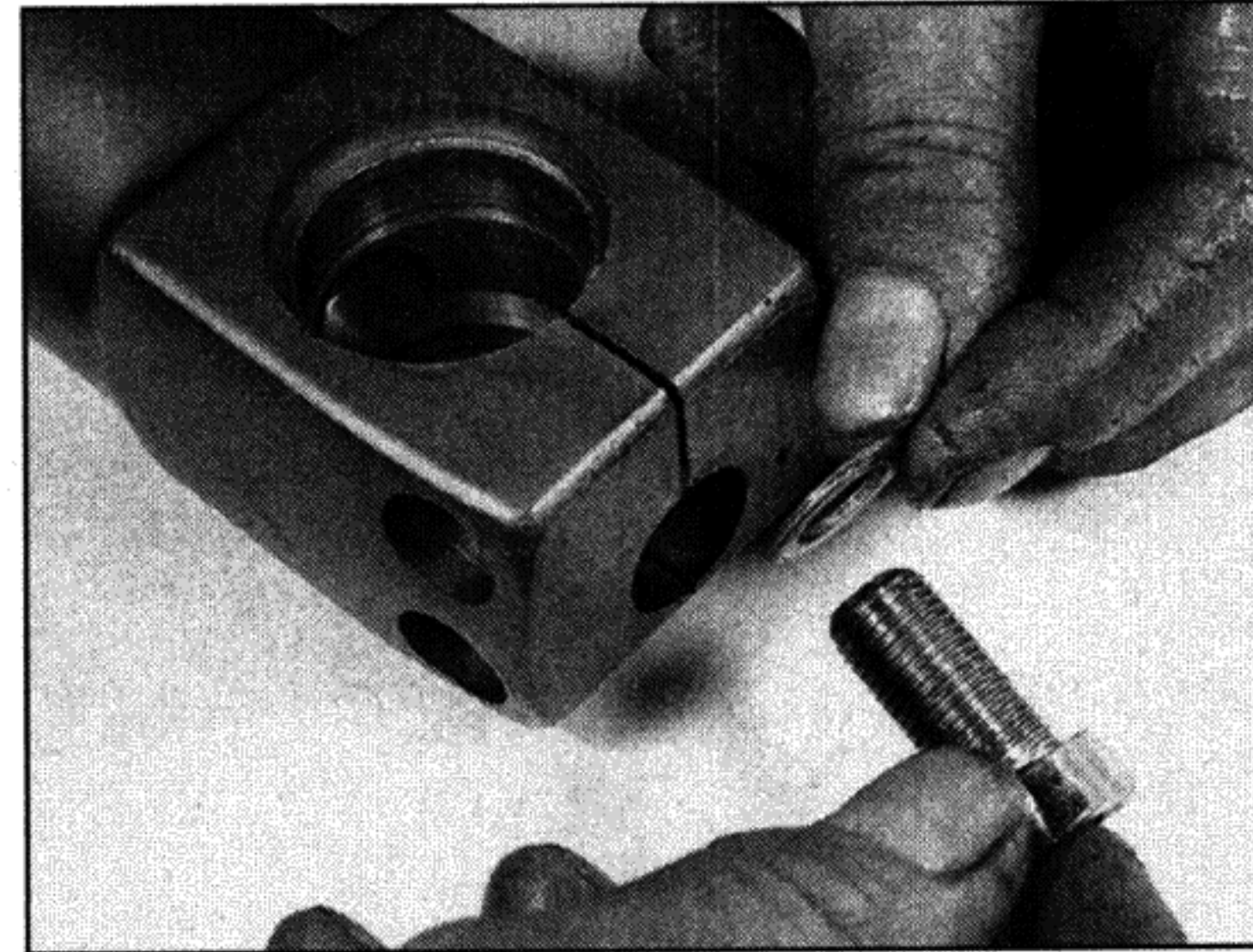
7.18 Prise off the bottom bush using a flat-bladed screwdriver



7.20a Slide the damper into the tube . . .



7.20b . . . and fit the seat onto its bottom end



7.21 Apply a thread locking compound to the damper rod bolt and use a new sealing washer

19 Check the damper rod assembly for damage and wear, and renew it if necessary. Holding the outside of the damper, pump the rod in and out of the damper. If the rod does not move smoothly in the damper it must be renewed.

Reassembly

20 Insert the damper rod into the fork tube and slide it into place so that it projects fully from the bottom of the tube, then install the seat on the bottom of the damper rod, making sure the projection in the base of the seat locates with the flat on the bottom of the damper (see illustrations).

21 Oil the fork tube and bottom bush with the specified fork oil and insert the assembly into the slider. Fit a new copper sealing washer to the damper rod bolt and apply a few drops of a suitable non-permanent thread locking compound, then install the bolt into the bottom of the slider (see illustration). Tighten the bolt to the specified torque setting. If the damper rod rotates inside the tube, wait until the fork is fully reassembled before tightening the bolt.

22 Push the fork tube fully into the slider, then oil the top bush and slide it down over the tube (see illustration). Press the bush squarely into its recess in the slider as far as possible, then install the oil seal washer with its flat side facing up (see illustration). Either use the Yamaha service tool or a

suitable piece of tubing to tap the bush fully into place; the tubing must be slightly larger in diameter than the fork tube and slightly smaller in diameter than the bush recess in the slider. Take care not to scratch the fork tube during this operation; it is best to make sure that the fork tube is pushed fully into the slider so that any accidental scratching is confined to the area above the oil seal.

23 When the bush is seated fully and squarely in its recess in the slider, (remove the washer to check, wipe the recess clean, then reinstall the washer), install the new oil seal. Smear the seal's lips with fork oil and slide it over the tube so that its markings face upwards and drive the seal into place as

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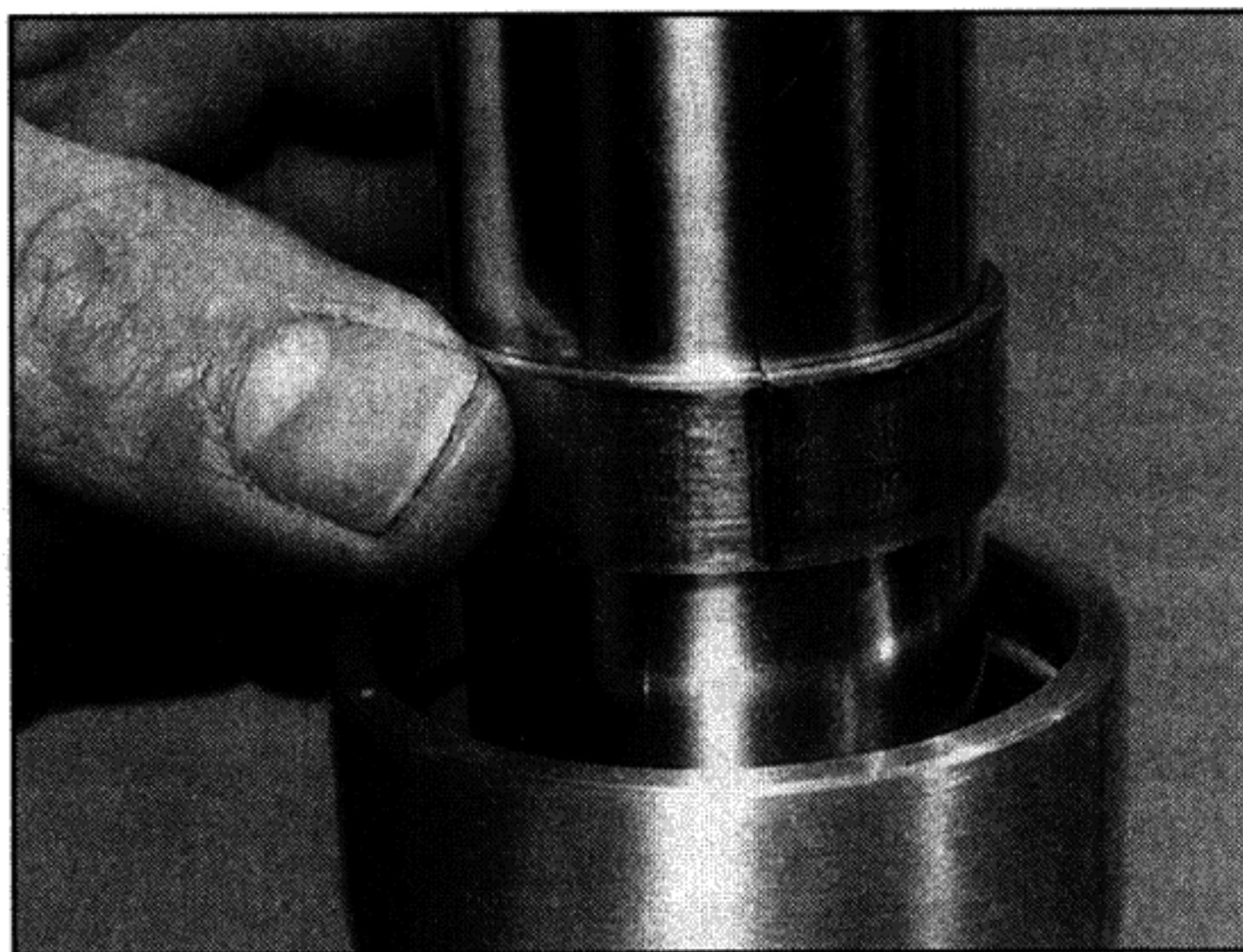
Place the old oil seal on top of the new one to protect it when driving the seal into place.

described above until the retaining clip groove is visible above the seal (see illustration).

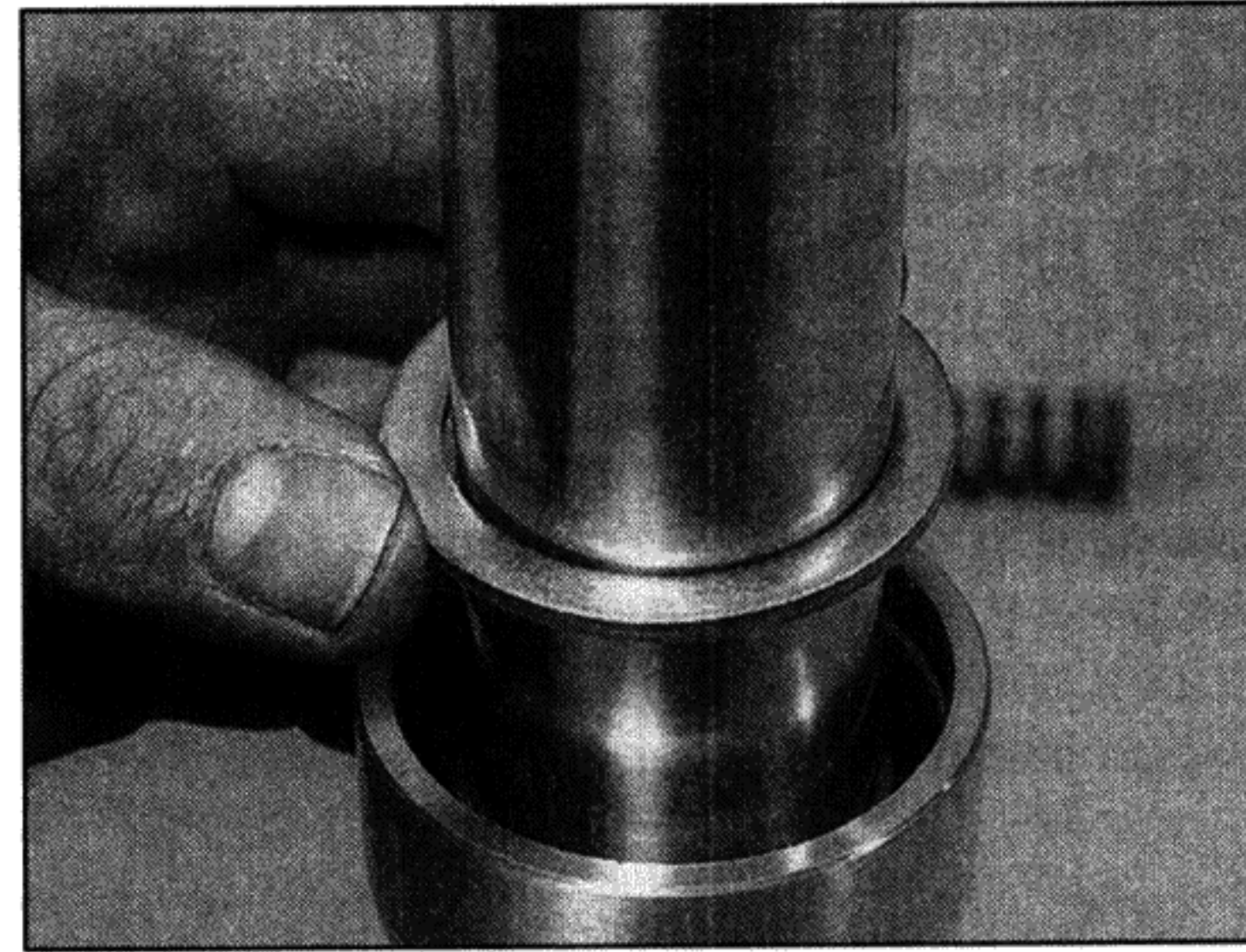
24 Once the seal is correctly seated, fit the retaining clip, making sure it is correctly located in its groove (see illustration).

25 Lubricate the lips of the new dust seal then slide it down the fork tube and press it into position (see illustration).

26 Slowly pour in the specified quantity of the specified grade of fork oil and pump the fork and damper rod at least ten times each to



7.22a Install the top bush . . .



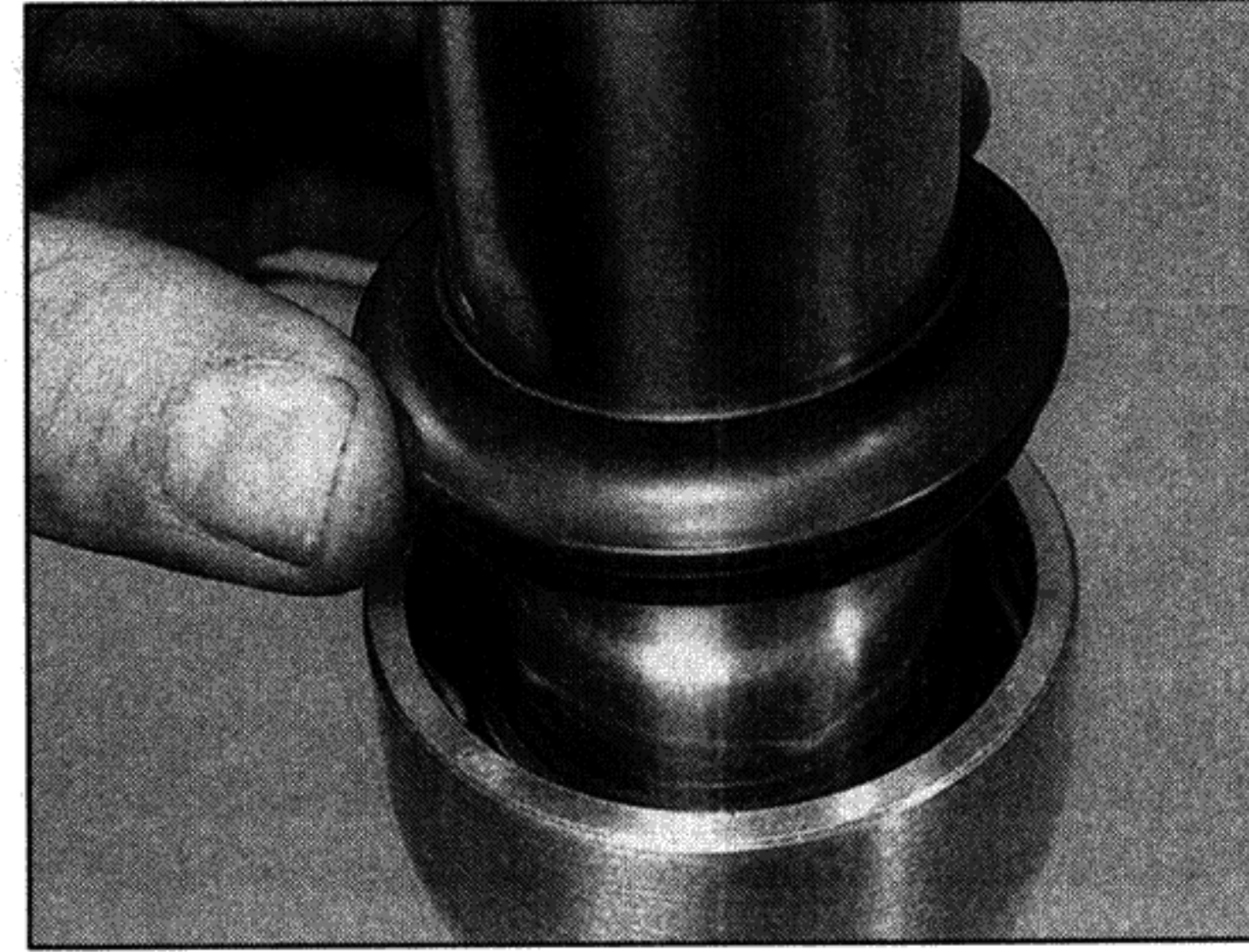
7.22b . . . followed by the washer



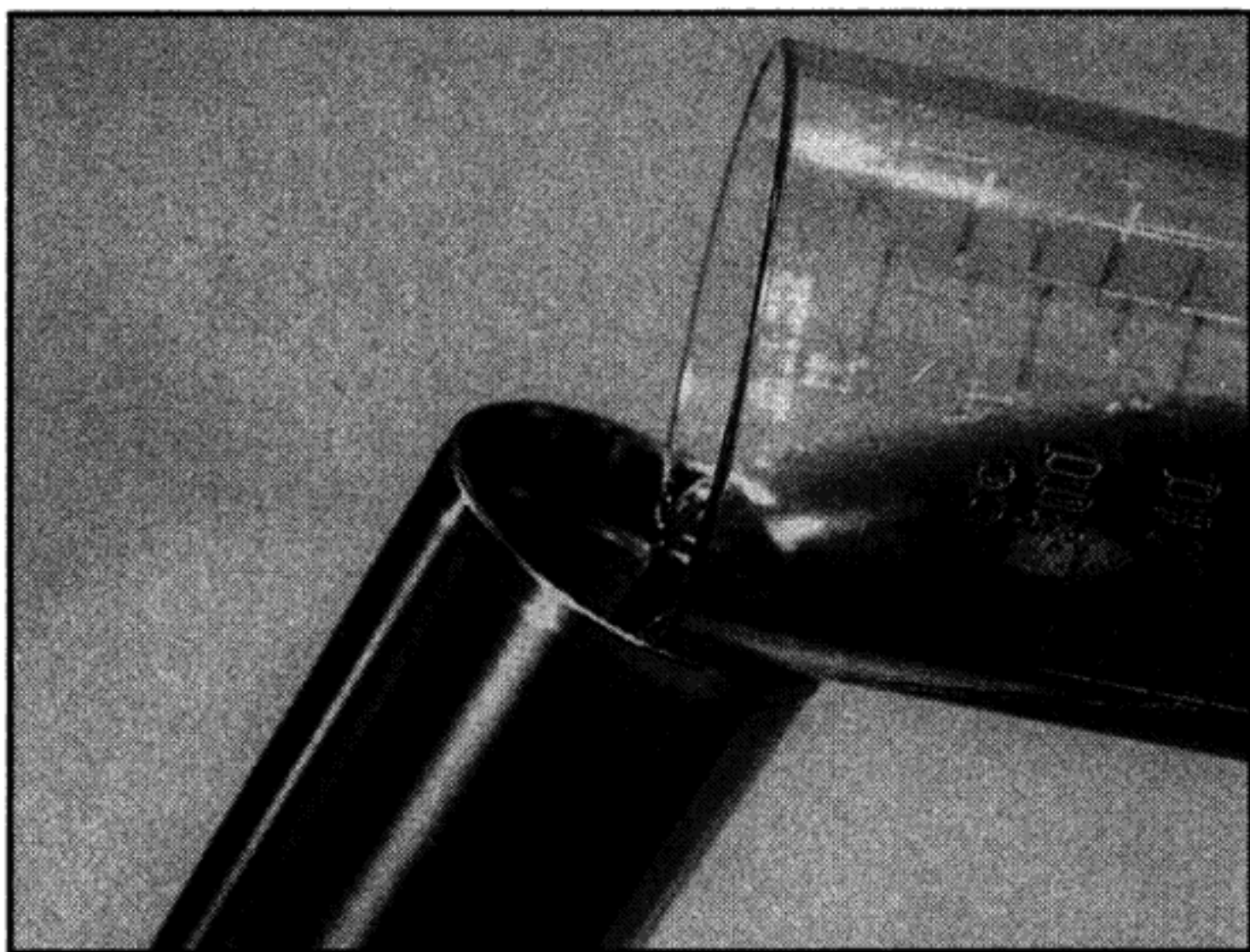
7.23 Make sure the oil seal is the correct way up



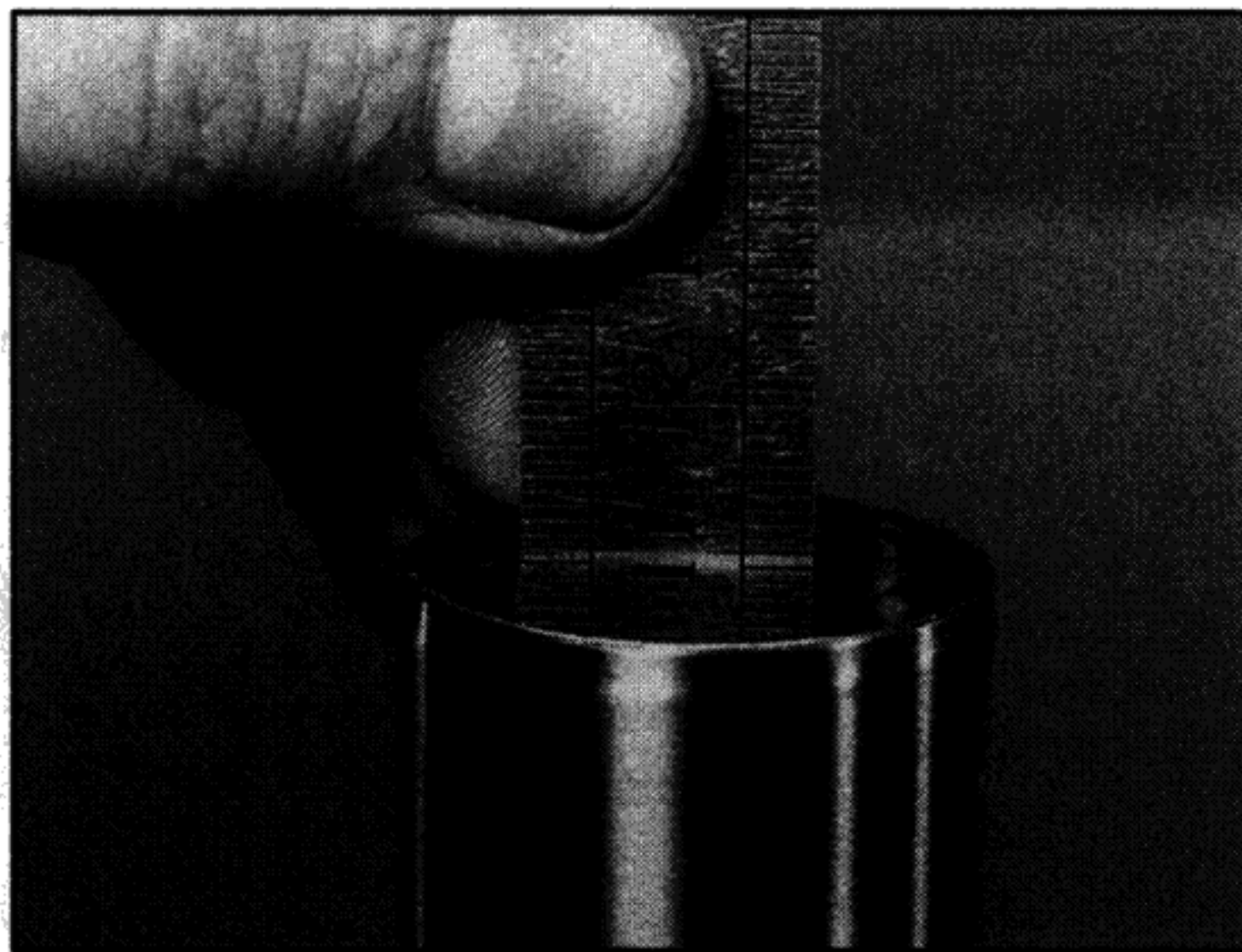
7.24 Install the retaining clip . . .



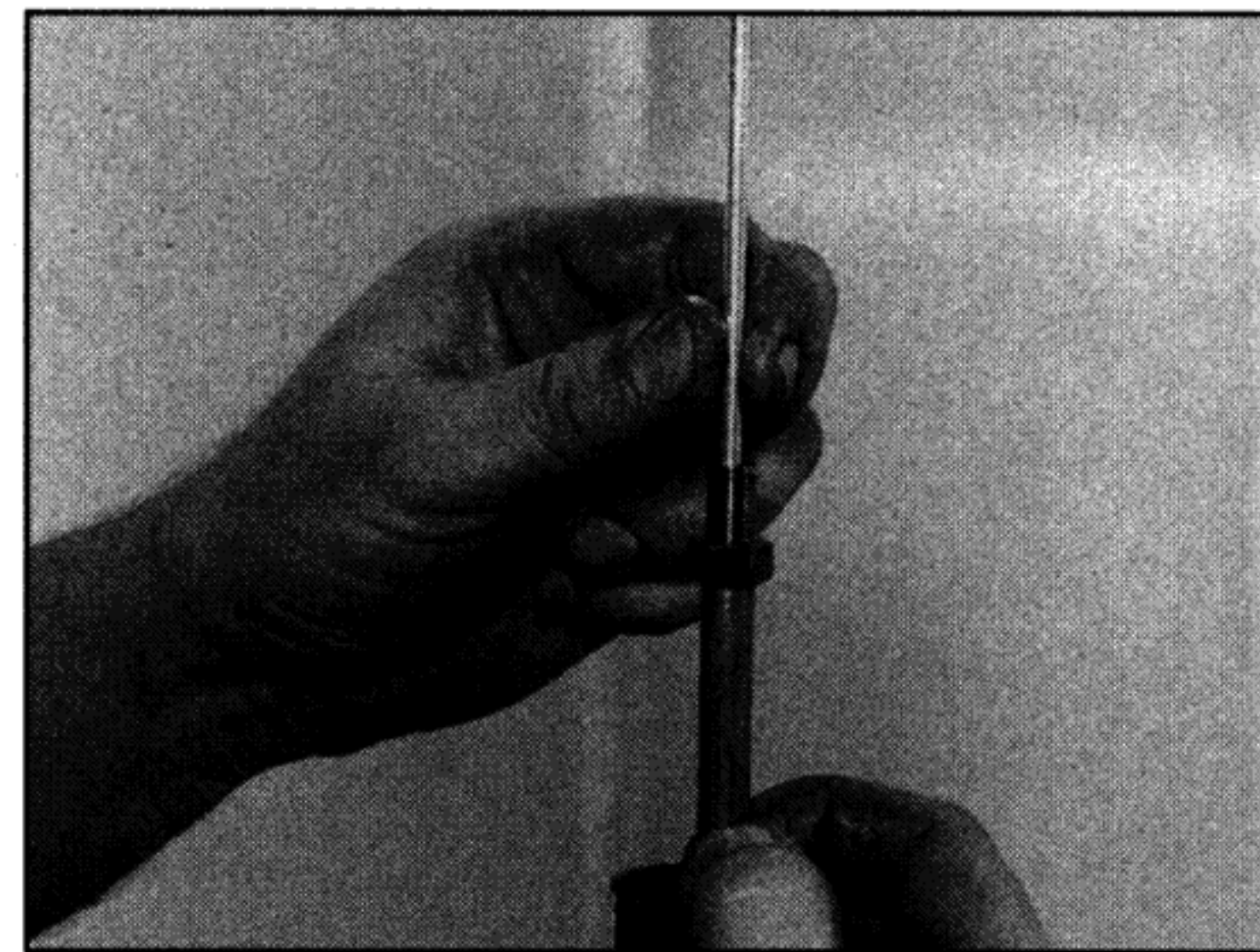
7.25 . . . followed by the dust seal



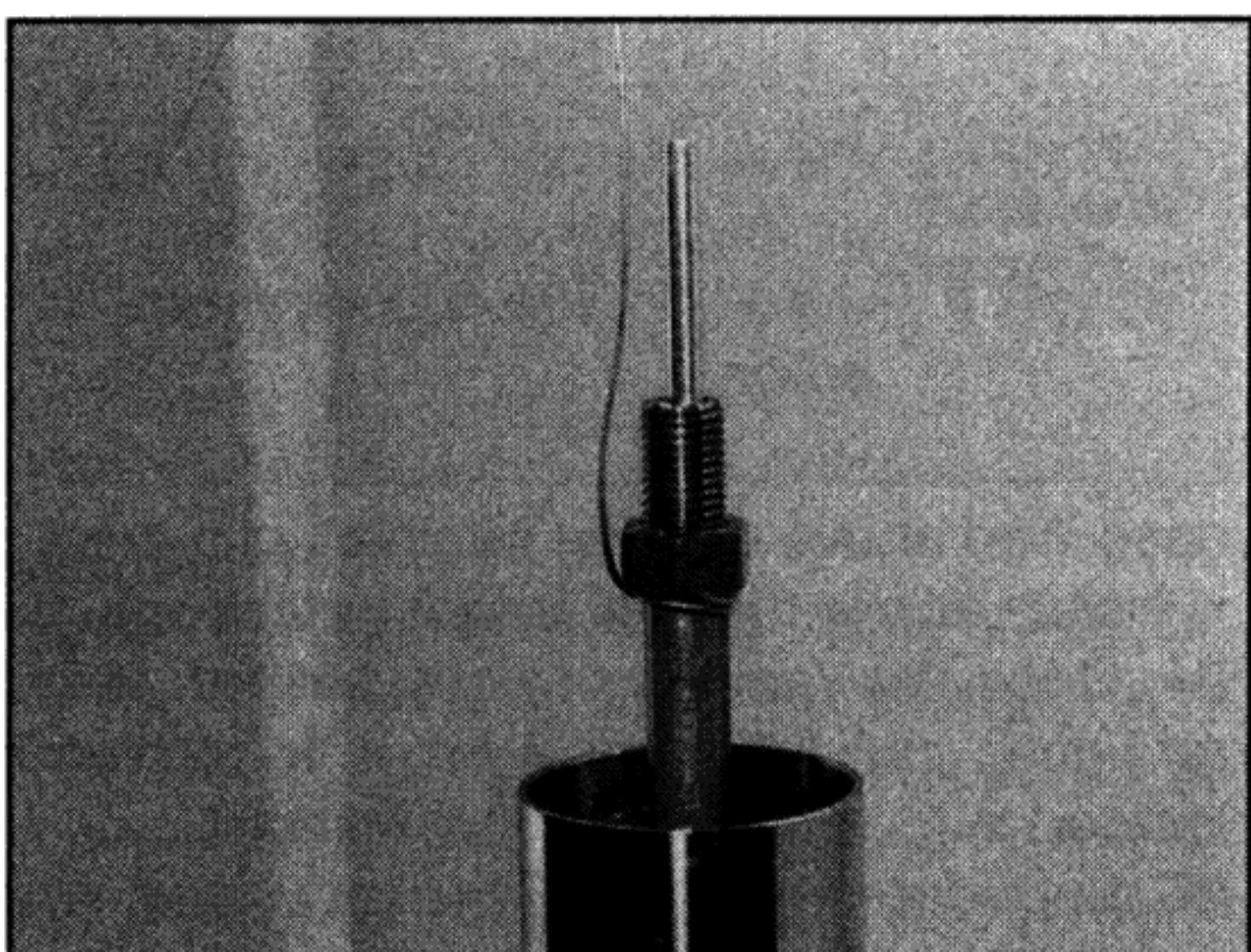
7.26a Pour the oil into the top of the tube



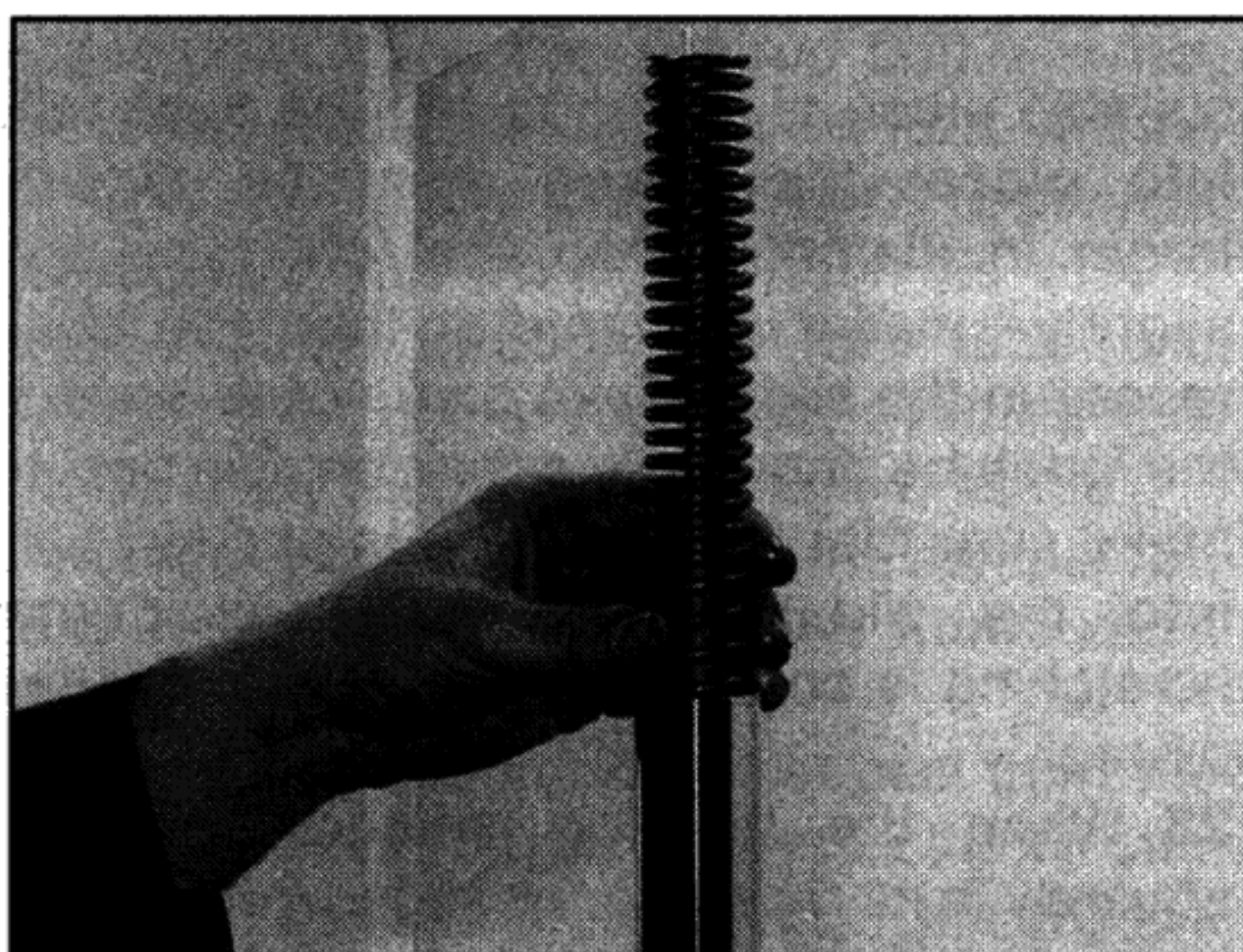
7.26b Measure the oil level with the fork held vertical



7.27a Insert the damping adjuster rod



7.27b Tie a piece of wire around the base of the locknut to keep the damper rod extended ...



7.27c ... and install the spring

distribute it evenly (see illustration); wait ten minutes then measure the oil level and adjust as necessary by adding or subtracting oil. Fully compress the fork tube and damper rod into the slider and measure the fork oil level from the top of the tube (see illustration). Add or subtract fork oil until it is at the level specified at the beginning of the Chapter.

27 Fit the damping adjuster rod into the damper rod (see illustration). It is advisable to tie a piece of wire around the locknut so that it can be used to hold the damper rod out when installing the spring – otherwise the rod

will settle down into the fork and will be inaccessible with the spring installed (see illustration). Clamp the slider in a vice via the brake caliper mounting lugs, taking care not to overtighten and damage them. Pull the fork tube and damper rod out of the slider as far as possible then install the spring with its closer-wound coils at the top (see illustration). Fit the spring seat, with its shouldered side fitting down into the top of the spring (see illustration 7.6).

28 Fit a new O-ring onto the fork top bolt. Thread the pre-load adjuster (with the top bolt

if it wasn't removed) onto the damper rod as far as it will go, then counter-hold it and tighten the locknut securely against it (see illustration and 7.5). If it was removed, thread the top bolt onto the pre-load adjuster (see illustration 7.4b).

29 Withdraw the tube fully from the slider and carefully screw the top bolt into the fork tube making sure it is not cross-threaded (see illustration). **Note:** The top bolt can be tightened to the specified torque setting at this stage if the tube is held between the padded jaws of a vice, but do not risk distorting the tube by doing so. A better method is to tighten the top bolt when the fork leg has been installed and is securely held in the triple clamps.

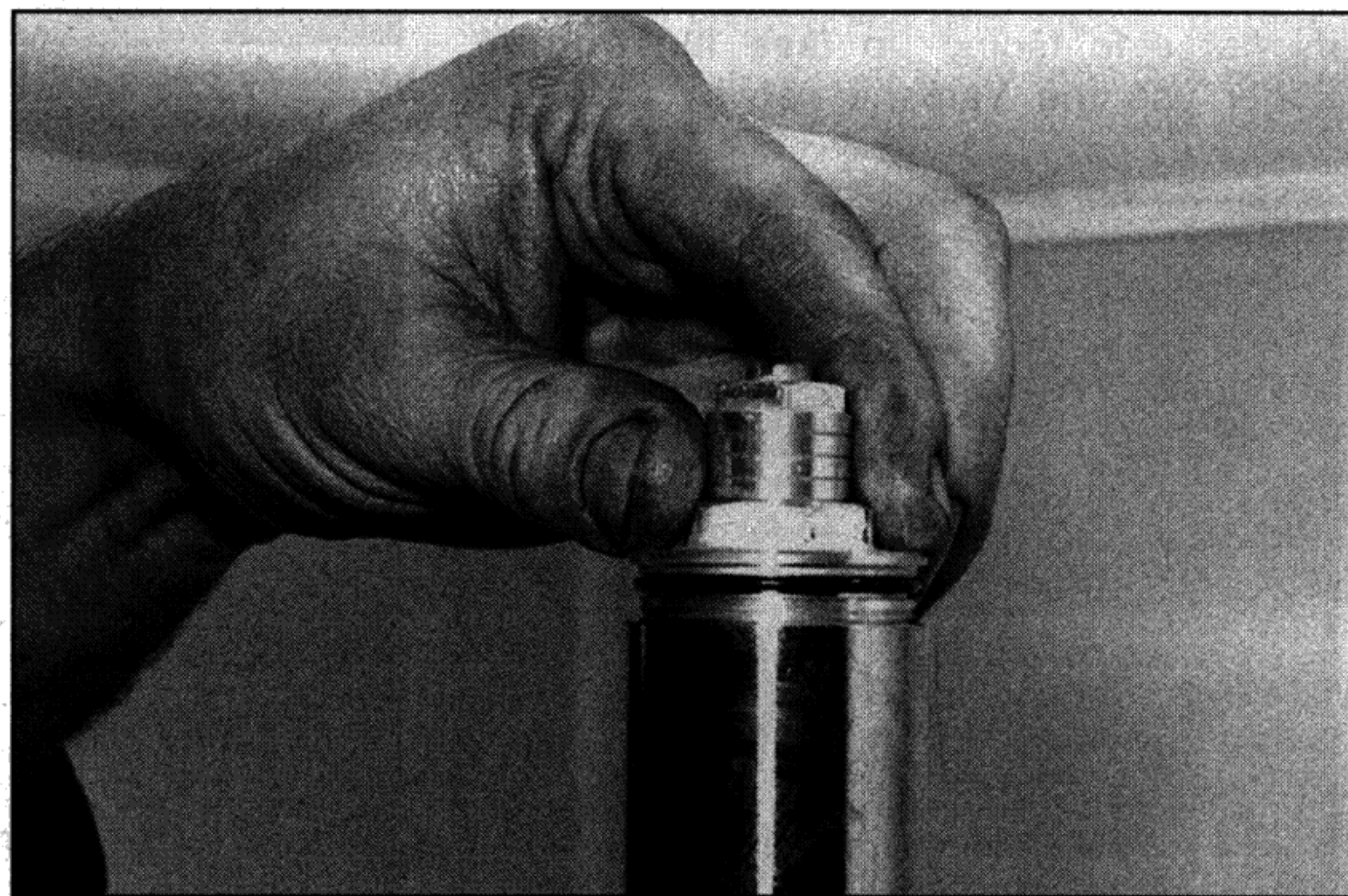


Use a ratchet-type tool when installing the fork top bolt. This makes it unnecessary to remove the tool from the bolt whilst threading it in making it easier to maintain a downward pressure on the spring.

If the damper rod Allen bolt requires tightening, clamp the fork slider between the padded jaws of a vice and have an assistant compress the tube into the slider so that



7.28 Thread the pre-load adjuster onto the damper rod and tighten the locknut against it



7.29 Thread the top bolt into the fork tube

maximum spring pressure is placed on the damper rod head – tighten the damper Allen bolt to the specified torque setting (see illustration 7.2).

30 Install the forks (see Section 6). Set the spring pre-load adjuster as required (see Section 12).

1996-on TDM models and TRX models

Disassembly

31 Always dismantle the fork legs separately to avoid interchanging parts and thus causing an accelerated rate of wear. Store all components in separate, clearly marked containers (see illustration).

32 Before dismantling the fork, it is advised that the damper rod bolt be slackened at this stage. Compress the fork tube in the slider so that the spring exerts maximum pressure on the damper rod head, then have an assistant slacken the damper rod bolt in the base of the fork slider (see illustration 7.2).

33 If the fork top bolt was not slackened with the fork in situ, carefully clamp the fork tube in a vice equipped with soft jaws, taking care not to overtighten or score its surface, and slacken the top bolt (see illustration 7.4).

34 The fork top bolt comes as an assembly with the pre-load adjuster and damping adjuster rod. Unscrew the fork top bolt from the top of the fork tube and lift it out until the damping adjuster rod is clear.

35 Slide the fork tube down into the slider. On TDM models withdraw the spring seat and spring from the tube. On TRX models withdraw the washer, spacer, spring seat and the spring from the tube. Note which way up the spring is fitted.

36 Invert the fork leg over a suitable container and pump the fork vigorously to expel as much fork oil as possible.

37 Remove the previously slackened damper rod bolt and its copper sealing washer from the bottom of the slider. Discard the sealing washer as a new one must be used on reassembly. If the damper rod bolt was not slackened before dismantling the fork, use the Yamaha service tool (TDM models – pt. nos. 90890-01465 and 90890-01326, TRX models – pt. nos. 90890-01388 and 90890-01326) to prevent the damper rod from turning. This tool is passed down through the fork tube and engages the damper rod head; a similar tool can be easily made in the home workshop.

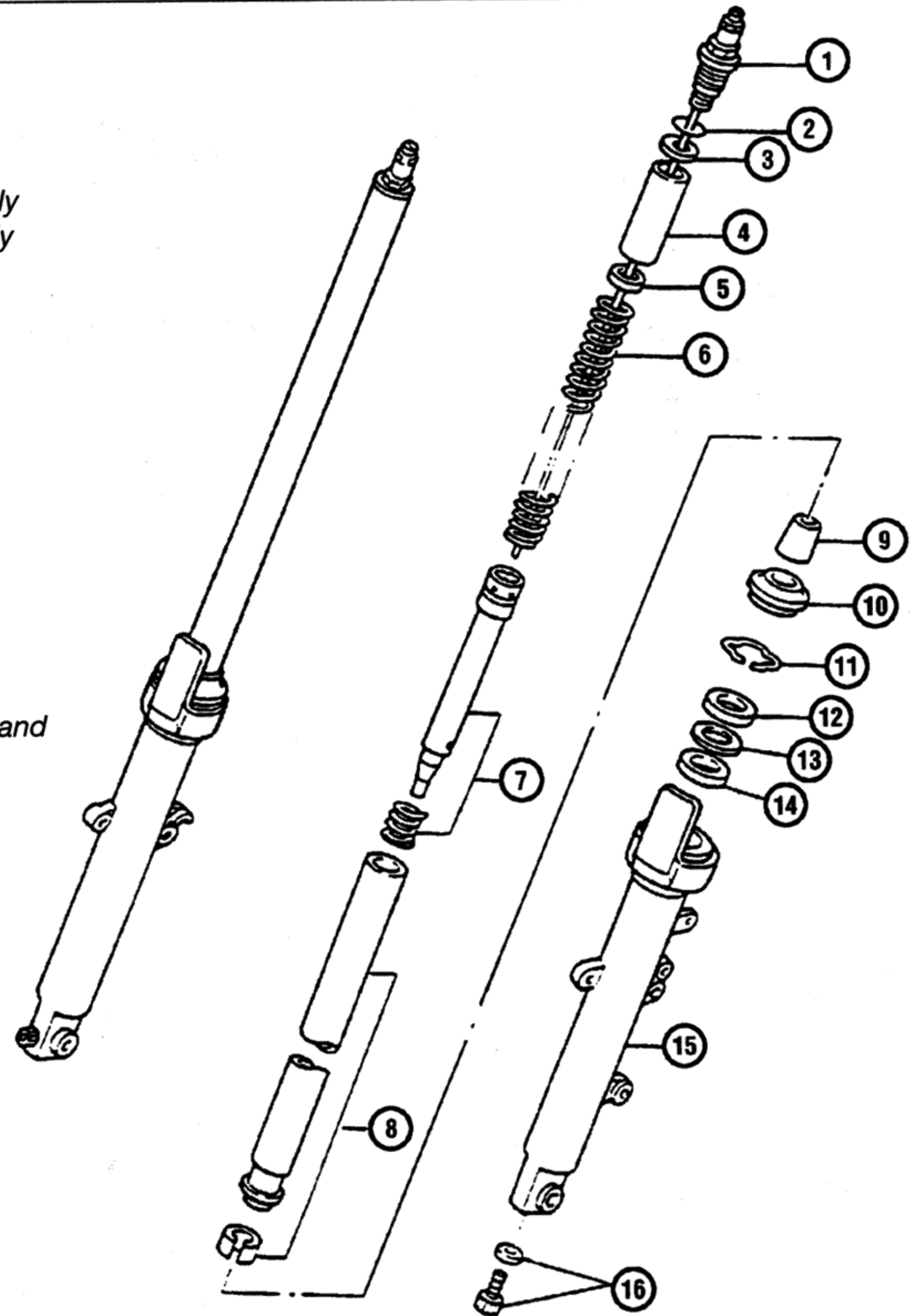
38 Invert the fork and withdraw the damper rod from inside the fork tube (see illustration). If required, slide the rebound spring off the damper rod.

39 Carefully prise out the dust seal from the top of the slider to gain access to the oil seal retaining clip (see illustration 7.10). Discard the dust seal as a new one must be used.

40 Carefully remove the retaining clip, taking care not to scratch the surface of the tube (see illustration 7.11).

41 To separate the tube from the slider it is

- 1 Top bolt and pre-load adjuster
- 2 O-ring
- 3 Washer – TRX only
- 4 Spacer – TRX only
- 5 Spring seat
- 6 Spring
- 7 Damper rod and rebound spring
- 8 Fork tube and bottom bush
- 9 Damper rod seat
- 10 Dust seal
- 11 Retaining clip
- 12 Oil seal
- 13 Washer
- 14 Top bush
- 15 Slider
- 16 Damper rod bolt and sealing washer



7.31 Front fork components – 1996-on TDM models and TRX models

necessary to displace the top bush and oil seal. The bottom bush should not pass through the top bush, and this can be used to good effect. Push the tube gently inwards until it stops against the damper rod seat. Take care not to do this forcibly or the seat may be damaged. Then pull the tube sharply outwards until the bottom bush strikes the top bush. Repeat this operation until the top bush and seal are tapped out of the slider (see illustration 7.12).

42 With the tube removed, slide off the oil seal, washer and top bush, noting which way up they fit (see illustration 7.13). Discard the oil seal as a new one must be used.

Caution: Do not remove the bottom bush from the tube unless it is to be renewed.

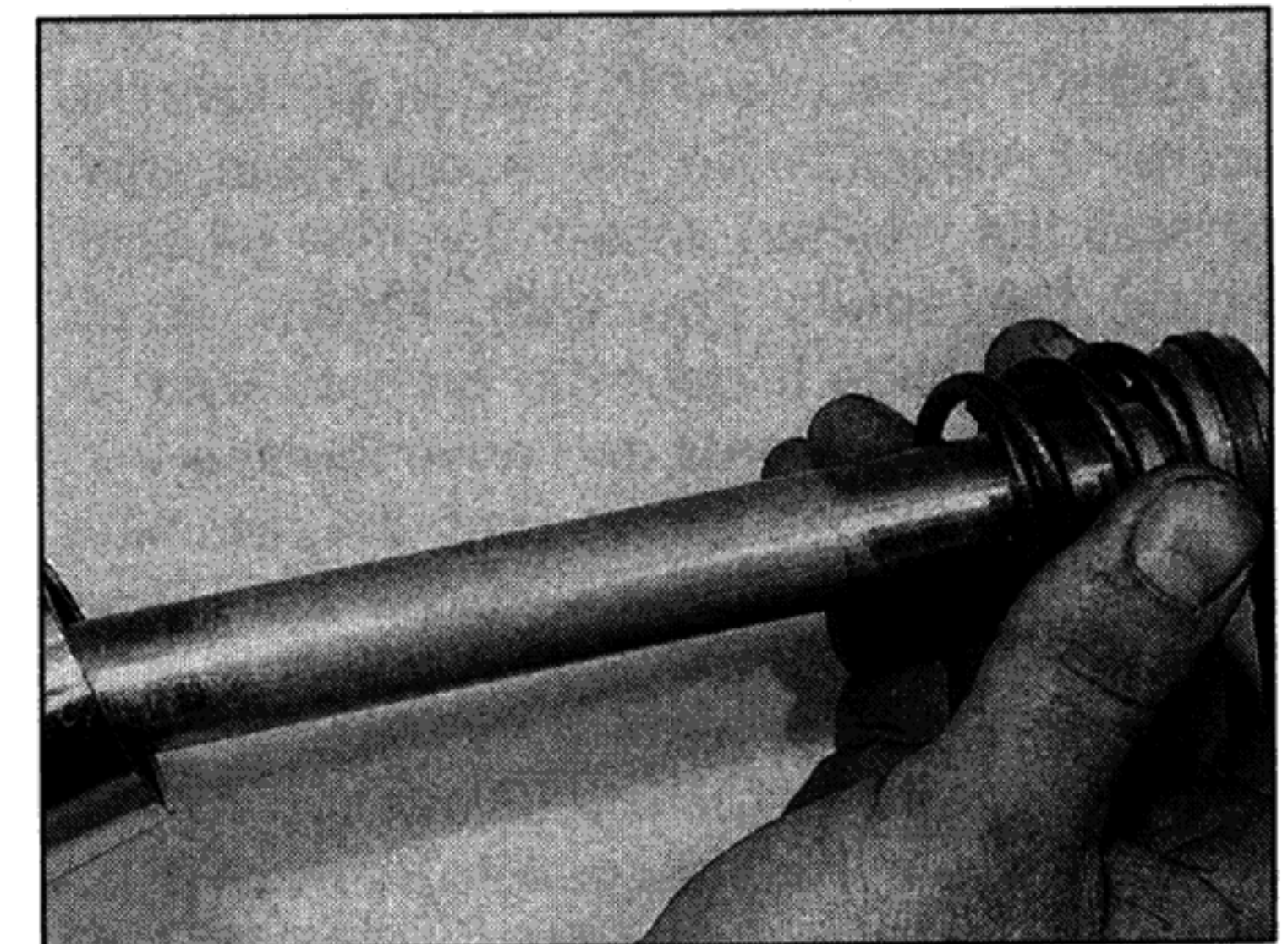
43 Tip the damper rod seat out of the slider, noting which way up it fits.

Inspection

44 Clean all parts in solvent and blow them dry with compressed air, if available. Check the fork tube for score marks, scratches, flaking of the chrome finish and excessive or abnormal wear. Look for dents in the tube and renew the tube in both forks if any are found.

Check the fork seal seat for nicks, gouges and scratches. If damage is evident, leaks will occur. Also check the oil seal washer for damage or distortion and renew it if necessary.

45 Check the fork tube for runout (bending) using V-blocks and a dial gauge, or have it done by a dealer (see illustration 7.16). Yamaha do not specify a runout limit, but if the tube is bent it should be renewed.



7.38 Withdraw the damper rod and rebound spring from the tube

46 Check the spring for cracks and other damage. Measure the spring free length and compare the measurement to the specifications at the beginning of the Chapter. If it is defective or sagged below the service limit, renew the springs in both forks. Never renew only one spring. Also check the rebound spring on the damper.

47 Examine the working surfaces of the two bushes; if worn or scuffed they must be renewed. To remove the bottom bush from the fork tube, prise it apart at the slit using a flat-bladed screwdriver and slide it off (see illustration 7.18). Make sure the new one seats properly.

48 Check the damper rod for damage and wear, and renew it if necessary.

Reassembly

49 If removed, slide the rebound spring onto the damper rod. Insert the damper rod into the fork tube and slide it into place so that it projects fully from the bottom of the tube, then fit the seat onto the bottom of the damper rod (see illustrations 7.38 and 7.20b).

50 Oil the fork tube and bottom bush with the specified fork oil and insert the assembly into the slider. Fit a new copper sealing washer to the damper rod bolt and apply a few drops of a suitable non-permanent thread locking compound, then install the bolt into the bottom of the slider (see illustration 7.21). Tighten the bolt to the specified torque setting. If the damper rod rotates inside the tube, use the tool described in Step 37 to hold the damper rod.

51 Push the fork tube fully into the slider, then oil the top bush and slide it down over the tube (see illustration 7.22a). Press the bush squarely into its recess in the slider as far as possible, then install the oil seal washer (see illustration 7.22b). Either use the Yamaha service tool or a suitable piece of tubing to tap the bush fully into place; the tubing must be slightly larger in diameter than the fork tube and slightly smaller in diameter than the bush recess in the slider. Take care not to scratch the fork tube during this operation; it is best to make sure that the fork tube is pushed fully into the slider so that any accidental scratching is confined to the area above the oil seal.

52 When the bush is seated fully and squarely in its recess in the slider, (remove the washer to check, wipe the recess clean, then reinstall the washer), install the new oil seal. Smear the seal's lips with lithium-based grease and slide it over the tube so that its markings face upwards and drive the seal into place as described above until the retaining clip groove is visible above the seal (see illustration 7.23).



Place the old oil seal on top of the new one to protect it when driving the seal into place.

53 Once the seal is correctly seated, fit the retaining clip, making sure it is correctly located in its groove (see illustration 7.24).

54 Lubricate the lips of the new dust seal then slide it down the fork tube and press it into position (see illustration 7.25).

55 Slowly pour in the specified quantity of the specified grade of fork oil and pump the fork at least ten times to distribute it evenly (see illustration 7.26a); the oil level should also be measured and adjustment made by adding or subtracting oil. Fully compress the fork tube into the slider and measure the fork oil level from the top of the tube (see illustration 7.26b). Add or subtract fork oil until it is at the level specified at the beginning of the Chapter.

56 Clamp the slider upright in a soft-jawed vice using the brake caliper mounting lugs, taking care not to overtighten and damage them. Pull the fork tube out of the slider as far as possible then install the spring and the spring seat. On TRX models fit the spacer and the washer.

57 Apply a smear of fork oil or grease to the new top bolt O-ring. Install the top bolt assembly, making sure the bottom of the damping adjuster rod locates correctly into the hole in the top of the damper rod, and thread the bolt into the top of the fork tube (see illustration 7.29).

Warning: It will be necessary to compress the spring by pressing it down using the top bolt to engage the threads of the top bolt with the fork tube. This is a potentially dangerous operation and should be performed with care, using an assistant if necessary. Wipe off any excess oil before starting to prevent the possibility of slipping.

Keep the fork tube fully extended whilst pressing on the spring. Screw the top bolt carefully into the fork tube making sure it is not cross-threaded. **Note:** The top bolt can be tightened to the specified torque setting at this stage if the tube is held between the padded jaws of a vice, but do not risk distorting the tube by doing so. A better method is to tighten the top bolt when the fork has been installed in the bike and is securely held in the bottom yoke.

58 Install the forks (see Section 6).

XTZ models

Disassembly

59 Always dismantle the fork legs separately to avoid interchanging parts and thus causing an accelerated rate of wear. Store all components in separate, clearly marked containers (see illustration).

60 Slacken the clamps securing the fork gaiter and slide the gaiter off the top of the fork.

61 Before dismantling the fork, it is advised that the damper rod bolt be slackened at this stage. Compress the fork tube in the slider so that the spring exerts maximum pressure on the damper rod head, then have an assistant slacken the damper rod bolt in the base of the fork slider (see illustration 7.2). If an assistant is not available, clamp the brake caliper mounting lugs in a soft-jawed vice to support the fork.

62 If the fork top bolt was not slackened with the fork in situ, carefully clamp the fork tube in a vice equipped with soft jaws, taking care not to overtighten or score its surface, and slacken the top bolt.

63 Unscrew the fork top bolt from the top of the fork tube.



Warning: The fork spring is pressing on the fork top bolt (via the spacer) with considerable pressure. Unscrew the bolt very carefully, keeping a downward pressure on it and release it slowly as it is likely to spring clear. It is advisable to wear some form of eye and face protection when carrying out this operation.

64 Slide the fork tube down into the slider and withdraw the spacer, spring seat and the spring from the tube. Note which way up the spring is fitted.

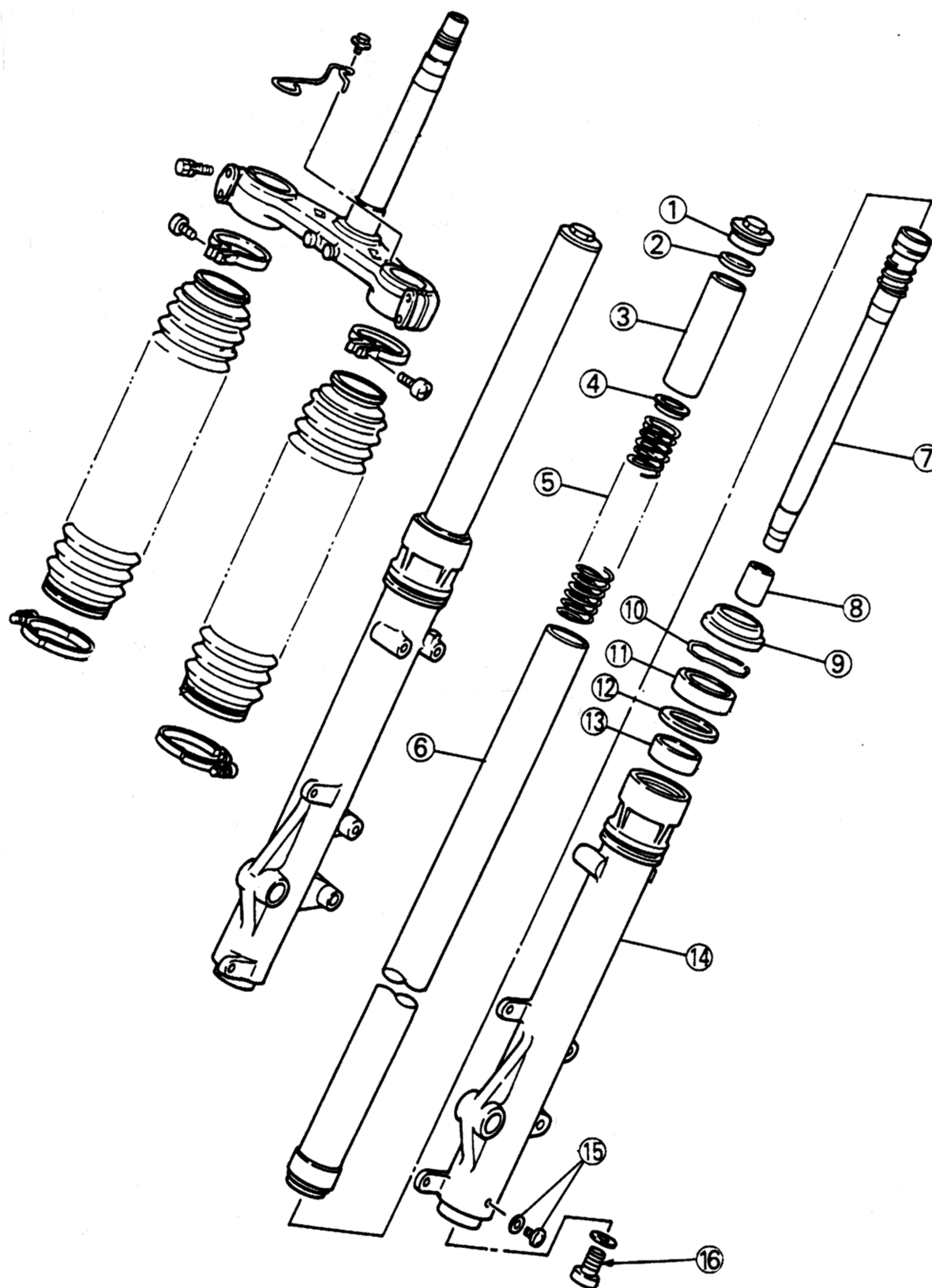
65 Invert the fork leg over a suitable container and pump the fork vigorously to expel as much fork oil as possible.

66 Remove the previously slackened damper rod bolt and its copper sealing washer from the bottom of the slider. Discard the sealing washer as a new one must be used on reassembly. If the damper rod bolt was not slackened before dismantling the fork, use the Yamaha service tool (pt. nos. 90890-01326 and 90890-01327) to prevent the damper rod from turning. This tool is passed down

TOOL TIP



Use a ratchet-type tool when installing the fork top bolt. This makes it unnecessary to remove the tool from the bolt whilst threading it in making it easier to maintain a downward pressure on the spring.



7.59 Front fork components – XTZ models

- 1 Top bolt
- 2 O-ring
- 3 Spacer
- 4 Spring seat
- 5 Spring
- 6 Fork tube and bottom bush

- 7 Damper rod and rebound spring
- 8 Damper rod seat
- 9 Dust seal
- 10 Retaining clip
- 11 Oil seal
- 12 Washer

- 13 Top bush
- 14 Slider
- 15 Oil drain screw and sealing washer – 1989-94 models
- 16 Damper rod bolt and sealing washer

through the fork tube and engages the damper rod head; a similar tool can be easily made in the home workshop..

67 Invert the fork and withdraw the damper rod from inside the fork tube (**see illustration 7.38**). If required, slide the rebound spring off the damper rod.

68 Carefully prise out the dust seal from the top of the slider to gain access to the oil seal retaining clip (**see illustration 7.10**). Discard the dust seal as a new one must be used.

69 Carefully remove the retaining clip, taking care not to scratch the surface of the tube (**see illustration 7.11**).

70 To separate the tube from the slider it is necessary to displace the top bush and oil seal. The bottom bush should not pass through the top bush, and this can be used to good effect. Push the tube gently inwards until it stops against the damper rod seat. Take care not to do this forcibly or the seat may be damaged. Then pull the tube sharply outwards until the bottom bush strikes the top bush. Repeat this operation until the top bush and seal are tapped out of the slider (**see illustration 7.12**).

71 With the tube removed, slide off the oil seal, washer and top bush, noting which way up they fit (**see illustration 7.13**). Discard the oil seal as a new one must be used.

Caution: Do not remove the bottom bush from the tube unless it is to be renewed.

72 Tip the damper rod seat out of the slider, noting which way up it fits.

Inspection

73 Clean all parts in solvent and blow them dry with compressed air, if available. Check the fork tube for score marks, scratches, flaking of the chrome finish and excessive or abnormal wear. Look for dents in the tube and renew the tube in both forks if any are found. Check the fork seal seat for nicks, gouges and scratches. If damage is evident, leaks will occur. Also check the oil seal washer for damage or distortion and renew it if necessary.

74 Check the fork tube for runout (bending) using V-blocks and a dial gauge, or have it done by a dealer (**see illustration 7.16**). Yamaha do not specify a runout limit, but if the tube is bent it should be renewed.

75 Check the spring for cracks and other damage. Measure the spring free length and compare the measurement to the specifications at the beginning of the Chapter. If it is defective or sagged below the service limit, renew the springs in both forks. Never renew only one spring. Also check the rebound spring.

76 Examine the working surfaces of the two bushes; if worn or scuffed they must be renewed. To remove the bottom bush from the fork tube, prise it apart at the slit using a flat-bladed screwdriver and slide it off (**see illustration 7.18**). Make sure the new one seats properly.

77 Check the damper rod for damage and wear, and renew it if necessary.

Reassembly

78 If removed, slide the rebound spring onto the rod. Insert the damper rod into the fork tube and slide it into place so that it projects fully from the bottom of the tube, then fit the seat onto the bottom of the damper rod (**see illustration 7.38 and 7.20b**).

79 Oil the fork tube and bottom bush with the specified fork oil and insert the assembly into the slider. Fit a new copper sealing washer to the damper rod bolt and apply a few drops of a suitable non-permanent thread locking compound, then install the bolt into the bottom of the slider (**see illustration 7.21**). Tighten the bolt to the specified torque setting. If the damper rod rotates inside the tube, use the tool described in Step 66 to hold the damper rod.

80 Push the fork tube fully into the slider, then oil the top bush and slide it down over the tube (**see illustration 7.22a**). Press the bush squarely into its recess in the slider as far as possible, then install the oil seal washer (**see illustration 7.22b**). Either use the Yamaha service tool or a suitable piece of tubing to tap the bush fully into place; the tubing must be slightly larger in diameter than the fork tube and slightly smaller in diameter than the bush recess in the slider. Take care not to scratch the fork tube during this operation; it is best to make sure that the fork tube is pushed fully into the slider so that any accidental scratching is confined to the area above the oil seal.

81 When the bush is seated fully and squarely in its recess in the slider, (remove the washer to check, wipe the recess clean, then reinstall the washer), install the new oil seal. Smear the seal's lips with lithium-base grease and slide it over the tube so that its markings face upwards and drive the seal into place as described above until the retaining clip groove is visible above the seal (**see illustration 7.23**).



Place the old oil seal on top of the new one to protect it when driving the seal into place.

82 Once the seal is correctly seated, fit the retaining clip, making sure it is correctly located in its groove (**see illustration 7.24**).

83 Lubricate the lips of the new dust seal then slide it down the fork tube and press it into position (**see illustration 7.25**).

84 Slowly pour in the specified quantity of the specified grade of fork oil and pump the fork at least ten times to distribute it evenly (**see illustration 7.26a**); the oil level should also be measured and adjustment made by adding or subtracting oil. Fully compress the fork tube into the slider and measure the fork oil level from the top of the tube (**see illustration 7.26b**). Add or subtract fork oil until it is at the level specified at the beginning of the Chapter.

85 Clamp the slider in a soft-jawed vice using the brake caliper mounting lugs, taking care not to overtighten and damage them. Pull the fork tube out of the slider as far as possible then install the spring, the spring seat, with its shouldered side fitting down into the top of the spring, and the spacer.

86 Apply a smear of grease to the new top bolt O-ring and thread the bolt into the top of the fork tube.



Warning: It will be necessary to compress the spring by pressing it down using the top bolt to engage the threads of the top bolt with the fork tube. This is a potentially dangerous operation and should be performed with care, using an assistant if necessary. Wipe off any excess oil before starting to prevent the possibility of slipping. Keep the fork tube fully extended whilst pressing on the spring. Screw the top bolt carefully into the fork tube making sure it is not cross-threaded. **Note: The top bolt can be tightened to the specified torque setting at this stage if the tube is held between the padded jaws of a vice, but do not risk distorting the tube by doing so (see Tool Tip).** A better method is to tighten the top bolt when the fork has been installed in the bike and is securely held in the bottom yoke.

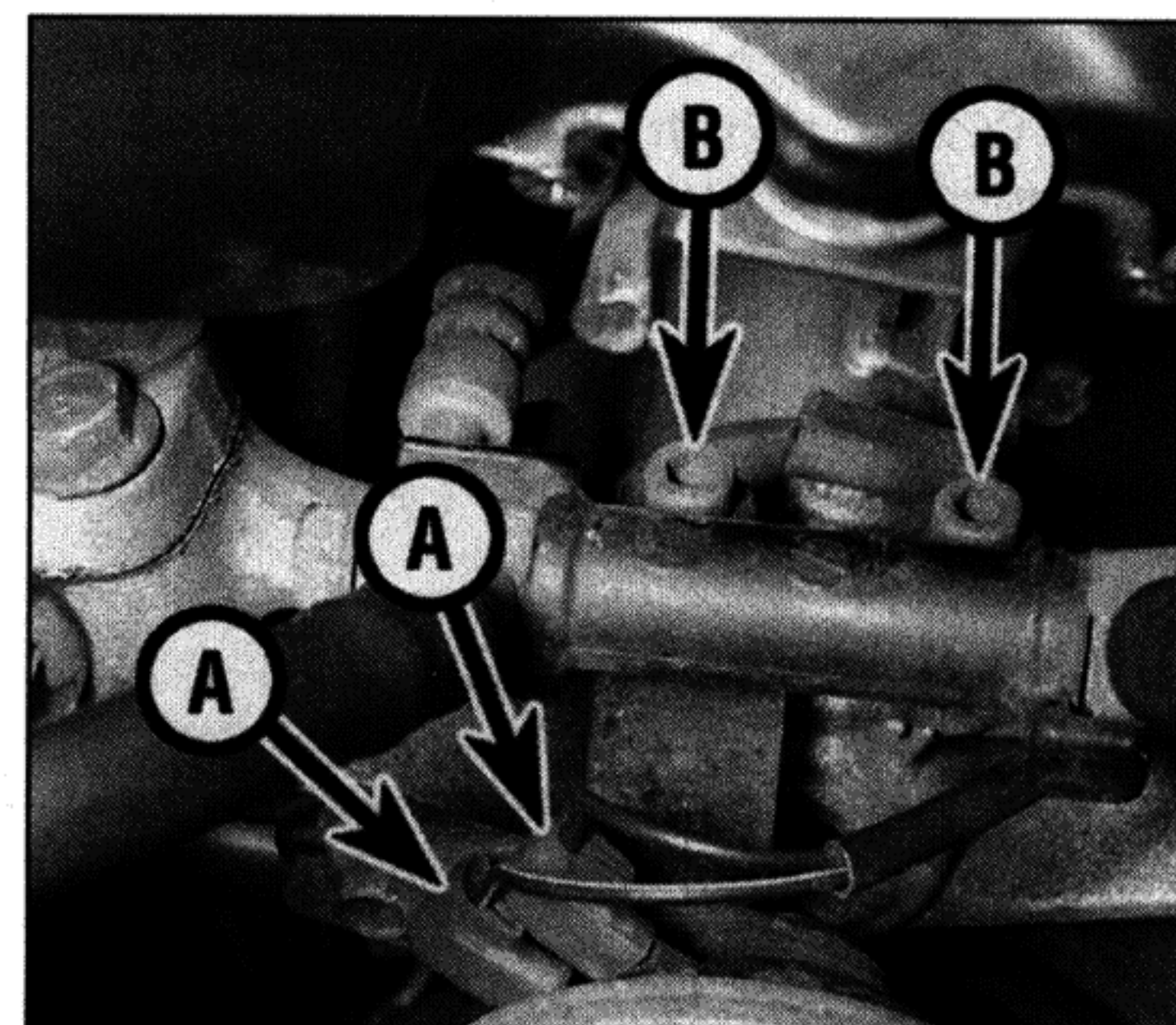
87 Install the forks (see Section 6).

8 Steering stem – removal and installation

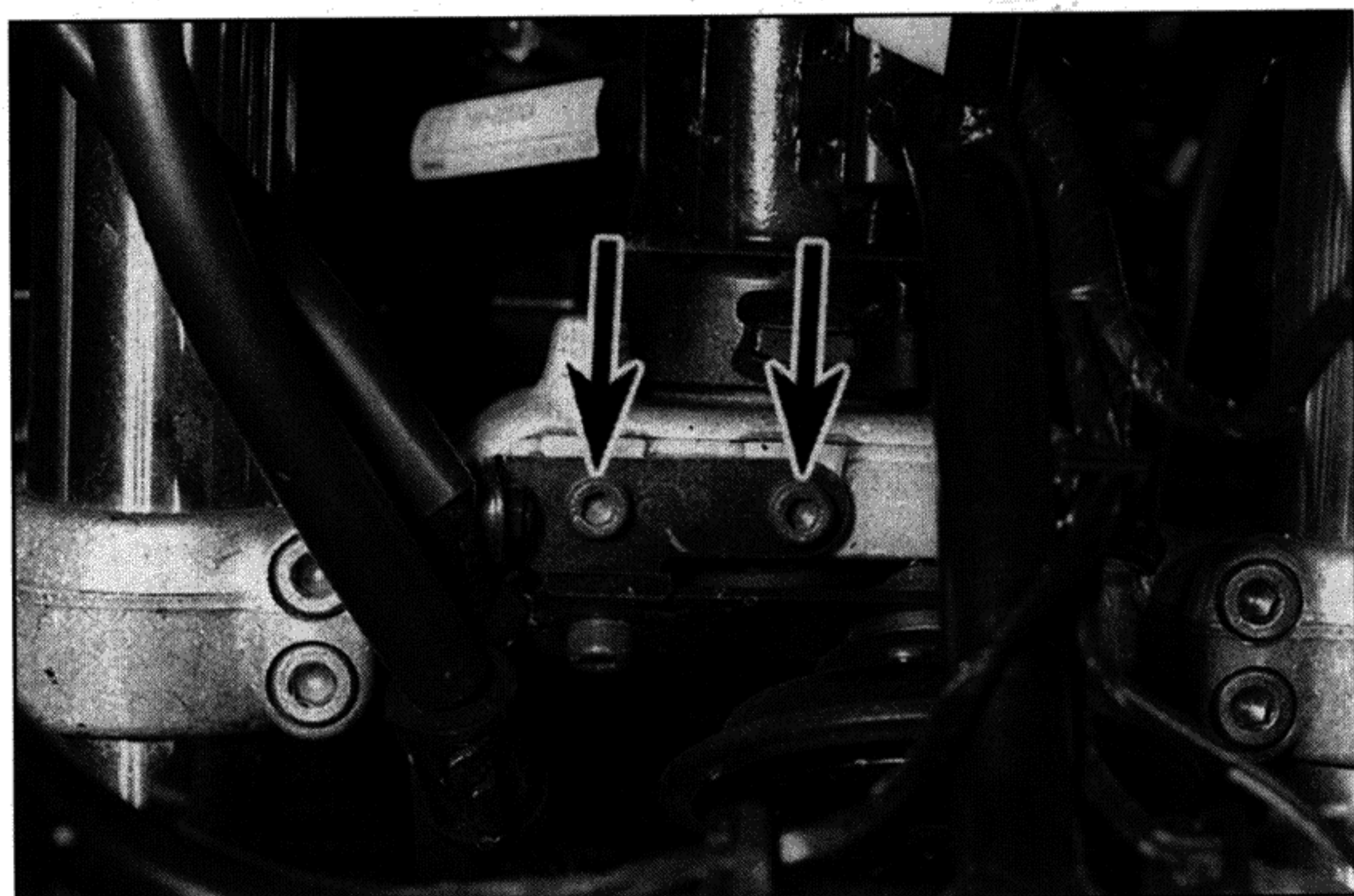


Removal

- 1 Remove the front forks (see Section 6).
- 2 On TDM models, displace the handlebars from the top yoke (see Section 5), then disconnect the horn wiring connectors and unscrew the bolts securing the front brake hose/horn bracket to the bottom yoke (**see illustration**). On 1996-on models, unscrew the bolts securing the choke knob and the cable guide to the top yoke.



8.2 Disconnect the horn wiring connectors (A), then unscrew the bolts (B) and displace the brake hose union/horn assembly



8.3 Disconnect the horn wiring connectors, then unscrew the bolts (arrowed) and displace the brake hose/horn assembly



8.4a Free the cable and wiring from the guides (arrowed) on the top yoke . . .

3 On TRX models, disconnect the horn wiring connectors and unscrew the bolts securing the front brake hose/horn bracket to the bottom yoke (see illustration).

4 On XTZ models, displace the handlebars from the top yoke (see Section 5). Slip the cables and wiring out of the guides on the top yoke, and unscrew the bolts securing the front brake hose and the cable guide to the bottom yoke (see illustrations).

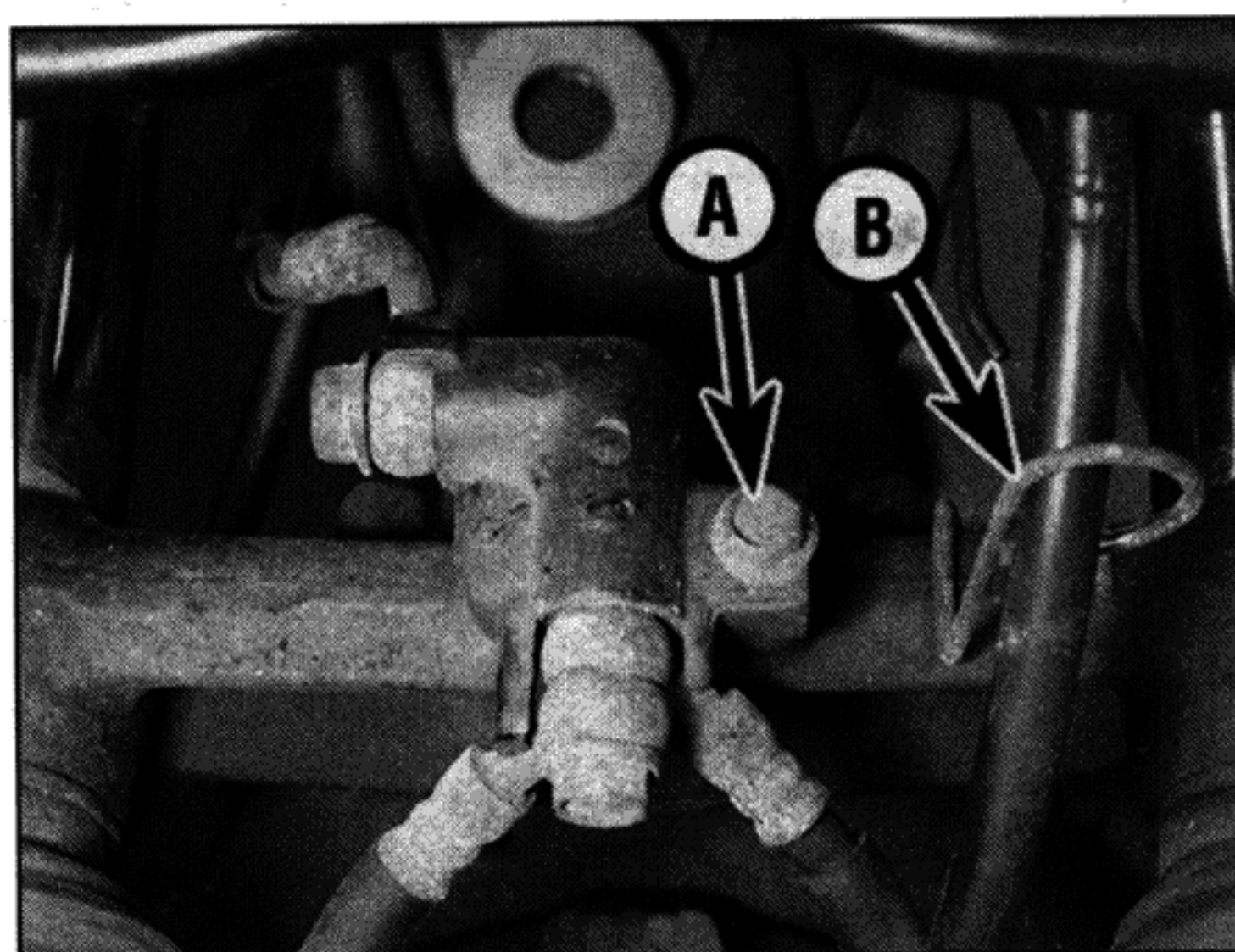
5 Unscrew the steering stem nut or bolt and remove it along with its washer, where fitted (see illustration). Lift the top yoke off the steering stem and place it aside, making sure no strain is placed on the ignition switch wiring (see illustration). On TRX models the yoke should be supported so that the master cylinder reservoir remains upright and so that no strain is placed on the hydraulic hoses.

6 On TDM and TRX models, remove the tabbed lockwasher, noting how it fits, then unscrew and remove the locknut using either a C-spanner, a peg spanner or a drift located in one of the notches (see illustration). Remove the washer.

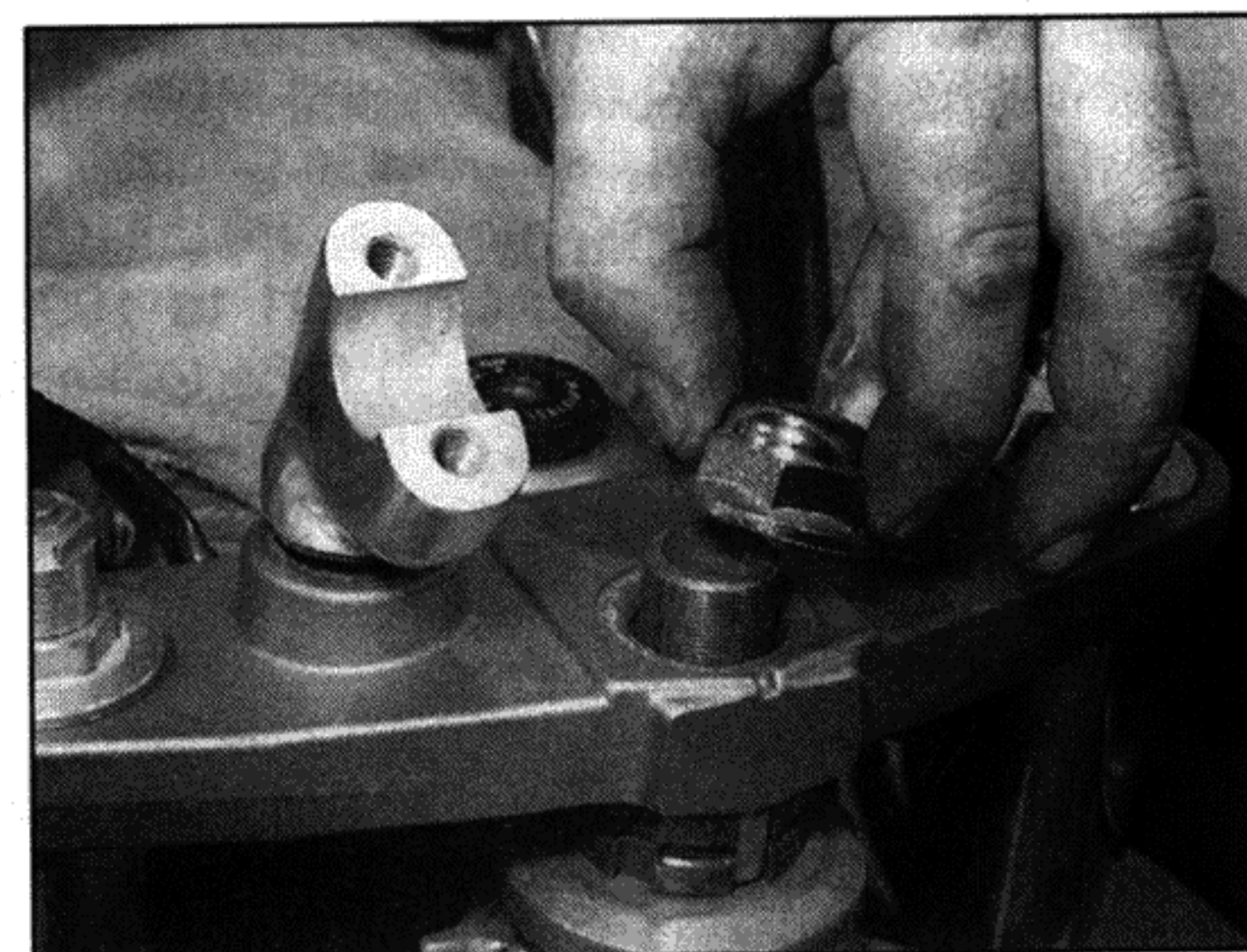
7 Supporting the bottom yoke, unscrew the adjuster nut using either a C-spanner, a peg-spanner or a drift located in one of the notches, then remove the adjuster nut and the bearing cover from the steering stem.

8 Gently lower the bottom yoke and steering stem out of the frame.

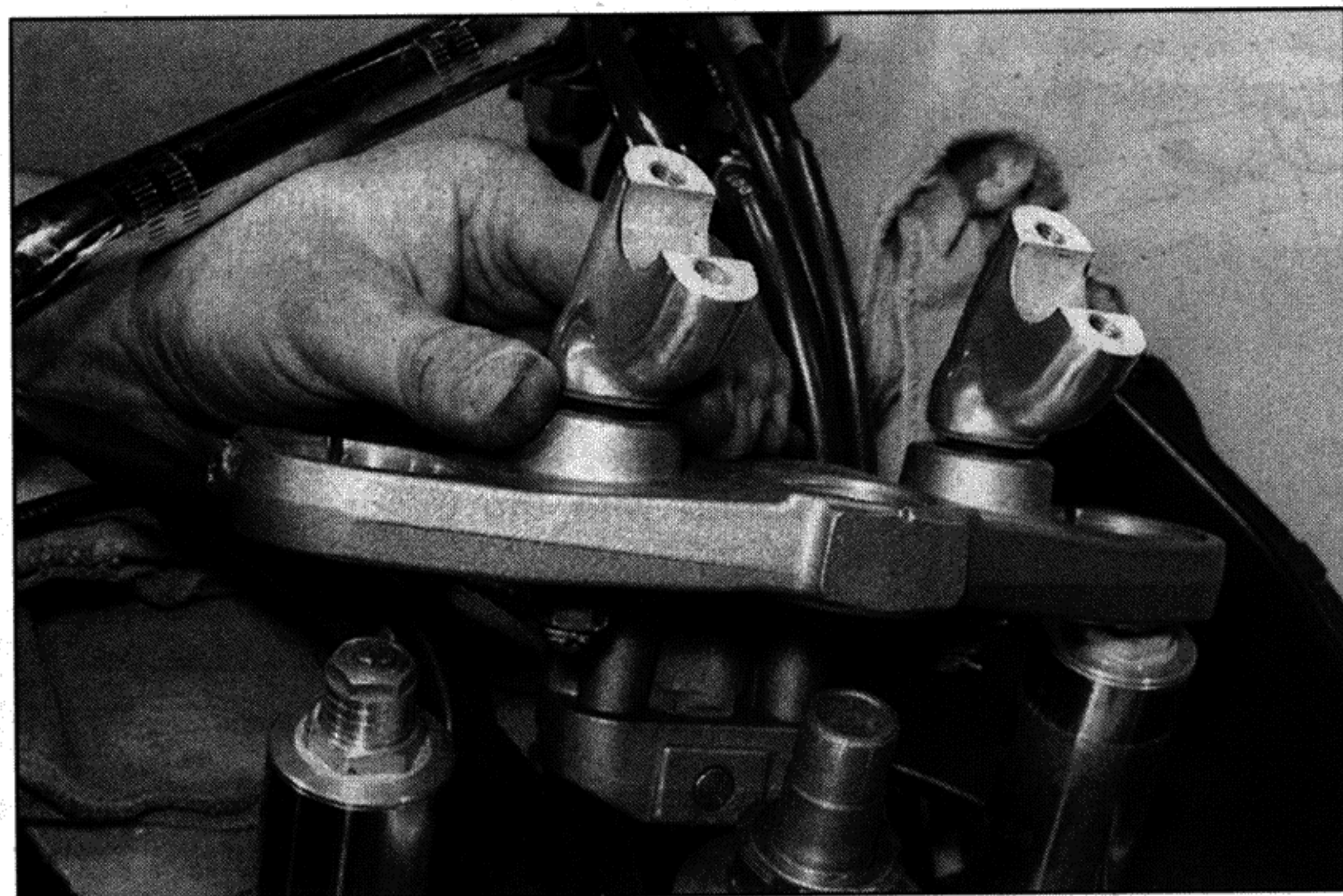
9 Remove the upper bearing from the top of the steering head. Remove all traces of old grease from the bearings and races and check them for wear or damage as described in Section 9. **Note:** Do not attempt to remove the outer races from the frame or the lower bearing from the steering stem unless they are to be renewed.



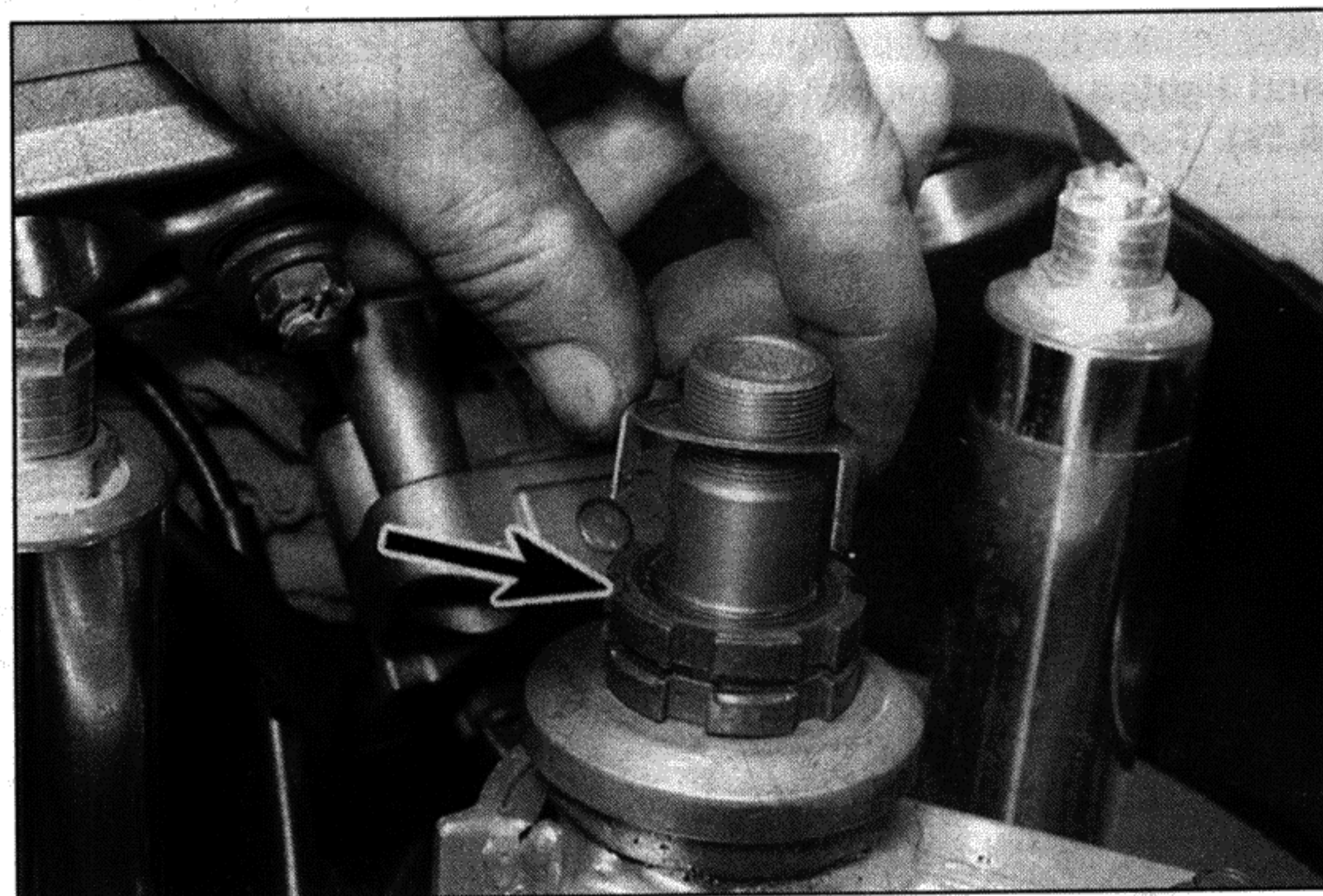
8.4b . . . and displace the brake hose union (A) and guide (B) from the bottom yoke by unscrewing the bolts



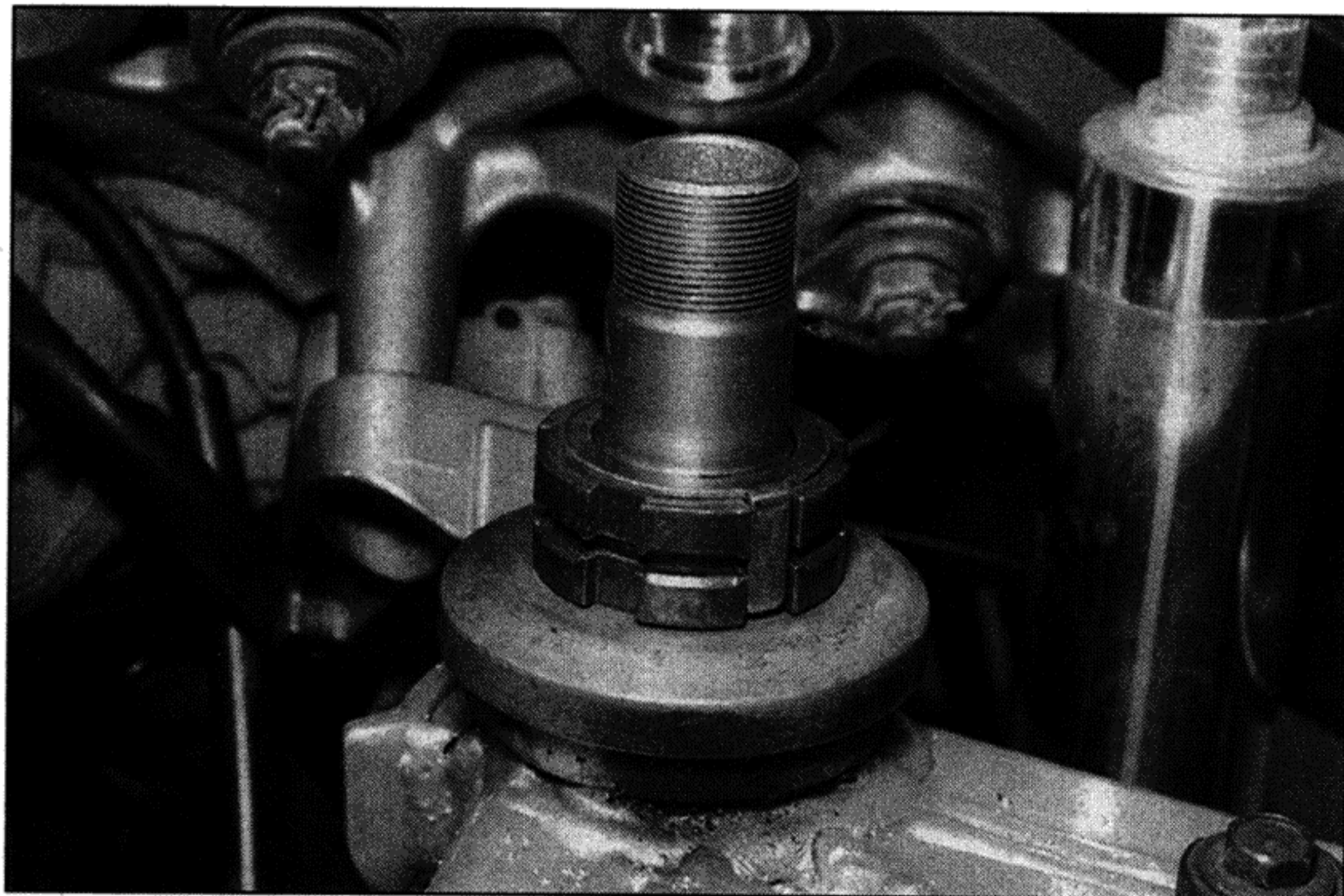
8.5a Unscrew the steering stem nut or bolt . . .



8.5b . . . and lift off the top yoke



8.6 Remove the lockwasher, then unscrew the locknut (arrowed)



8.12 Align the adjuster nut and locknut so that the lockwasher tabs fit into the notches in both



8.13 Tighten the steering stem nut or bolt to the specified torque

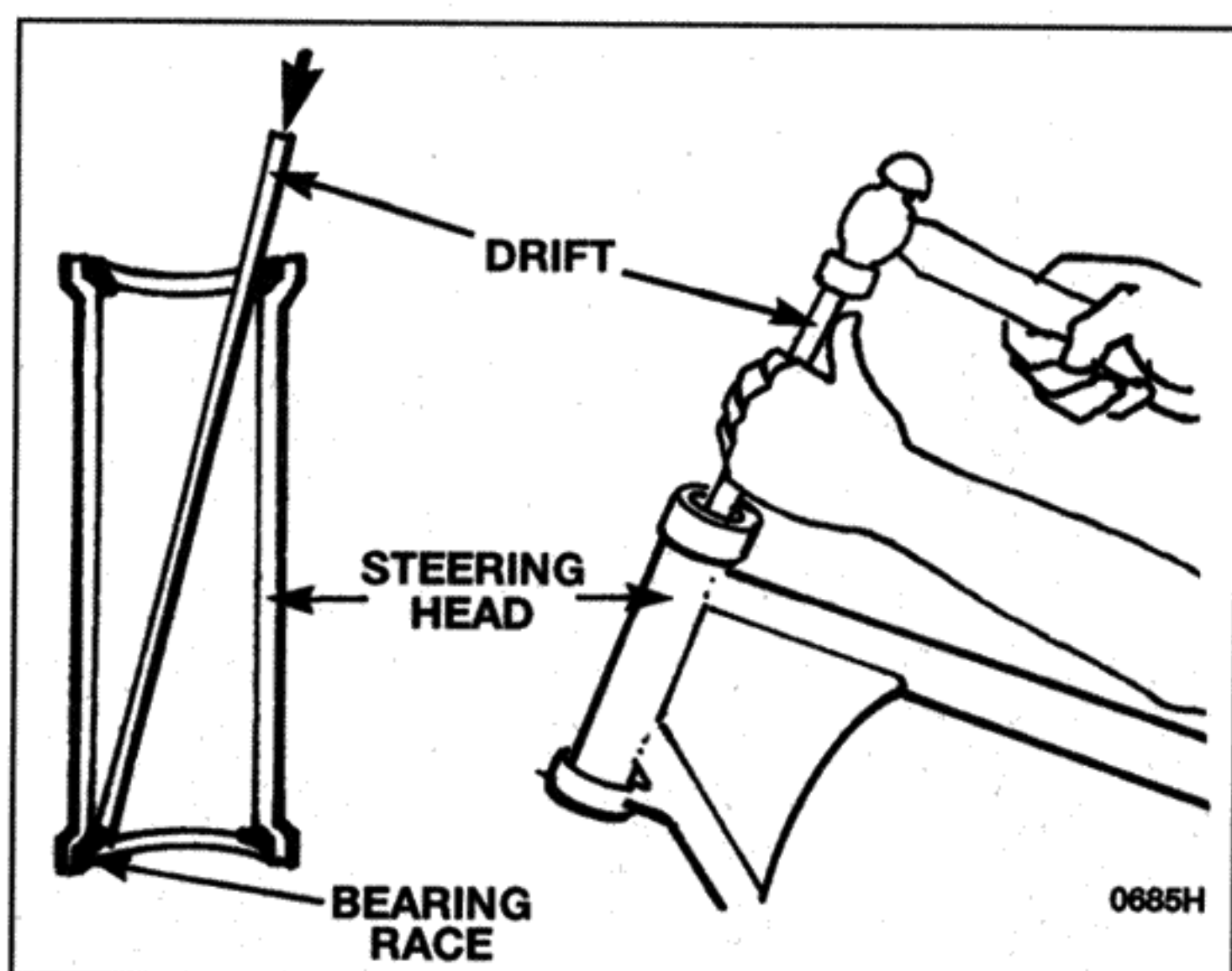
Installation

10 Smear a liberal quantity of lithium-based grease on the bearing races in the frame. Also work some grease well into both the upper and lower bearings.

11 Carefully lift the steering stem/bottom yoke up through the steering head. Fit the upper bearing into the top of the steering head, then install the bearing cover. Thread the adjuster nut onto the steering stem and adjust the bearings as described in Chapter 1.

12 On TDM and TRX models, install the washer and the locknut. On 1991 to 1995 TDM models the tapered side of the locknut must face down. Tighten the locknut finger-tight, then tighten it further until its notches align with those in the adjuster nut. If necessary, counter-hold the adjuster nut and tighten the locknut using a C-spanner or drift until the notches align, but make sure the adjuster nut does not turn as well. Install the tabbed lockwasher so that the tabs fit into the notches in both the locknut and adjuster nut (see illustration).

13 Fit the top yoke onto the steering stem (see illustration 8.5b), then install the washer (where fitted) and steering stem nut or bolt and tighten it finger-tight (see illustration 8.5a). Temporarily install one of the forks to



9.4 Drive the bearing outer races out with a drift as shown

align the top and bottom yokes, and secure it by tightening the bottom yoke clamp bolt only. Now tighten the steering stem nut or bolt to the torque settings specified at the beginning of the Chapter (see illustration).

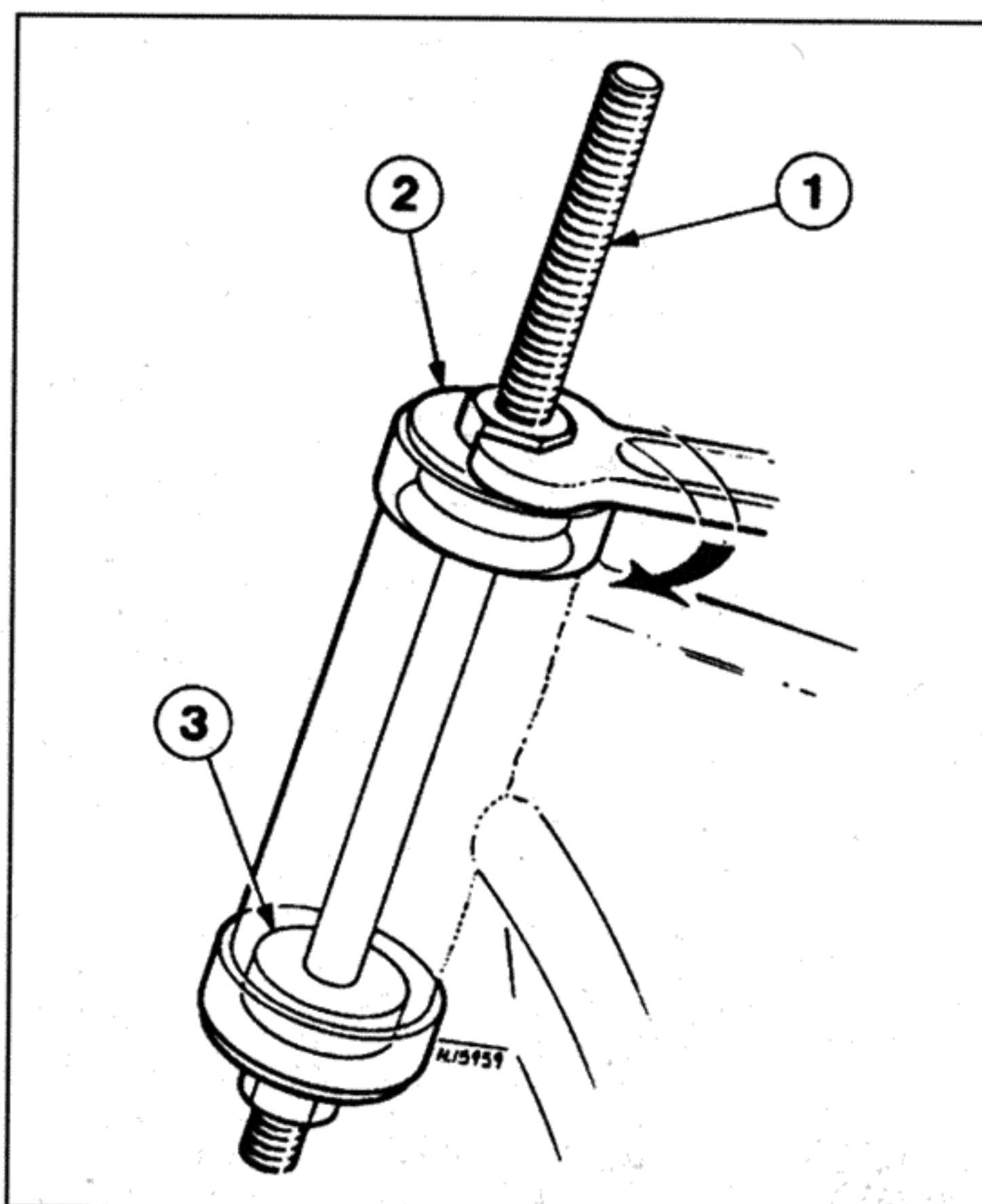
14 Install the remaining components in a reverse of the removal procedure.

15 Carry out a check of the steering head bearing freeplay as described in Chapter 1, and if necessary re-adjust.

9 Steering head bearings – inspection and replacement

Inspection

1 Remove the steering stem (see Section 8).



9.6 Drawbolt arrangement for fitting steering stem bearing outer races

- 1 Long bolt or threaded bar
- 2 Thick washer
- 3 Guide for lower race

2 Remove all traces of old grease from the bearings and races and check them for wear or damage.

3 The outer races should be polished and free from indentations. Inspect the bearing rollers for signs of wear, damage or discoloration, and examine the bearing roller retainer cage for signs of cracks or splits. Spin the bearings by hand. They should spin freely and smoothly. If there are any signs of wear on any of the above components both upper and lower bearing assemblies must be renewed as a set. Only remove the races if they need to be renewed – do not re-use them once they have been removed.

Replacement

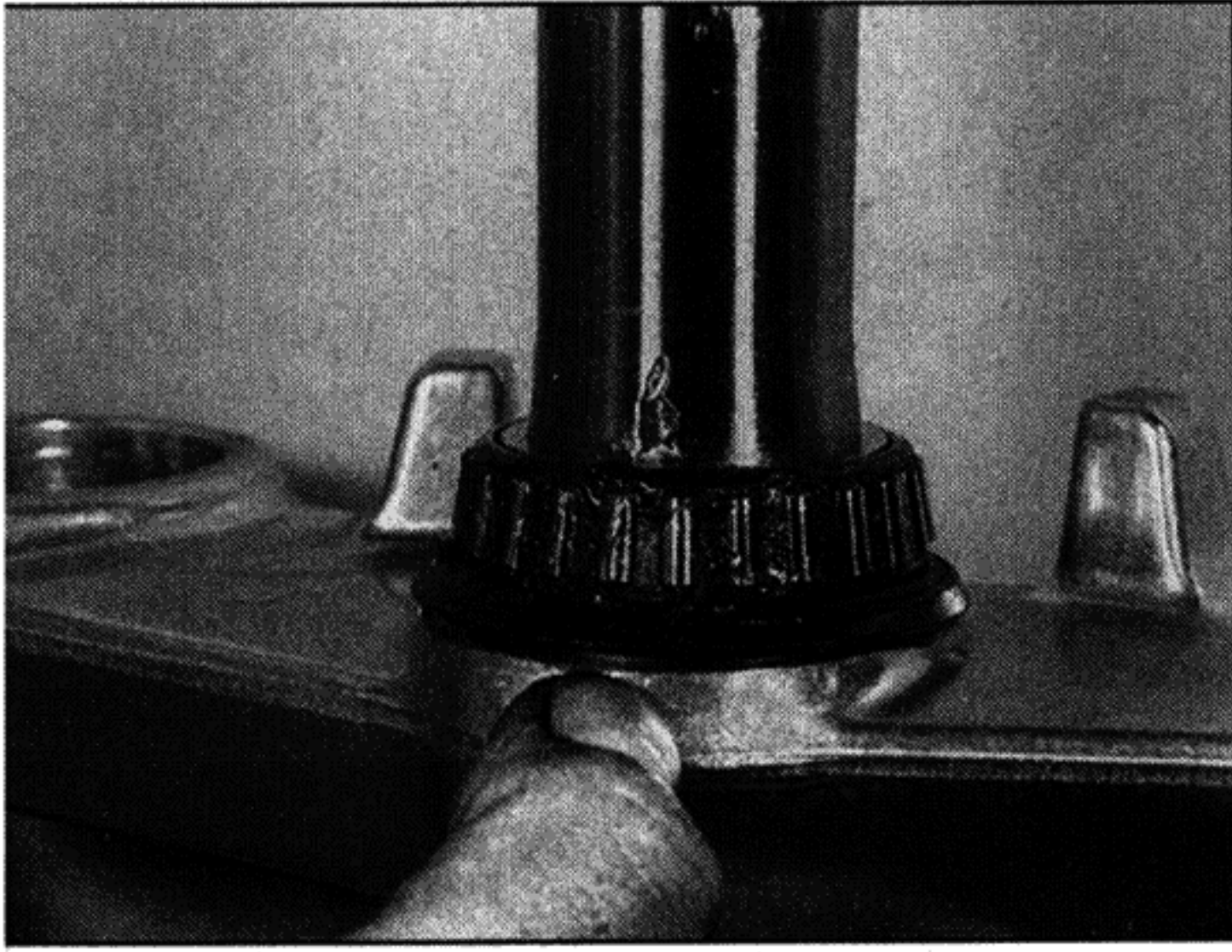
4 The outer races are an interference fit in the steering head and can be tapped from position with a suitable drift (see illustration). Tap firmly and evenly around each race to ensure that it is driven out squarely. It may prove advantageous to curve the end of the drift slightly to improve access.

5 Alternatively, the races can be removed using a slide-hammer type bearing extractor; these can often be hired from tool shops.

6 The new outer races can be pressed into the head using a drawbolt arrangement (see illustration), or by using a large diameter tubular drift which bears only on the outer edge of the race. Ensure that the drawbolt washer or drift (as applicable) bears only on the outer edge of the race and does not contact the working surface. Alternatively, have the races installed by a Yamaha dealer equipped with the bearing race installing tools.

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Installation of new bearing outer races is made much easier if the races are left overnight in the freezer. This causes them to contract slightly making them a looser fit. Alternatively, use a freeze spray.

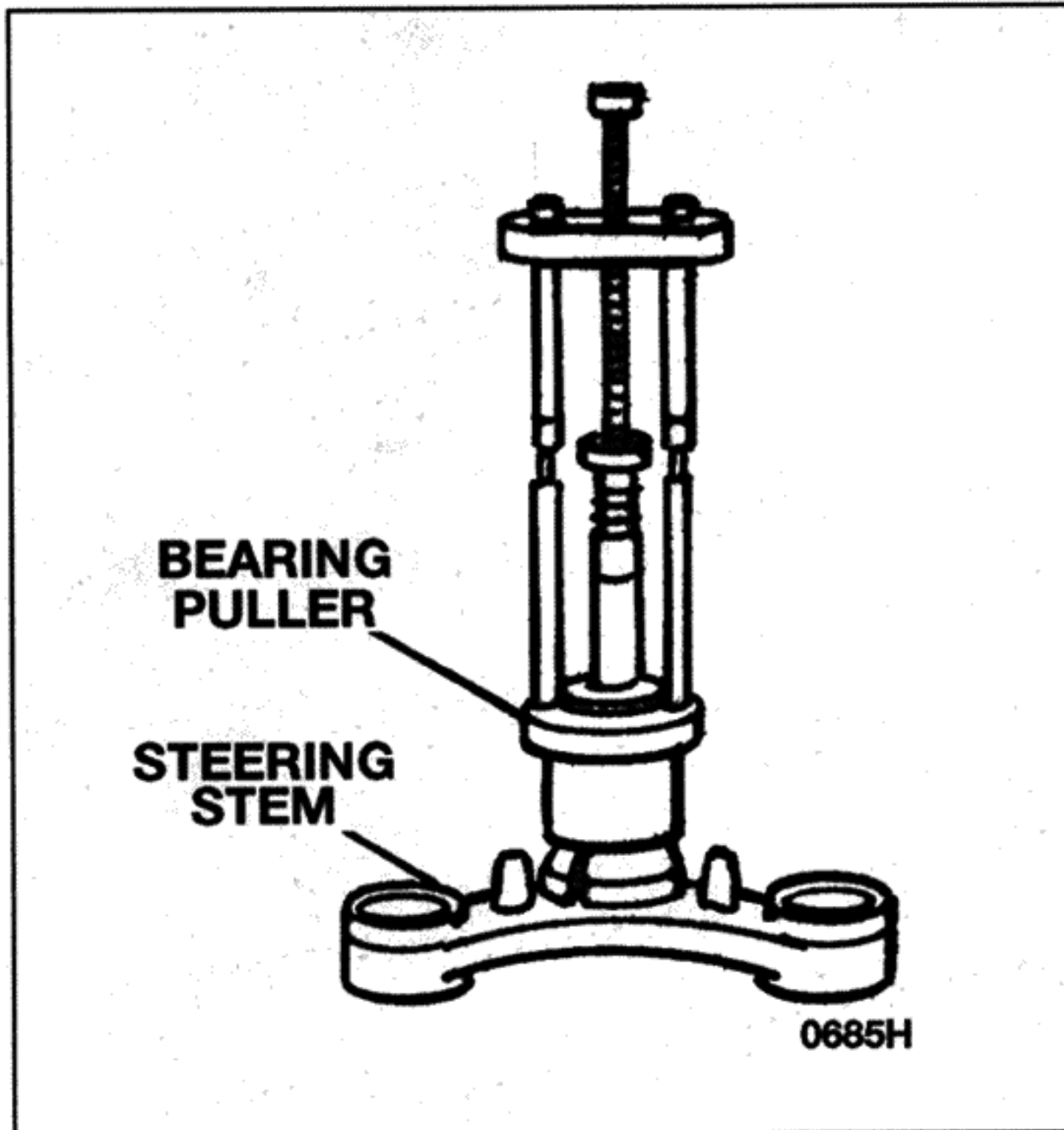


9.7a Remove the lower bearing and grease seal only if they are being renewed

7 The lower bearing should only be removed if a new one is being fitted (**see illustration**). To remove the lower bearing from the steering stem, use two screwdrivers placed on opposite sides of the race to work it free. If the bearing is firmly in place it will be necessary to use a bearing puller (**see illustration**), or in extreme circumstances to split the bearing's inner section using an angle grinder. Take the steering stem to a Yamaha dealer if required. Check the condition of the dust seal that fits under the lower bearing and renew it if it is worn, damaged or deteriorated.

8 Fit the new lower bearing onto the steering stem. A length of tubing with an internal diameter slightly larger than the steering stem will be needed to tap the new bearing into position (**see illustration**). Ensure that the drift bears only on the inner edge of the bearing and does not contact the rollers.

9 Install the steering stem (see Section 8).



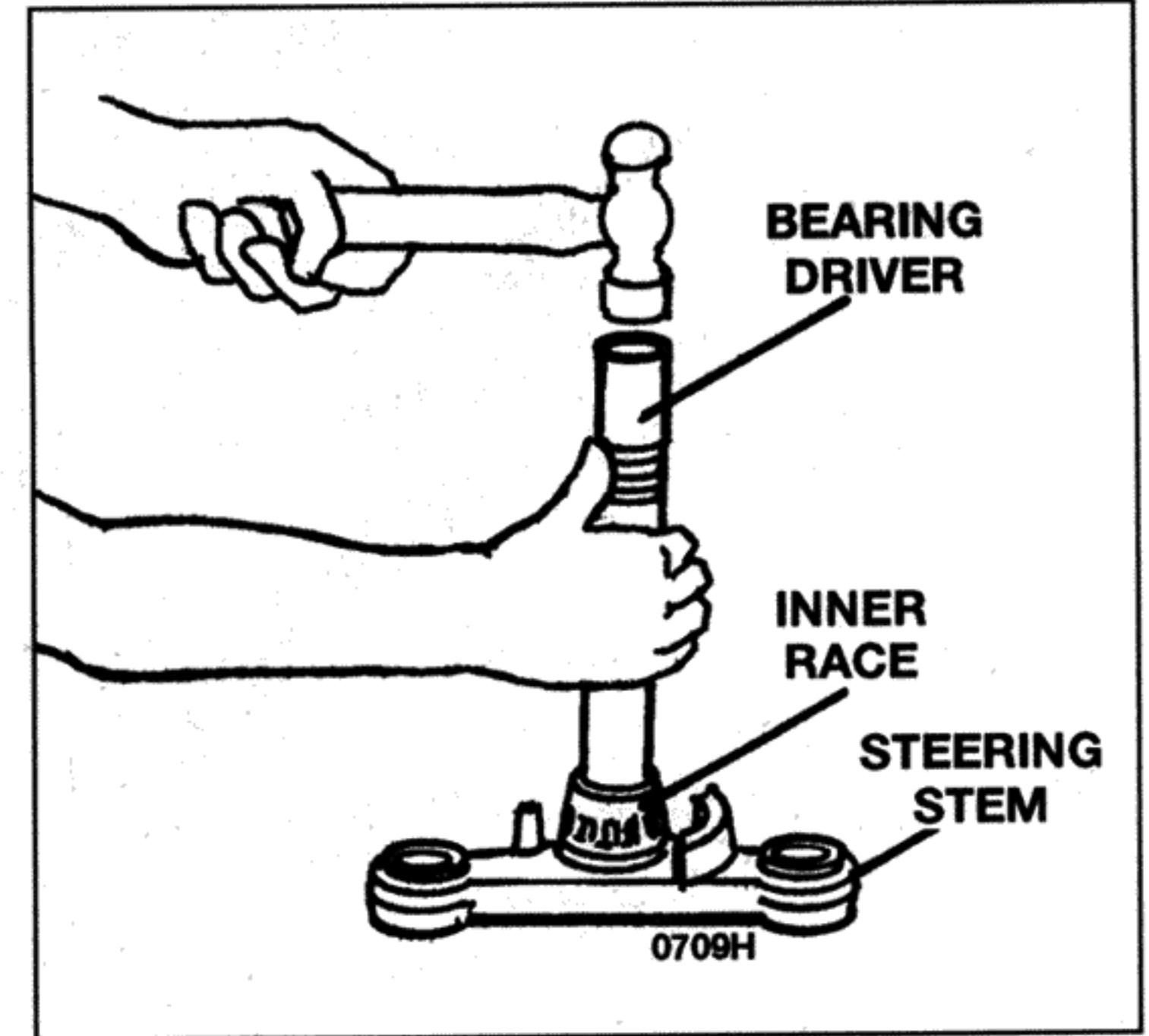
9.7b It is best to remove the lower bearing using a puller

securing the bottom of the shock absorber to the swingarm (**see illustrations**).

4 Unscrew the nut on the shock absorber upper mounting bolt (**see illustration**). Support the shock absorber and withdraw the upper mounting bolt, then manoeuvre the shock down and out of the bottom of the machine (**see illustration**).

TRX and XTZ models

5 Place the machine on an auxiliary stand. Position a support under the rear wheel so



9.8 Drive the new bearing on using a suitable bearing driver or a length of pipe that bears only against the inner race and not against the rollers or cage

that it does not drop when the shock absorber is removed, but also making sure that the weight of the machine is off the rear suspension so that the shock is not compressed.

6 Remove the seat (see Chapter 8). If required for improved clearance, also remove the exhaust system (see Chapter 4). On XTZ models, remove the fuel tank (see Chapter 4), and where fitted, remove the rubber boot from around the shock absorber lower mounting.

7 Unscrew the nut and withdraw the bolt

10 Rear shock absorber – removal, inspection and installation



Warning: Do not attempt to disassemble this shock absorber. It is nitrogen-charged under high pressure. Improper disassembly could result in serious injury. Instead, take the shock to a Yamaha dealer or suspension specialist with the proper equipment to do the job.

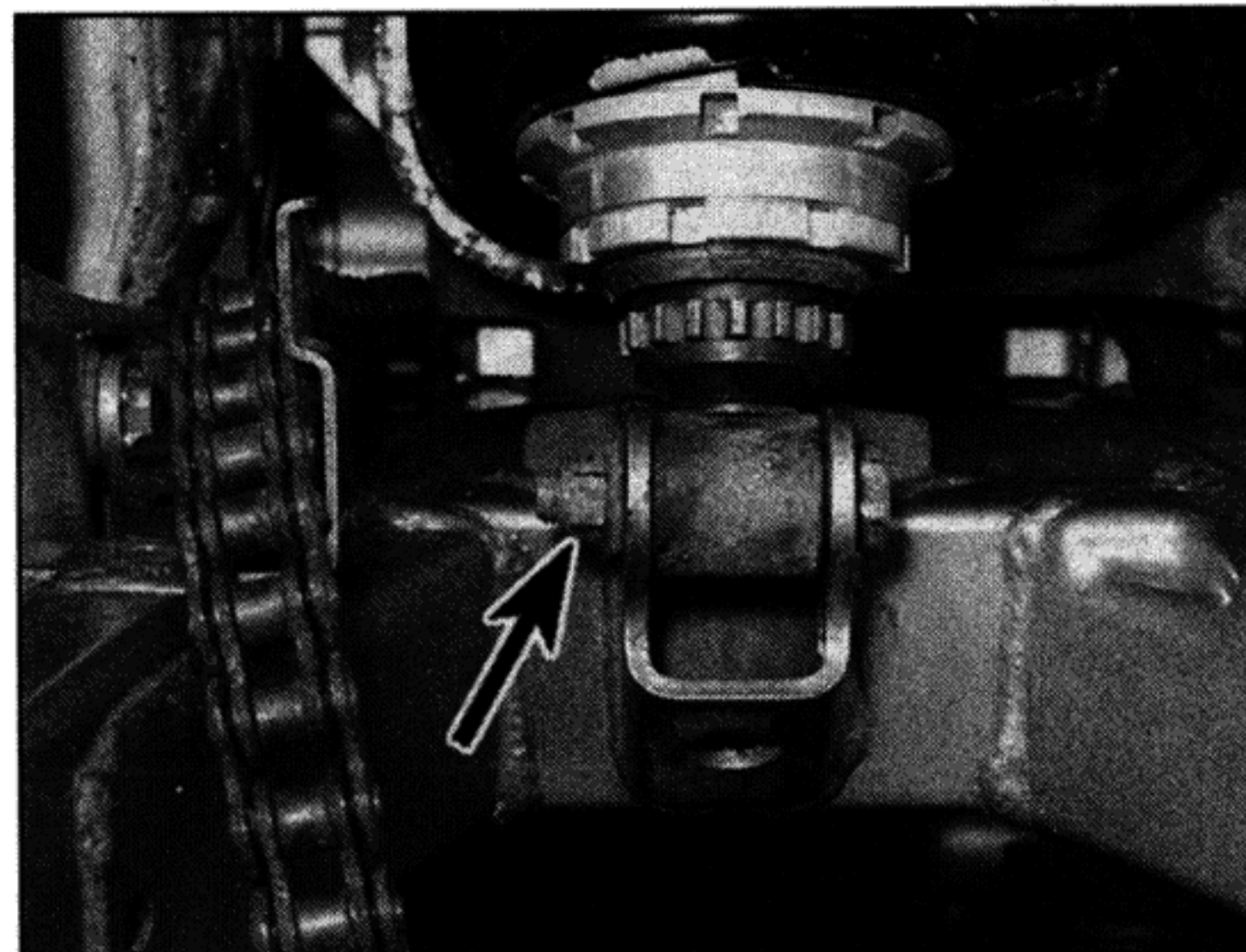
Removal

TDM models

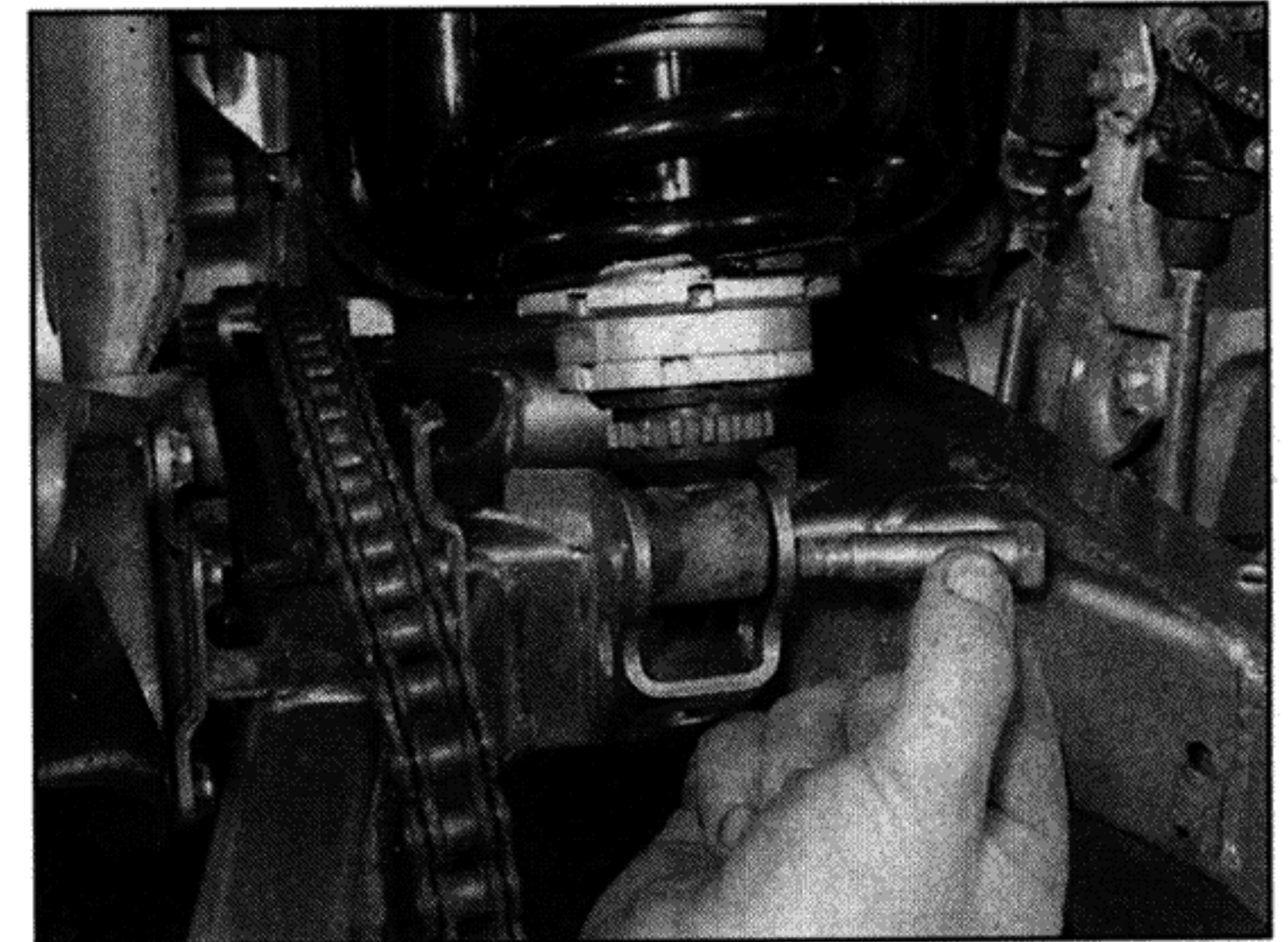
1 Place the machine on an auxiliary stand. Position a support under the rear wheel so that it does not drop when the shock absorber is removed, but also making sure that the weight of the machine is off the rear suspension so that the shock is not compressed.

2 Remove the seat (see Chapter 8).

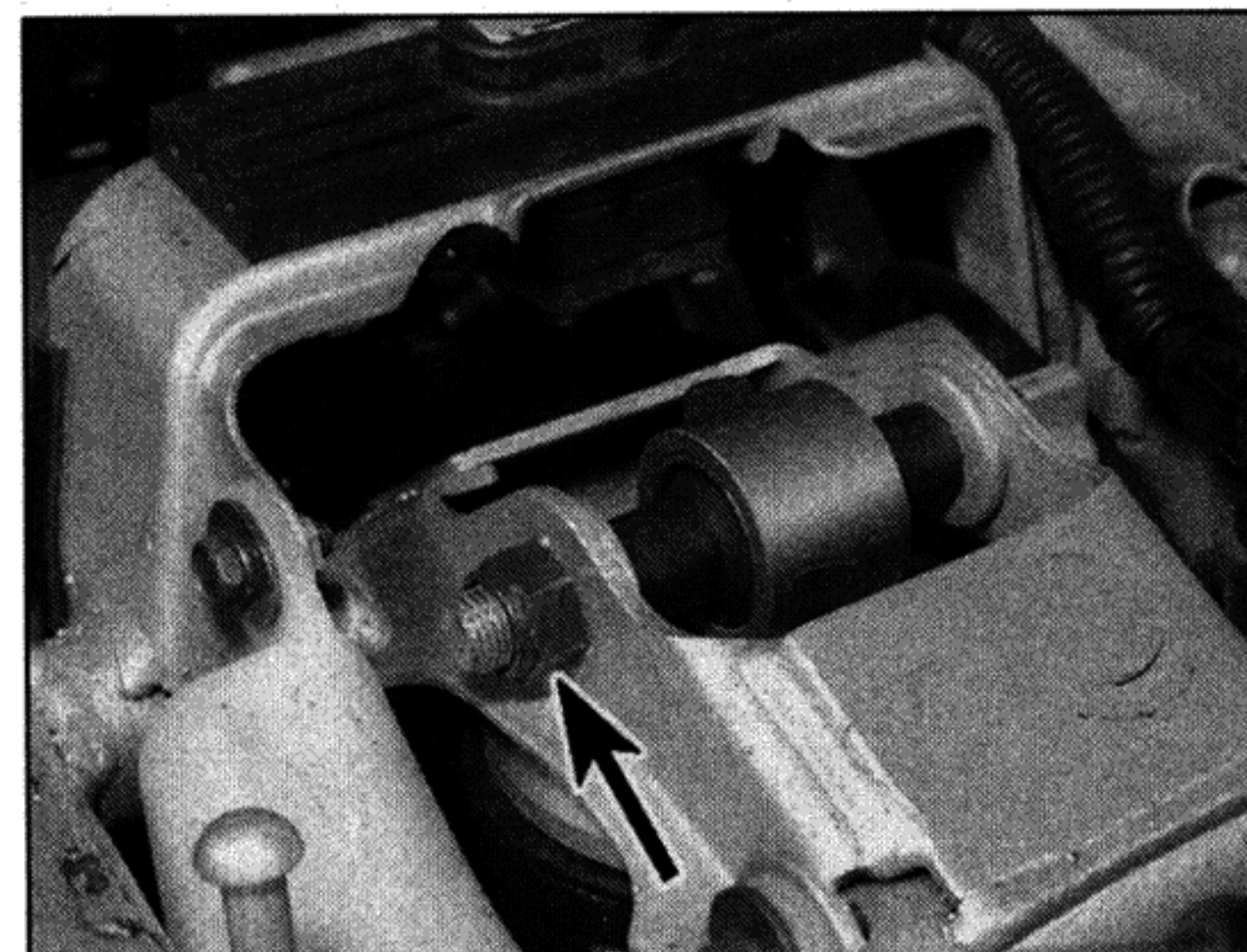
3 Unscrew the nut and withdraw the bolt



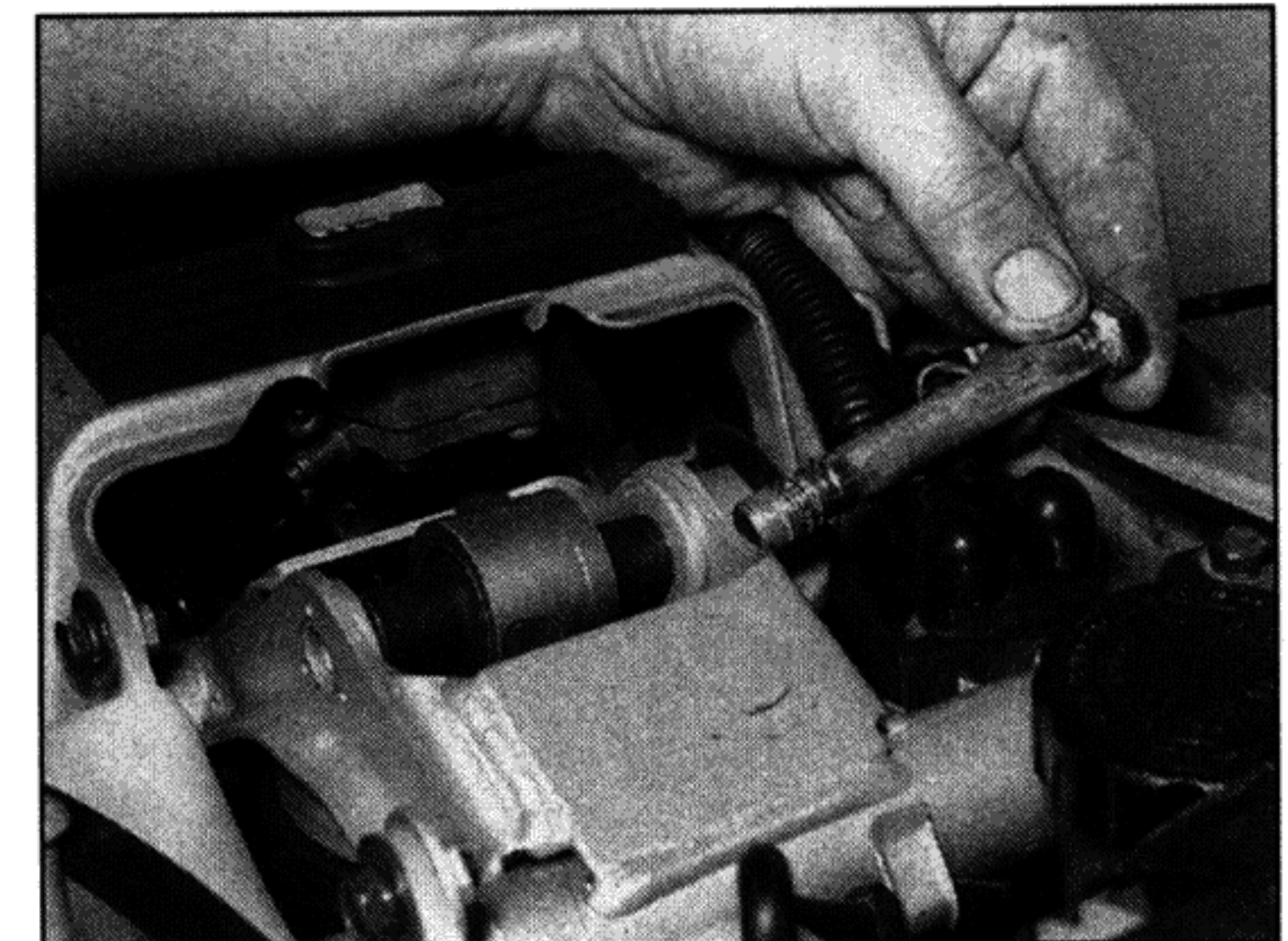
10.3a Unscrew the nut (arrowed) ...



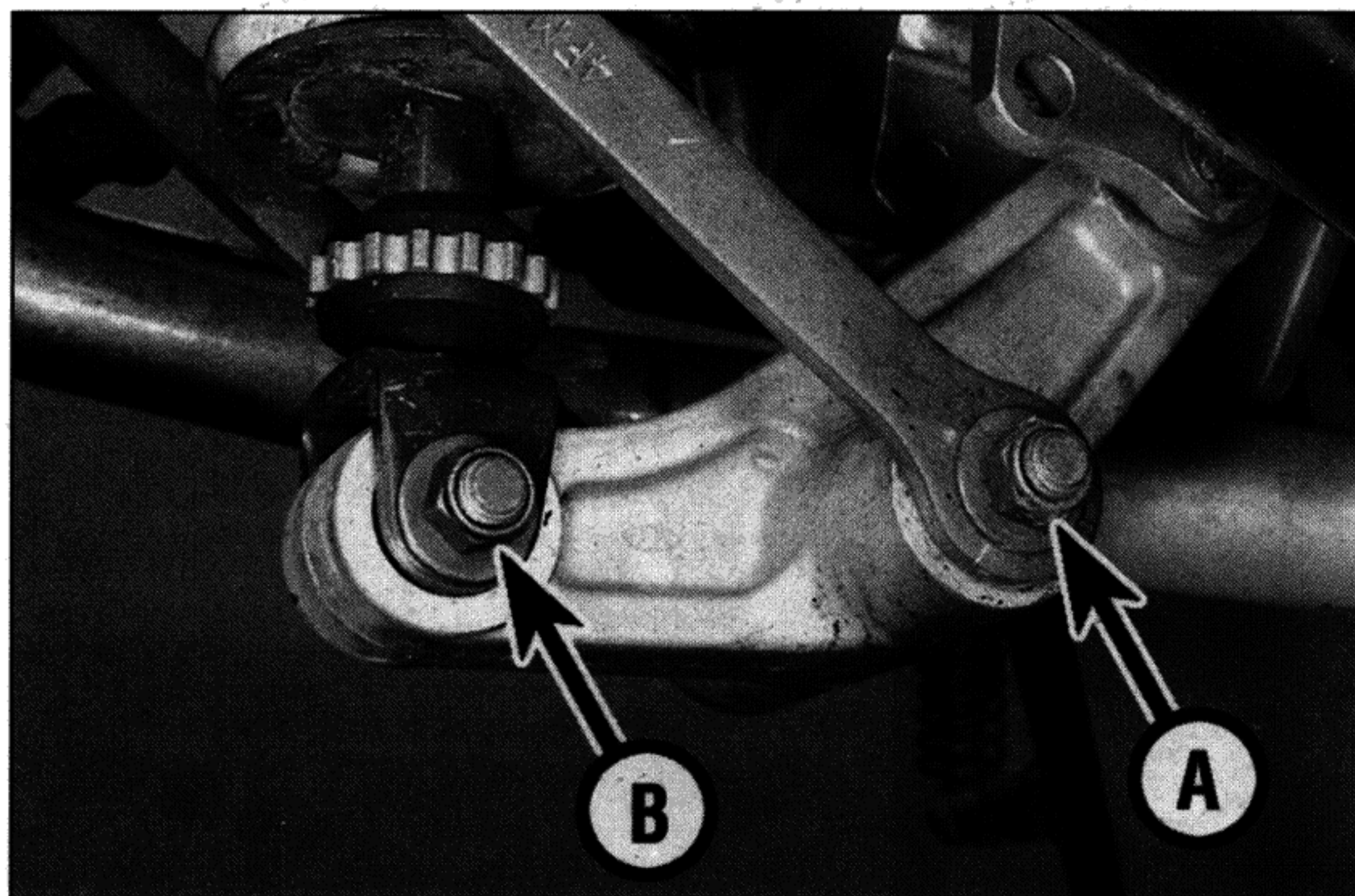
10.3b ... and withdraw the bolt



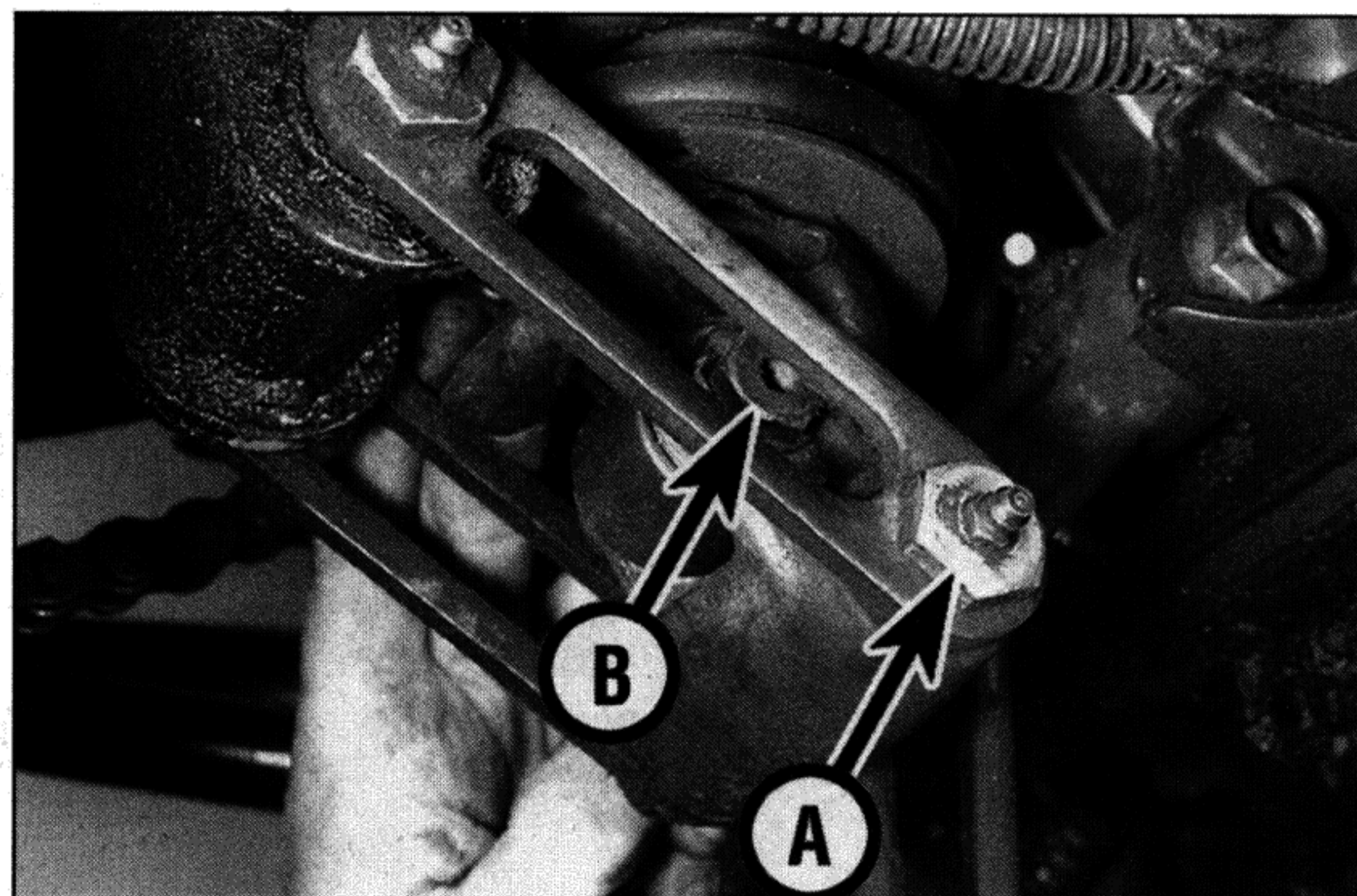
10.4a Unscrew the nut (arrowed) ...



10.4b ... then support the shock and withdraw the bolt



10.7a Linkage rod to linkage arm bolt (A), shock absorber lower mounting bolt (B) – TRX models



10.7b Linkage rod to linkage arm bolt (A), shock absorber lower mounting bolt (B) – XTZ models

securing the linkage rods to the linkage arm (see illustrations). Unscrew the nut and withdraw the bolt securing the bottom of the shock absorber to the suspension linkage arm. Swing the linkage rods rearwards and the linkage arm down.

8 On TRX models, slacken the clamp screw securing the reservoir to its holder and free the hose from its clip on the frame (see illustrations). Slip the reservoir out and feed it through to the shock absorber.

9 Unscrew the nut on the shock absorber upper mounting bolt (see illustrations).

10 Support the shock absorber and withdraw

the upper mounting bolt, then manoeuvre the shock down and out of the bottom of the machine, on TRX models feeding the reservoir through as you do.

Inspection

11 Inspect the shock absorber for obvious physical damage and the coil spring for looseness, cracks or signs of fatigue.

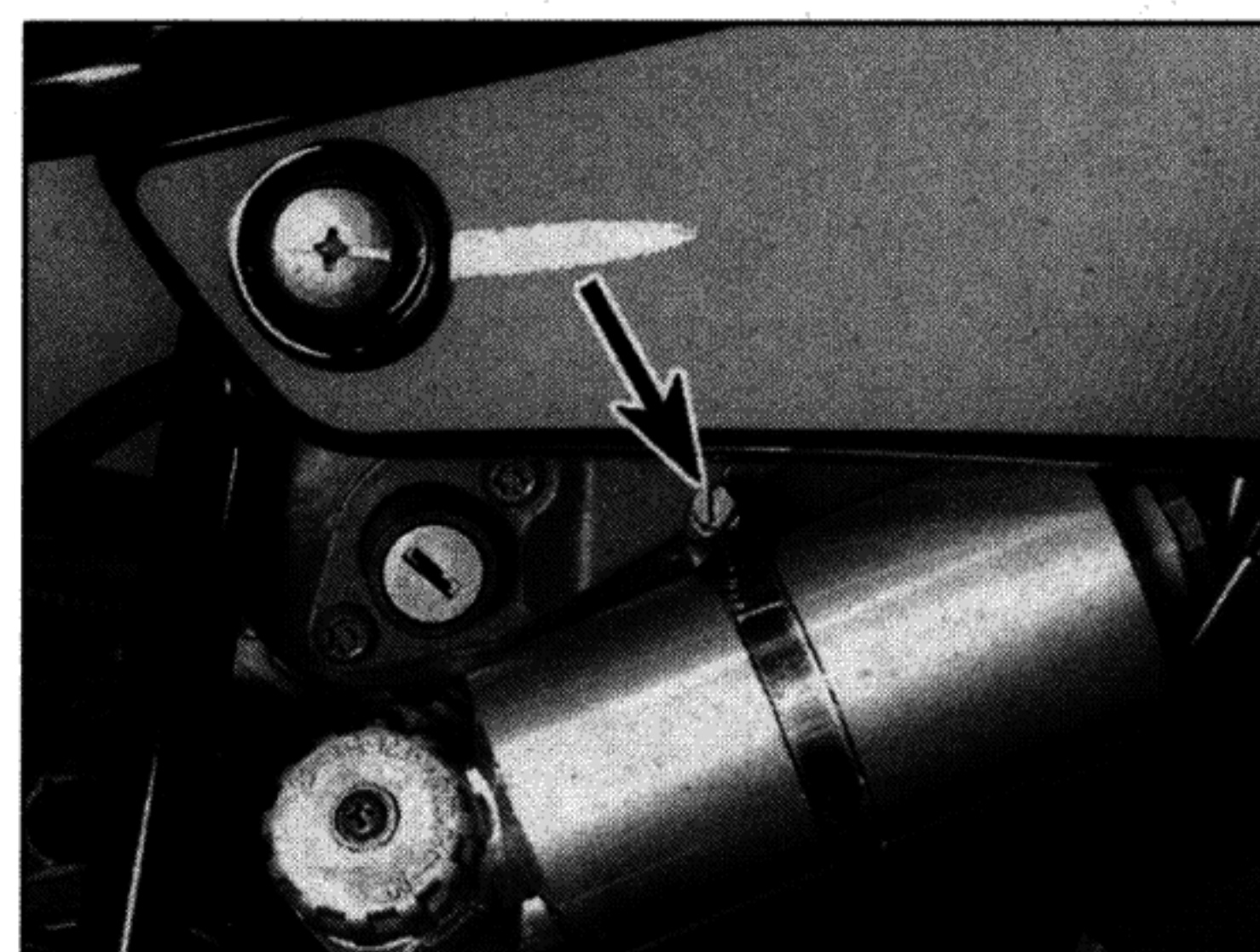
12 Inspect the damper rod for signs of bending, pitting and oil leakage (see illustration).

13 Inspect the pivot hardware at the top and bottom of the shock for wear or damage.

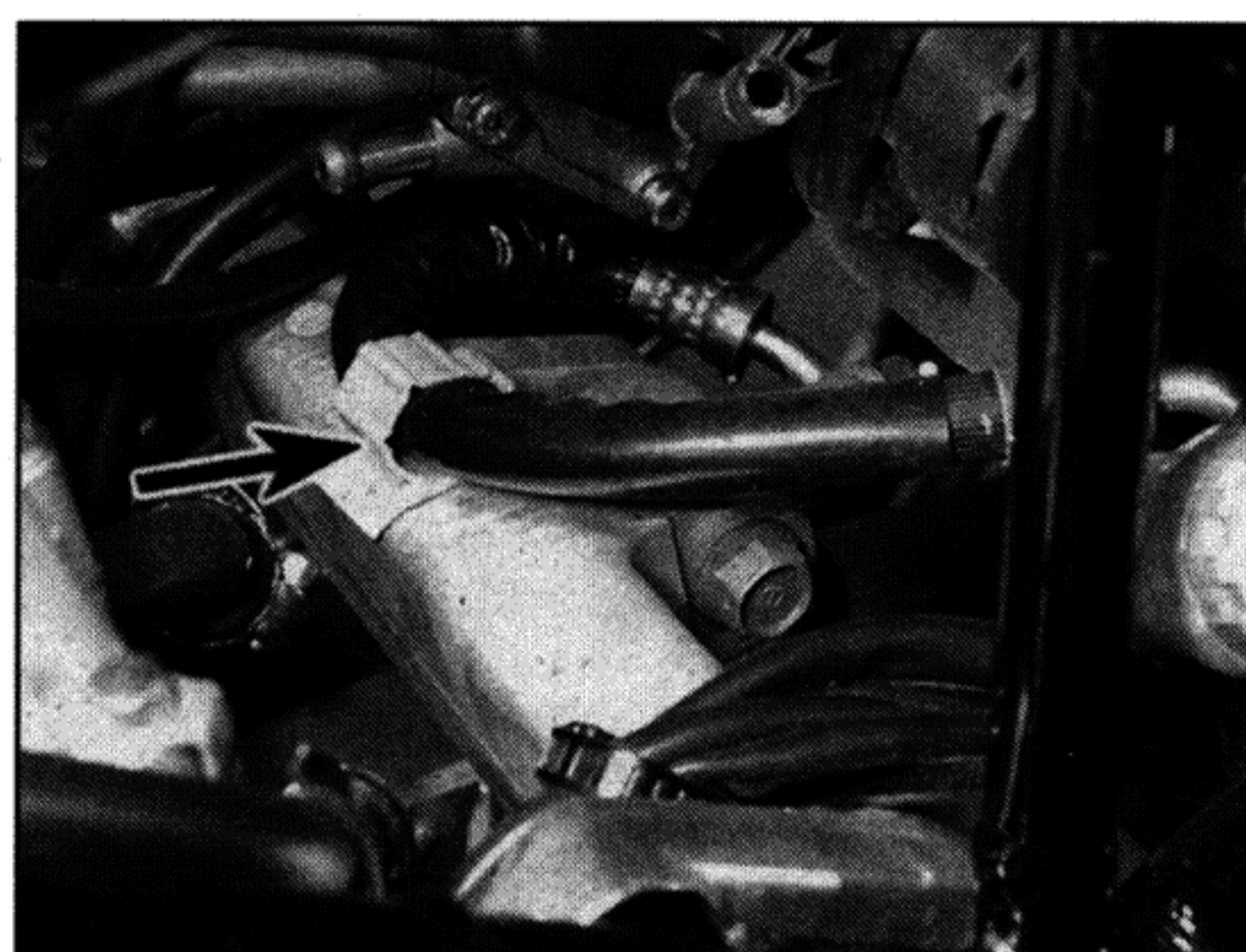
Installation

14 Installation is the reverse of removal. Apply molybdenum disulphide grease to the shock absorber and linkage rod pivot points. Install the bolts and nuts finger-tight only until all components are in position, then tighten the nuts to the torque settings specified at the beginning of the Chapter.

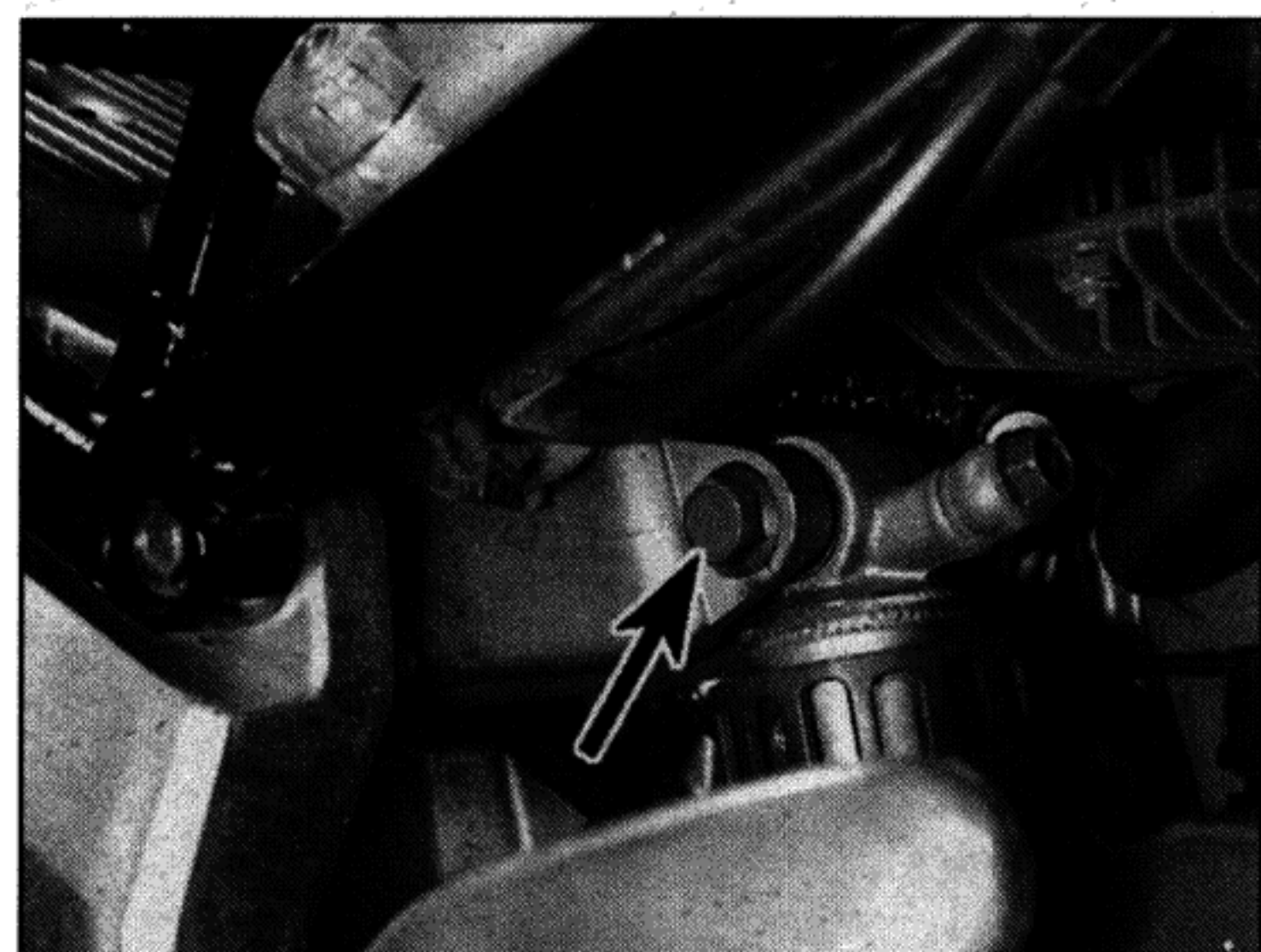
11 Rear suspension linkage (TRX and XTZ models) – removal, inspection and installation



10.8a Slacken the clamp screw (arrowed) and free the reservoir . . .



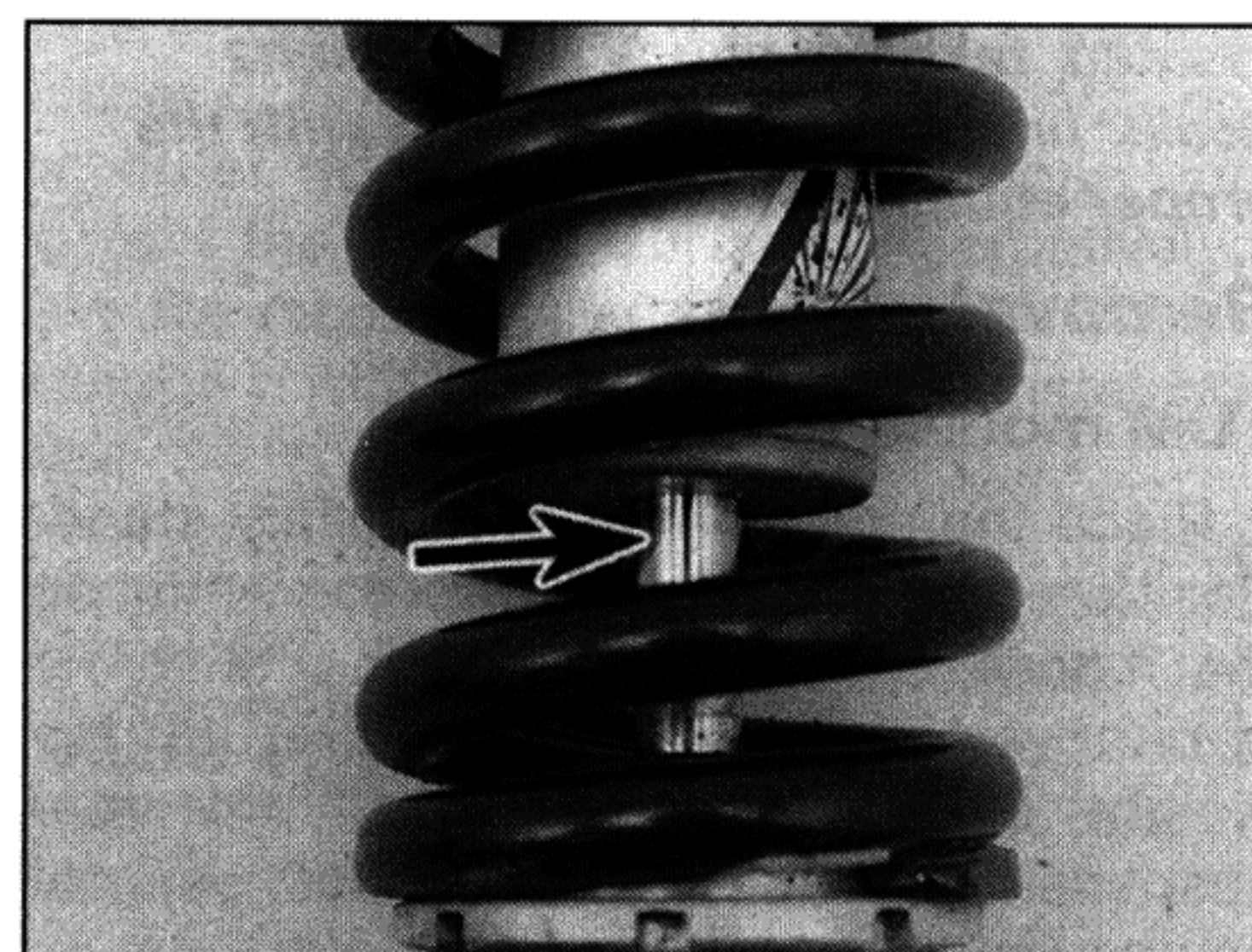
10.8b . . . and release the hose from its clip (arrowed)



10.9a Shock absorber upper mounting bolt (arrowed) – TRX models



10.9b Shock absorber upper mounting bolt (arrowed) – XTZ models



10.12 Look for cracks, pitting and oil leakage on the damper rod (arrowed)

Removal

1 Place the machine on an auxiliary stand. Position a support under the rear wheel so that it does not drop when the shock absorber lower mounting bolt is removed, but also making sure that the weight of the machine is off the rear suspension so that the shock is not compressed.

2 Remove the seat (see Chapter 8). If required for improved clearance, also remove the exhaust system (see Chapter 4). On XTZ models, where fitted, remove the rubber boot from around the shock absorber lower mounting.

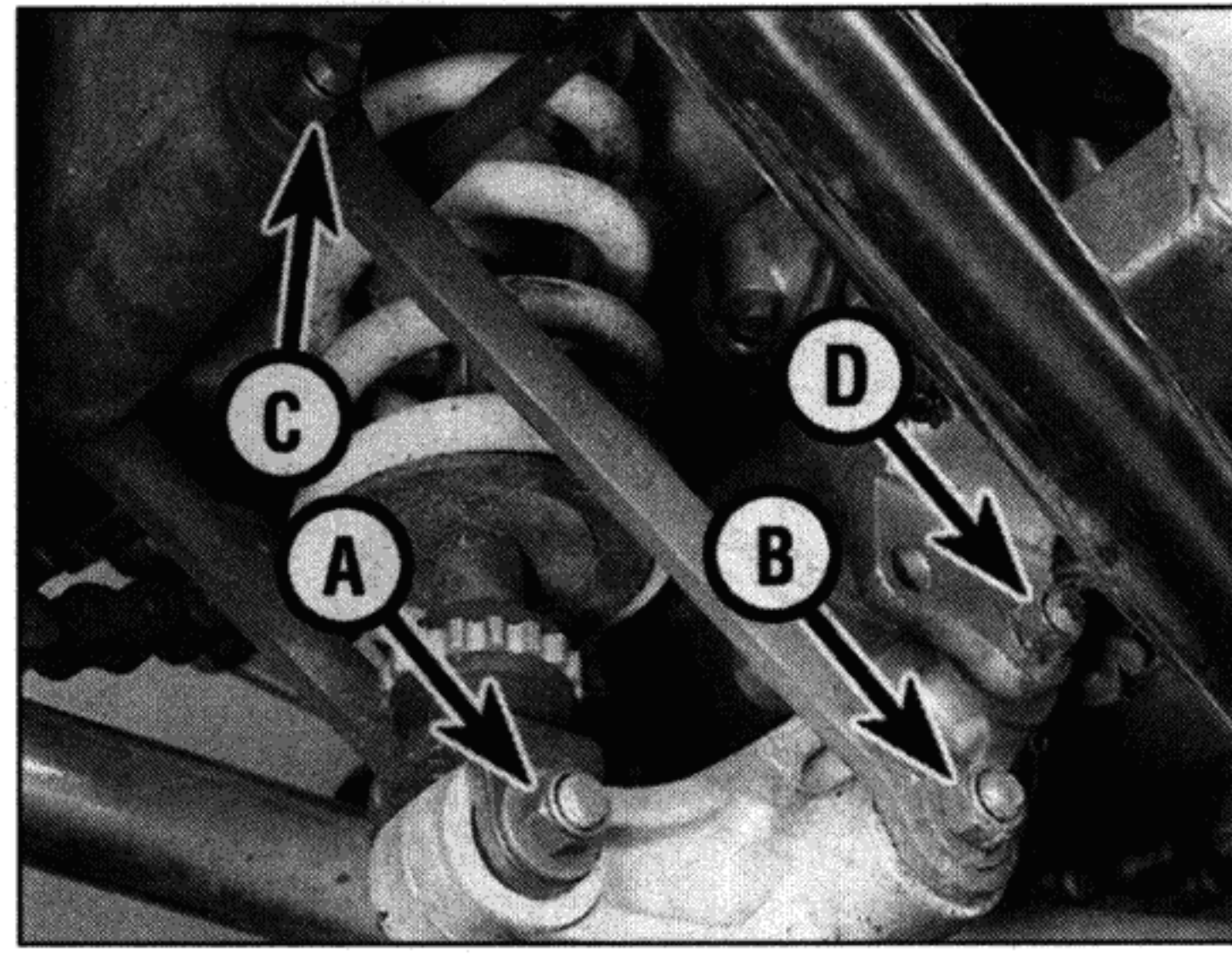
3 Unscrew the nuts and withdraw the bolts securing the shock absorber and the linkage rods to the linkage arm (**see illustrations**). Note which bolts fit where.

4 Unscrew the nut and withdraw the bolt securing the linkage rods to the swingarm and remove the rods.

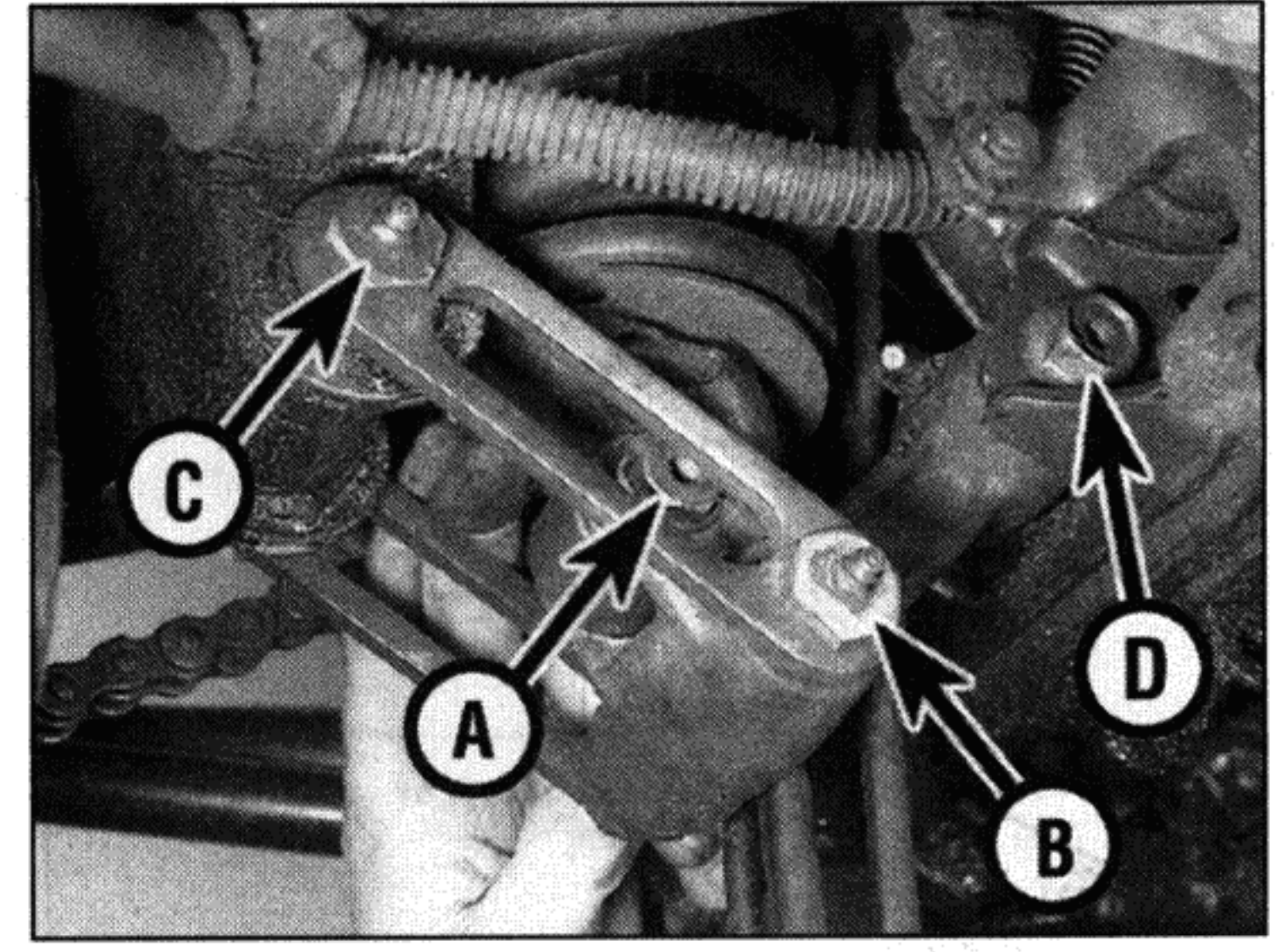
5 Unscrew the nut and withdraw bolt securing the linkage arm to the frame and remove the linkage arm, noting which way round it fits.

Inspection

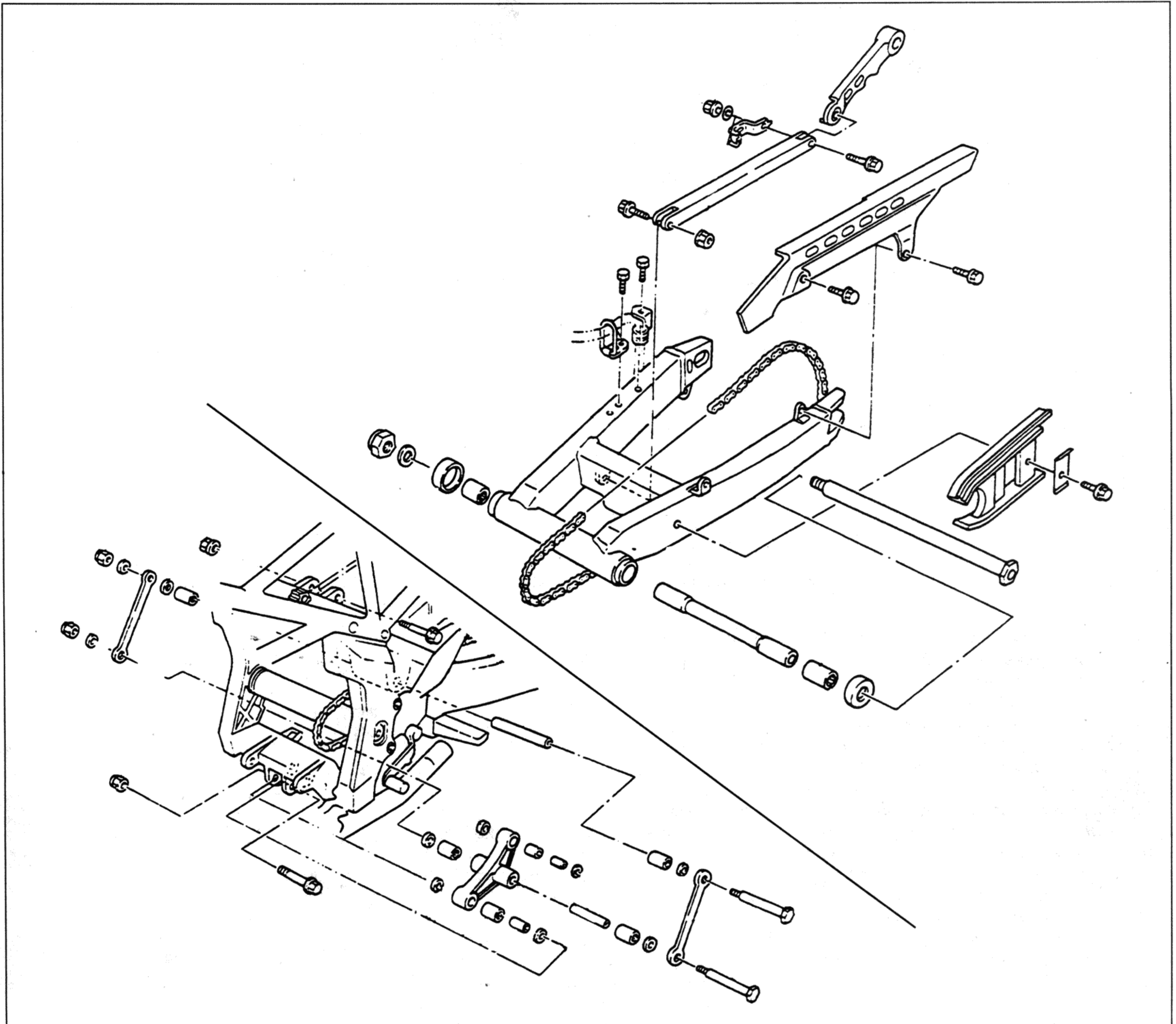
6 Withdraw the inner sleeves and lever out the grease seals from the linkage arm and swingarm, noting their different sizes (**see illustrations**). Thoroughly clean all



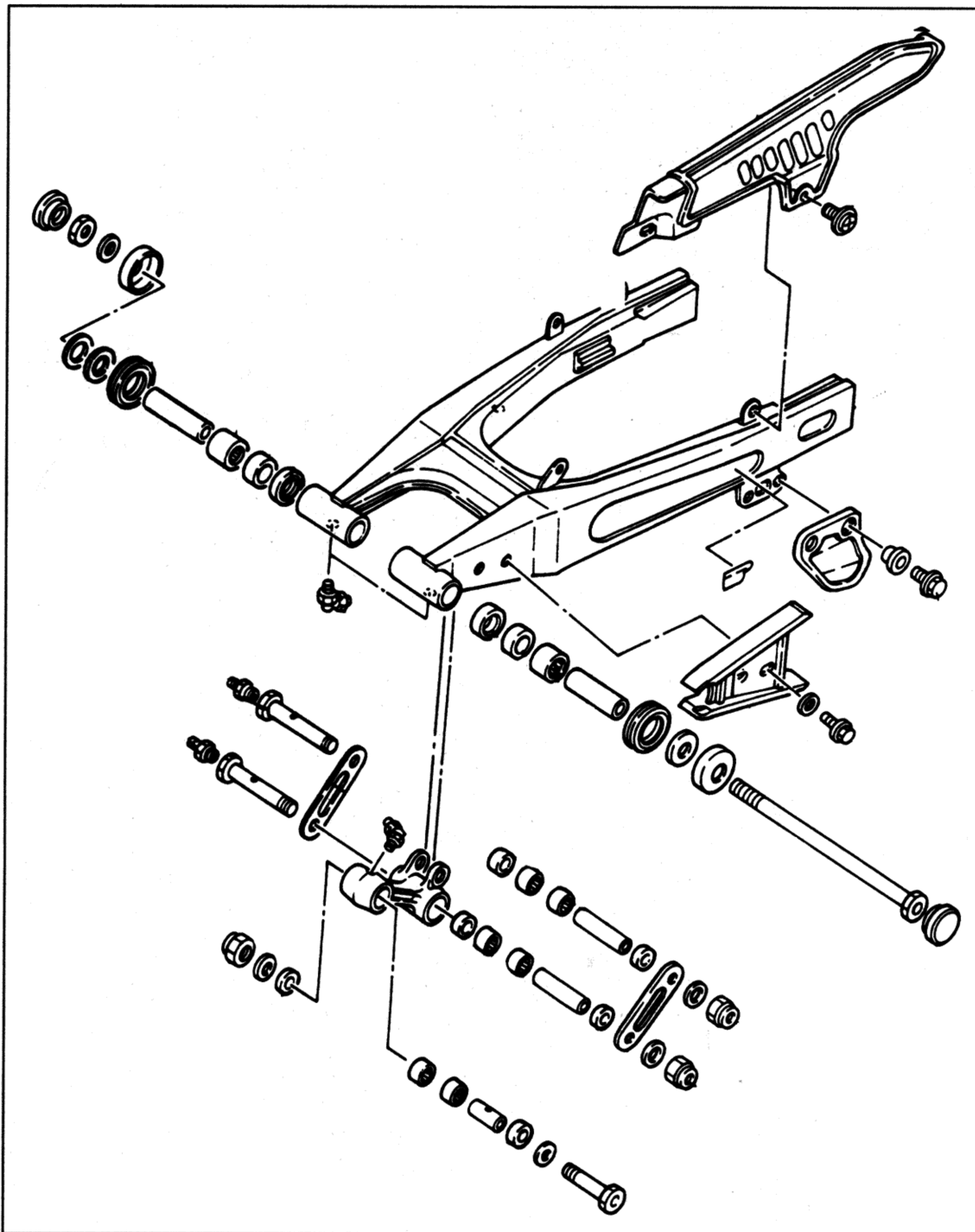
11.3a Shock absorber to linkage arm bolt (A), linkage rod to linkage arm bolt (B), linkage rod to swingarm bolt (C), linkage arm to frame bolt (D) – TRX models



11.3b Shock absorber to linkage arm bolt (A), linkage rod to linkage arm bolt (B), linkage rod to swingarm bolt (C), linkage arm to frame bolt (D) – XTZ models



11.6a Suspension linkage and swingarm assembly – TRX models



11.6b Suspension linkage and swingarm assembly – XTZ models

components, removing all traces of dirt, corrosion and grease. On XTZ models make sure that the grease nipple passages in the linkage arm and pivot bolts are clear.

7 Inspect all components closely, looking for obvious signs of wear such as heavy scoring, or for damage such as cracks or distortion.

8 Check the condition of the needle roller bearings in the linkage arm and swingarm.

9 Worn bearings can be drifted out of their bores, but note that removal will destroy them; new components should be obtained before work commences. The new ones should be pressed or drawn into their bores rather than driven into position. In the absence of a press, a suitable drawbolt arrangement can be made up as described below.

10 Obtain a long bolt or a length of threaded rod from a local engineering works or some other supplier. The bolt or rod should be

about one inch longer than the combined width of the linkage piece and one bearing. Also required are suitable nuts and two large and robust washers having a larger outside diameter than the bearing housing. In the case of the threaded rod, fit one nut to one end of the rod and stake it in place for convenience.

11 Fit one of the washers over the bolt or rod so that it rests against the head or staked nut, then pass the assembly through the relevant bore. Over the projecting end place the bearing, which should be greased to ease installation, followed by the remaining washer and nut.

12 Holding the bearing to ensure that it is kept square, slowly tighten the nut so that the bearing is drawn into its bore.

13 Once it is fully home, remove the drawbolt arrangement and, if necessary, repeat the procedure to fit the other bearings.

14 Lubricate the needle roller bearings and the spacers with molybdenum disulphide grease (TRX models) or lithium-based grease (XTZ models) and install the inner sleeves.

15 Check the condition of the grease seals and renew them if they are damaged or deteriorated. Press the seals squarely into place.

Installation

16 Installation is the reverse of removal. Apply molybdenum disulphide grease (TRX models) or lithium-based grease (XTZ models) to the pivot points. Install the bolts and nuts finger-tight only until all components are in position, then tighten the nuts to the torque settings specified at the beginning of the Chapter.

12 Suspension – adjustments

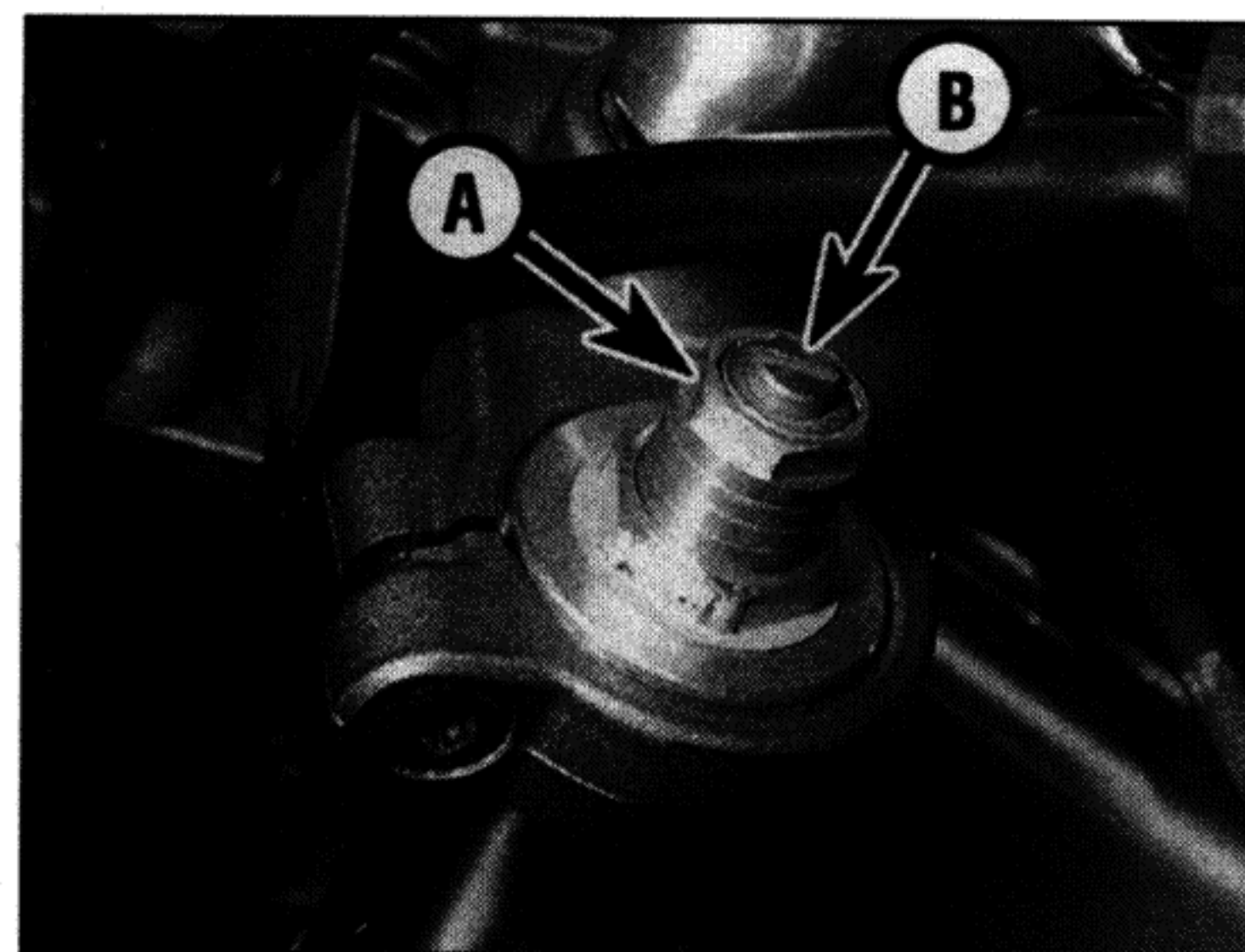


Front forks

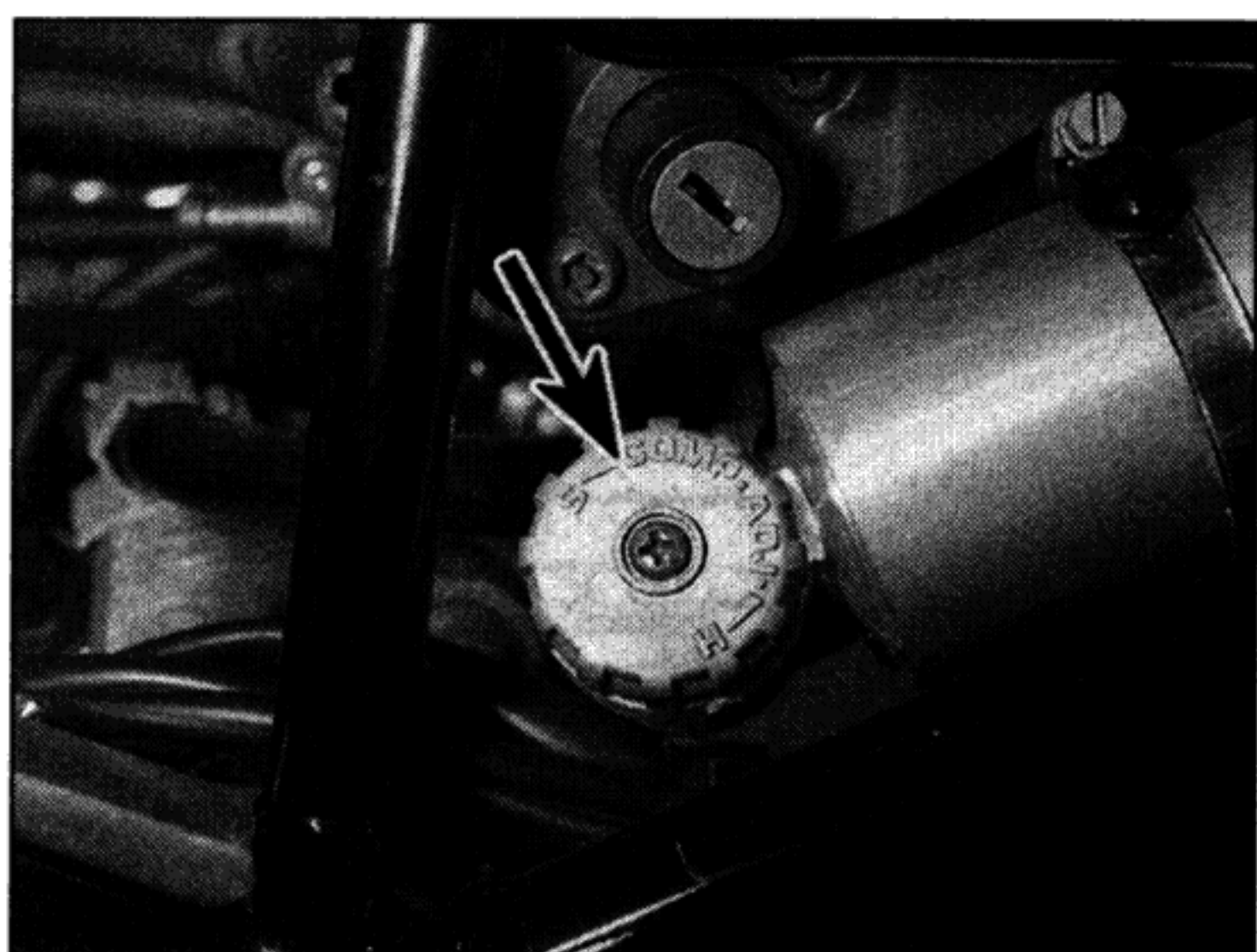
1 On XTZ models, the front forks are not adjustable.

2 On TDM and TRX models, spring pre-load is adjusted using a suitable spanner on the adjuster flats on the top of the forks (**see illustration**). The amount of pre-load is indicated by lines on the adjuster. There are five lines on TDM models and eight on TRX models. The standard position is with the fifth (1991 to 1995 TDM models), third (1996-on TDM models) or sixth (TRX models) line just visible above the top bolt hex. Turn the adjuster clockwise to increase pre-load and anti-clockwise to decrease it. Always make sure both adjusters are set equally.

3 On TDM models, rebound damping is adjusted using a screwdriver in the slot in the adjuster protruding from the pre-load adjuster (**see illustration 12.2**). The amount of damping is indicated by the number of clicks when turned anti-clockwise from the fully screwed-in position. There are six positions on 1991 to 1995 TDM models, and five on 1996-on TDM models. The standard position is four clicks out. Turn the adjuster clockwise



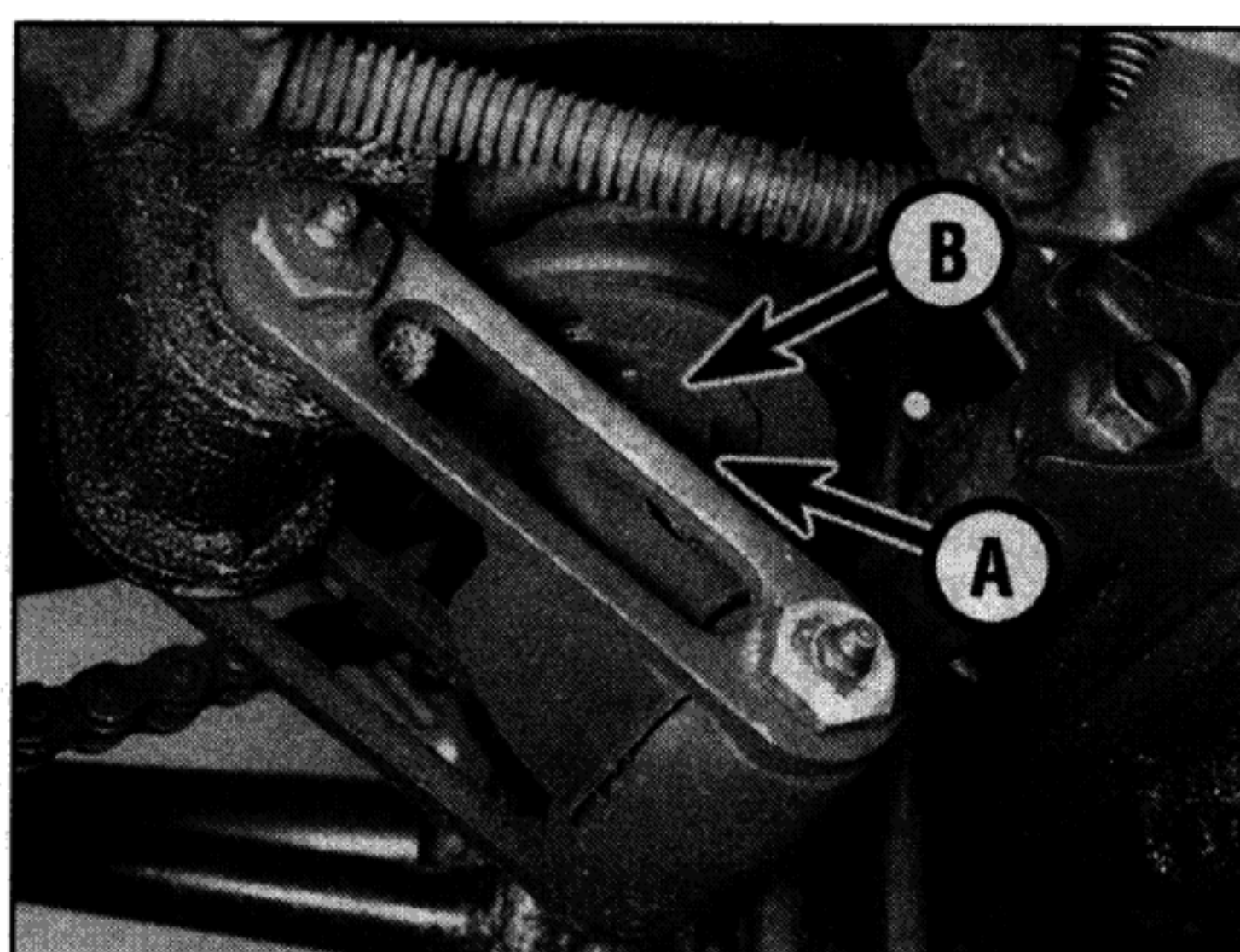
12.2 Spring pre-load adjuster (A), rebound damping adjuster (B) – TDM and TRX models



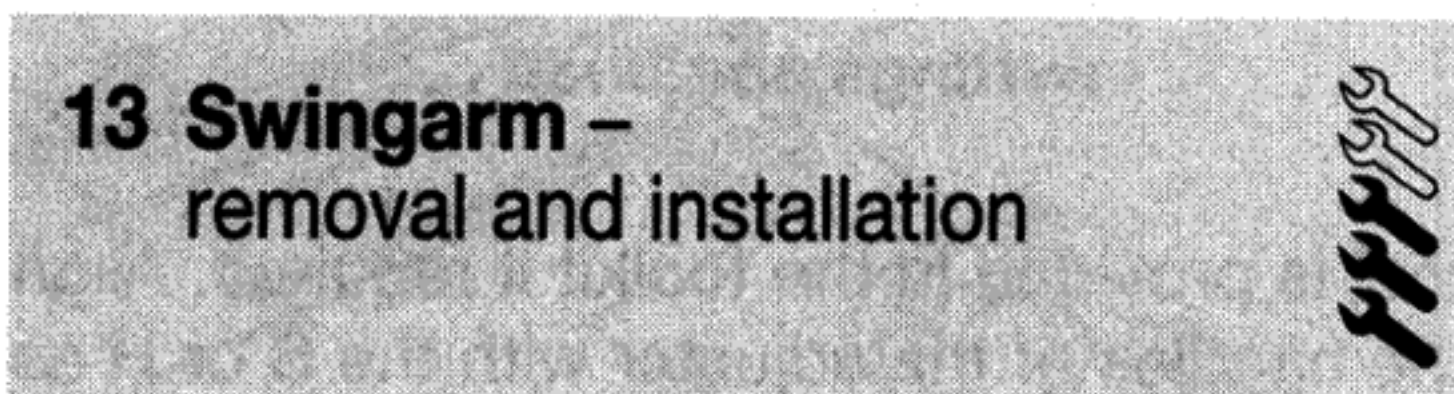
12.9 Compression damping adjuster – TRX models

the shock absorber reservoir (see illustration). Turn the adjuster clockwise to increase damping and anti-clockwise to decrease it. To establish the current setting, turn the adjuster in (clockwise) until it stops, counting the number of clicks, then reset it as required by turning it out. There are twenty positions. The standard position is ten clicks out.

10 On XTZ models, pre-load adjustment is made by slackening the locknut on the base of the shock absorber, then turning the adjuster nut clockwise (as you look up at it from the bottom) to increase pre-load and anti-clockwise to decrease it (see illustration). Refer to the diagram for the standard, maximum and minimum settings (see illustration). Tighten the locknut securely after adjustment.

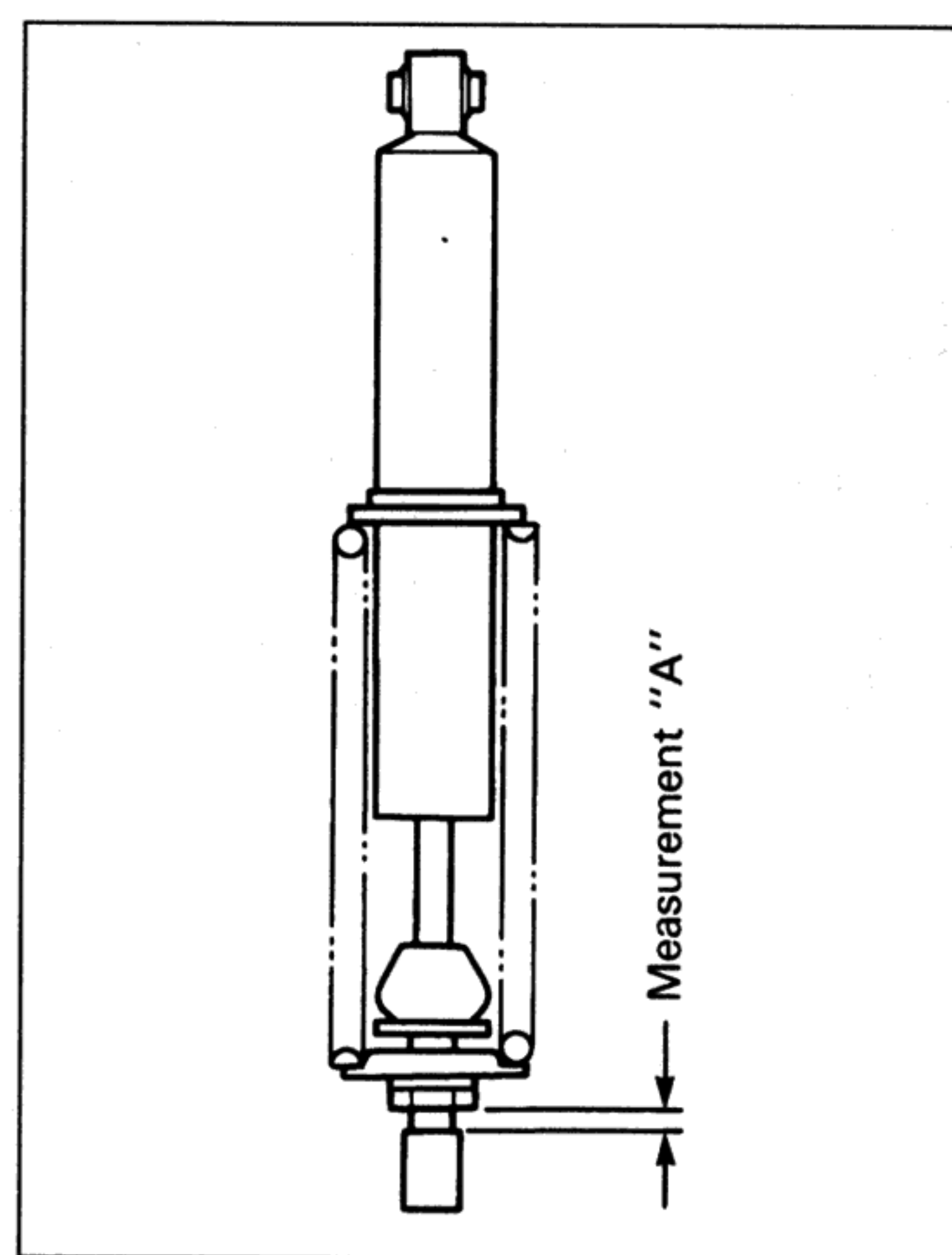


12.10a Slacken the locknut (A) and turn the adjuster (B) as required . . .



Removal

- 1** Remove the rear wheel (see Chapter 7).
- 2** On XTZ models, the swingarm side clearance should be measured prior to removal. Push the swingarm to one side of the frame, then slip a feeler gauge between the frame and the swingarm on the side from which the swingarm was pushed and measure the clearance. If it is greater than specified, refer to Section 14.
- 3** On TDM models, unscrew the bolt which secures the caliper bracket to the swingarm and remove the bracket (see Chapter 7,



12.10b . . . and according to the specified settings

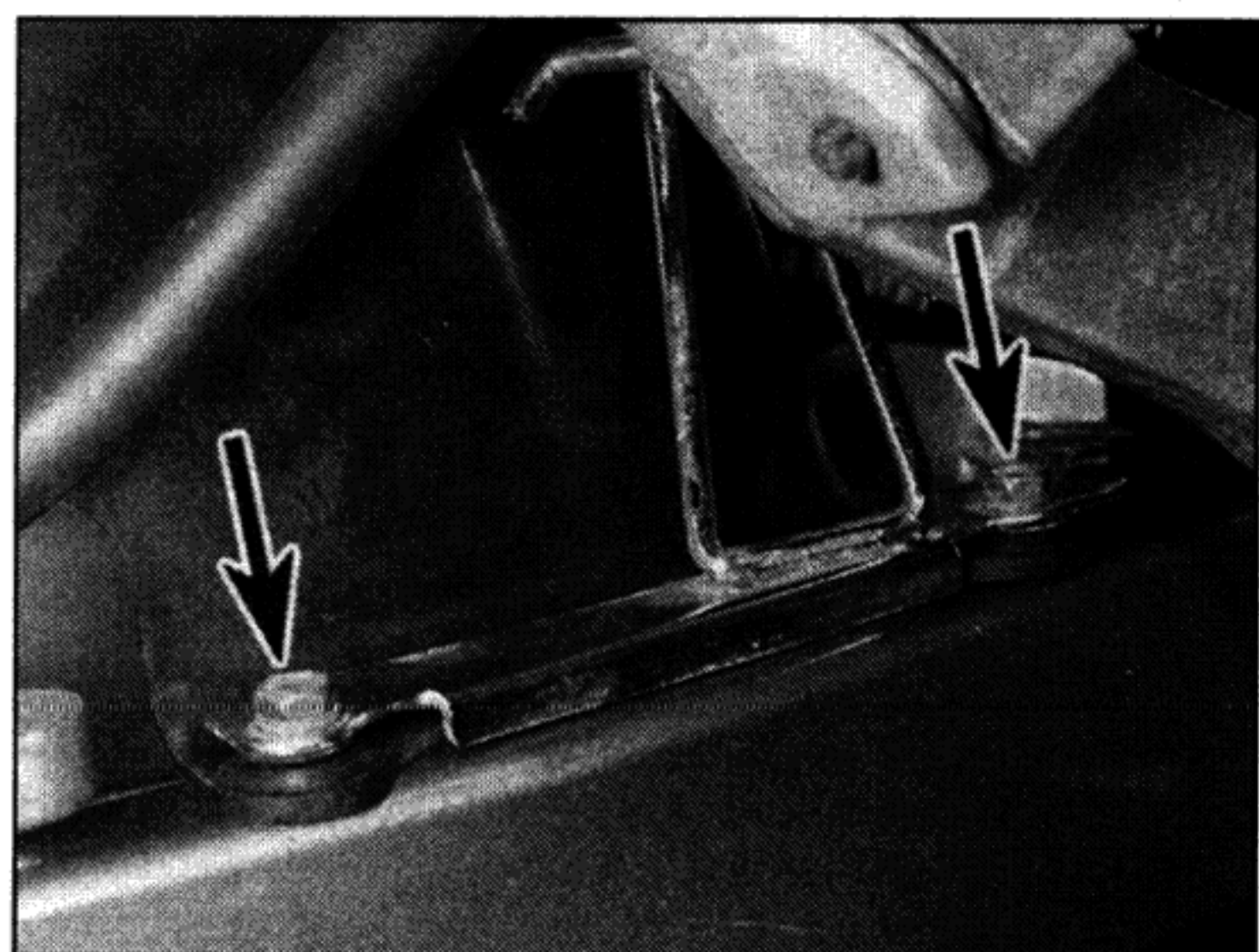
Standard length, A = 5.4 mm
Minimum length, A = 5.4 mm
Maximum length, A = 15.4 mm

Section 12, Step 2). Unscrew the bolts securing the hose guide to the swingarm, noting how they also secure the rear mudguard (see illustration).

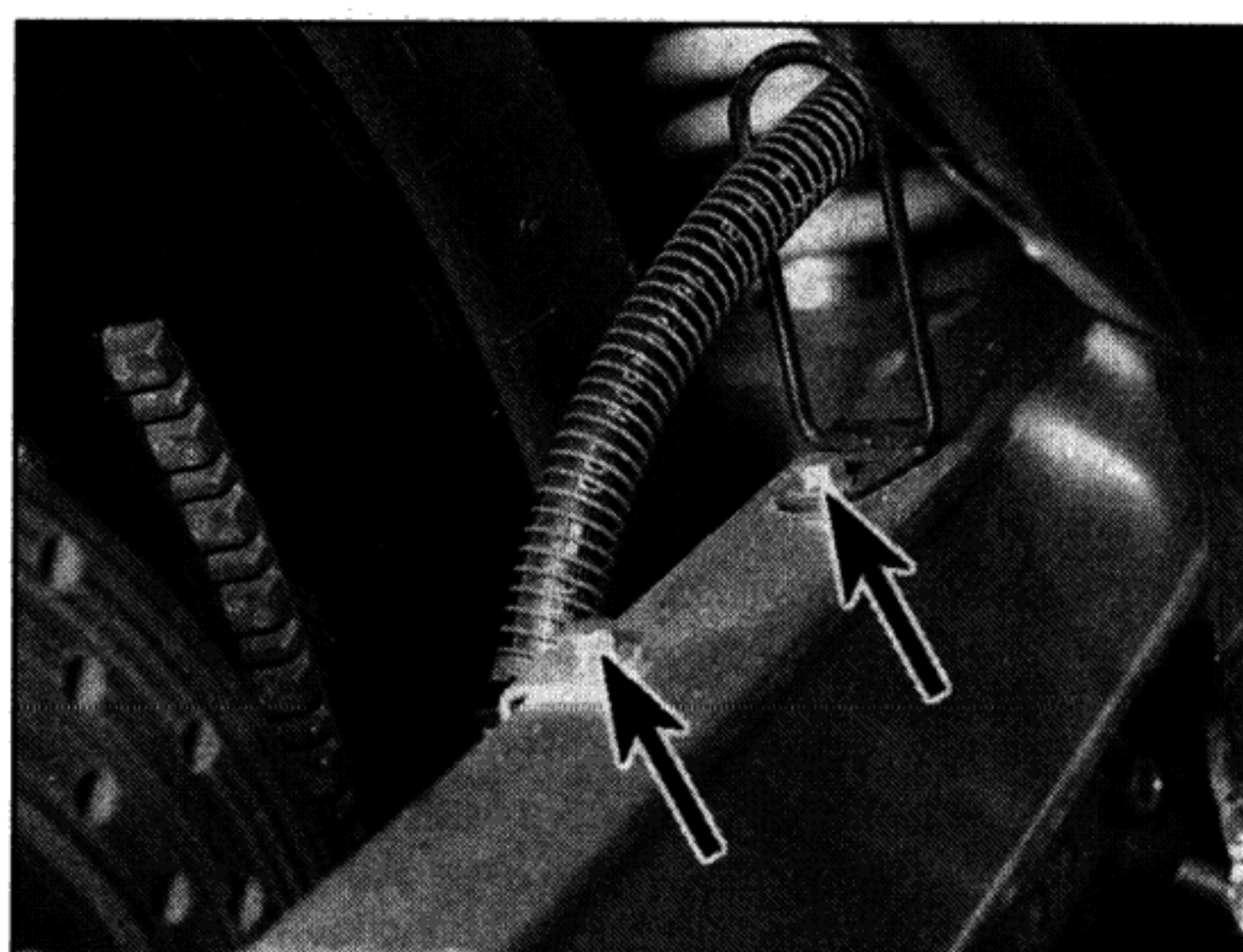
4 On TRX models, unscrew the bolt securing each brake hose guide to the swingarm (see illustration). Remove the split pin from the bolt securing the brake torque arm to the swingarm, then unscrew the nut, withdraw the bolt and detach the arm (see illustration).

5 On XTZ models, unscrew the bolt securing each brake hose guide to the underside of the swingarm (see illustration). Disconnect the brake hose from the rear caliper (see Chapter 7) and remove the caliper. Feed the hose through its guide on the inside of the swingarm and support it with its end upright.

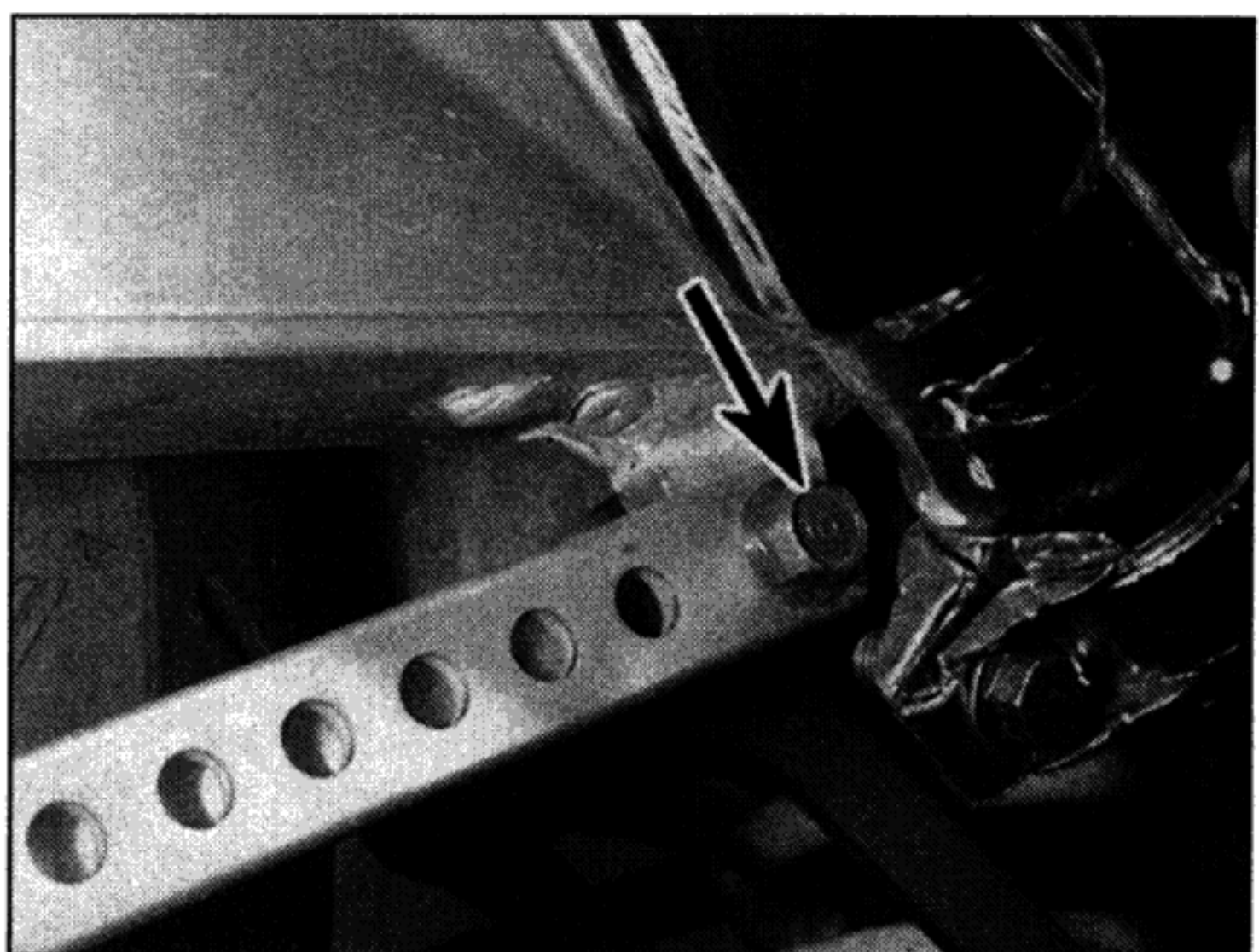
6 Unscrew the bolts securing the chain guard to the swingarm and remove the guard, on TDM models along with the rear mudguard, noting how they fit (see illustration).



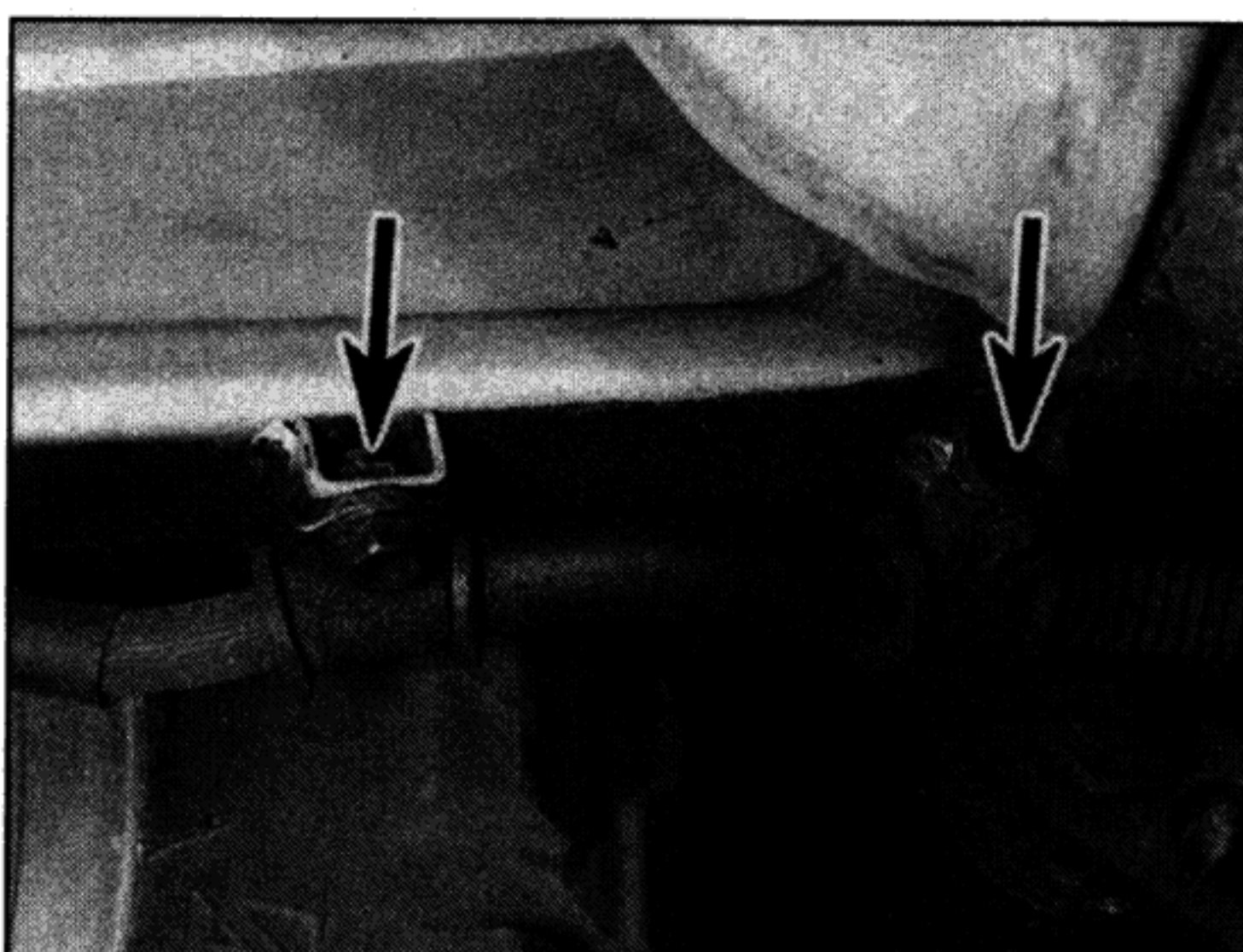
13.3 Unscrew the bolts (arrowed) and detach the hose guide



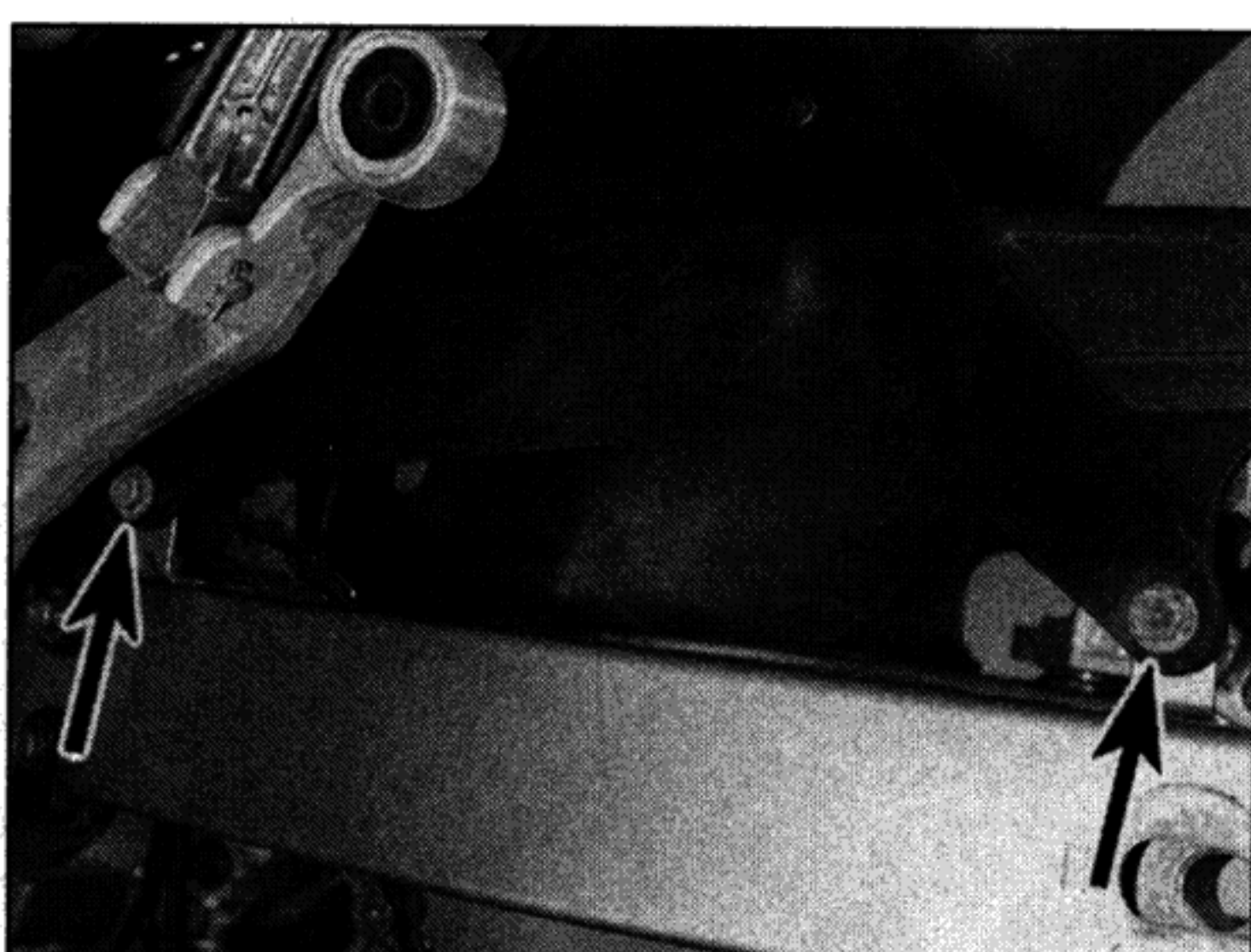
13.4a Unscrew the bolts (arrowed) and detach the hose guides



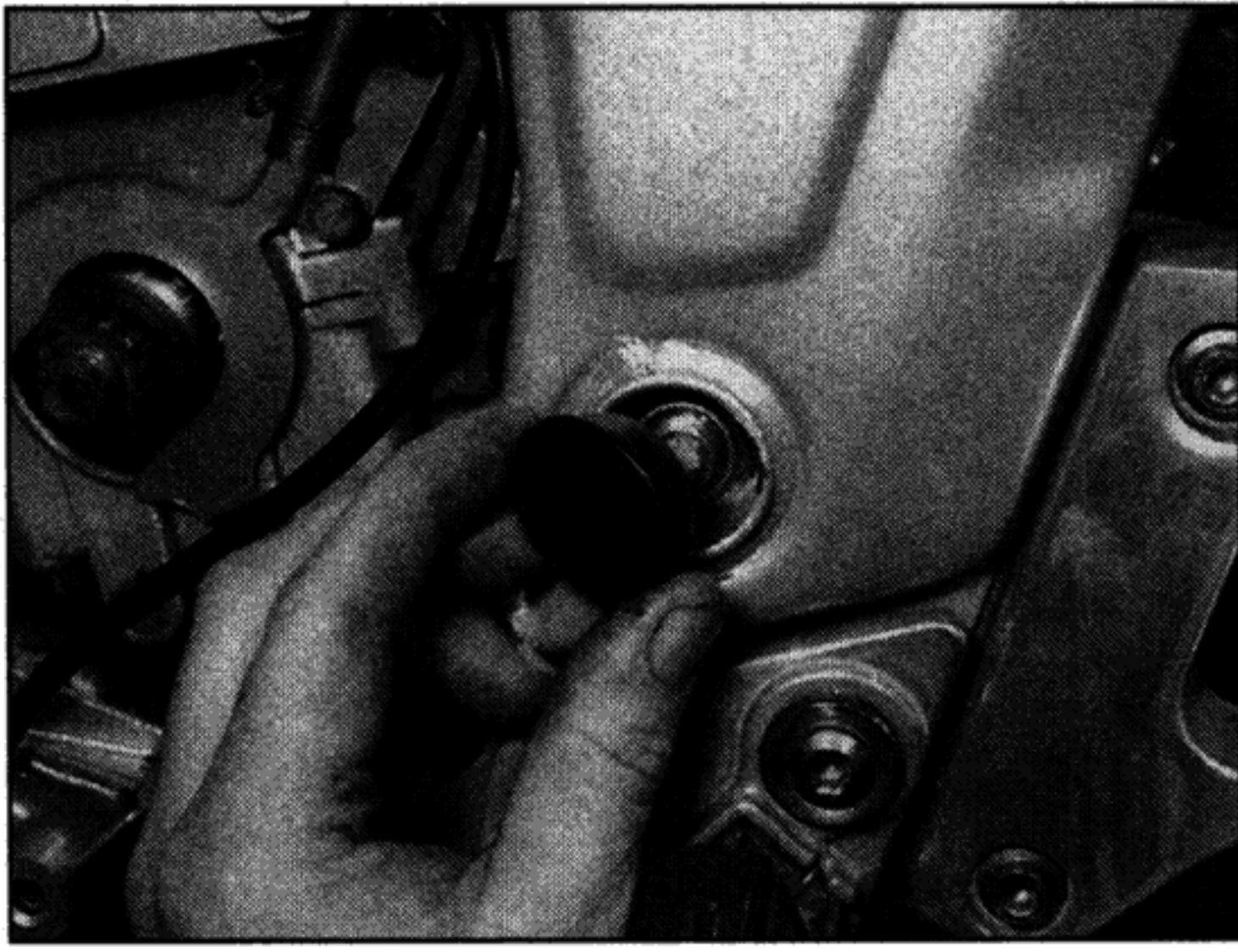
13.4b Detach the torque arm by removing the bolt (arrowed)



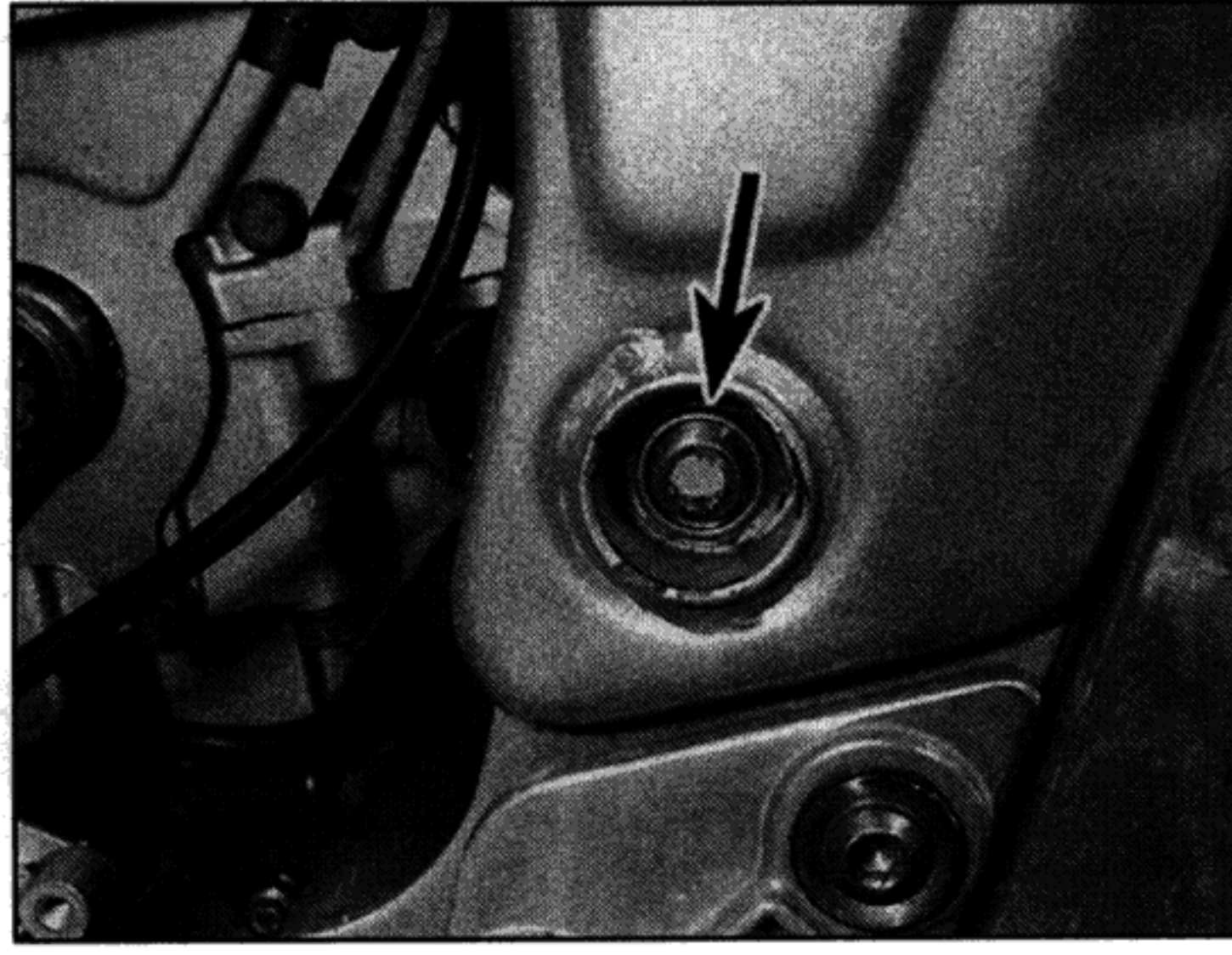
13.5 Unscrew the bolts (arrowed) and detach the hose



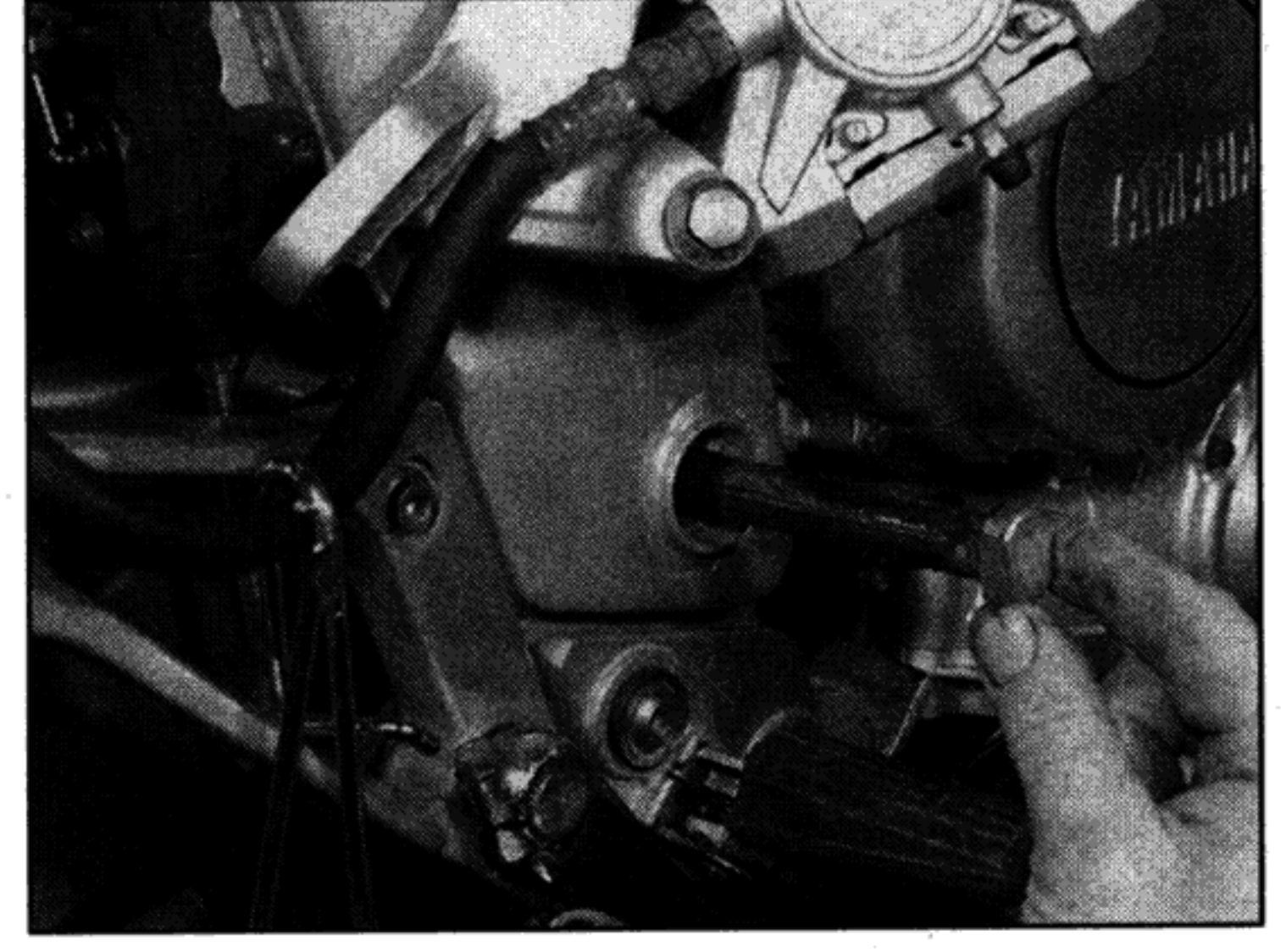
13.6 Chainguard/rear mudguard bolts (arrowed) – TDM shown



13.9a Remove the blanking caps if fitted ...



13.9b ... then unscrew the swingarm nut (arrowed) – TDM shown



13.10 Withdraw the pivot bolt and remove the swingarm – TDM shown

7 On TDM models, unscrew the nut and withdraw the bolt securing the bottom of the shock absorber to the swingarm (see illustrations 10.3a and b).

8 On TRX and XTZ models, remove the rear shock absorber (see Section 10). If required, remove the linkage rods from the swingarm (see Section 11).

9 Where fitted, remove the blanking cap from each end of the swingarm pivot (see illustration). Unscrew the nut on the end of the swingarm pivot bolt and remove the washer, where fitted (see illustration).

10 Support the swingarm, then withdraw the pivot bolt and remove the swingarm (see

illustration). Knock the pivot bolt through using a drift if required.

11 Remove the chain slider from the front of the swingarm if necessary, noting how it fits (see illustration). If it is badly worn or damaged, it should be renewed.

12 Inspect all components for wear or damage as described in Section 14.

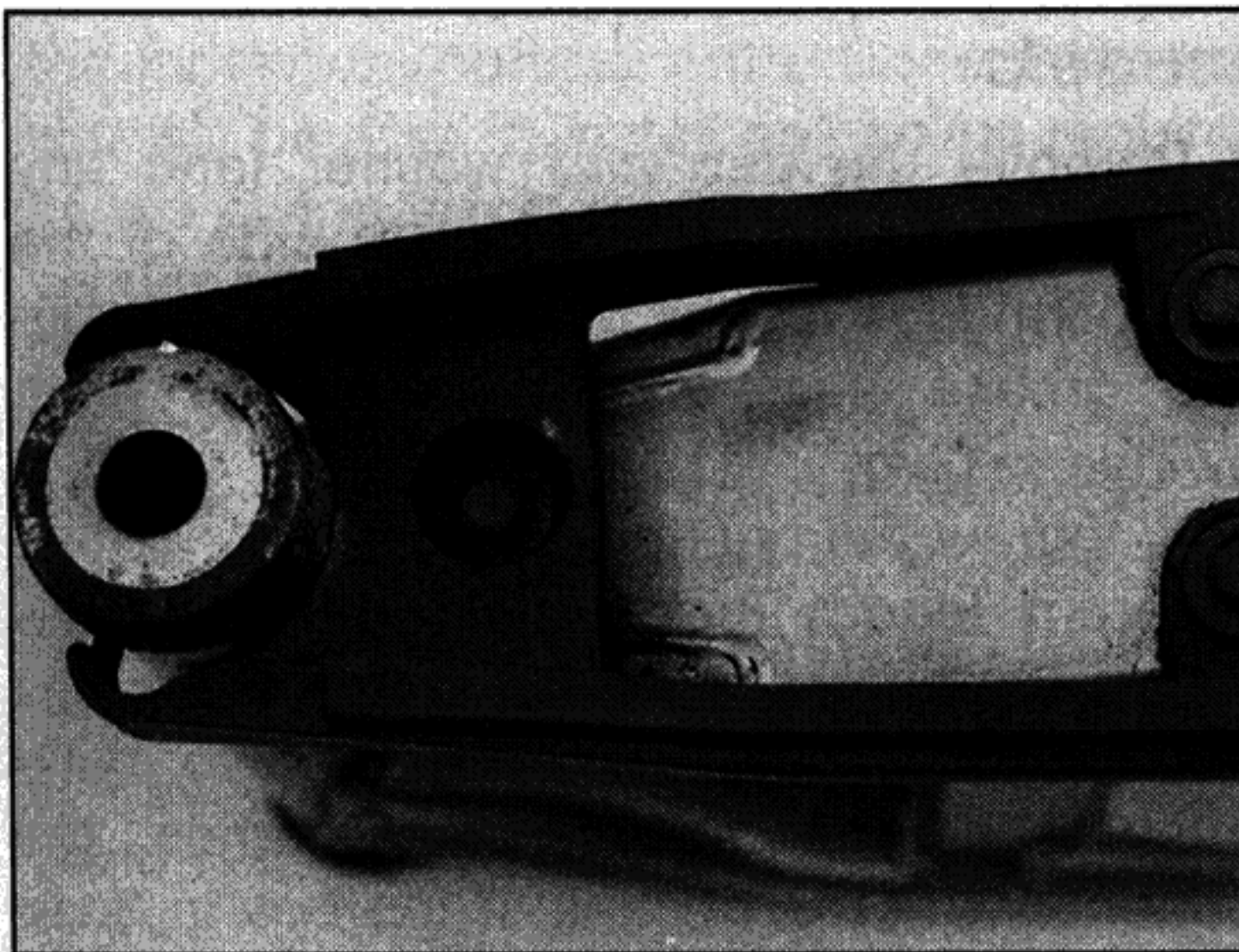
Installation

13 If removed, install the chain slider and tighten its bolt(s) securely (see illustration 13.11).

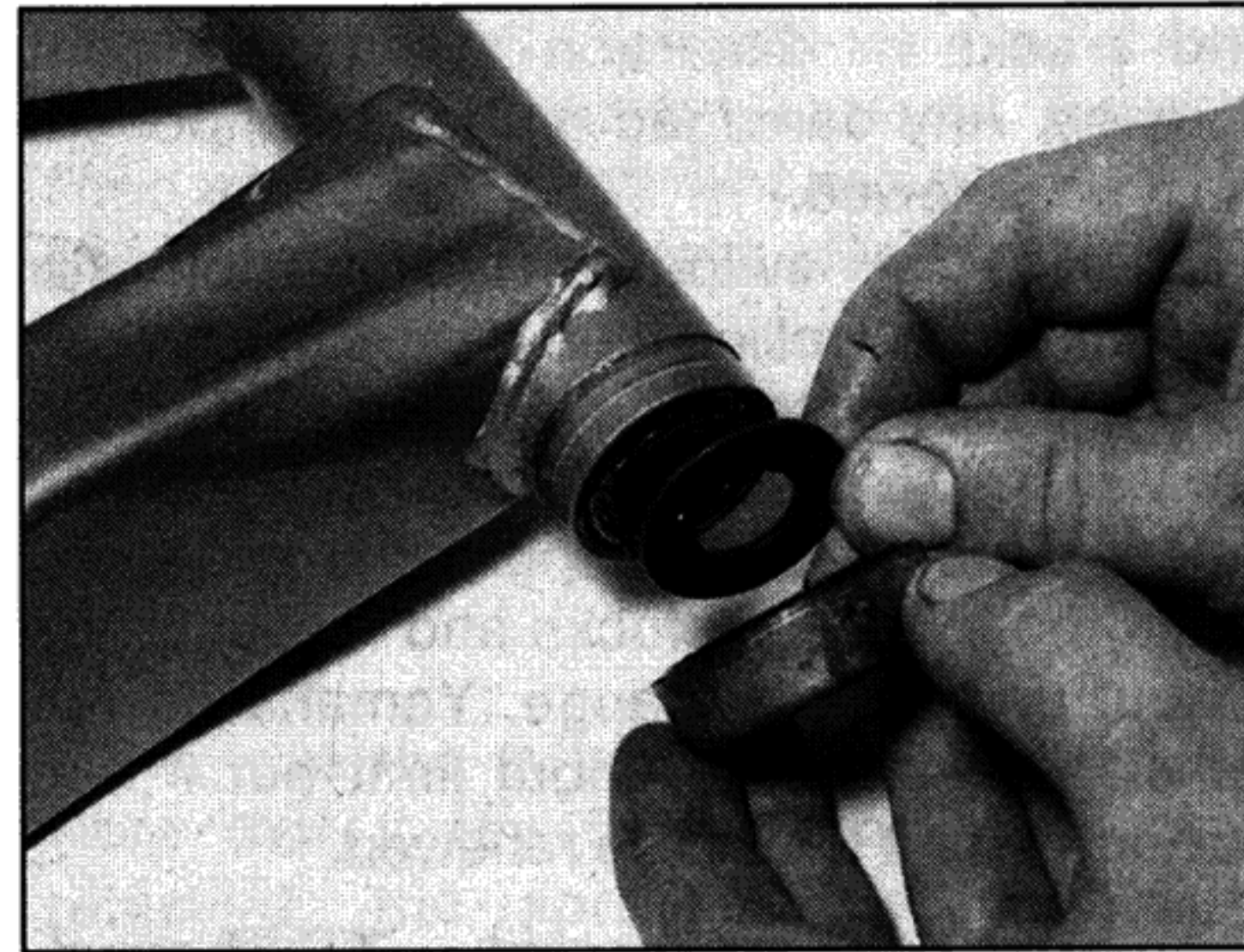
14 Remove the cap and washer (where fitted) from each side of the swingarm, and withdraw

the bearing spacer(s) (see illustrations). Lubricate the seals (XTZ models) and bearings with molybdenum disulphide grease (TRX models) or lithium-based grease (XTZ models). Also grease the collar(s) and swingarm pivot. Re-install the washers and caps.

15 Offer up the swingarm, and have an assistant hold it in place (see illustration). Make sure the drive chain is looped over the front of the swingarm. Slide the pivot bolt through the swingarm (see illustration 13.10), on TDM models making sure the flats on the head of the pivot bolt locate correctly with the flats in the frame (see illustration). Install the



13.11 Remove the chain slider if required



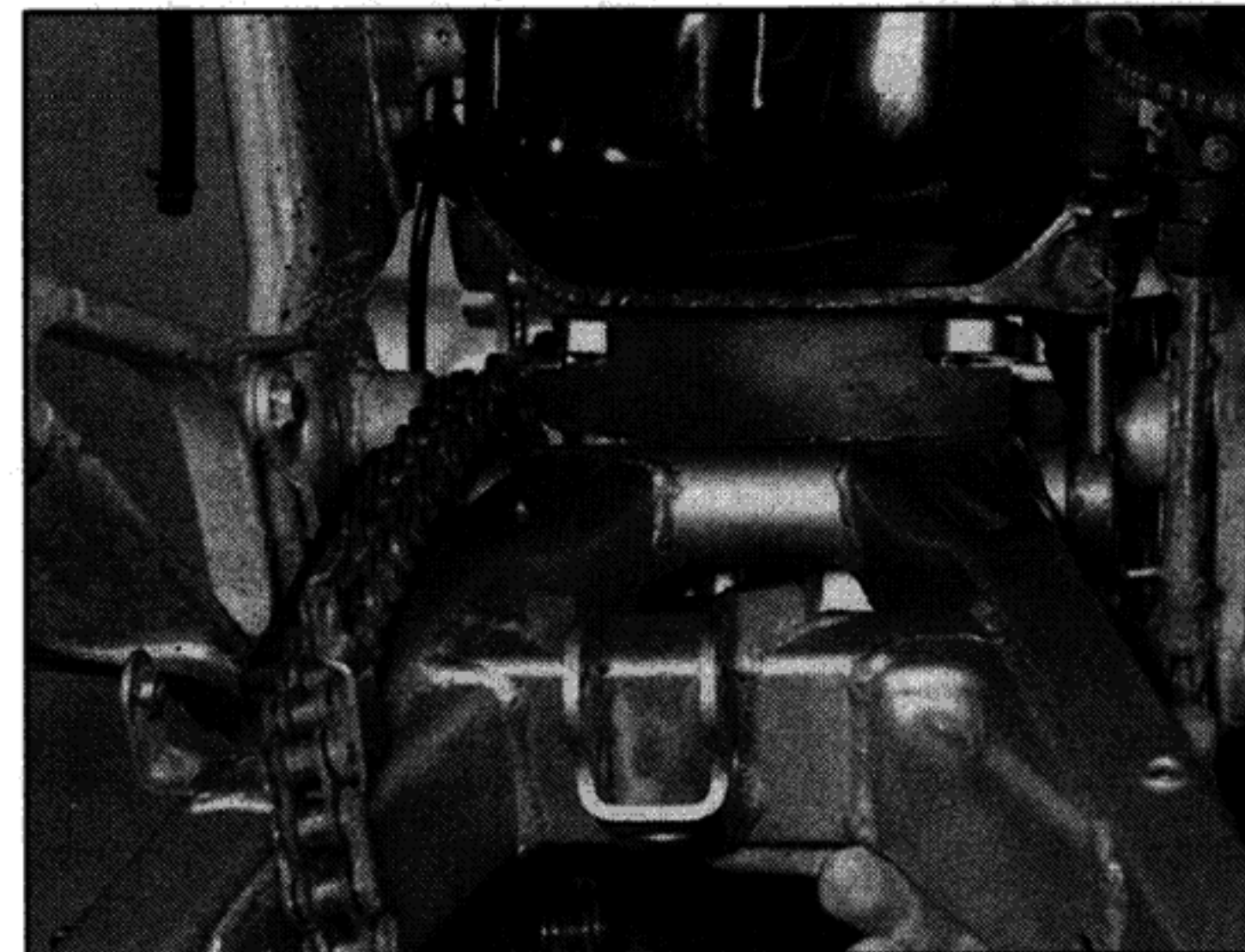
13.14a Remove the cap and washer (where fitted) ...



13.14b ... then withdraw the collar ...



13.14c ... and grease the bearings and other components as described



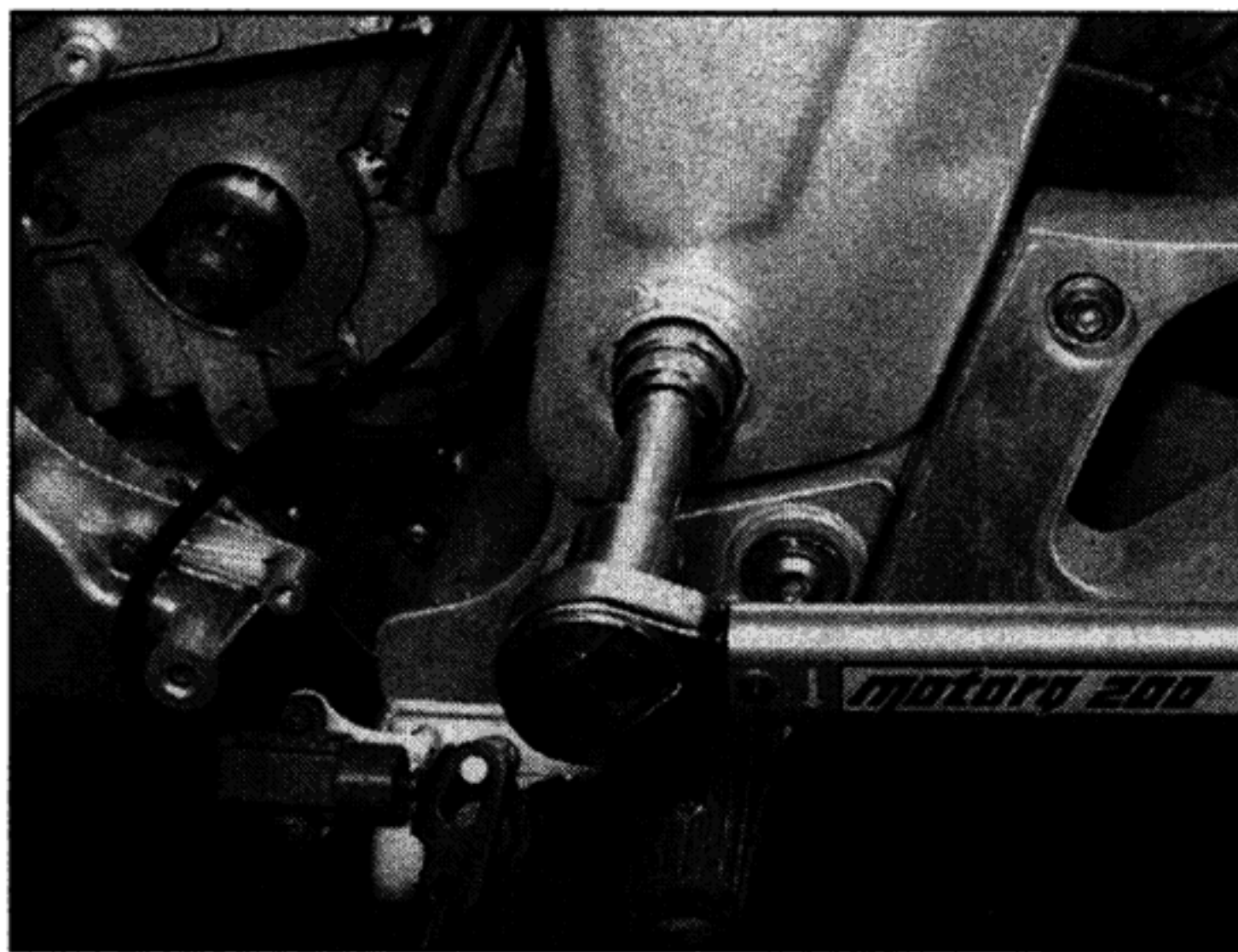
13.15a Do not forget to loop the chain over the swingarm



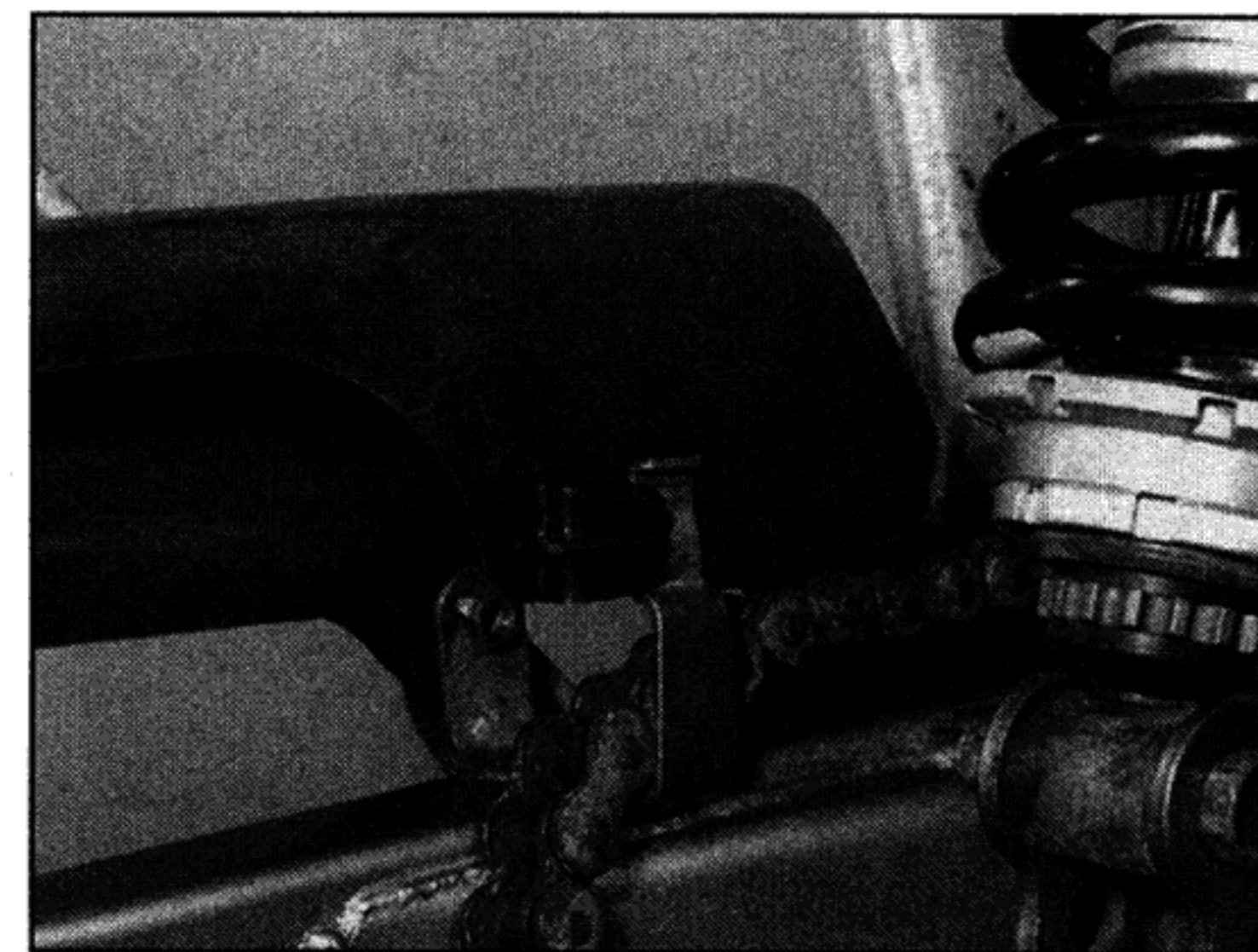
13.15b On TDM models, make sure the bolt head flats locate correctly



13.15c Fit the nut (with its washer, where fitted) . . .



13.15d . . . and tighten it to the specified torque



13.17a On TDM models, locate the chainguard as shown . . .

nut with its washer, where fitted and tighten the nut to the torque setting specified at the beginning of the Chapter (see illustrations). On TRX and XTZ models it may be necessary to counter-hold the bolt head to prevent it from turning. Where removed, fit the blanking caps (see illustration 13.9a).

16 Install the rear shock absorber (see Section 10) and on TRX and XTZ models the suspension linkage rods, if removed (see Section 11).

17 Install the chainguard, along with the rear fender on TDM models, making sure it locates correctly over the lugs on the swingarm (see illustrations).

18 On TDM models, fit the caliper bracket onto the swingarm and loosely install the bolt (see illustration). Fit the brake hose guide onto the swingarm (see illustration 13.3).

19 On TRX models, fit the brake torque arm onto the swingarm, then install the bolt and tighten the nut to the specified torque setting (see illustration 13.4b). Fit a new split pin onto the bolt. Fit the brake hose guides onto the swingarm (see illustration 13.4a).

20 On XTZ models, feed the brake hose through its guide on the inside of the swingarm and install it onto the caliper (see Chapter 7); note that the rear brake hydraulic system will require topping up and bleeding of air. Fit the brake hose guides onto the underside of the swingarm (see illustration 13.5).

21 Install the rear wheel (see Chapter 7), not

forgetting to tighten the caliper bracket bolt on TDM models.

22 Check and adjust the drive chain slack (see Chapter 1). Check the operation of the rear suspension before taking the machine on the road.

14 Swingarm – inspection and bearing replacement

Inspection

1 Thoroughly clean all components, removing all traces of dirt, corrosion and grease (see illustrations 11.6a and b).

2 Inspect all components closely, looking for obvious signs of wear such as heavy scoring, and cracks or distortion due to accident damage. Any damaged or worn component must be renewed.

3 Check the swingarm pivot bolt for straightness by rolling it on a flat surface such as a piece of plate glass (first wipe off all old grease and remove any corrosion using fine emery cloth). If the equipment is available, place the axle in V-blocks and measure the runout using a dial gauge. Yamaha do not specify a maximum runout limit but if it is obviously bent it must be renewed.

Bearing replacement – TDM and TRX models

4 Remove the cap and washer (where fitted)

from each side of the swingarm (see illustration 13.14a).

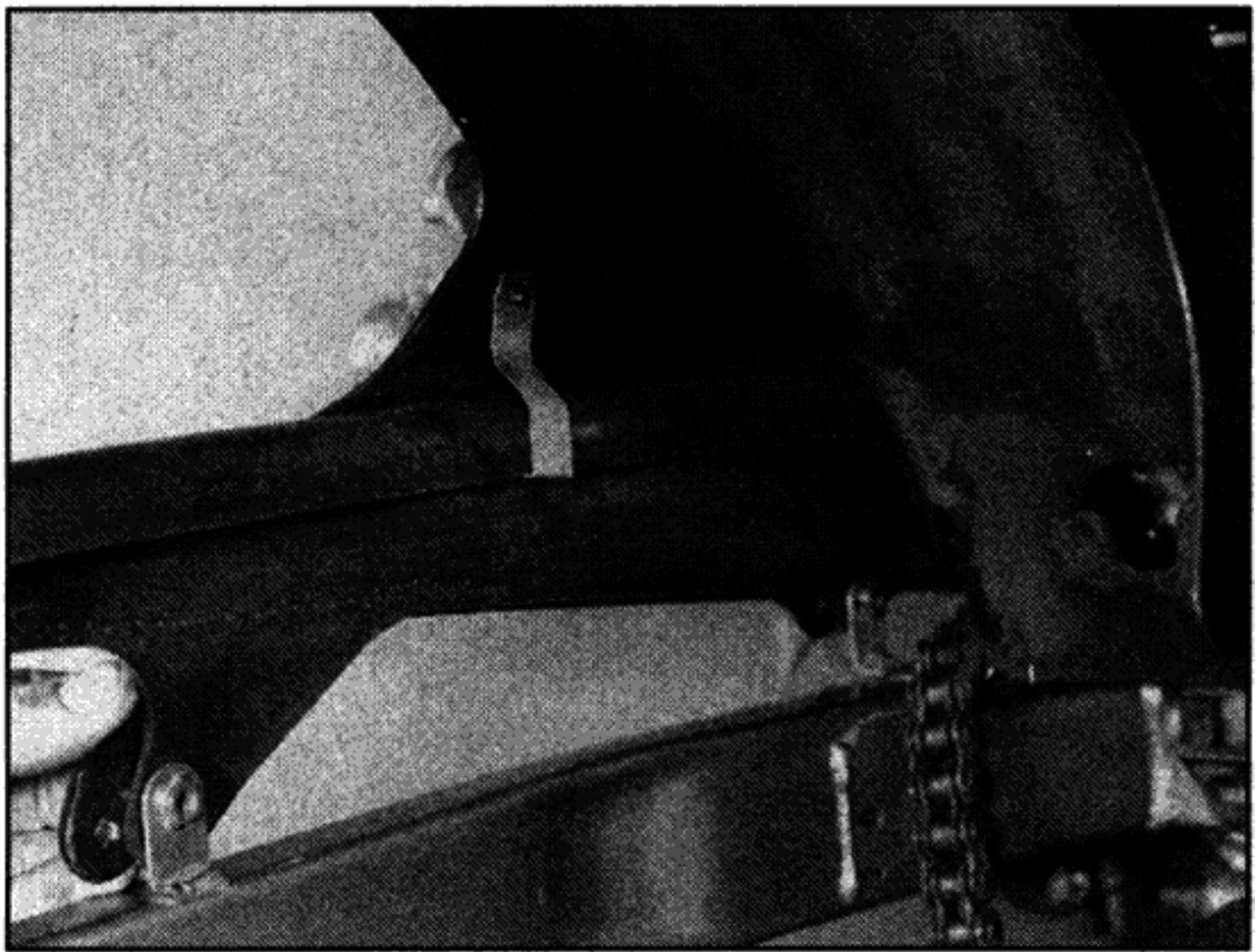
5 Withdraw the bearing spacer (see illustration 13.14b) and clean all old grease off the spacer and the two needle roller bearings in the swingarm. If the bearings do not run smoothly and freely they must be renewed (see illustration 13.14c). Refer to *Tools and Workshop Tips* (Section 5) in the Reference section for details of using a drawbolt tool or bearing extractor with slide-hammer attachment to remove the bearings and install new ones.

6 Lubricate the bearings and the spacer with molybdenum disulphide grease. Install the caps and washers (where fitted) on the swingarm ends

Bearing replacement – XTZ models

7 Remove the cap and washer (and any shims, where fitted) from each side of the swingarm (see illustration 13.14a). Lever out the grease seal on each side of each swingarm pivot.

8 Withdraw the bearing spacers, noting their different length (see illustration 13.14b). Clean all old grease off the spacers, the two needle roller bearings and the two plain bushes in the swingarm. Examine the bearings and the bushes; if the bearings do not run smoothly and freely and the bushes are scored or worn they must all be renewed. Refer to *Tools and Workshop Tips* (Section 5)



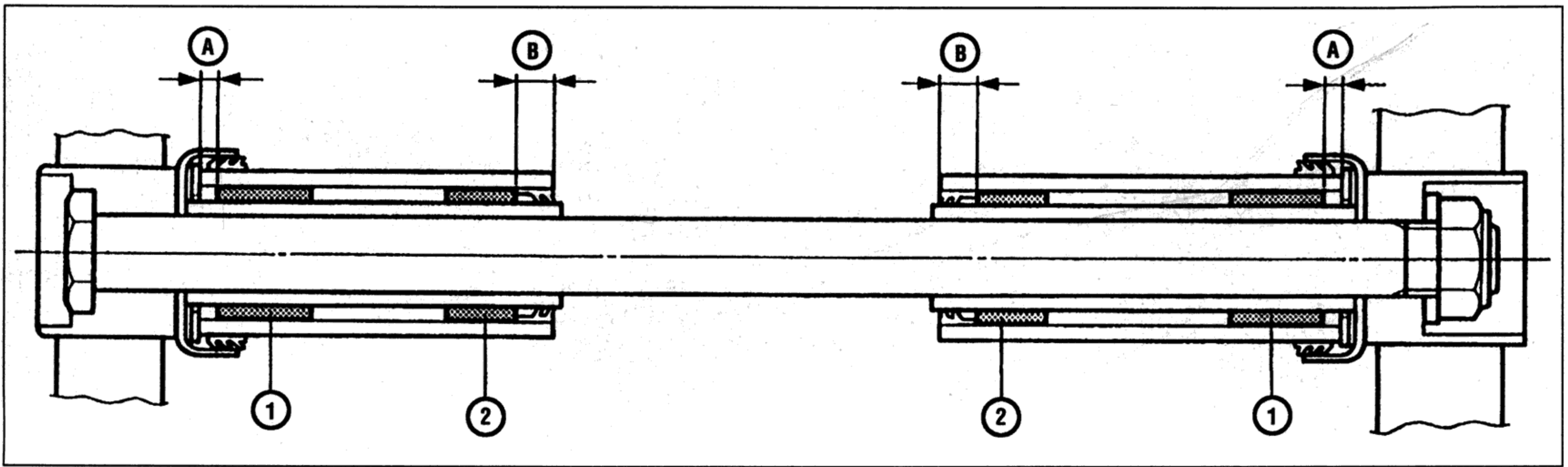
13.17b . . . then fit the mudguard . . .



13.17c . . . not forgetting the collars



13.18 Locate the caliper bracket and loosely install the bolt



14.8 Swingarm bearing (1) and bush (2) installed depth

A 4 mm

B 8 mm

in the Reference section for details of using a drawbolt tool or bearing extractor with slide-hammer attachment to remove the bearings and bushes and install new ones. When installing the new components note that they must be positioned to a specific depth in the swingarm housings (**see illustration**).

9 Measure the length of each bearing spacer and the thickness of each washer and compare them to the specifications, renewing any component that is worn. **Note:** Worn components will increase swingarm sideplay.

10 Although it is possible to measure the swingarm sideplay with all components assembled on the bike it is preferably to calculate sideplay by direct measurement of the individual components. Done this way, you will be able to install any shims required as the swingarm is refitted. You will need a vernier gauge to do this accurately. Measure the width of the swingarm mounting boss on the engine and call this dimension A. Record the lengths of the two spacers measured in Step 9 as dimensions B and C. Now measure the overall length of the swingarm (from the outside of one bearing housing to the outside of the other) and record this as dimension D. Record the thicknesses of the two washers (added together) measured in Step 9 and record this as dimension E. Compute swingarm sideplay by subtracting the swingarm width and washer thicknesses from the boss width and spacer lengths, thus:

$$\text{Sideplay} = (A + B + C) - (D + E)$$

If the sideplay is within the limit of 0.4 to 0.7 mm no shims are required. If sideplay exceeds 0.7 mm, fit one or two shims as required to bring sideplay within the specified limit. Shims are available in 0.3 mm thicknesses. The shims should be fitted between the cap and washer; if two shims are required fit one on each side, whereas if only one shim is required fit this on the right-hand side.

11 Press the grease seals into their locations in each side of the swingarm bearing

housings, renewing them if they are damaged or deteriorated.

12 Lubricate the bearings, bushes and spacers with lithium-based grease. Do not forget to install the bearing spacer between the bearings in the swingarm. Install the washers, shims (where fitted) and caps on the outer ends of the swingarm.

15 Drive chain – removal, cleaning and installation

Endless type chain

Note: An endless chain has no riveted (soft) link – all links and pins are the same. The chain fitted as original equipment and supplied as a spare part from Yamaha dealers is of the endless type.



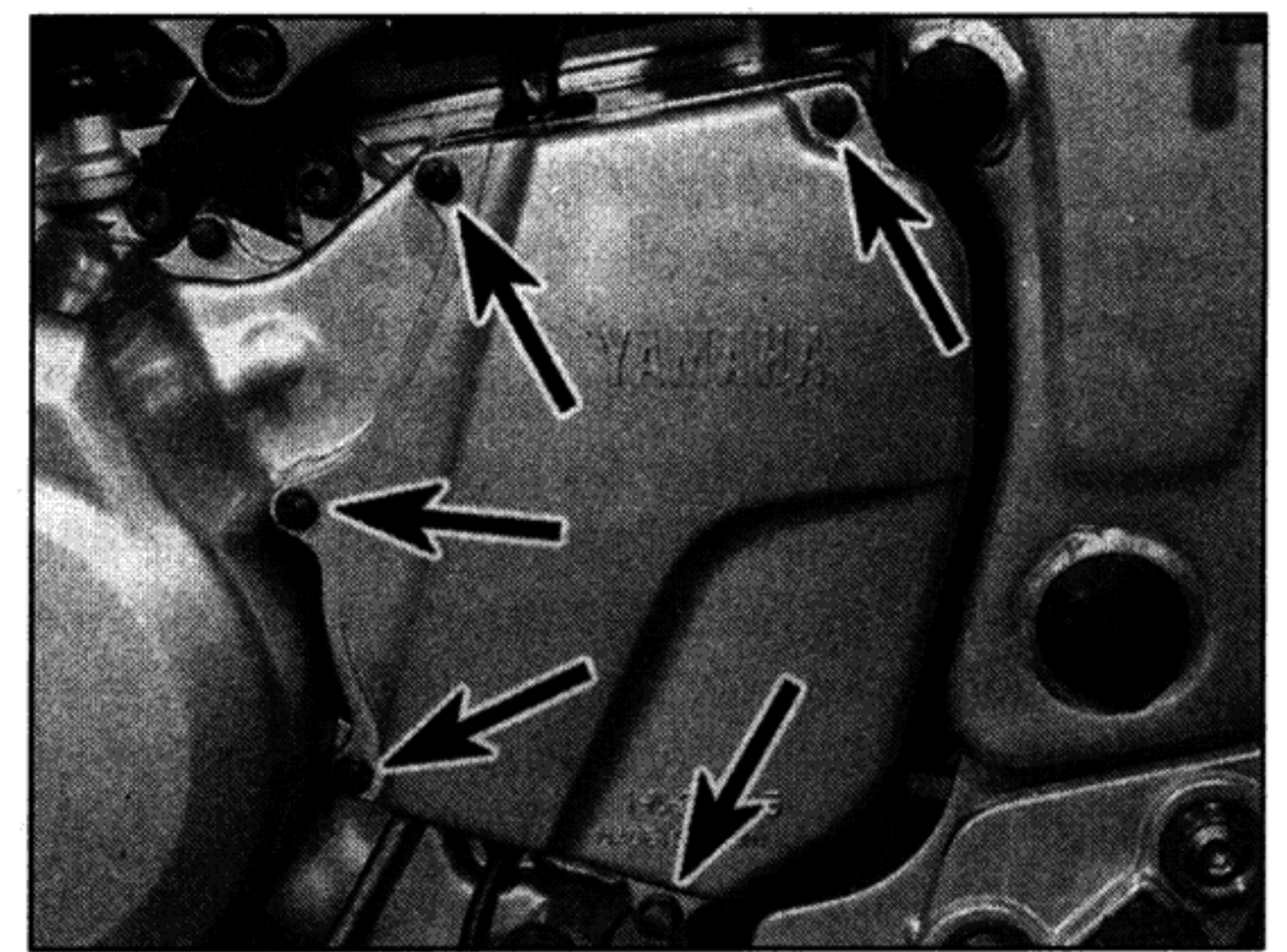
Warning: NEVER install a drive chain which uses a clip-type master (split) link.

Removal

1 Remove the swingarm (see Section 13). Note that if the front sprocket is being removed, the sprocket nut should be slackened before removing the swingarm, so that the rear brake can be used so stop the sprocket turning (see Section 16).

2 On TDM and XTZ models, unscrew the bolts securing the outer front sprocket cover and remove the cover (**see illustration**). Unscrew the gearchange lever linkage arm pinchbolt and remove the arm from the shaft, noting the alignment of the punch mark with the slit in the clamp (**see illustration**). If no mark is visible, make your own before removing the arm so that it can be correctly aligned with the shaft on installation. Unscrew the bolts securing the inner sprocket cover, on TDM models noting the clip secured by the top rear bolt, and remove the cover (**see illustration**).

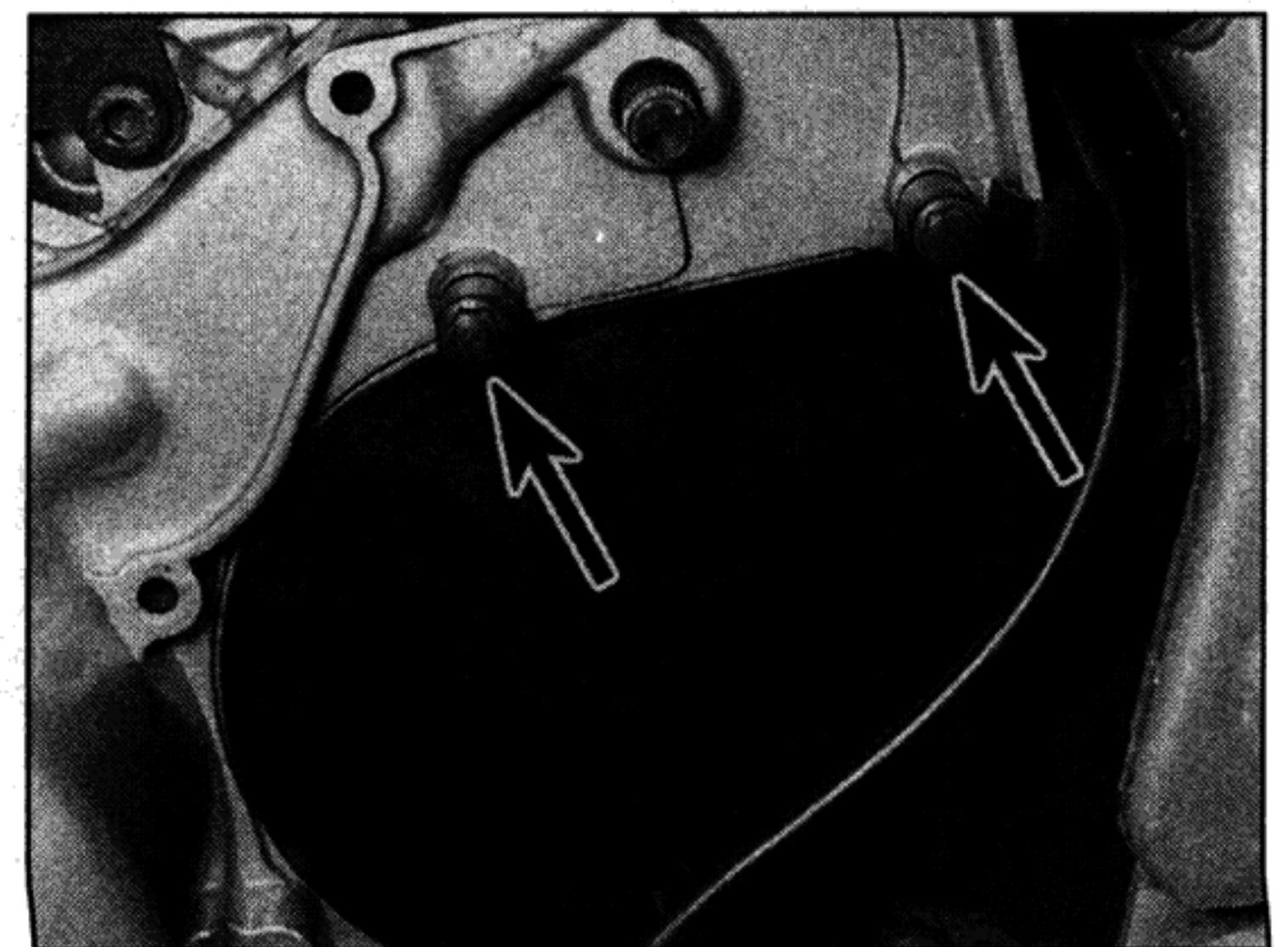
3 On TRX models, unscrew the gearchange



15.2a Unscrew the bolts (arrowed) and remove the cover



15.2b Linkage arm/shaft alignment – TDM models



15.2c Unscrew the bolts (arrowed) and remove the inner cover



15.3 Linkage arm/shaft alignment – TRX models

lever linkage arm pinchbolt and remove the arm from the shaft, noting the alignment of the punch mark with the slit in the clamp (**see illustration**). If no mark is visible, make your own before removing the arm so that it can be correctly aligned with the shaft on installation. Unscrew the bolts securing the outer front sprocket cover and remove the cover, then unscrew the bolts securing the inner sprocket cover, noting the clip secured by the top rear bolt, and remove the cover.

4 Slip the chain off the front sprocket and remove it from the bike.

Cleaning and wear check

5 Soak the chain in paraffin (kerosene) for approximately five or six minutes.

Caution: Don't use gasoline (petrol), solvent or other cleaning fluids. Don't use high-pressure water. Remove the chain, wipe it off, then blow dry it with compressed air immediately. The entire process shouldn't take longer than ten minutes – if it does, the O-rings in the chain rollers could be damaged.

6 Once the chain has been cleaned and dried, check it for wear by measuring a 10-link length with the chain taught; anchor one end of the chain and hold the other end tensioned whilst the measurement is taken (**see illustration**). Compare the result the wear limits at the beginning of this Chapter. Note that chains do not wear evenly, so take measurements at various points in the chain's run.

Installation

7 Installation is the reverse of removal. On completion adjust and lubricate the chain

following the procedures described in Chapter 1.

Riveted link type chain

Removal

Note: The riveted (soft) link can be identified by its identification markings on the side plate and usually slightly different colour. Also the staked ends of the link's two pins look as if they have been deeply centre-punched, instead of peened over as with all other pins.

8 Locate the joining link in a suitable position to work on by rotating the back wheel; midway between the sprockets is ideal.

9 Slacken the drive chain as described in Chapter 1.

10 Split the chain at the joining link using an approved chain breaker tool intended for motorcycle use. There are a number of types available for motorcycle use and it is important to follow carefully the instructions supplied with the tool – see *Tools and Workshop Tips* in the Reference section for a typical example. Remove the chain from the bike, noting its routing through the swingarm.

Cleaning and wear check

11 See Steps 5 and 6.

Installation



Warning: NEVER install a drive chain which uses a clip-type master (split) link. If you do not have access to a chain riveting

tool, have the chain fitted by a Yamaha dealer.

12 Remove the engine sprocket cover as described in Steps 2 or 3, as applicable.

13 Thread the chain into position, making sure that it takes the correct route around the swingarm and sprockets and leave the two ends in a convenient place to work on. Obtain a new soft link – never attempt to reuse an old link.

14 Install the new soft link complete with an O-ring on each of its pins through the chain ends from the inside of the chain. Install an O-ring over the pin ends and fit the side plate with its identification marks facing out; use the chain tool to press the side plate into position.

15 Stake the new link pins using the chain riveting tool, following carefully the instructions of both the chain manufacturer and the tool manufacturer. Refer to *Tools and Workshop Tips* in the Reference section for

chain riveting details using a typical commercially available tool.

16 After riveting, check the soft link pin ends for any signs of cracking. If there is any evidence of cracking, the soft link, O-rings and side plate must be removed and the procedure repeated with a new soft link.

17 Install the sprocket cover in a reverse of the removal procedure. Adjust and lubricate the chain following the procedures described in Chapter 1.

16 Sprockets – check and replacement



Check

1 On TDM and XTZ models, unscrew the bolts securing the outer front sprocket cover and remove the cover (**see illustration 15.2a**). Unscrew the gearchange lever linkage arm pinchbolt and remove the arm from the shaft, noting the alignment of the punch mark with the slit in the clamp (**see illustration 15.2b**). If no mark is visible, make your own before removing the arm so that it can be correctly aligned with the shaft on installation. Unscrew the bolts securing the inner sprocket cover, on TDM models noting the clip secured by the top rear bolt, and remove the cover (**see illustration 15.2c**).

2 On TRX models, unscrew the gearchange lever linkage arm pinchbolt and remove the arm from the shaft, noting the alignment of the punch mark with the slit in the clamp (**see illustration 15.3**). If no mark is visible, make your own before removing the arm so that it can be correctly aligned with the shaft on installation. Unscrew the bolts securing the outer front sprocket cover and remove the cover, then unscrew the bolts securing the inner sprocket cover, noting the clip secured by the top rear bolt, and remove the cover.

3 Check the wear pattern on both sprockets (**see illustration 1.7 in Chapter 1**). If the sprocket teeth are worn excessively, renew the chain and both sprockets as a set. Whenever the sprockets are inspected, the drive chain should be inspected also (see Chapter 1). If you are renewing the chain, renew the sprockets as well.

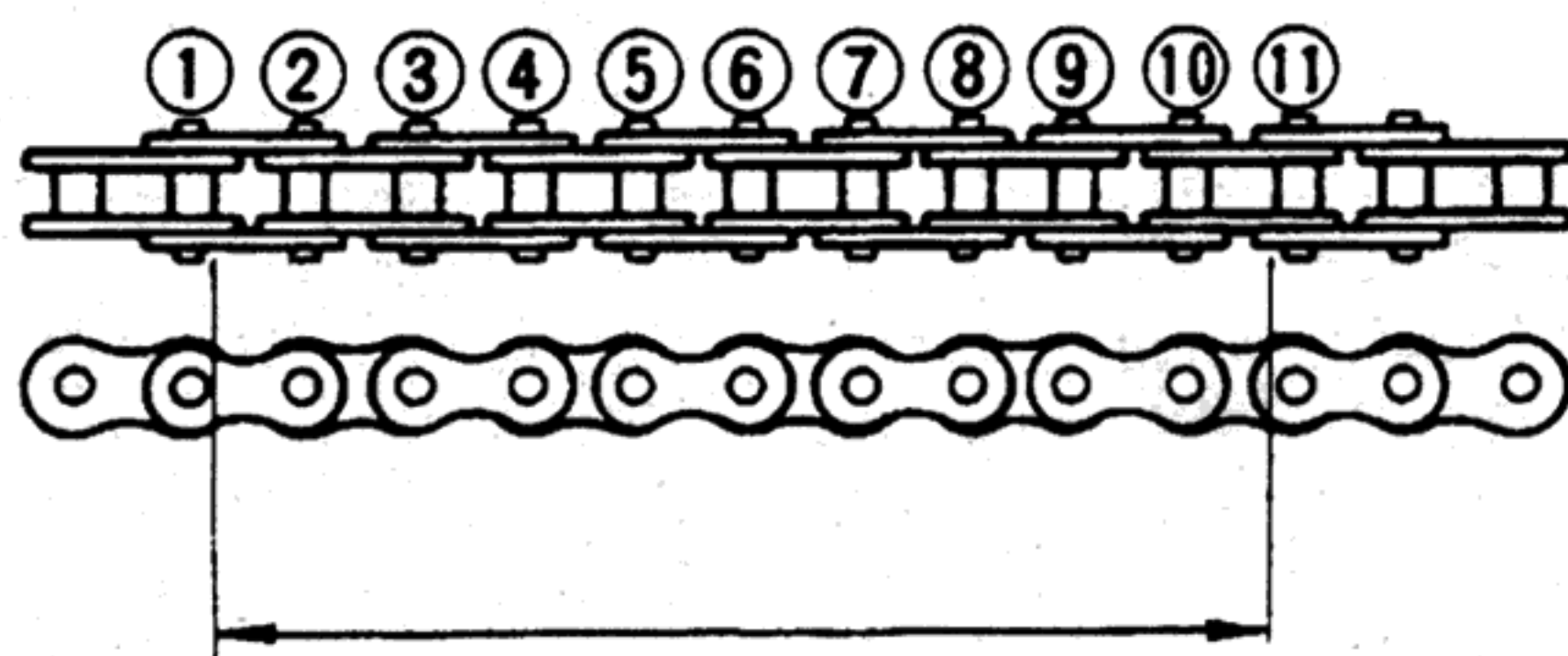
4 Adjust and lubricate the chain following the procedures described in Chapter 1.

Caution: Use only the recommended lubricant.

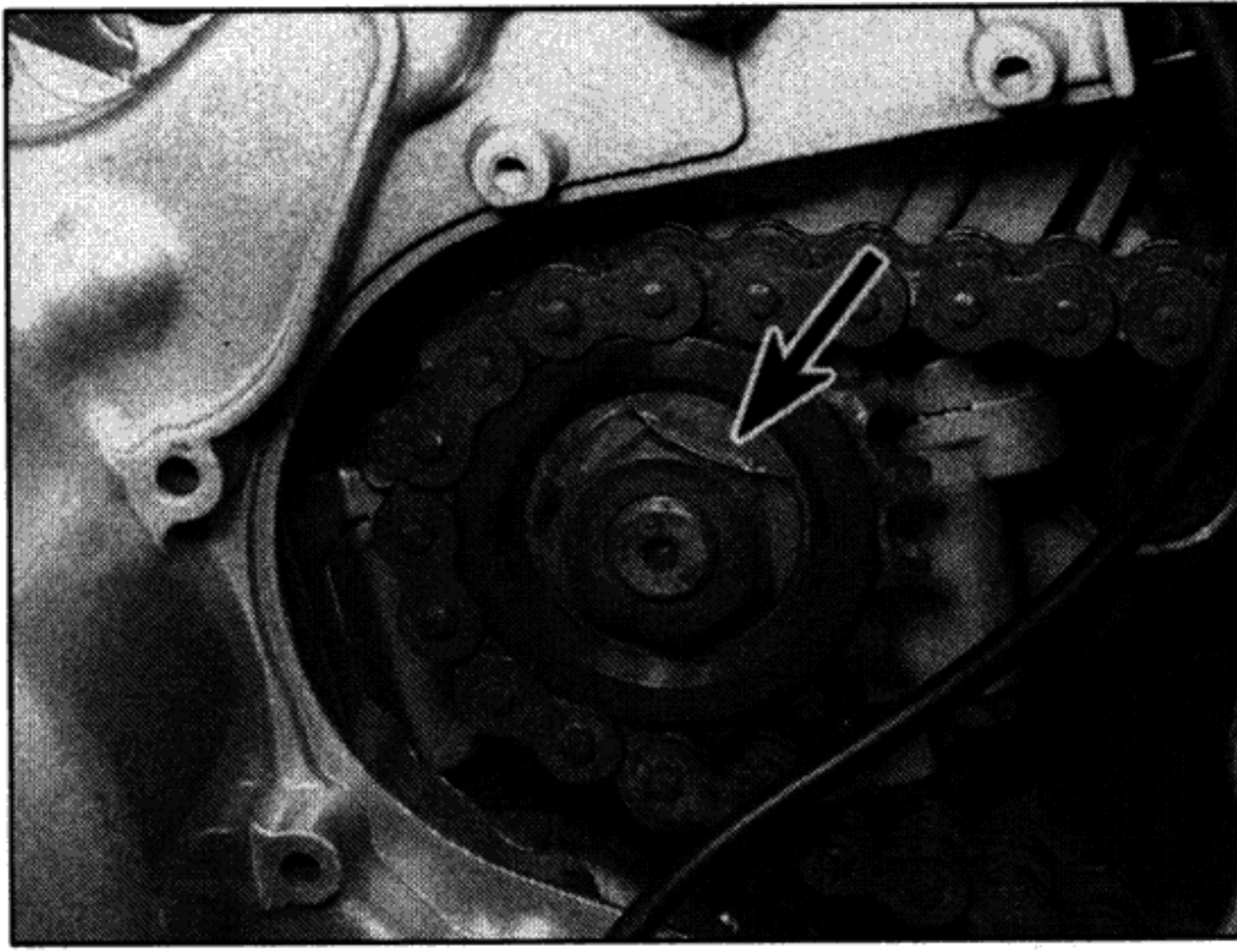
Replacement

Front sprocket

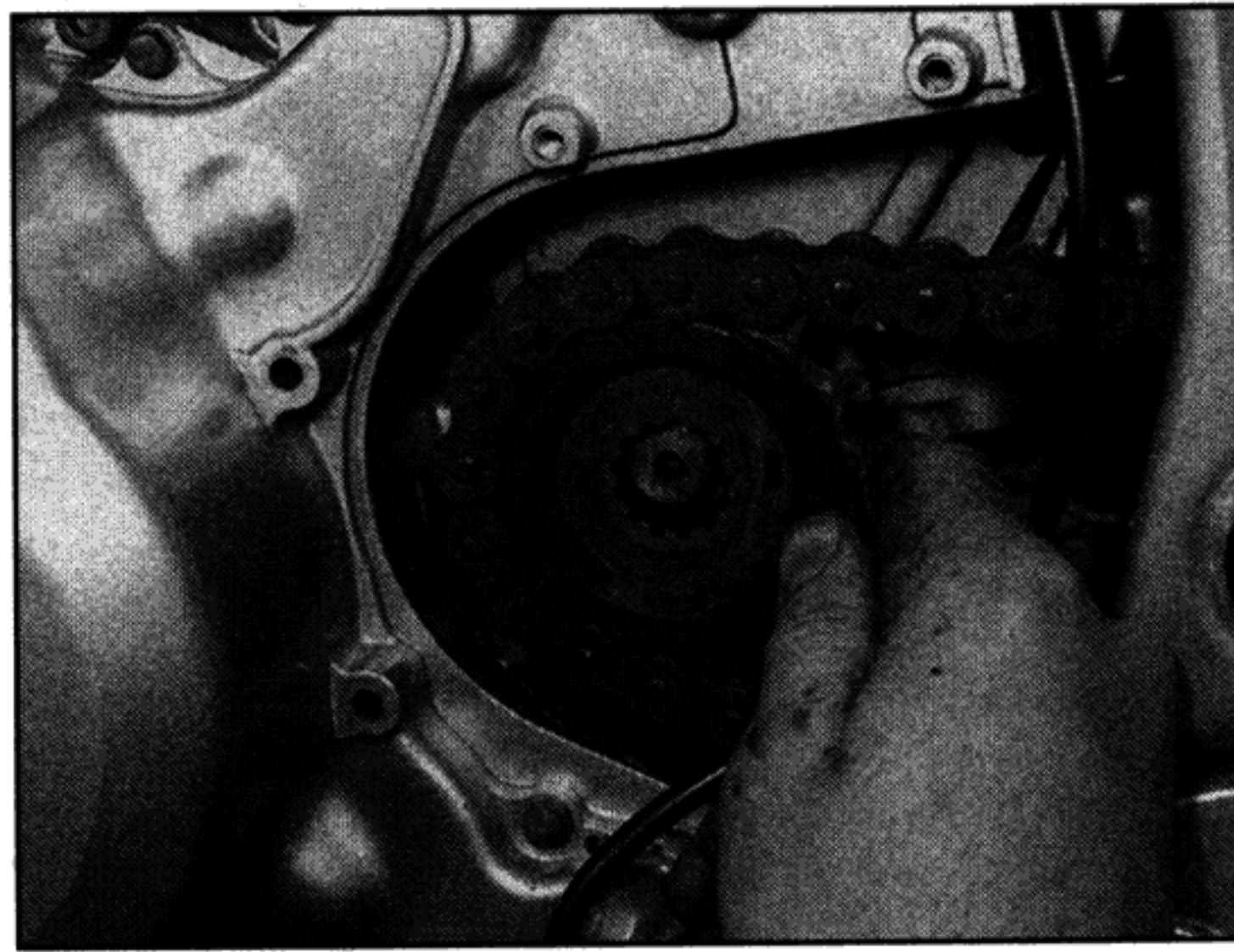
5 On TDM and XTZ models, unscrew the bolts securing the outer front sprocket cover and remove the cover (**see illustration 15.2a**). Unscrew the gearchange lever linkage arm pinchbolt and remove the arm from the shaft, noting the alignment of the punch mark with the slit in the clamp (**see illustration 15.2b**). If



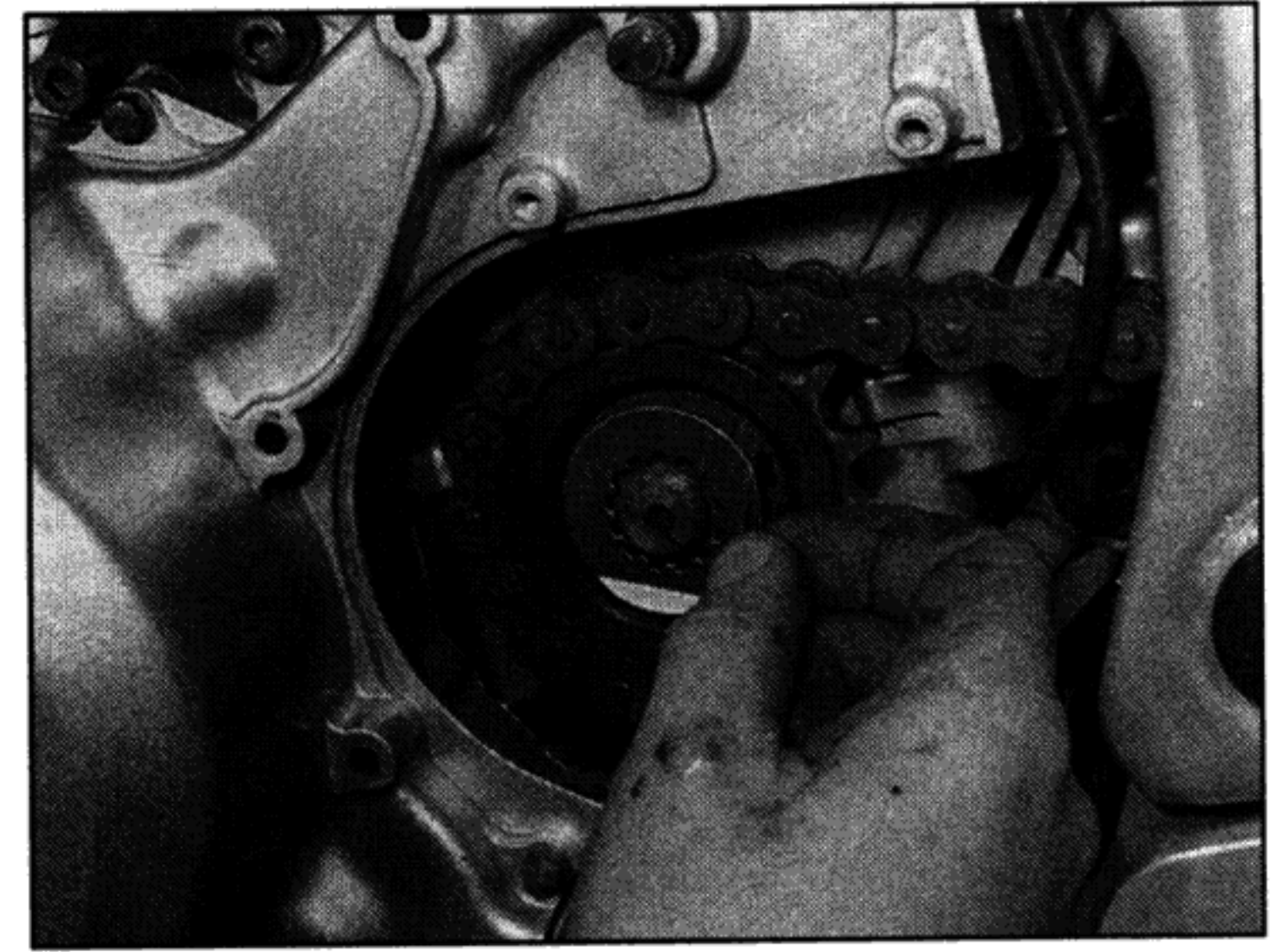
15.6 Check the amount of stretch by measuring a 10-link length as shown



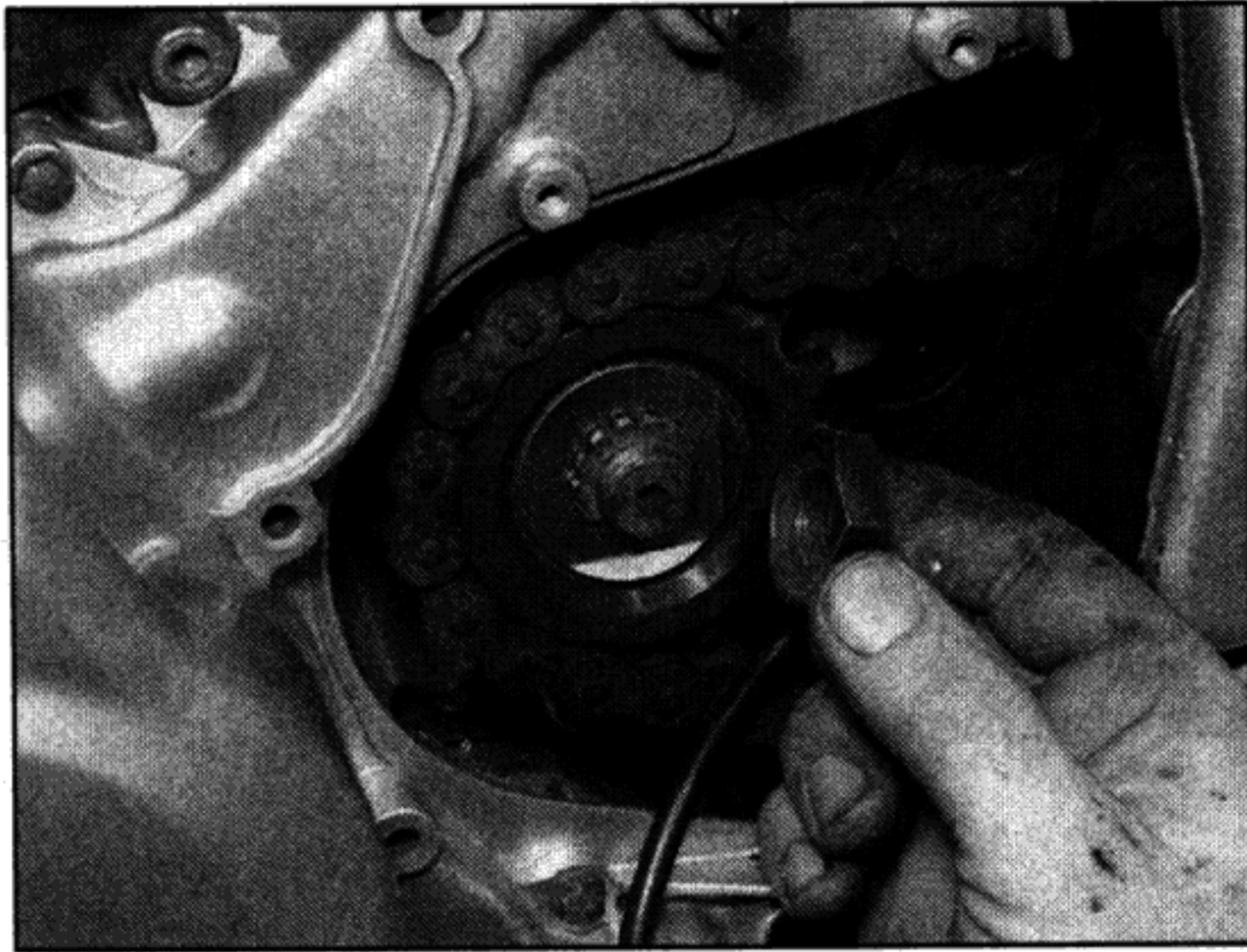
16.7 Bend back the lockwasher tab(s) (arrowed), then unscrew the nut



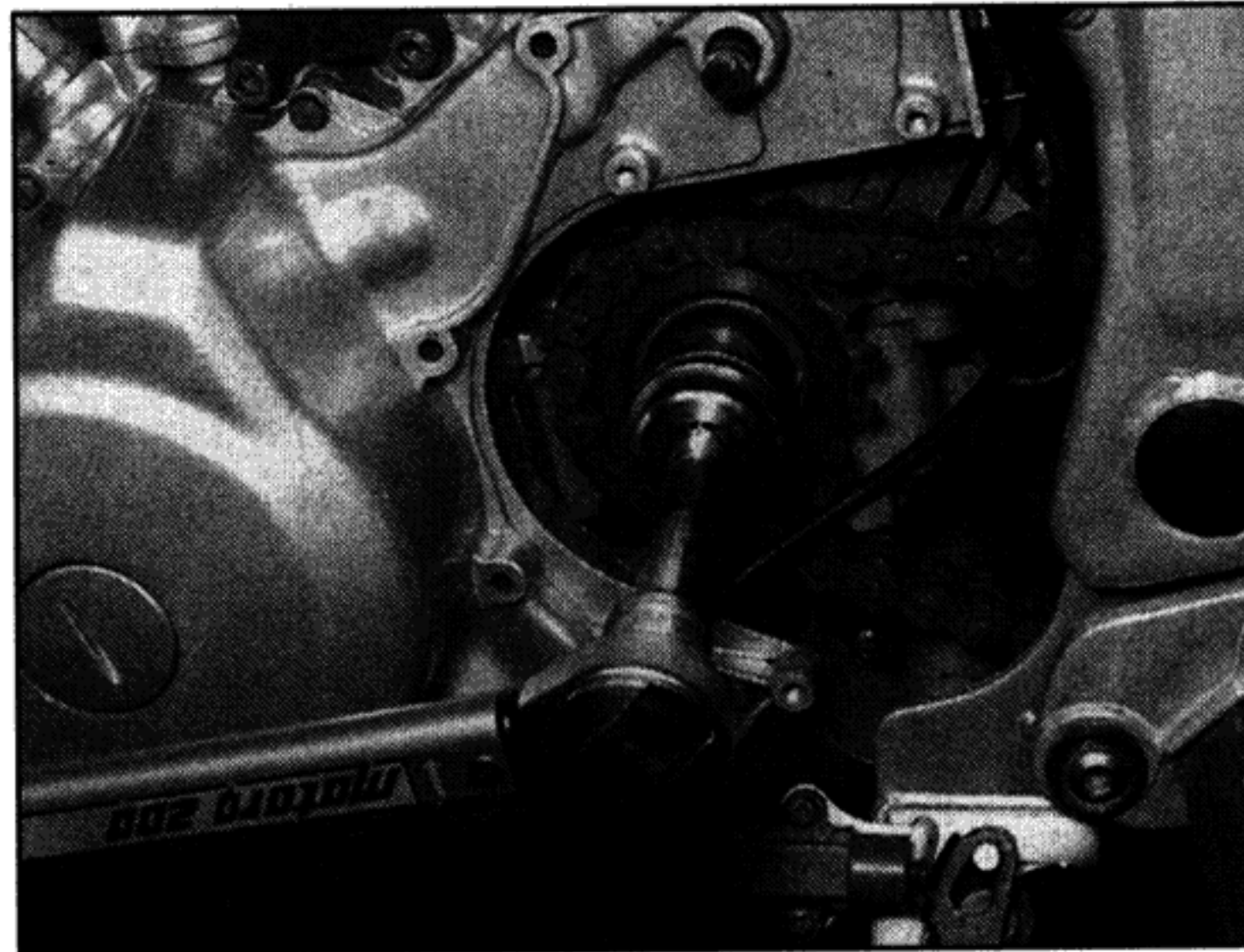
16.8 Slide the sprocket off the shaft and remove it



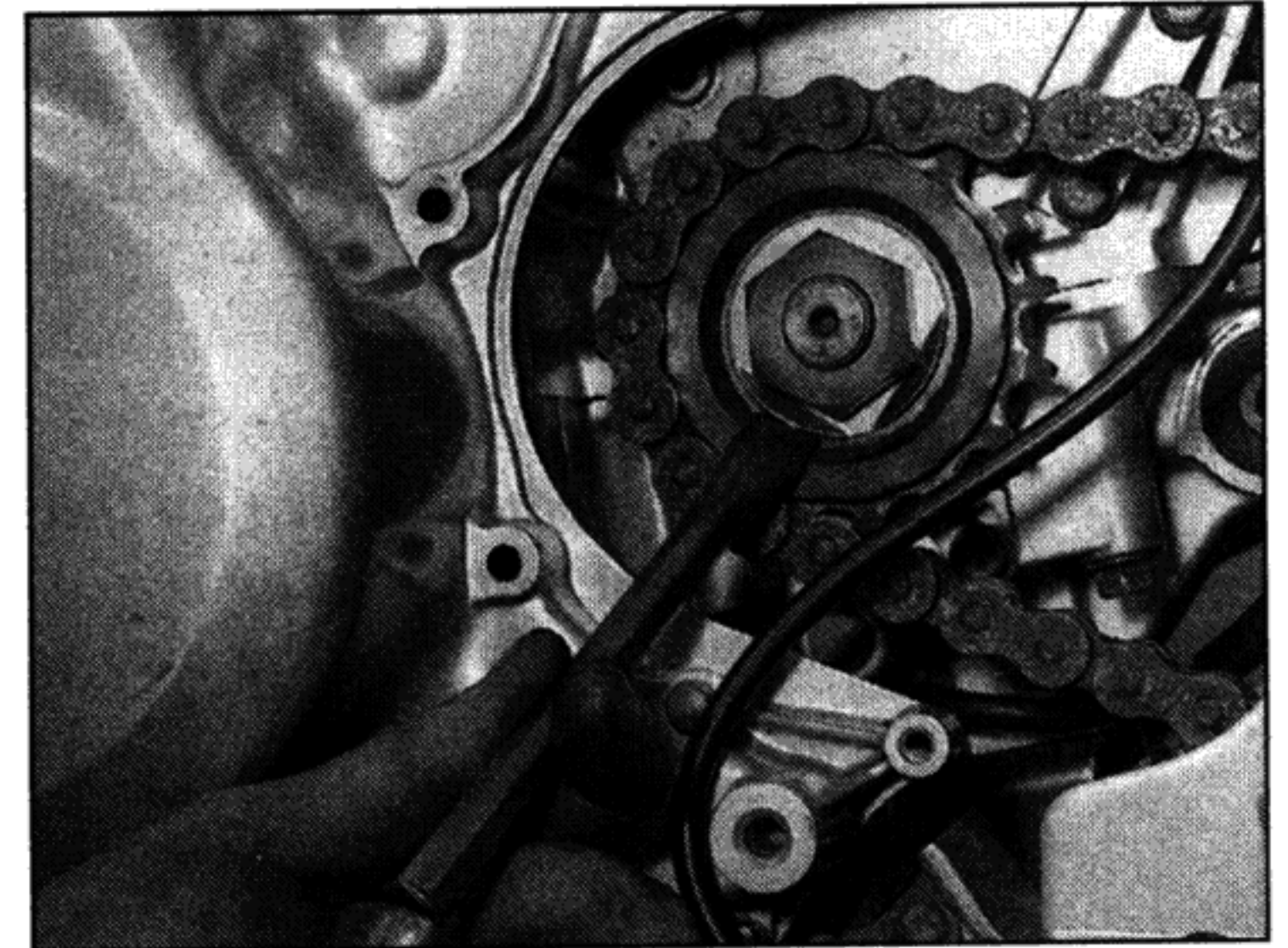
16.10a Fit a new lockwasher . . .



16.10b . . . make sure the nut is the correct way round . . .



16.10c . . . and tighten it to the specified torque



16.10d Bend the tabs up against the nut

no mark is visible, make your own before removing the arm so that it can be correctly aligned with the shaft on installation. Unscrew the bolts securing the inner sprocket cover, on TDM models noting the clip secured by the top rear bolt, and remove the cover (**see illustration 15.2c**).

6 On TRX models, unscrew the gearchange lever linkage arm pinchbolt and remove the arm from the shaft, noting the alignment of the punch mark with the slit in the clamp (**see illustration 15.3**). If no mark is visible, make your own before removing the arm so that it can be correctly aligned with the shaft on installation. Unscrew the bolts securing the outer front sprocket cover and remove the cover, then unscrew the bolts securing the inner sprocket cover, noting the clip secured by the top rear bolt, and remove the cover.

7 Bend down the tab(s) on the sprocket nut lockwasher (**see illustration**). Have an assistant apply the rear brake, then unscrew the nut and remove the washer. Refer to Chapter 1 and adjust the chain so that it is fully slack.

8 Slide the sprocket and chain off the shaft and slip the sprocket out of the chain (**see illustration**). If there is not enough slack on the chain to remove the sprocket, disengage the chain from the rear wheel.

9 Engage the new sprocket with the chain and slide it on the shaft (**see illustration 16.8**). Take up the slack in the chain (see Chapter 1).

10 Slide on a new lockwasher, then fit the nut with its recessed side facing in and tighten it to the torque setting specified at the beginning of the Chapter, using the method employed on removal to prevent the sprocket from turning (**see illustrations**). Bend up one of the pre-formed tabs of the lockwasher against the nut flats (**see illustration**).

11 On TDM and XTZ models, install the inner sprocket cover, on TDM models not forgetting the clip secured by the top rear bolt, and tighten the bolts securely (**see illustration 15.2c**). Align the split in the gearchange linkage arm clamp with the punch mark on the shaft, then fit the arm on the shaft and tighten the pinchbolt to the specified torque setting (**see illustration 15.2b**). Install the outer sprocket cover and tighten its bolts to the specified torque (**see illustration 15.2a**).

12 On TRX models, install the inner sprocket cover, not forgetting the clip secured by the top rear bolt, and tighten the bolts securely. Install the outer sprocket cover and tighten its bolts to the specified torque. Align the split in the gearchange linkage arm clamp with the punch mark on the shaft, then fit the arm on the shaft and tighten the pinchbolt to the specified torque setting (**see illustration 15.3**).

Rear sprocket

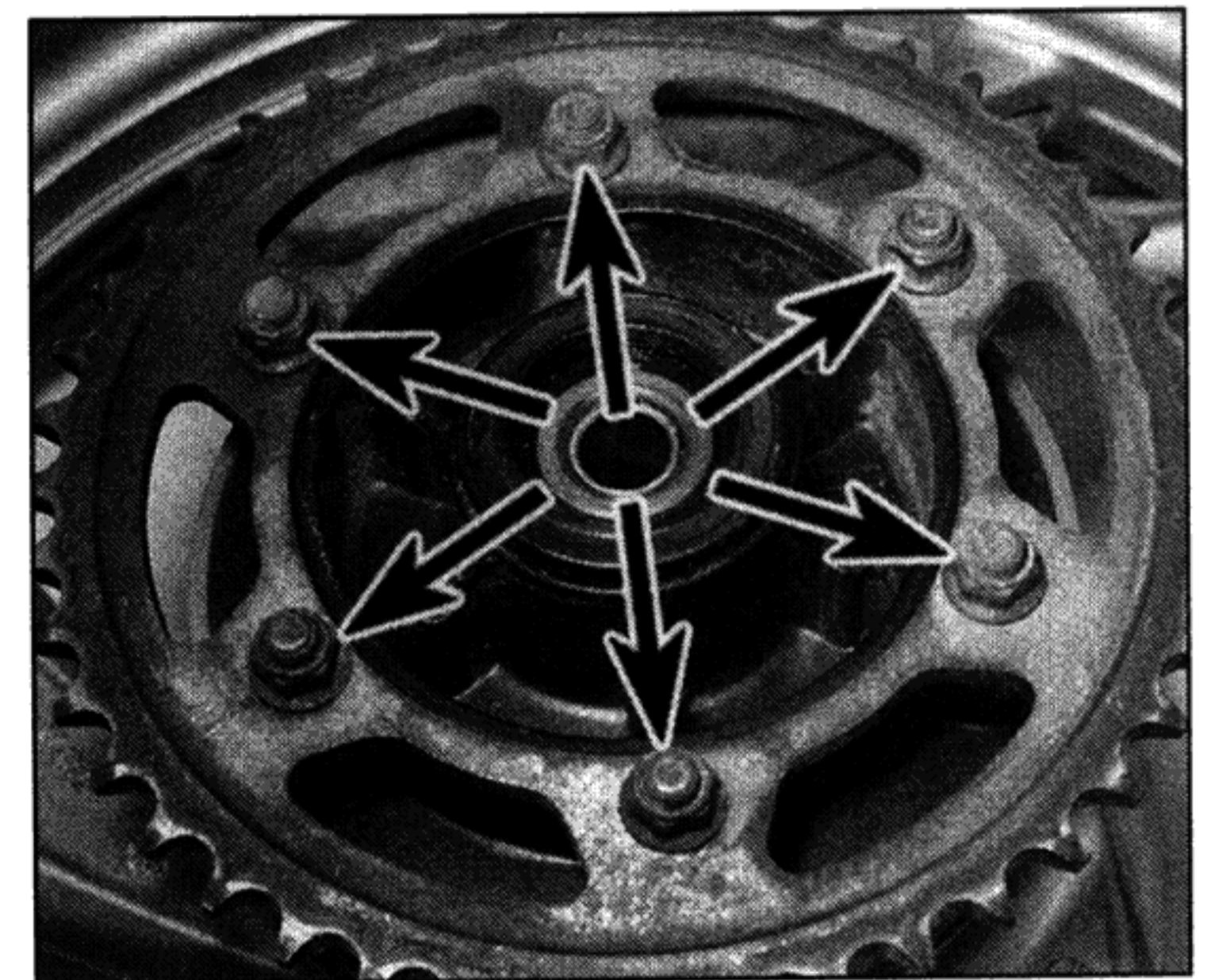
13 Remove the rear wheel (see Chapter 7).

14 On XTZ models, bend back the locking tabs on the sprocket nut lockplates.

15 Unscrew the nuts securing the sprocket to the hub assembly (**see illustration**). Remove the sprocket, noting which way round it fits.

16 Install the sprocket onto the hub with the stamped mark facing out. On XTZ models, install the lockplates, noting that new ones should be used. Tighten the nuts evenly and in a criss-cross sequence to the torque setting specified at the beginning of the Chapter. On XTZ models, bend the tabs of the lockplates up against the nut flats.

17 Install the rear wheel (see Chapter 7).



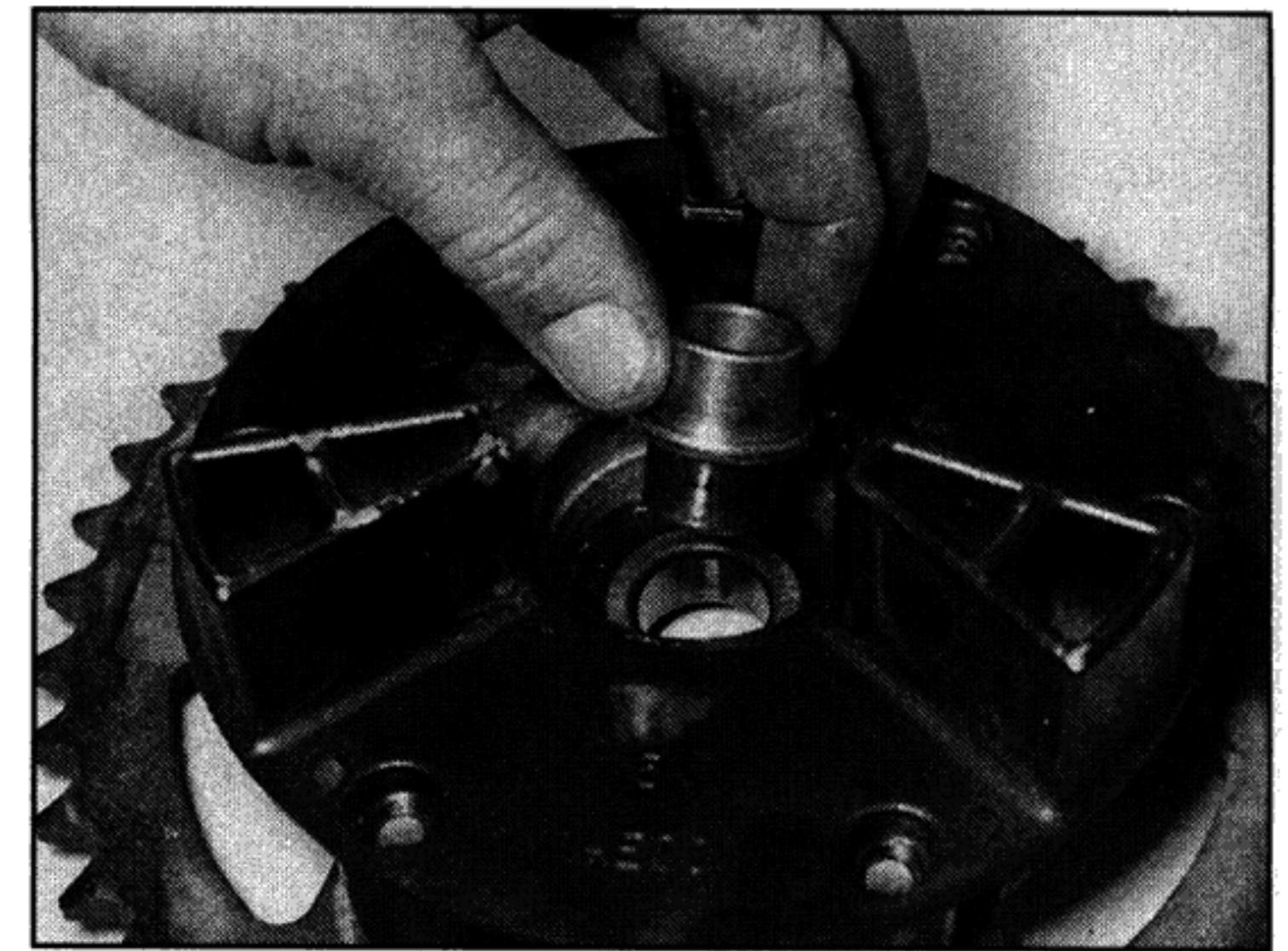
16.15 Unscrew the nuts (arrowed) and remove the sprocket



17.2 Lift the sprocket coupling out of the wheel . . .



17.3 . . . and remove the rubber dampers



17.5 Fit the spacer into the bearing if it was removed

17 Rear sprocket coupling/rubber dampers – check and replacement



1 Remove the rear wheel (see Chapter 7).
Caution: Do not lay the wheel down on the disc as it could become warped. Lay the wheel on wooden blocks so that the disc is off the ground.

2 Lift the sprocket coupling out of the wheel leaving the rubber dampers in position in the wheel (see illustration). Note the spacer inside the coupling – it should be a tight fit but remove it if it is likely to drop out. Check the coupling for cracks or any obvious signs of damage. Also check the sprocket studs for wear or damage.

3 Lift the rubber damper segments from the wheel and check them for cracks, hardening and

general deterioration (see illustration). Renew the rubber dampers as a set if necessary.

4 Checking and replacement procedures for the sprocket coupling bearing are described in Chapter 7.

5 Installation is the reverse of removal. Make sure the spacer is still correctly installed in the coupling, or install it if it was removed (see illustration).

6 Install the rear wheel (see Chapter 7).