

# **DOMINATOR BUS CHASSIS**

## **SERVICE MANUAL**

for

**London Country**

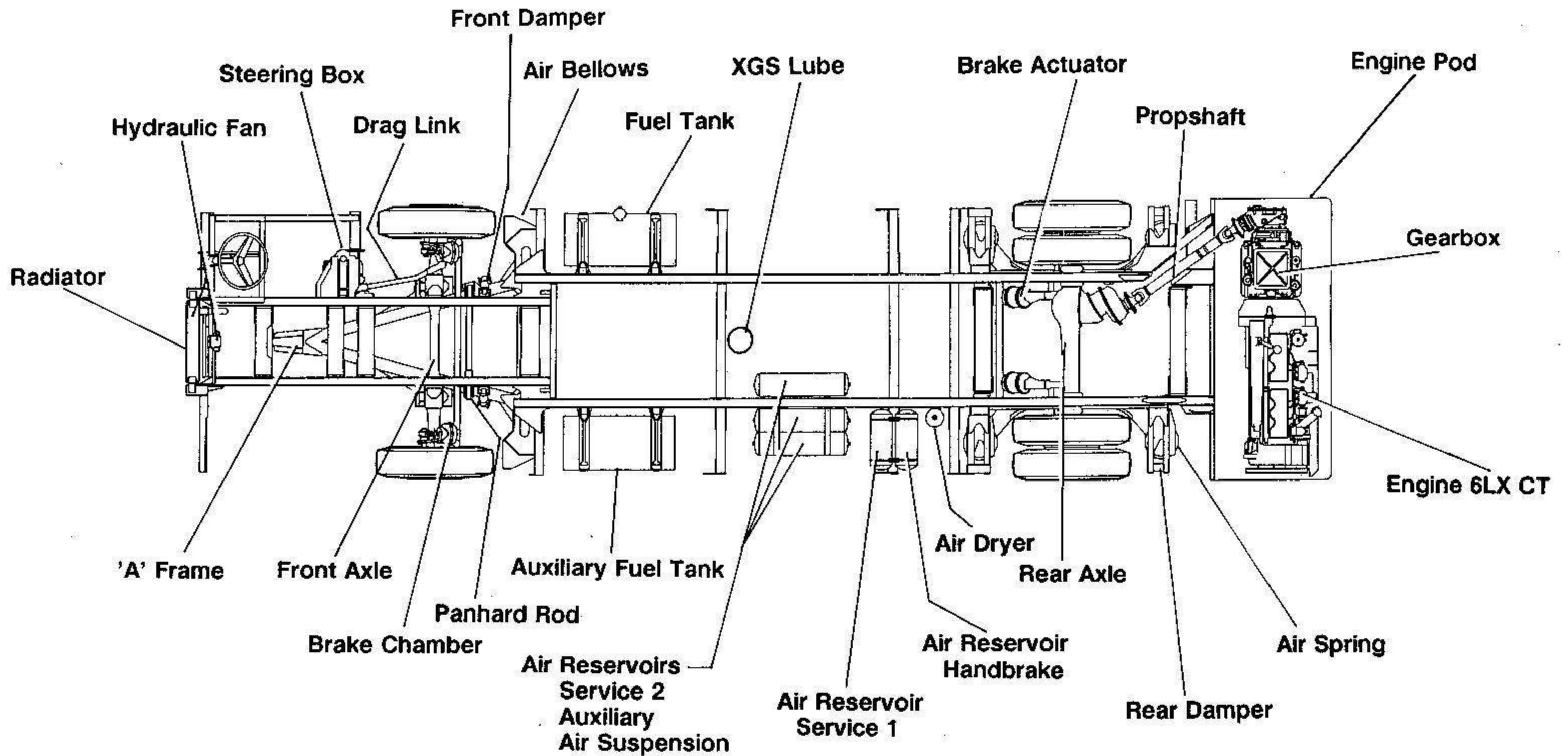
**Chassis Number Commencing  
DDA 1020  
and  
DDA 1026**

**DENNIS**

**Specialist Vehicles**

**PUBLICATION No 1857**

# General Location



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## OPERATION

|   | 1000<br>mile | Daily | Weekly | A | B                   | C |
|---|--------------|-------|--------|---|---------------------|---|
| From new only ●   | ●            | ○     | ○      | ○ | ○                   | ○ |
| <b>Front Axle</b>   |              |       |        |   |                     |   |
| Check hub bearing adjustment  | ○            |       |        | ○ | ○                   | ○ |
| Oil seals for leakage   | ○            |       | ○      |   |                     | ○ |
| Wear in stub axles  |              |       |        |   | ○                   | ○ |
| Check security of axle  | ○            |       |        |   | ○                   | ○ |
| Repack hub bearings with grease and check bearing adjustment              |              |       |        |   | Yearly              |   |
| Check kin pin wear  |              |       |        |   | Yearly              |   |
| <b>Rear Axle</b>  |              |       |        |   |                     |   |
| Security of axle  | ○            |       |        |   | ○                   | ○ |
| Adjustment of hub bearings and satisfactory lubrication                   | ○            |       |        | ○ | ○                   | ○ |
| Oil seals for leakage   | ○            |       |        |   | ○                   |   |
| Examine half shafts, nuts and studs for security                          | ○            |       |        | ○ | ○                   | ○ |
| Drain oil when warm and refill with fresh oil                             | ○            |       |        |   | Yearly or 40,000 Km |   |
| Repack hub bearings with fresh grease                                     |              |       |        |   | Yearly              |   |
| Check axle oil level  | ○            |       | ○      | ○ | ○                   | ○ |
| <b>Propellor Shafts</b>   |              |       |        |   |                     |   |
| Check tightness of all fixings  | ○            |       |        | ○ | ○                   | ○ |
| Check for wear on the universal and sliding joints                        | ○            |       |        |   | ○                   | ○ |
| Grease universal and sliding joints                                       |              |       |        | ○ | ○                   |   |
| <b>Suspension</b>   |              |       |        |   |                     |   |
| Check spring and axle mountings, tighten if necessary                     | ○            |       |        | ○ | ○                   | ○ |
| Check the front and rear damper mountings                                 | ○            |       |        | ○ | ○                   | ○ |
| Check operation of shock absorbers  |              |       |        | ○ | ○                   | ○ |
| Security of spring anchor brackets to frame                               | ○            |       |        | ○ | ○                   | ○ |
| Check all mechanical joints and mountings are secure                      | ○            |       |        |   | ○                   |   |
| Check static unladen height of air spring assemblies, adjust as necessary | ○            |       |        |   | ○                   |   |
| Remove dirt and grease deposits from air spring units                     | ○            |       |        |   | ○                   |   |
| Check air system for leaks  | ○            |       |        |   | ○                   |   |
| Clean air system line filter element                                      |              |       |        | ○ | ○                   | ○ |
| Test levelling valve operation  |              |       |        |   |                     | ○ |

At every 96,000 miles (160,000 KM) the following should be performed:

Service or replace isolator valve

Service or replace pressure protection valve

## OPERATION

|   | 1000<br>mile | Daily | Weekly | A      | B | C |
|---|--------------|-------|--------|--------|---|---|
| From new only ●   | ●            | o     | o      | o      | o | o |
| <b>Electrical</b>   |              |       |        |        |   |   |
| Check all connections throughout the system for cleanliness, security and insulation                                    | o            |       |        | Yearly |   |   |
| Check operation of all lights, switches, warning lights, direction indicators, stop lights, horns functioning correctly | o            | o     |        | o      | o | o |
| Alternator charging   | o            | o     |        | o      | o | o |
| Instruments working correctly   | o            | o     |        | o      | o | o |
| Top up battery with pure distilled water, clean and protect terminals with petroleum jelly                              | o            |       | o      | o      | o | o |
| Check rear pod doors / engine start interlock   |              |       |        | o      | o | o |
| Check headlight beams are correctly set   | o            |       |        | o      | o | o |
| Remove battery(s), clean and test, clean and repaint the carrier  |              |       |        | Yearly |   |   |
| Overall starter & alternator  |              |       |        | Yearly |   |   |
| <b>Gearbox (Voith)</b>  |              |       |        |        |   |   |
| Check idling speed of engine  |              |       |        |        | o |   |
| Check adjustment of load transmitter  |              |       |        |        | o |   |
| Change the oil filter   | o            |       |        |        | o |   |
| Check the tightness of all fixings  | o            |       |        | o      | o | o |
| Ensure that the gearbox breather is not blocked   | o            |       |        |        | o | o |
| Check for oil leaks and rectify   | o            |       | o      | o      | o | o |
| Clean suction strainer  |              |       |        |        |   | o |
| Check oil level   | o            |       | o      | o      | o | o |
| <b>Cooling System</b>   |              |       |        |        |   |   |
| Check security of radiator mountings  | o            |       |        | o      | o | o |
| Check cooling system level  | o            | o     | o      | o      | o | o |
| Check hoses for leaks and signs of deterioration and pressure test  |              |       |        | Yearly |   |   |
| Drain and flush out. Refill with the correct engine coolant   |              |       |        |        |   | o |
| Check operation of low coolant alarm  |              |       |        | o      | o | o |
| Lubricate automatic radiator shutter angle bearings and control bar ( if fitted)  |              |       |        | o      | o | o |
| <b>Engine</b>   |              |       |        |        |   |   |
| Carry out all service requirements indicated in the engine manufacturer's literature                                    | o            | o     | o      | o      | o | o |
| For all engine information consult the relevant routine maintenance section in the engine manufacturer's service manual | o            | o     | o      | o      | o | o |
| Check security of throttle control linkage and lubricate  |              |       |        | o      | o | o |

## OPERATION

|  | 1000<br>mile | Daily | Weekly | A | B                | C |
|--|--------------|-------|--------|---|------------------|---|
| From new only ●  | ●            | o     | o      | o | o                | o |
| <b>Engine and Transmission</b>   |              |       |        |   |                  |   |
| Security of engine and gearbox in chassis  | o            |       |        |   |                  | o |
| Security and efficiency of silencer and pipes  | o            |       |        | o | o                | o |
| Leaks in oil, water and fuel systems   | o            |       |        | o | o                | o |
| Fuel filters for cleanliness   | o            |       |        | o | o                | o |
| Security of radiator mountings   | o            |       |        | o | o                | o |
| Alternator drive belt tension  | o            |       |        | o | o                | o |
| <b>Air Cleaner</b>   |              |       |        |   |                  |   |
| Check security of mountings, pipework and hose connections to ensure a good and leak-free condition. Replace all worn or damaged parts |              |       |        | o | o                | o |
| Servicing periods are covered by a fitted restriction indicator  |              |       |        |   |                  |   |
| <b>Hydraulics</b>  |              |       |        |   |                  |   |
| Check level of fluid in hydraulic reservoir  |              |       | o      | o | o                | o |
| Check security of all components as shown on the hydraulic system diagram  |              |       |        |   | o                | o |
| Check all pipework and connections for leaks   |              |       |        | o | o                | o |
| Drain hydraulic oil and change filter in reservoir   |              |       |        |   | 2 Yearly         |   |
| Change return line oil filter  |              |       |        |   | Every 160,000 Km |   |
| <b>General</b>   |              |       |        |   |                  |   |
| Driver's seat and adjustment   | o            |       |        |   | o                | o |
| Windscreen wipers and washers operating correctly  | o            |       | o      | o | o                | o |
| Heating system check   | o            |       |        | o | o                | o |
| Rear view mirrors check  |              | o     |        | o | o                | o |
| Security of bumper bar   | o            |       | o      | o | o                | o |
| Check the windscreen washer fluid level  |              | o     | o      | o | o                | o |
| Security of fuel tank and operation of gauge   | o            |       |        | o | o                | o |
| Fuel pipes for leaks and security  | o            |       |        | o | o                | o |
| Lubricate all linkages with oil or grease as required  | o            |       | o      | o | o                | o |
| Lubricate all points fitted with grease nipples, using correct grease  | o            |       | o      | o | o                | o |
| Automatic chassis lubrication, check level in reservoir  |              | o     | o      | o | o                | o |
| <b>Wheels and Tyres</b>  |              |       |        |   |                  |   |
| Check all wheel nuts and tighten if necessary  | o            |       | o      | o | o                | o |
| Tyres free from damage, cuts and foreign matter  | o            | o     |        | o | o                | o |
| Tyre pressures correct including spare   | o            | o     |        | o | o                | o |
| Tread depth is within legal limit  |              | o     |        | o | o                | o |
| Check valves are positioned at 180 degrees to each other on twin wheel   | o            |       | o      | o | o                | o |

NOTE: Equipment fitted to the coach body is additional to the above service schedule, and therefore information should be obtained from the bodybuilder,

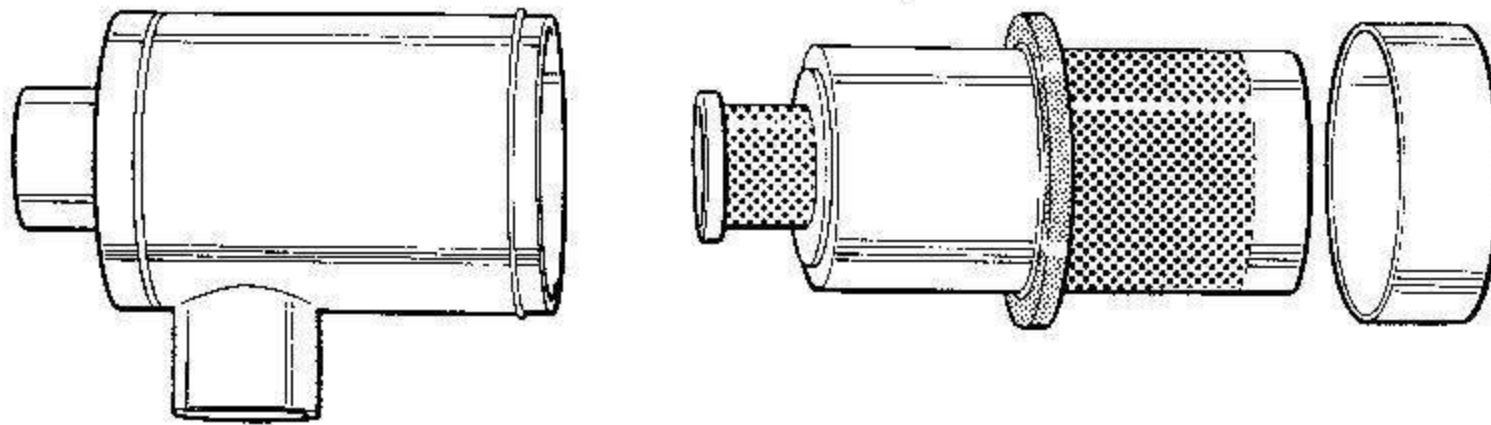
## **AIR CLEANER**

Servicing  
Dismantling  
Inspection  
Element

## AIR CLEANER (Heavy Duty)

### SERVICE

The air cleaner should be serviced at the service intervals recommended in the maintenance summary, the restriction indicator fitted in this vehicle will indicate when the element needs servicing, outside of normal periods.



### DISMANTLING

1. Clean the outside of air cleaner body before dismantling.
2. Remove wing nut and cover from air cleaner.
3. Remove main element, wing nut and gasket assembly, and carefully withdraw main element.  
*(If in doubt - always fit a new element).*
4. Element damage will be indicated by areas of concentrated dust on the clean side of the cleaner. Damaged elements must be replaced immediately.  
*(If in doubt - always fit a new element).*

### INSPECTION

5. Wipe clean inside of body assembly using a damp cloth.
6. Check that body gaskets are properly secured and in good condition.
7. Also check filter body for cracks or other damage.  
*Replace damaged parts immediately.*
8. Check all new or properly serviced elements for damage. *(See section on element servicing and inspection).* Ensure gaskets are securely affixed and in perfect condition, always check element part number against air cleaner information label.

### ASSEMBLY

9. Re-assemble air cleaner following reverse procedure to above, making sure all elements are properly secured.  
Always check air cleaner threads are clean and undamaged.
10. Reset restriction indicator



## VEHICLE CHECKS

11. Following re-assembly but, before restarting engine, the following system checks must be carried out.

- (a) Check all cleaner to engine pipework for defects to ensure good and leak free condition.
- (b) Check that all rubber hose connections are tight and leak free. Replace any worn or damaged parts.
- (c) Check that the cleaner mounting fixtures are secure.

## ELEMENT SERVICING AND INSPECTION

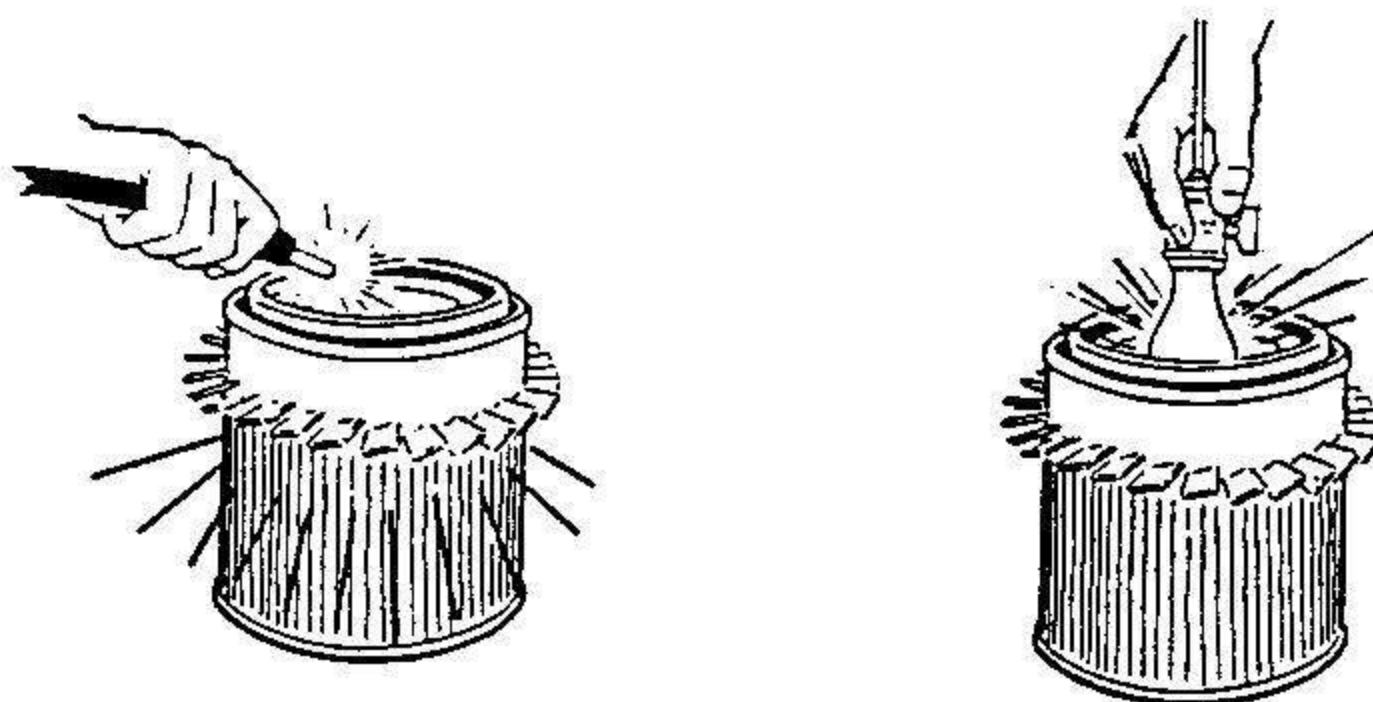
**NOTE:** Treated elements (denoted by suffix 'T' on part number e.g. AZA 304T) are specially treated to extend considerably the service life of elements. Washing of treated elements is not recommended as it removes the treatment used in the element manufacture and subsequent element life will be substantially shorter:

## COMPRESSED AIR CLEANING

Direct air through element in reverse direction to normal flow. Move nozzle up and down pleats whilst slowly rotating element. Keep nozzle at least 1 in. from pleated paper. Air pressure must not exceed 80 p.s.i. (5.6 kg/cm<sup>2</sup>) or damage will result.

## INSPECTION

After cleaning, inspect element for damage by placing a bright light inside. Thin spots, pin holes or the slightest break will render the element unsuitable for further use.



## DOMINATOR SERVICING SCHEDULE

The first service, 1000 miles / 1600 KM for a new vehicle, must be carried out not later than the first 1000 miles / 1600 KM running, or after fitment of a new re-conditioned unit. As this is the most important service for the vehicle, it is essential that the service and inspection instructions in the following schedules are followed to the letter.

Maintenance service in addition to daily weekly routine operations, is based on three types of periodic service, "A" (standard), "B" (includes "A" service) and "C" (includes "A" and "B" service).

The interval between each service should be a maximum of 3 months / 6000 miles / 10,000 KM following a recommended sequence A- B-A-C.

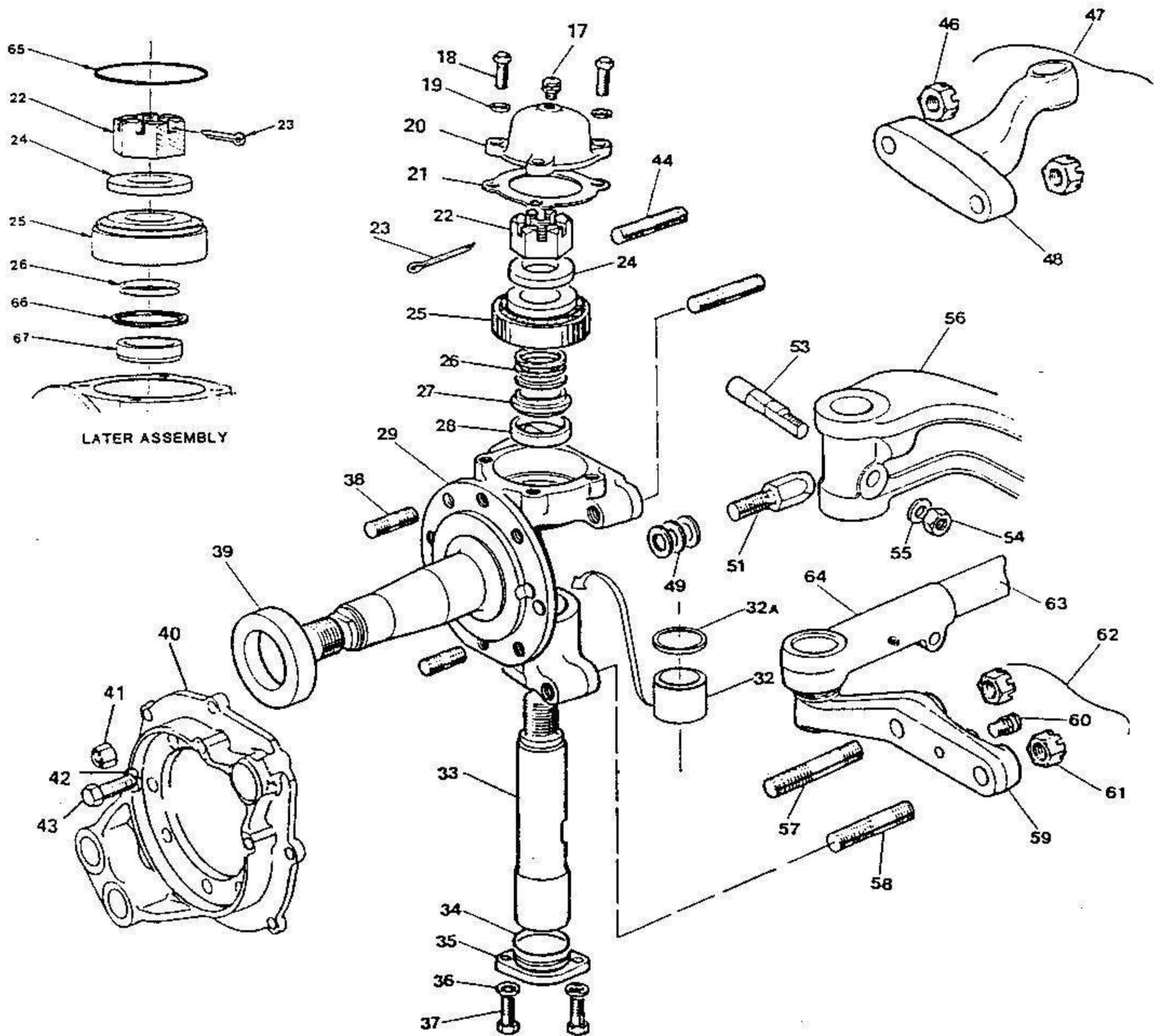
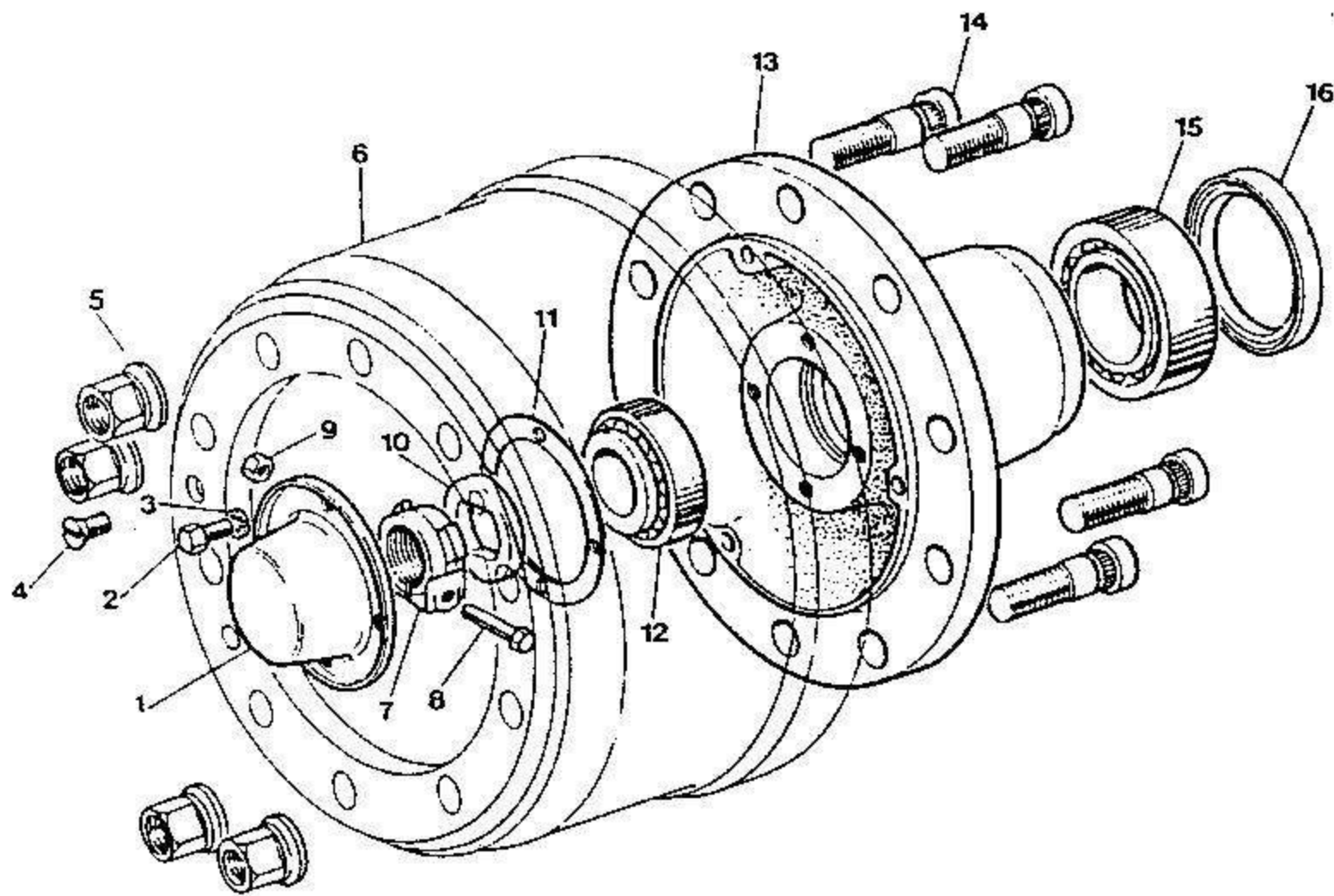
**NOTE** On stop / start short distance operation the hours run are more important than the distance.

### OPERATION

|   | 1000<br>mile | Daily | Weekly | A                    | B | C |
|---|--------------|-------|--------|----------------------|---|---|
| From new only •   | •            | o     | o      | o                    | o | o |
| <b>Steering Gear</b> (see also Hydraulics)  |              |       |        |                      |   |   |
| Overall play at steering wheel  | o            |       | o      | o                    | o | o |
| Check for security - drop arm securing nut, steering box, mountingbolts, track rod clamps bolts and steering lock stops           | o            |       |        |                      | o | o |
| Check wheels do not foul other parts when on full lock  | o            |       |        |                      | o | o |
| Front axle and wheel alignment adjust if necessary  | o            |       |        |                      | o | o |
| Check all ball joints and linkages for play   |              |       |        | o                    | o | o |
| Check mitre box for leakage   | o            |       |        | o                    | o | o |
| Check mitre box oil level   |              |       |        |                      |   | o |
| <b>Braking System</b> (see section Test & Check List)   |              |       |        |                      |   |   |
| Check and adjust brakes if necessary  | o            |       | o      | o                    | o | o |
| Check all systems function correctly and correct operating pressures are being attained   | o            | o     | o      | o                    | o | o |
| Check all air line connections and mountings for leakage and security and all rubber component for signs of cracking or hardening |              | o     |        | o                    | o | o |
| Air pressure build-up and buzzer functioning correctly  | o            | o     | o      | o                    | o | o |
| Wear in mechanical link connections and lubricate   |              |       |        |                      | o | o |
| Satisfactory operation of parking brake   | o            | o     | o      | o                    | o | o |
| Check brake lining condition, adjust brakes if necessary  |              |       |        |                      | o |   |
| <b>It is advisable to remove all valves from the vehicle, dismantle and renew any worn or damaged parts</b>                       |              |       |        |                      |   |   |
| Check function and cleanliness of air dryer   |              |       |        | o                    | o | o |
| Drain air reservoirs  |              |       | o      | o                    | o | o |
| Renew all brake actuator diaphragms   |              |       | 2      | Yearly or 160,000 Km |   |   |
| Lubricate brake camshafts   |              |       |        | o                    | o | o |
| Check slack adjusters   |              |       |        | o                    | o | o |
| Check compressor air intake filters   |              |       |        | o                    | o | o |

## FRONT AXLE

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## KIRKSTALL S.62 — FRONT AXLE

The axle is of the "Reversed Elliot" type comprising a girder section axle bed or beam with stub axles.

Each stub axle is carried on a parallel king pin, with a steep angle roller bearing at the top and a plain phosphor bronze bush at the bottom. In some installations a plain bush is fitted at the top also on the offside pin.

The taper roller bearings are of generous size and are secured and adjusted by means of a special split nut and washer.

Brakes can be serviced without disturbing the hub. The brake drums are of special alloy cast iron carried on the outside of hub flanges.

Steering ball joints with case-hardened balls and rubbing pads incorporate compression springs which automatically take up any wear.

Wheels may have standard or spigotted attachment.

### LUBRICATION

Steering Ball Joints and Swivel Pin Bushes Top and Bottom

Lubricate with lithium based grease at regular intervals not exceeding 7 days or 50 hours.

### Hub Bearings

Packed with lithium based grease on initial assembly; clean out and re-charge every 12 months. Fill with grease using a bearing packet or manually knead grease into space between the rollers race and cage. Between the bearings, smear inside of hub with grease to depth of 1.5mm. DO NOT FILL HUB CAVITY.

### Hub End Cap

1.5mm thickness of grease round inner cavity.

### MAINTENANCE

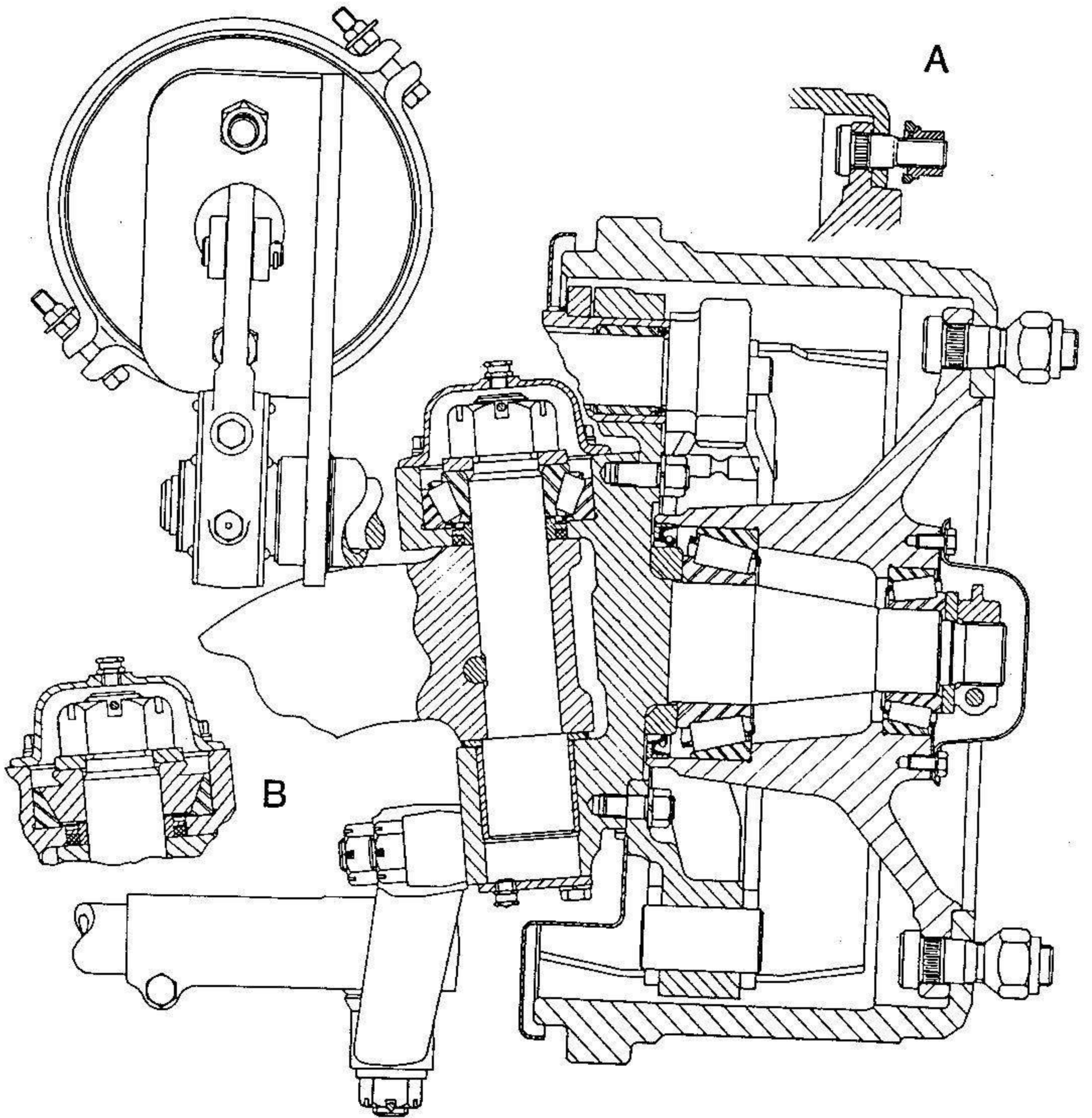
#### 1. ADJUSTMENT OF HUB BEARINGS

An inspection should be made after the first 4,800 Km and then at intervals of 40,000 Km.

With the wheels jacked up they should revolve quite freely without any roughness. The hub should have a slight movement within the limits .1/.15mm when rocked backwards and forwards on the stub. See "to adjust end float" section if any adjustment is required.

#### 2. TO CHECK FRONT WHEEL TOE IN

Set the front wheels in the straight ahead position, and at points level with the wheel centre, measure the distance between the edges of the wheel rims both in front and behind the axle centre. For correct toe in for vehicles fitted with crossply tyres, the front measurement should be 1.6mm to 3.2mm smaller than the rear measurement. For vehicles fitted with radial tyres the wheels should be parallel to 1.6mm toe in. To allow for inaccuracies in the wheels, the same check should be made with the vehicle moved an amount equivalent to one half of a wheel revolution. Any adjustment required can be effected by slackening the track rod tube. DO NOT FORGET TO RETIGHTEN THE CLAMPING BOLTS TO 54/58 lb ft (7.5/8 kgm).



A - Alternative Spigotted Wheel Fixing  
B - Alternative Plain Bush - Top Offside Pin

## TO REMOVE THE HUBS

1. Jack up the vehicle and remove the road wheels.
2. Back off the brake adjustment.
3. Remove the brake drum retaining setscrew (4).
4. Support the brake drum (6) with a rope sling and pull the drum from the wheel studs.
5. Remove the hub cap setscrews (2) and washers (3); the hub cap (1) and joint (11) can then be removed.
6. Slacken the hub nut pinch bolt (8) and remove the hub nut (7) and pull off the washer (10).
7. The hub (13) complete with its bearings and oil seal can then be removed.
8. Remove the oil seal (16) from the hub, drive out the bearings (12) and (15) from the hub.
9. If the oil seal wear sleeve (39) shows signs of wear or corrosion it must be removed and replaced with a new part.

## INSPECTION

Thoroughly clean all the parts. Inspect all parts for wear and renew if necessary. Parts such as oil seals and paper or cork joints should be renewed whenever they have been removed.

NOTE: Before the stub axles can be overhauled the brake assemblies must be removed. This can be done without the need to completely dismantle the brake.

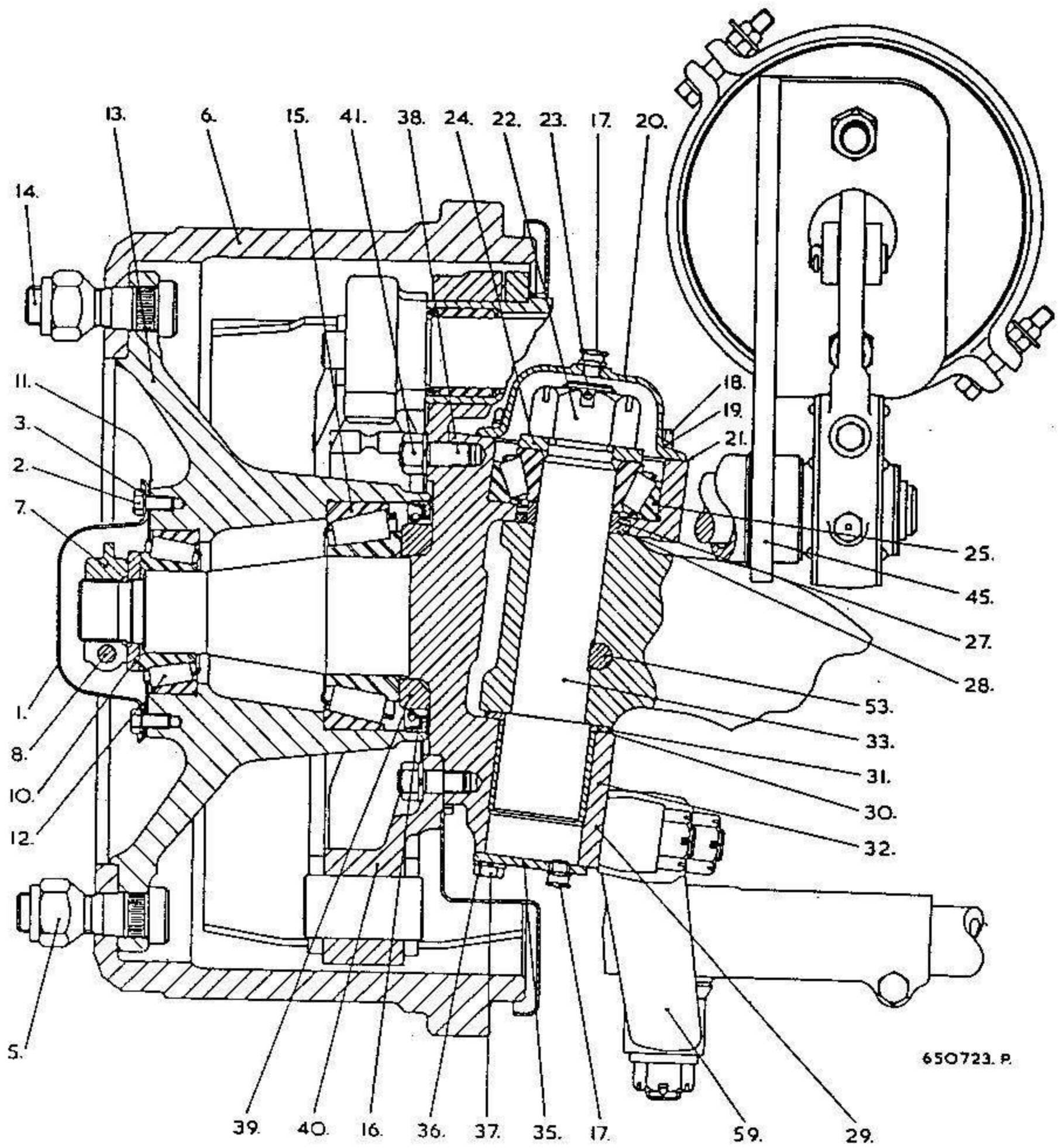
Disconnect the brake cylinder push rod from the brake lever slack adjuster.

Remove the nuts (41), washers (42) and bolts (43) securing the brake bracket (40) to the swivel (29).

The complete Brake Assembly can then be removed from the axle.

## TO REMOVE THE STUB AXLE ASSEMBLY

1. Disconnect the steering levers (47 or 59) from the steering gear and track rods.
2. Remove the swivel top cap setscrews (18) and washers (19) enabling the top cap (20) and joint (21) to be lifted off.
3. Remove the setscrews (37) and washers (36) securing the bottom cap (35) and pull off the cap and 'O' ring (34).
4. Take out the split pin (23) and remove the swivel pin nut (22) and washer (24).
5. Remove the cotter pin nut (54) and washer (55). Drive out the cotter pin (53) from the axle beam (56).
6. Give the axle beam (56) a sharp tap to loosen the swivel pin (33). The pin can then be driven out downwards, thus releasing the swivel pin from the axle beam.
7. The swivel assembly, complete with cylinder bracket and steering levers can then be pulled from the axle beam.
8. Take out the swivel bearings (25), bearing shims (26), bearing sleeve (27) and felt washer (28) from the swivel top and oil seal (32A) and bush (32) from the swivel bottom. If one of the swivel bearings is plain, it must be refitted in the same location.



KIRKSTALL TYPE S62  
With 'S' Cam Brakes



9. Remove the lockwire (47), unscrew the nuts (46) and pull off the top steering lever (48) and cylinder bracket (45) taking care not to damage the studs (44).
10. Take out the lockwire (62) remove nuts (61) and pull off the bottom lever (59) taking care not to damage the studs (57 and 58).

## INSPECTION

Thoroughly clean all parts and inspect for wear, renewing if necessary.

Inspect the steering arms for flaws which may have developed due to impact shocks.

If distortion of the axle beam, swivel or steering levers has occurred, it is impracticable to straighten without the manufacturing facilities.

Pack bearings with grease as stated under Lubrication prior to reassembly.

Soak the felt washer in clean gear oil on earlier axles.

## ASSEMBLY

To assemble Swivel

1. On earlier axles, assemble the upper felt washer (28) and bearing sleeve (27) together. Fit in position in the swivel, i.e. with the felt to the bottom and flush with the top inner face of the swivel. On later axles, fit oil seal (66) open face first, into the top swivel box.
2. Fit the upper bearing cup (5) into top swivel bore.
3. Press the bottom bush (32) into position in swivel, with the bush 3.9mm (0.17 in) below the top face of the swivel (29) to form a recess for the seal (32A).
4. Assemble the seal (32A) in swivel and offer the assembly to the axle beam (56). Ensure that the swivel bore is free from burrs and corrosion. Grease the box.
5. Drive the swivel pin (33) through the swivel (29) and axle beam (56), ensuring that the machined groove in the pin is correctly aligned with the cotter pin hole.
6. Fit the cotter pin (53) nut (54) and washer (55) but DO NOT tighten nut.
7. On later axles, fit the bearing sleeve (67) over the swivel pin (33) to abut the axle beam (56), taking care not to damage the oil seal (66).
8. Select shims (26) with a total thickness of approximately .51mm and place on top of bearing sleeve (27 or 67). Fit the upper bearing taking care to locate the plain bearing in the location from which it was removed.
9. Fit the bearing cone washer (24) and swivel pin nut (22), tighten nut. (See Torque Table).

NOTE: New swivels will be supplied to the new standard and are fully inter-changeable as long as the new sealing parts (66 and 67) are fitted at the same time.

### Swivel Adjustment

With a nominal shim thickness of .51mm placed between the bearing and bearing sleeve, attach a cord and a spring balance to the end of the stub. Pull the swivel from lock to lock, noting the spring balance reading. The correct reading should be 0.4 to 0.5 kgm if a plain bearing cone is fitted or 1.35 to 2.7 kgm if a roller bearing cone is fitted. If the reading is not between these limits, it will be necessary to alter the shim thickness between the bearing and its sleeve.

To increase the force required, remove shims from the nominal stack.

To decrease the force required, add shims to the stack.

Add or subtract shims as required until a correct reading is obtained.

9. When the swivel is set correctly, check that the nut (22) is tightened. Fit split pin (23).
10. Tighten cotter pin nut (54). (See Torque Table).
11. Paint the inside of the top cap (20) with a grease layer approx. 1.5mm thick and place in position on swivel with a new joint (21). Securing with setscrews (18) and washers (19). (See Torque Table).
12. Place a new 'O' ring (34) in position on the bottom cap (35) apply grease around the 'O' ring and fit the assembly into position in swivel, securing with setscrews (37) and washers (36). (See Torque Table).
13. Through the grease nipples charge the swivel pin assembly with grease until it seeps out at the top and bottom joints between the swivel and the axle.
14. Locate the bottom lever (59) on to its studs (57 and 58) and fit nuts (61). Tighten nuts and secure with lockwire.
15. Position the cylinder bracket (45) and top lever (48) on the studs (44), fit and tighten the nuts (46) and secure with lockwire.
16. Reconnect the steering gear and tie rods to the steering levers (47 and 49).

## **BRAKE ASSEMBLY**

Fit the complete brake assembly on to the swivel stub, locating on the brake studs (38). Secure with nuts (41), bolts (43) and spring washers (42). (See Torque Table).

## **TO ASSEMBLE HUBS**

1. Fit the oil seal wear sleeve (39) on to the axle stub (29).
2. Fit the inner and outer bearing cups into their bores in the hub (13). Pack the bearings with grease as indicated under Lubrication. Paint the inside of the hub with a layer of grease approx. 1.5mm thick.
3. Fit the inner bearing cone in to its cup in the hub (13). Press the hub oil seal (16) into position in the hub.
4. Fit the hub assembly on to the axle stub and assemble the outer bearing cone (12) into its cup.
5. Fit the bearing washer (10) and bearing nut (7) and tighten hard with the aid of a tommy bar, at the same time revolving the hub.

## **TO ADJUST END FLOAT**

Rotate the hub and, using a hide faced hammer, knock the hub backwards and forwards along axle arm to shock load and thus settle bearings in position.

*NOTE: It is very important to rotate and shock load the hub because:*

- (a) *The rotation serves to ensure that the bearing rollers settle into running in their correct tracks.*
- (b) *The shock load is to ensure that the bearings are seated correctly up to their abutment shoulders.*

Check tightness of hub nut (7) and, if nut is loose, re-tighten hard. Rotate and shock load hub again.

Continue this procedure until hub nut cannot be tightened further after hub has been rotated and shock loaded.

Back off the hub nut by approximately 30° then rotate again and knock the hub outwards along the axle stub to release bearings.

Mount a dial indicator on the hub flange and position the pointer on the end of axle stub. Rock the hub backwards and forwards along the stub, taking a reading on dial indicator.

The correct end float is between limits 0.004 in./0.006 in. (0.102/0.152mm).

Fit the pinch bolt (8) and tighten the pinch bolt nut (9), (see Torque Table). Check the end float again, using the above procedure, and adjust if outside specified limits.

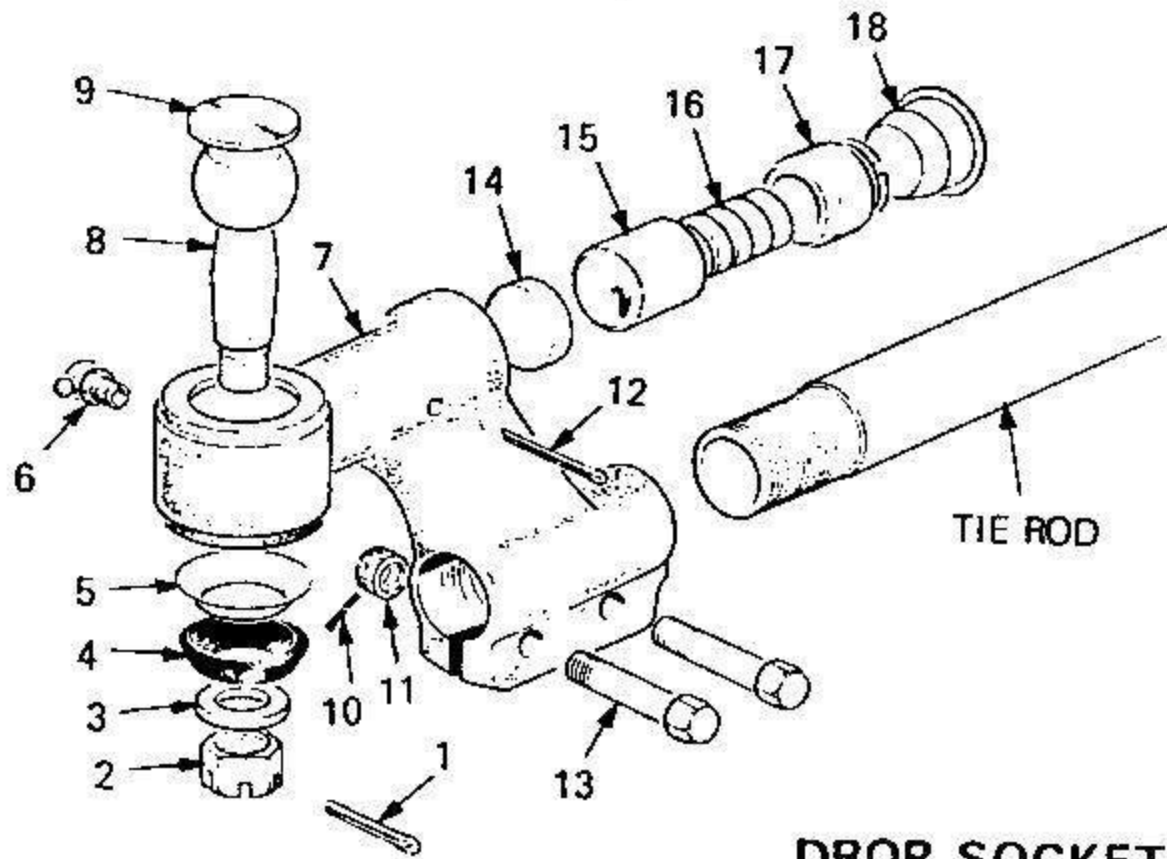
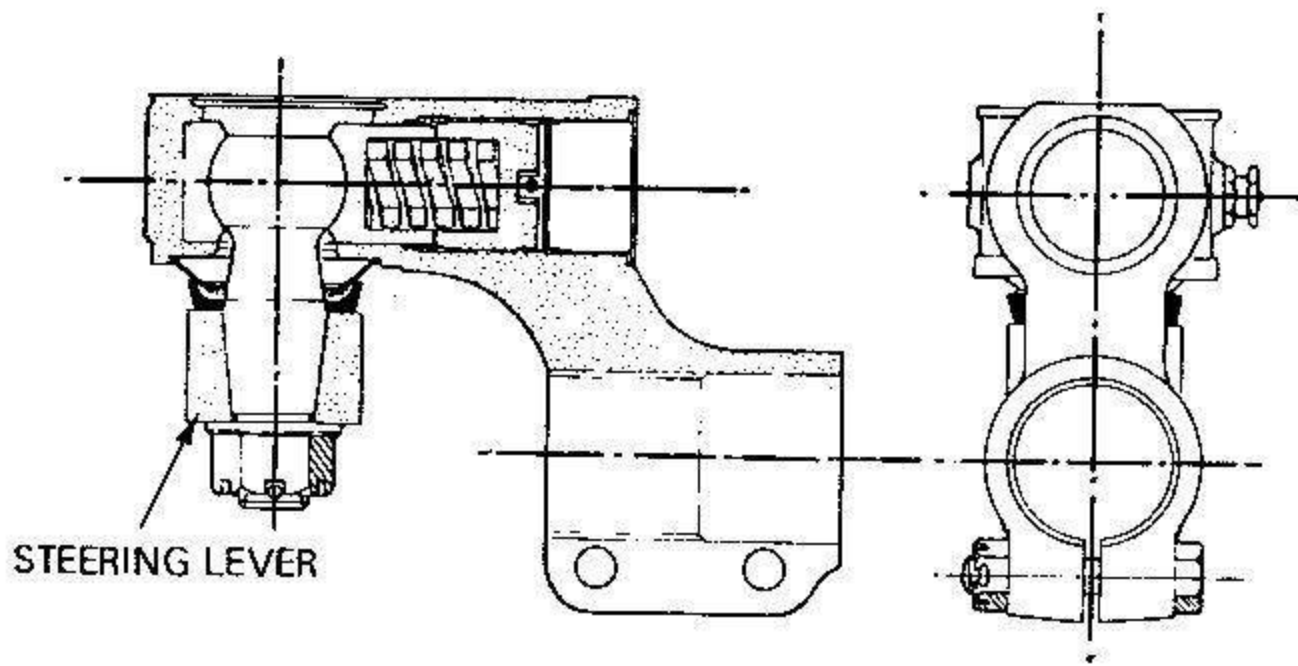
This check is to ensure that the hub nut has not moved during the locking procedure and must be carried out to ensure correct setting.

6. Paint the inside of the hub cap (1) with a grease layer approx. 1.5mm thick.
7. Fit the hub cap (1), with new joint (11) and secure with setscrews (2) and spring washers (3). (See Torque Table)>
8. Refit the brake drum (6) securing with setscrews (4).
9. Re-adjust the brakes and refit the road wheels and wheel nuts (5). Tighten to the correct torque as described in WHEEL AND TYRES at the end of this Manual.

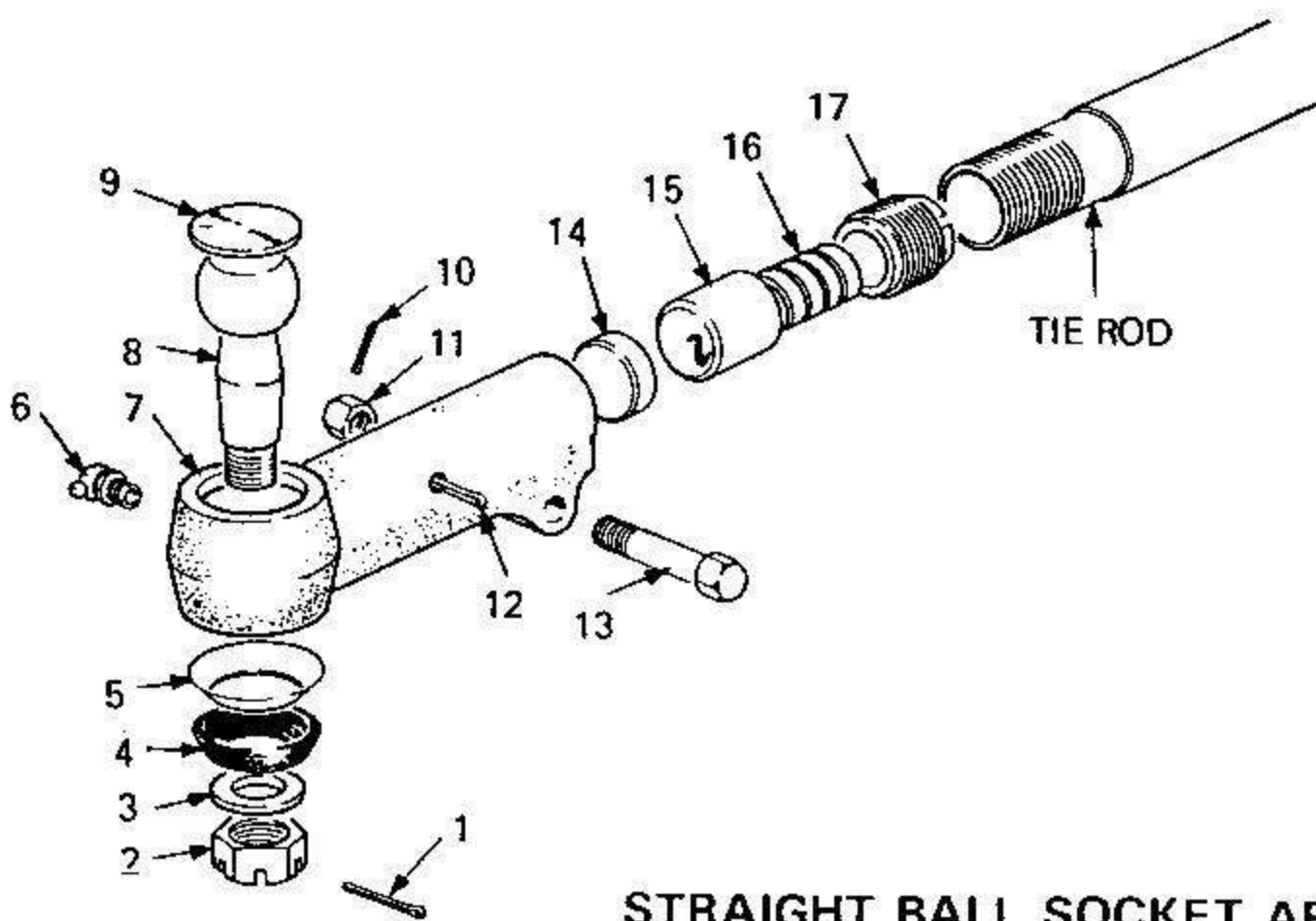
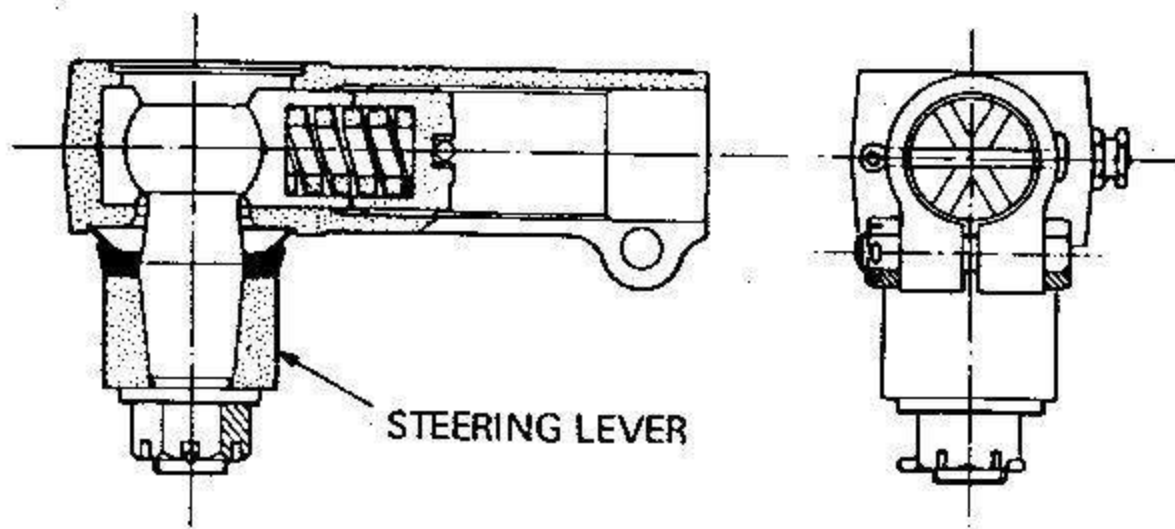
#### **TO REMOVE BALL SOCKET ASSEMBLY**

1. Remove split pin (1) from pin nut (2).
2. Using a  $\frac{3}{4}$  in. UNF spanner, unscrew and remove pin nut (2) also remove pin washer (3).
3. Remove ball joint assembly from steering lever. Using two 2 lb hammers, and simultaneously tapping the steering lever to free the taper of the ball pin.
4. Remove the dirt seal (4) also the dirt seal (pressing) (5) from the ball pin.
5. Remove plastic cap (18) from drop socket body.
6. Remove the adjuster piece split pin (12) from ball socket body (7).
7. Using a suitable tool, e.g. a piece of 1 in. x  $\frac{1}{8}$  in. x 9 in. flat bar, unscrew and remove the adjuster piece (17). Waggle ball pin (8) to free the thrust cup (15). Remove the compression spring (16) also the thrust cup (15) from the ball socket body.
8. Using a hide mallet, tap the ball pin (8) out of the body. This operation will also remove the cover plate (9) from the body (7).
9. The rubbing pad (14) can now be removed from the body (7).

Thoroughly clean all parts and check for wear, renewing where necessary.



**DROP SOCKET ARRANGEMENT**



**STRAIGHT BALL SOCKET ARRANGEMENT**

## TO ASSEMBLE BALL SOCKET

1. Using scraping tool, clean the peened areas on the ball socket body to enable the cover plate (9) to be fitted.
2. Knock the rubbing pad (14) into its recess in the ball socket body.
3. Thoroughly grease the rubbing pad (14) and ball pin (8) with Shell Retinax A or equivalent.
4. Insert ball pin (8) into body.
5. Insert thrust cup (15) compression spring (16) and adjuster piece (17) into body.
6. Using suitable tool, e.g. a piece of 1 in. x 1/8 in. x 9 in. flat bar, tighten the adjuster piece (17) fully home (SOLID), locating the thrust cup (15) onto the ball pin (8).
7. Still with the tool located on the adjuster piece (17). Back off carefully (LEAST AMOUNT) until the adjuster piece split pin (12) is allowed to pass through the body.
8. Fit cover plate (9) into top of ball socket body, re-peen, using a cold chisel to secure.
9. Fit plastic cap (18) into drop socket body.
10. Fit dirt seal (pressing) (5) and dirt seal (rubber) (4) onto ball pin (8).
11. Locate ball socket and tie rod assembly with steering lever, carefully align and fit ball pin (8) into hole in the steering lever.
12. Fit pin washer (3) onto ball pin (8).
13. Screw pin nut (2) onto ball pin (8) using 3/4 in. UNF spanner. Tighten to 100/130 lbf ft (13.8/18 kgm). adjust up to nearest split pin hole to allow split pin (1) to pass through the ball pin (8).
14. Recharge the ball socket with Shell Retinax A or equivalent grease.

**TORQUE TABLE**  
**S62 – STEERING AXLE**

| <b>ITEM</b> | <b>DESCRIPTION</b>                 | <b>TORQUE</b>                   |
|-------------|------------------------------------|---------------------------------|
| 2           | Hub Cap Setscrew                   | 21.7/24 N m<br>(16/18 lb ft)    |
| 5           | Wheel Nut, spigotted               | 610/644 N m<br>(450/475 lb ft)  |
|             | Wheel Nut, non-spigotted           | 515/570 N m<br>(380/420 lb ft)  |
| 9           | Bearing Nut Pinch Bolt Nut         | 32.5/35 N M<br>(24/26 lb ft)    |
| 18          | Swivel Top Cap Setscrew            | 62.4/67.8 N m<br>(46/50 lb ft)  |
| 22          | Swivel Pin Nut                     | 407/678 N m<br>(300/500 lb ft)  |
| 37          | Swivel Bottom Cap Setscrew         | 38/42 N m<br>(28/31 lb ft)      |
| 38          | Brake Bracket Stud                 | 54.2/59.7 N m<br>(40/44 lb ft)  |
| 41          | Brake Bracket Nut                  | 89.5/100.3 N m<br>(66/74 lb ft) |
| 44          | Chamber Bracket/Top Lever Stud     | 244/298 N m<br>(180/220 lb ft)  |
| 46          | Steering Lever/Chamber Bracket Nut | 244/298 N m<br>(180/220 lb ft)  |
| 54          | Swivel Pin Cotter Nut              | 71.9/80 N m<br>(53/59 lb ft)    |
| 57 &<br>58  | Bottom Steering Lever Stud         | 244/298 N m<br>(180/220 lb ft)  |
| 61          | Steering Lever Nut                 | 244/298 N m<br>(180/220 lb ft)  |

Pack bearings with grease as stated under lubrication prior to reassembly.

## **REAR AXLE**

**D66 BH Drive Head  
Rear Axle Hub**

## D 66 BH DRIVE HEAD

| <b>Description</b>   | <b>Sub-Section</b> |
|--|--------------------|
| Lubrication  |                    |
| Preparation for Overhaul   | 1                  |
| Removal of driveshafts   | 2                  |
| Removal of bevel casing/differential assembly from axle casing                                 | 3                  |
| Dismantling helical pinion assembly  | 4                  |
| Dismantling the spiral bevel pinion assembly   | 5                  |
| Dismantling the bevel casing/differential assembly   | 6                  |
| Inspection   | 7                  |
| Assembling the spiral bevel wheel (crown wheel and differential)                               | 8                  |
| Spiral bevel pinion assembly   | 9                  |
| Initial preparation before fitting assembled spiral bevel wheel (crown wheel and differential) | 10                 |
| Fitting spiral bevel wheel (crown wheel and differential into bevel casing                     | 11                 |
| Setting "no end float" condition   | 12                 |
| Setting the spiral bevel wheel (crown wheel and pinion back-lash)                              | 13                 |
| Setting the spiral bevel wheel (crown wheel) bearings  | 14                 |
| Gear identification and crown wheel and pinion mesh setting instructions                       | 15                 |
| Helical pinion assembly  | 16                 |
| Final assembly   | 17                 |



## **D66 BH DRIVE HEAD (ANGLE DRIVE)**

### **DESCRIPTION**

The drive is transmitted through helical gears to an overhung angular spiral bevel pinion.

Both pinion and helical gear run in taper roller bearings which are adjustable by packing shims or by graded spacers.

The crown wheel and differential assembly is also mounted in taper roller bearings, adjustment by special nuts running in the differential straps.

A variety of helical gears, spiral bevel pinions and crown wheels are available to cover a wide range of axle ratios.

### **LUBRICATION**

Drive Head:

- a) Fill through the front plug hole in the axle bowl until oil just runs out.
- b) Fit the filler plug.

Helical Casing:

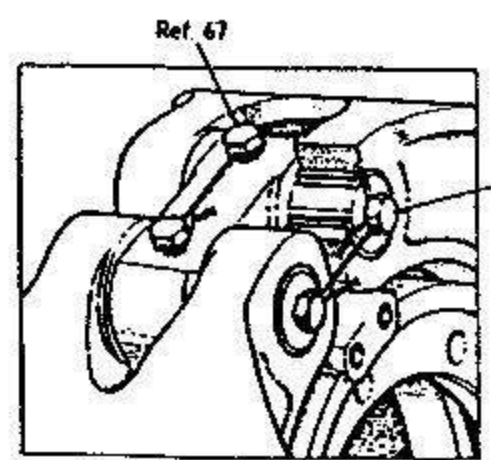
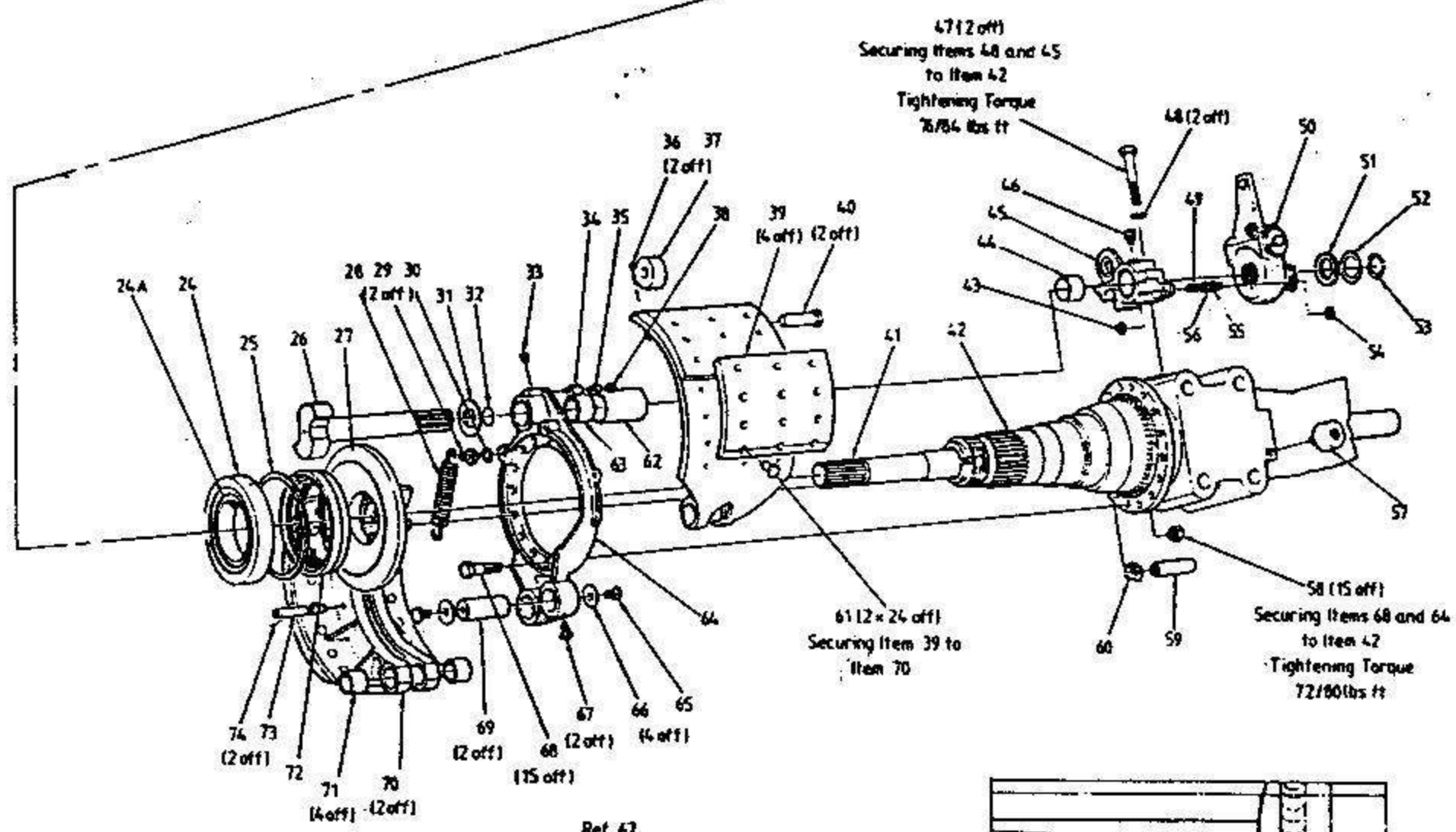
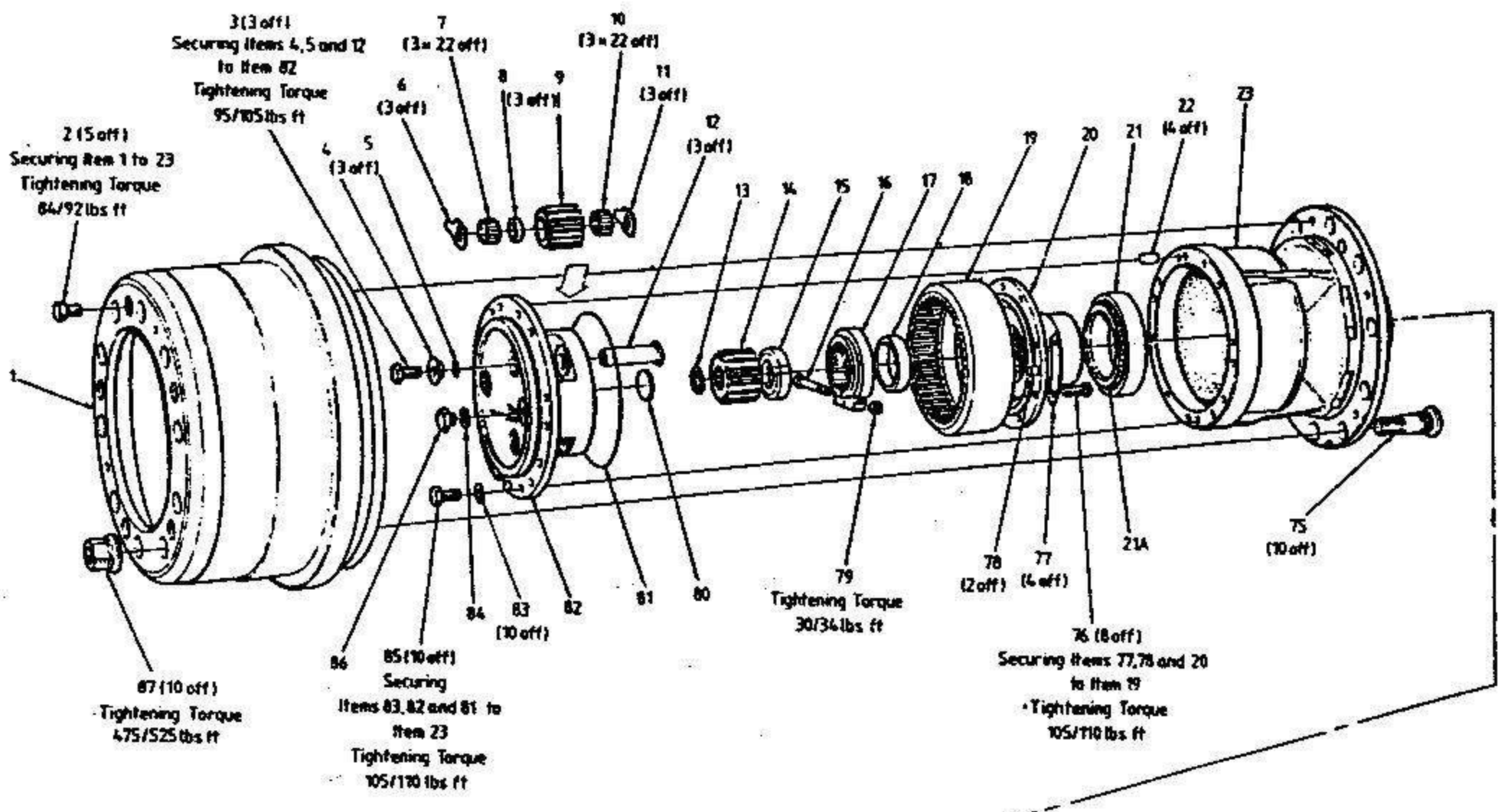
- a) Now fill through the rear plug (in helical casing) until oil runs out.
- b) Leave for 15 minutes for oil to settle, then top up if necessary.
- c) Fit filler plug.

For correct specification and schedule see LUBRICATION CHART.

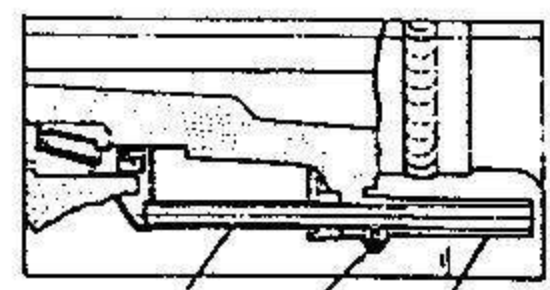
### **1 - PREPARATION FOR OVERHAUL**

Note: On dismantling, clean all parts in paraffin or other suitable cleaning agent and place on a clean work surface.

- 1.1 Before attempting to remove the road wheels, drive the vehicle onto a level, solid concrete floor and over a maintenance pit if possible, preferably after a short run to warm the oil.
- 1.2 Chock the appropriate wheels.
- 1.3 Whilst the road wheels are still on the ground, loosen the wheelnuts on both hubs.
- 1.4 Jack up the axle and support with suitably placed timbers.
- 1.5 Remove the wheelnuts and pull off the road wheels.
- 1.6 With suitable drip trays placed under the drive head and hubs, (drive head capacity 25¾ pints - 9.6 litres. Hub capacity 3 pints - 1.7 litres) remove the appropriate drain and filler plugs to drain oil.
- 1.7 Disconnect the propshaft from its coupling flange.
- 1.8 Remove the axle from vehicle and place on a suitable stand.



View showing Wire locking of Pivot Pin Lockscrews (Item 67) and Brake Shoe Pivot Pin Setscrews (Item 65).



Cross section view of Oil Collector Drain positioned at BDC.

FIG. 1 REAR AXLE HUB

## **2 - REMOVAL OF DRIVESHAFTS (FIG. 1)**

- 2.1** Using a ¾" A/F spanner, remove the 10 off planet carrier setscrews (85) and washers (83).
- 2.2** Fit two ½" UNF extractor bolts in the tapped holes provided in the planet carrier flange and tighten evenly to draw the planet carrier assembly (82) from the hub, taking care not to lose the planet carrier dowels.
- 2.3** Remove the planet carrier 'O' ring (81) and discard for renewal.
- 2.4** Pull out the drive shaft (41) complete with sun gear (14).
- 2.5** Repeat ops 1 to 4 for the other hub end.

## **3 REMOVAL OF BEVEL CASING/DIFFERENTIAL ASSEMBLY FROM AXLE CASING**

Having previously removed the drive shafts in Section 2 proceed as follows:

- 3.1** Using an 11/16" A/F socket, unscrew and remove the sixteen axle casing nuts and spring washers (50 and 54).
- 3.2** Support the assembly with suitable sling and lifting gear.
- 3.3** Insert two extractor bolts into the tapped holes provided in the bevel casing flange (51). Tighten to draw the assembly from the axle casing (35). Place on suitable build stool or legs.
- 3.4** Remove the axle casing joint (34) from the axle casing studs (39).

## **4 - DISMANTLING HELICAL PINION ASSEMBLY (FIG. 2)**

- 4.1** Remove both drive shafts as described in 2.1 to 2.5. Place a suitable wedge between the crownwheel and pinion teeth to prevent movement.
- 4.2** Using a suitable pry bar, carefully lever the peened portion of the coupling flange nut (1) to clear the helical pinion threads.
- 4.3** Using a 2.22" A/F spanner, loosen the coupling flange nut (1).  
**DO NOT REMOVE AT THIS STAGE.**
- 4.4** Using a 5/8" A/F spanner, remove the 16 off helical pinion housing setscrews (7) and washers (8).
- 4.5** Separate the helical pinion housing (9) from the spiral bevel pinion housing (15) taking care not to lose the three location dowels (52).
- 4.6** Remove the coupling flange nut and washer (1) with the assembly resting on the pinion face.
- 4.7** Using suitable extraction equipment, pull the coupling flange (2) from the helical pinion (55). E303 series equipment is available if required.
- 4.8** Using a 5/8" A/F spanner, remove the six oil seal/bearing retainer screws (57) and washers (56).
- 4.9** Pull off the bearing retainer (4) complete with oil seal (3). Take care not to lose the helical bearing shims.
- 4.10** Prise out and discard the oil seal (3).

- 4.11 Lift out the helical pinion (55) complete with its bearing cones (10A and 53A).
- 4.12 Separate the bearing cones from the pinion.
- 4.13 Using a soft metal drift, tap the outer (10) bearing cup from the bore in the helical casing (9).

## 5 - DISMANTLING THE SPIRAL BEVEL PINION ASSEMBLY (FIG.2)

- 5.1 With a suitable pry bar, carefully lever the peened portion of the pinion nut (11) to clear the pinion threads.
- 5.2 Using a 2.22" A/F spanner, loosen the pinion nut (11).  
DO NOT REMOVE AT THIS STAGE.
- 5.3 With an 11/16" A/F spanner, remove the 6 off pinion housing nuts (16) and washers (17).
- 5.4 Using a hide faced hammer, tap the pinion housing (15) from its register, along with complete pinion assembly and helical gear inner bearing cup (13). Take care not to lose the pinion/crown wheel setting shims (22) as the housings are split.
- 5.5 Remove the helical gear inner bearing cup (13) from its bore in the pinion housing (15) if required.
- 5.6 Using an A/F spanner, remove the pinion nut (11).
- 5.7 With a suitable extractor, pull the helical gear (12) from the spiral bevel pinion (21).
- 5.8 Knock the pinion (21) along with the inner cone (20A) bearing spacers (18 and 19).
- 5.9 Tap the bearing spacers and bearing cone from pinion.
- 5.10 Lift out the outer cone of bearing (13) and inspect the bearing cups in the pinion bearing housing (15). Drive out the bearing cups with a soft metal drift if required.

## 6 - DISMANTLING THE BEVEL CASING/DIFFERENTIAL ASSEMBLY

- 6.1 Mark the bevel casing straps (41) to ensure correct re-assembly.
- 6.2 Using a 15/16" A/F socket, unscrew and remove the four bevel casing strap stud nuts (33) and washers (32).
- 6.3 Lift off the bevel casing straps (41).
- 6.4 Remove and discard the two differential adjusting nut split pins (42) from the bevel casing straps (41).
- 6.5 Remove the two differential bearing adjusting nuts (27).
- 6.6 Lift out the spiral bevel wheel (crownwheel) (21) and differential unit
- 6.7 Lift the two differential cage bearing cups (28) off their cones (28A) and inspect for wear/damage.
- 6.8 Using a suitable bearing extractor tool, remove the two differential case bearing cones (28A) from the differential cage halves (29 and 29A).
- 6.9 Stand the remaining assembly on the bench - differential cage, female half, (20) - outer face down.

Annotations relevant to Assembly Procedure \*

MATCHING PARTS :-

Pinion (Item 21) and Crownwheel (Item 21A).

Bevel Casing Assembly comprising :-  
Items 24, 32, 33, 41 and 51

Differential Cage Pair comprising :-  
Items 29 and 29A

\* Note - All Bearings must be lightly Oiled before Setting and rotated whilst being Set.  
Select Graded Spacers (Items 18 and 19) to obtain Bearing torque of 15/25 lbs ins with Pinion (Item 21) assembled in Pinion Bearing Housing (Item 15) before assembly into Bevel Casing (Item 51).

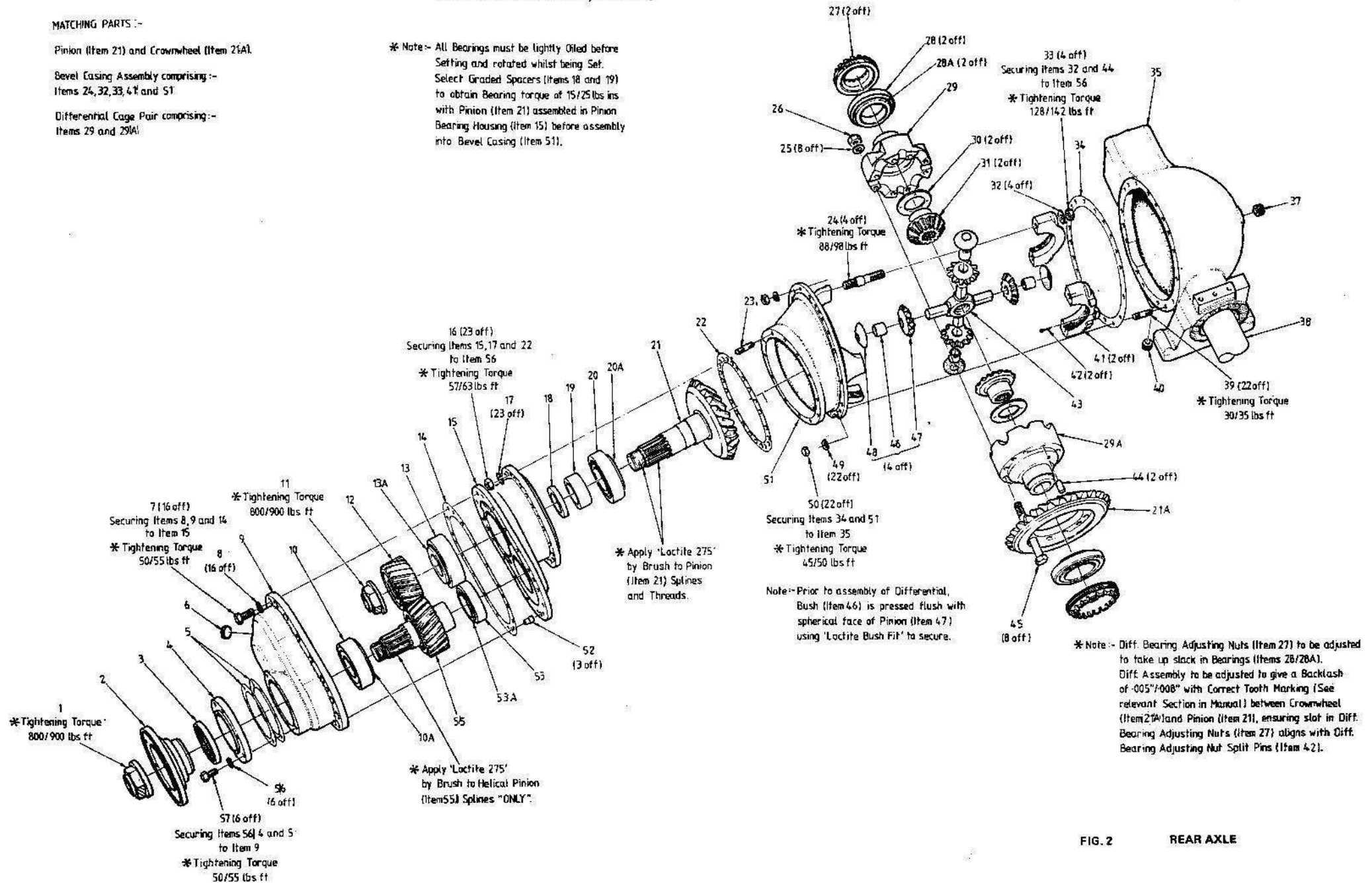


FIG. 2 REAR AXLE

- 6.10 Using a 15/16" A/F socket, unscrew and remove the eight differential cage bolt nuts and washers (25 and 26).
- 6.11 Scribe a line across the joining faces of the differential case halves (29 and 29A) to ensure correct re-alignment on assembly.
- 6.12 The differential cage halves (29 and 29A) can now be separated, enabling the two bevel wheels (31), two thrust washers and bush assemblies (46 and 47), also four thrust washers (48), to be removed. NOTE: Inspect bushes (46) for wear/damage.
- 6.13 Using a hide faced mallet, knock out eight differential cage bolts (45), taking care not to damage the threads.
- 6.14 Using a hide faced mallet, tap the spiral bevel wheel (Crownwheel) (21A), then carefully slide it off the differential cage (29A).  
Check that the two dowels (44) are still located in the differential cage (29A).

## 7 - INSPECTION

After carefully cleaning the various parts, they should be inspected for wear and/or damage. Any parts found to be defective in any way should be removed.

Oil seals, joints either paper or cork, and thrust washers should be renewed as a matter of course at each overhaul.

## 8 - ASSEMBLING THE SPIRAL BEVEL WHEEL (CROWNWHEEL) AND DIFFERENTIAL

- 8.1 Press one of the differential bearing cones (28A) onto both differential cage halves (17 and 40).
- 8.2 Stand the differential cage (male half) (40) on its bearing and fit one differential bevel wheel thrust washer and differential bevel wheel (29 and 29A) into the differential cage.
- 8.3 Assemble the four differential bevel pinion and bush assemblies (46 and 47) and the four differential bevel thrust washers (48) onto the differential trunnion (43). NOTE: If a new bush (46) is to be fitted into the bore of a pinion (47) it must be done using a suitable press due to the tight fit between pinion and bush. The bush (47) is pressed flush with the spherical face of the pinion (47). If no press is available, then a new pinion and bush assembly must be fitted.
- 8.4 Lay the differential trunnion assembly onto the differential bevel wheel (31), ensuring that the teeth mesh correctly.
- 8.5 Place the other differential bevel wheel and thrust washer (31 and 30) on to the differential bevel pinions, again ensuring that the teeth are correctly meshed.
- 8.6 Carefully fit the differential cage (female half) (29A) on to the assembly, aligning the matching marks on both differential cage halves.
- 8.7 Check that the two differential cage dowels (44) are located in their relevant holes in the differential cage (female half) (29A).
- 8.8 Fit the spiral bevel wheel (crownwheel) (21A) on to the differential cage (Female half) (29A), ensuring that the two differential cage dowels (44) are correctly located.
- 8.9 Fit the eight differential cage bolts (45) through the spiral bevel wheel (crownwheel) and differential assembly. Secure with eight nuts and washers (25 and 26) using a 15/16" A/F socket. Tighten to 166/184 lbs.ft.

## 9 - SPIRAL BEVEL PINION ASSEMBLY (FIG. 2)

- 9.1 Fit the inner and outer bearing cups (13 and 20) into their respective bores in pinion housing (15).
- 9.2 Press the inner bearing cone (20A) onto pinion shaft (21).
- 9.3 Fit the inner bearing spacer (19) (large inside chamfer end first) graded spacer (18) (large outside chamfer outwards) (19) then slide the pinion assembly into position in the housing (15).

Note: If new spacers or bearings are being fitted, assemble with the largest available spacer. This is to ensure that the bearing pre-load errs on the low side, thus preventing resultant bearing damage.

- 9.4 Press the outer cone of bearing (13) into position on the pinion(21).
  - 9.5 Press the helical gear (12) onto pinion splines and secure in position with combined washer and nut (11). Place the assembly in a vice, clamping the pinion gear but taking care not to damage the teeth.
  - 9.6 Lightly oil the bearings, then using 2.22" A/F socket and torque wrench, progressively tighten the nut (11), whilst rotating the bearings and shock loading the assembly using a rawhide mallet, to a torque reading of 800/900 lbs.ft. Reposition the assembly in the vice to clamp the bearing housing flange.
  - 9.7 After tightening the nut, secure a length of cord around the helical gear (12) and attach free end to the spring balance. Pull the spring balance and, ignoring the force required to start rotation, note the force required to maintain rotation. The correct torque setting of 15 to 25 lb/in (1.7 to 2.8 Nm) should give a spring balance reading of 6.5 to 11 lb (3 to 5 KG). If the spring balance reading is less than 6½ lb., then shims need to be added or a larger graded spacer fitted.
  - 9.8 When the correct pre-load has been obtained, lock the nut (11) in position by peening the locking flange into the slot provided by using a round-noted chisel.
- ## 10 INITIAL PREPARATION BEFORE FITTING ASSEMBLED SPIRAL BEVEL WHEEL (CROWNWHEEL) AND DIFFERENTIAL

Having previously stood the bevel casing pinion and helical gear housing assembly on the bench, supported on four legs (bolts), continue the build sequence.

- 10.1 Check the fit of the differential cage bearing cups (28) and also the differential bearing adjusting nuts (27) as follows.
- 10.2 Clean and deburr the bevel casing (51) legs and bevel casing straps (41).
- 10.3 Fit the bearing cups (28) into the half bores of the bevel casing (51) legs. Check seating by rotating.
- 10.4 Check the four bevel casing strap studs (24), if any have been removed, replace by using a stud runner and ½" drive impact wrench with a stud box and socket. Tighten to 88/98 lb.ft.
- 10.5 Carefully fit the two bevel casing straps (41) down the studs (24) to locate on the bearing cups (21). Check alignment of matching marks on bevel casing legs and straps (51 and 41) to ensure that the straps are not transposed; the bearing cups (28) should seat snugly in the bores, and the bearing adjusting nuts (27) should be free to turn with hand pressure only; if not, it may be because of cross threading. Remove and deburr. On no account use additional pressure, e.g. hammer.
- 10.6 Fit the four bevel casing strap washers (32) and temporary plain nuts on to the bevel casing strap studs (24). Tighten to 105 lb.ft. using a 15/16" A/F socket.

- 10.7 Check the fit of the bearing cups (28) in their bores. See Fig. 3. They must be a hand push fit (i.e. standard to .002" slack). If not, carefully clean out the bores to attain correct fit.

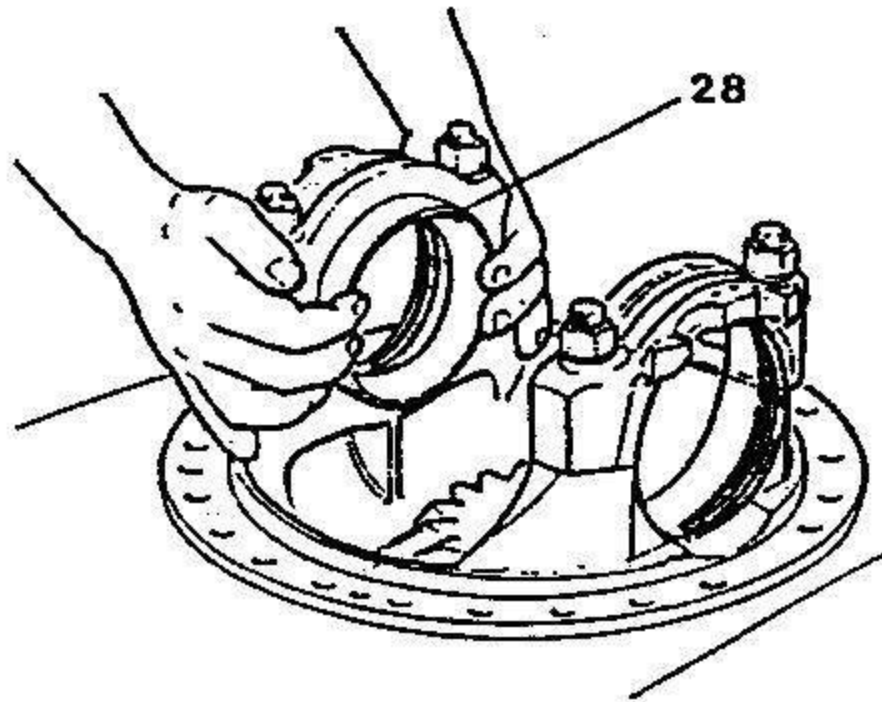


FIG. 3 CHECKING THE BEARING CUP FIT

- 10.8 Check the freedom of the differential bearing adjusting nuts (27) by unscrewing and refitting, to assist this operation tap the bevel casing straps (41) lightly on the top. See Fig. 4.
- 10.9 Having checked the fitting of the bearing cups (28) and adjusting nuts (27), remove the bevel casing straps, bearing cups and adjusting nuts.

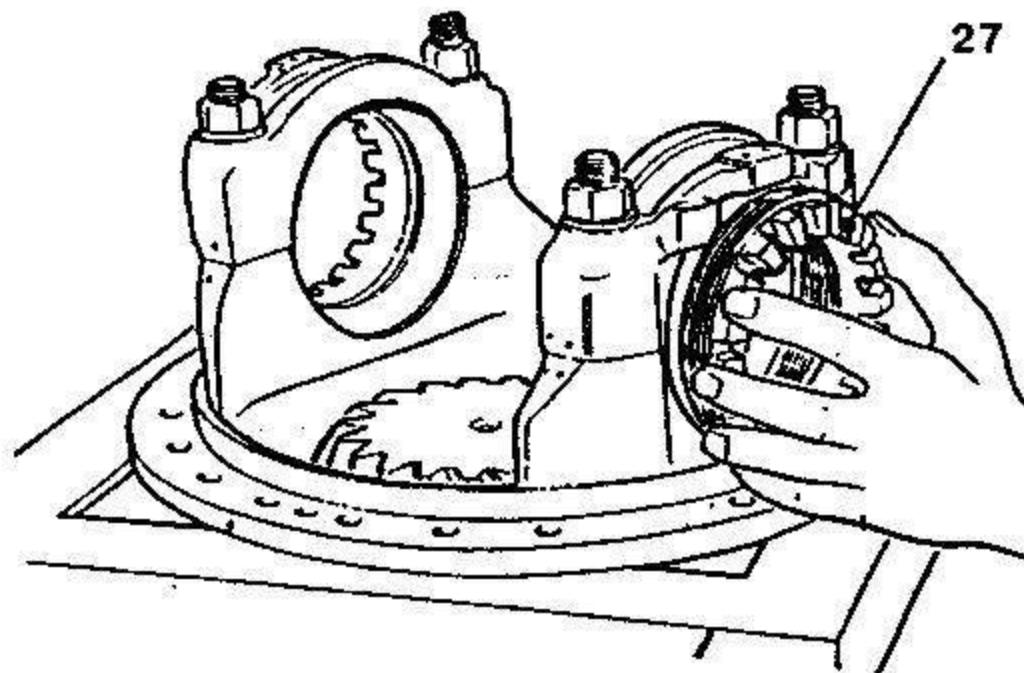
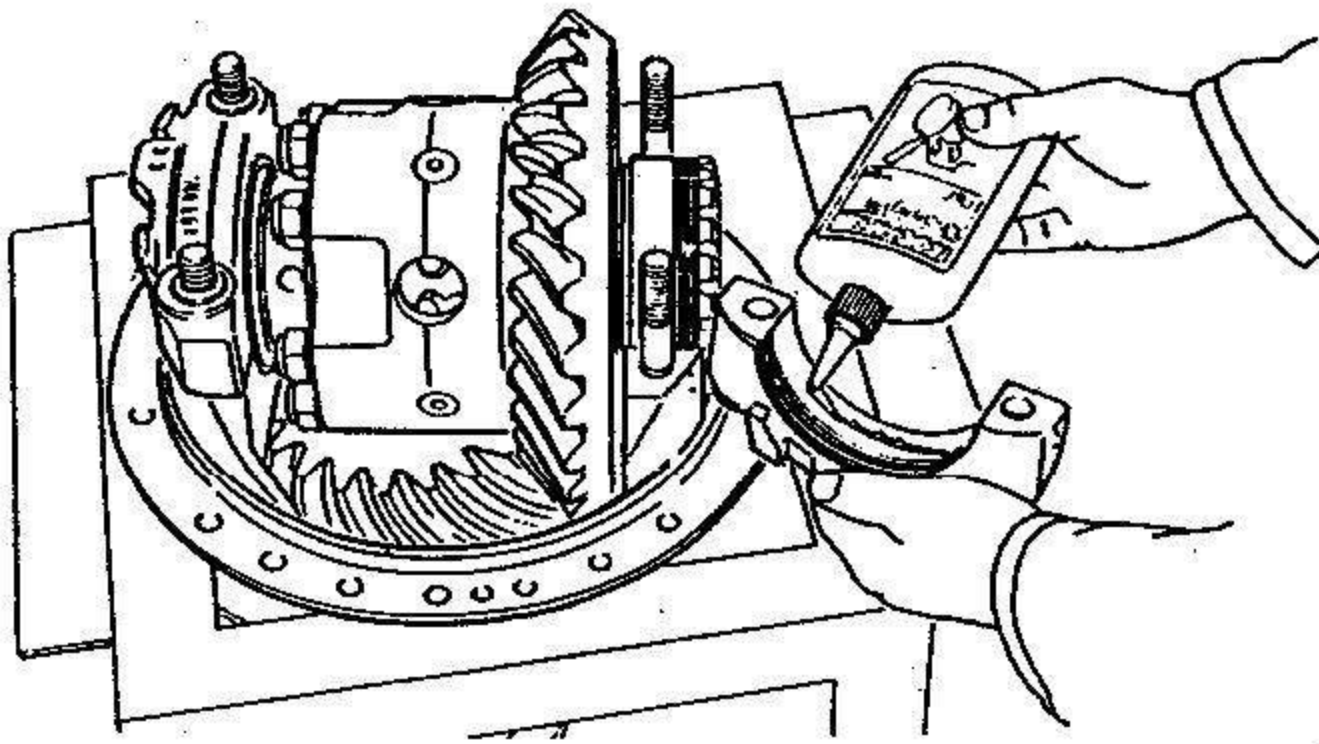


FIG. 4 CHECKING THE ADJUSTING NUTS FIT

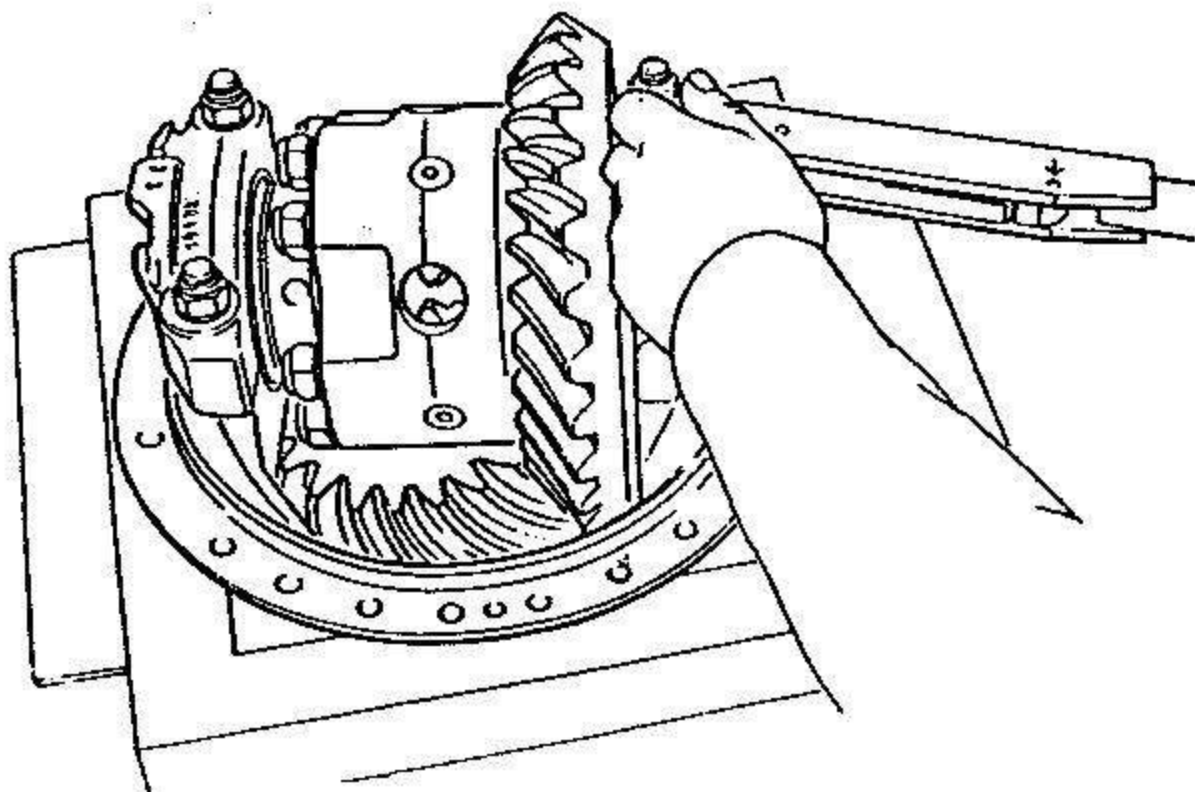
- 11 FITTING SPIRAL BEVEL WHEEL (CROWNWHEEL) AND DIFFERENTIAL INTO BEVEL CASING
- 11.1 Apply a THIN bead of 'Loctite 641' using correct applicator to give a 1/8" wide band, into the bevel casing straps (41) bores. (Fig. 5). This is to prevent the possibility of the differential bearing cups (28) spinning in service.



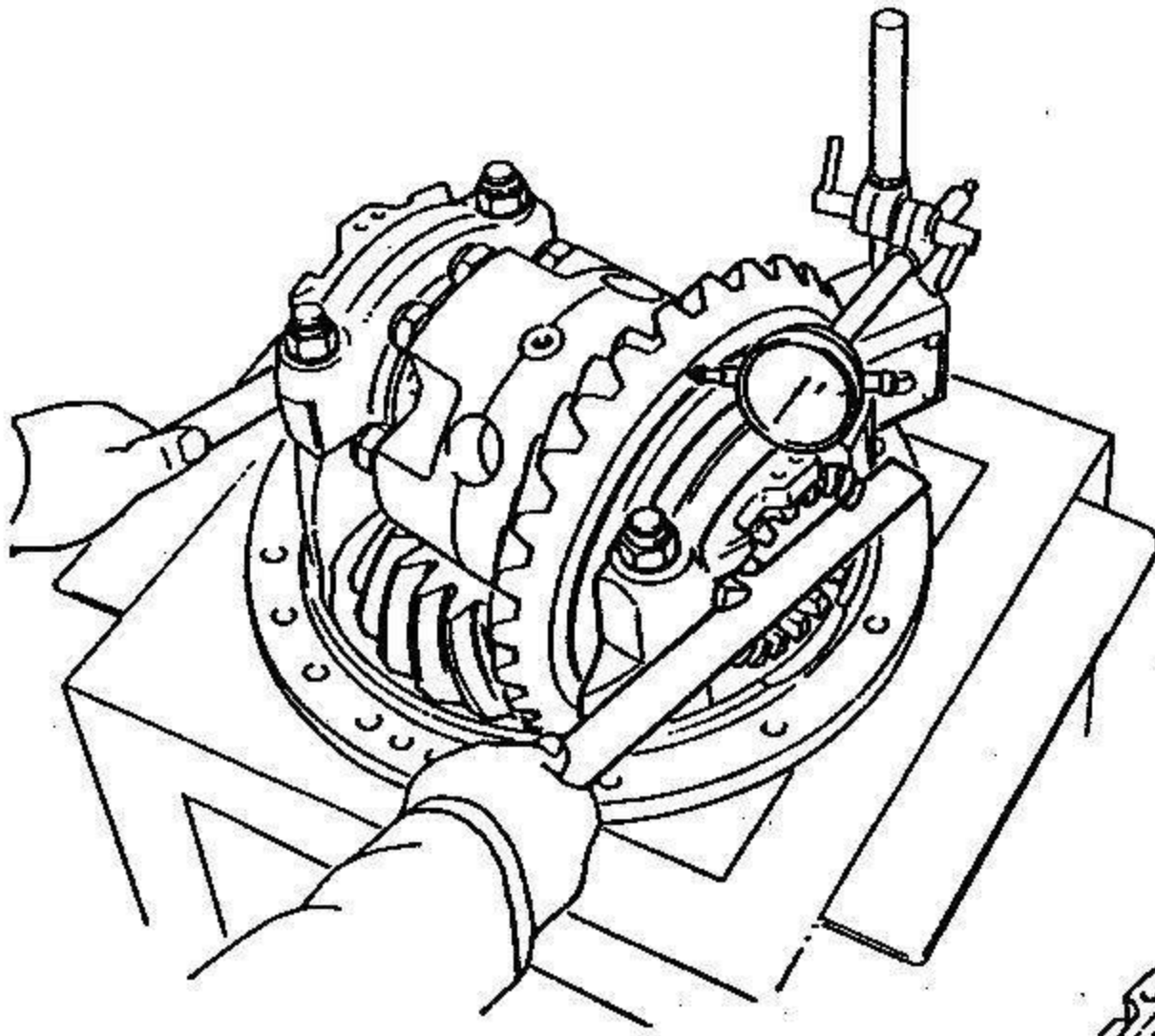


**FIG. 5 ASSEMBLING THE BEVEL CARRIER STRAPS**

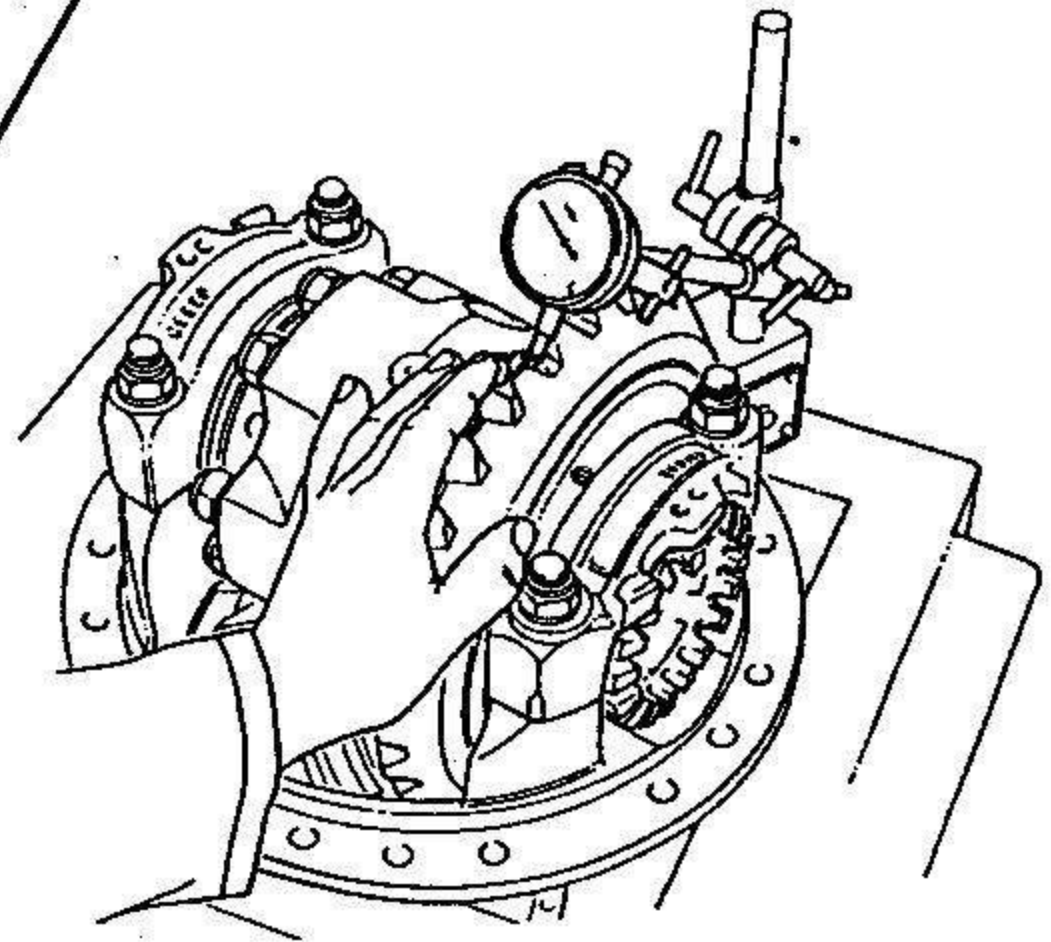
- 11.2 Hold the differential bearing cups (28) in position on the differential bearing cones (28A) and place the spiral bevel wheel (crownwheel) and differential assembly in position in the bevel casing (51).
  - 11.3 Fit the two differential bearing adjusting nuts (27) on to the half threads of the bevel casing legs (51). Re-check the freedom of the nuts in the threads.
  - 11.4 Refit the two bevel casing straps (41) (by hand) on to the bevel casing strap studs (24) to locate on the bearing cups and adjusting nuts (27 and 28).
- Note: Ensure all matching marks coincide to obviate misalignment of straps (41).
- 11.5 Turn the bearing adjusting nuts (27) hand tight against the bearings (28).
  - 11.6 Fit the four bevel casing strap washers (32) and bevel casing strap stud nuts (33) and using a 15/16" A/F socket, tighten nuts to 128/142 lb.ft. (Fig. 6).



**FIG. 6 SETTING THE BEVEL CARRIER STRAPS**



**FIG. 7 SETTING THE DIFFERENTIAL BEARINGS**



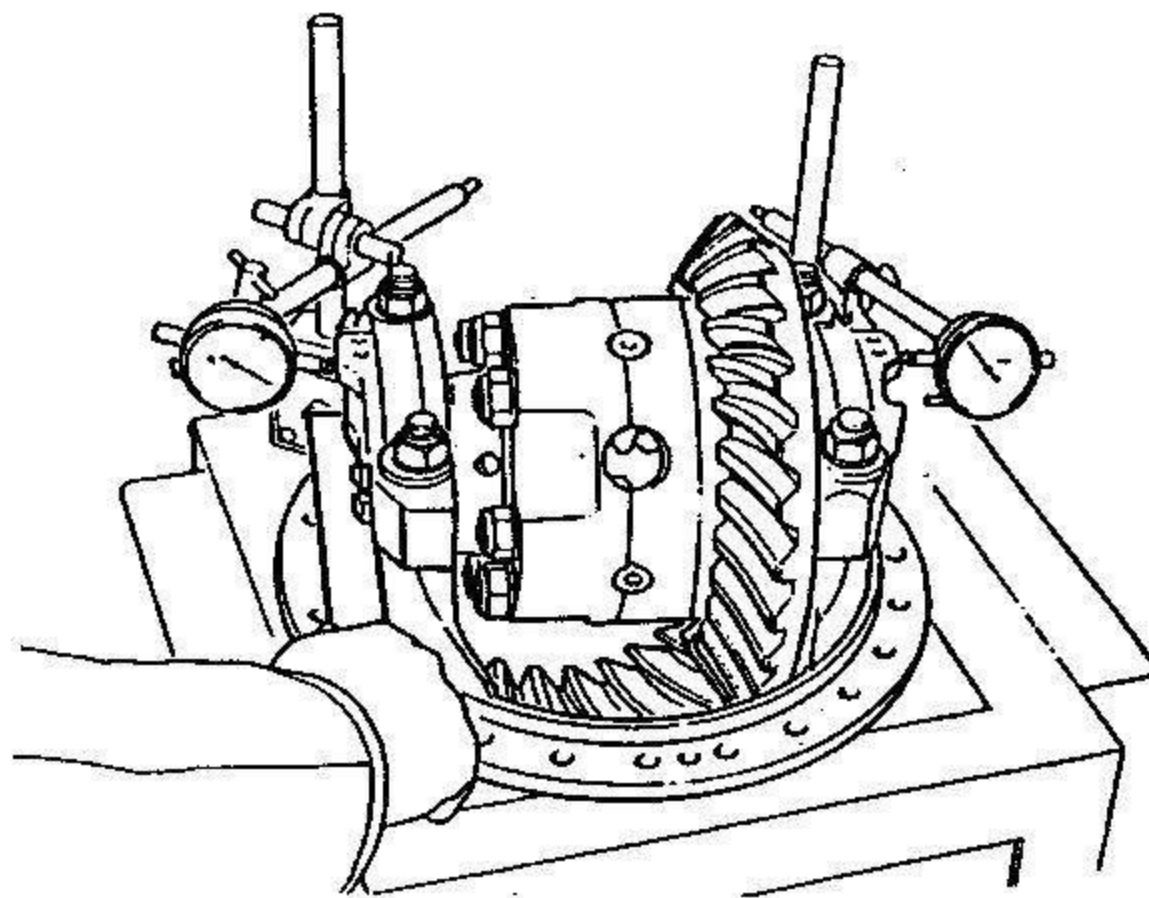
**FIG. 8 SETTING THE DIFFERENTIAL BACKLASH**

## 12 SETTING "NO END FLOAT" CONDITION

- 12.1 Set up a dial indicator on the back face of the spiral bevel wheel (crownwheel) (21A) as shown in Fig. 7 and screw in each differential bearing adjusting nut (27) just sufficiently to ensure no spiral bevel wheel (crownwheel) axial movement is registered on the dial indicator.
- 12.2 Tap the bevel casing straps (41) and rotate spiral bevel wheel (crownwheel), then recheck that no axial movement is present.

## 13 SETTING THE SPIRAL BEVEL WHEEL (CROWNWHEEL) AND PINION BACKLASH

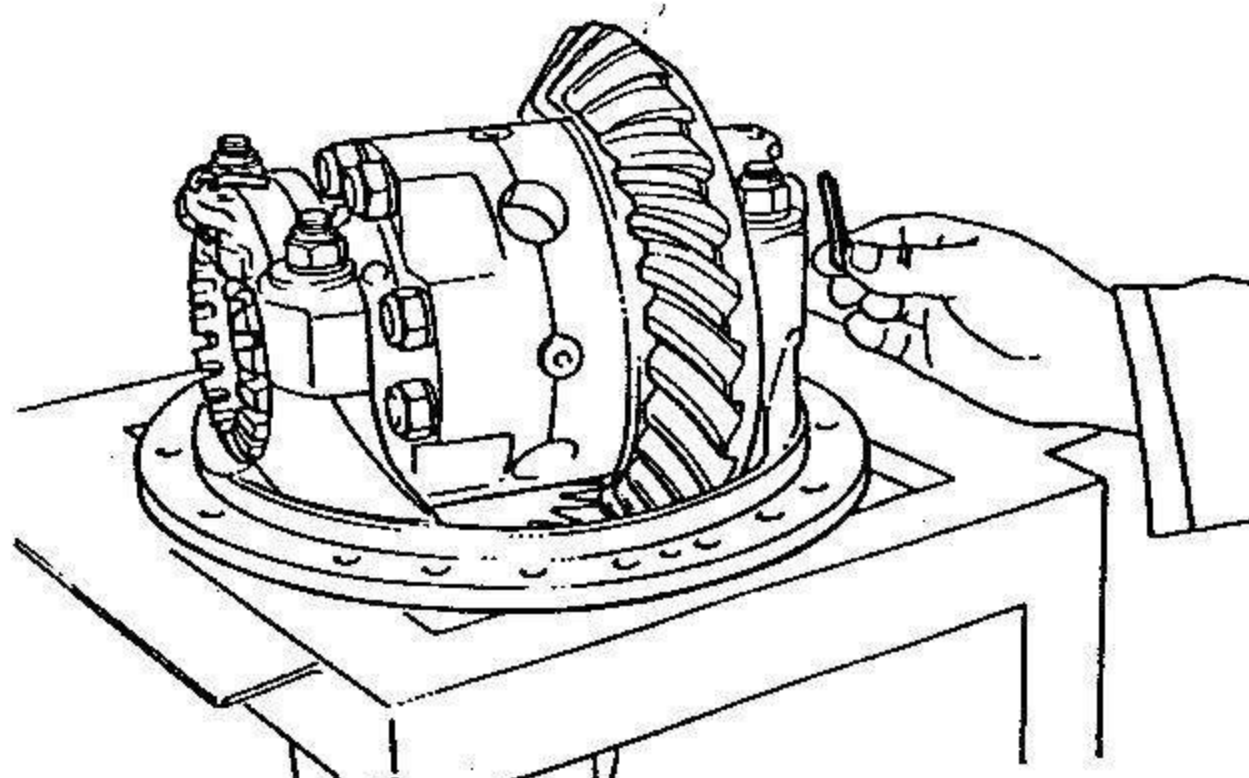
- 13.1 Move the dial indicator on to the spiral bevel wheel (crownwheel) (21A) tooth as shown in Fig. 8. Hold the spiral bevel pinion (21) still and rock the spiral bevel wheel (crownwheel) (21A) backwards and forwards, to check free play between gears (backlash) and note the variation of indicator reading.
- 13.2 Repeat the above operation so that four readings are taken at positions equally spaced around the spiral bevel wheel (crownwheel) (21A). The variations of the readings on the dial indicator must be within the limits of .008" to .013". If a difference in dial readings exceeds half the backlash tolerance then the assembly should be further examined for cause and rectified.



**FIG. 9                      SETTING THE CROWN WHEEL BEARINGS**

**14                      SETTING THE SPIRAL BEVEL WHEEL (CROWNWHEEL) BEARINGS**

- 14.1                      Set up two dial indicators diametrically opposite on the bevel casing strap register points as shown in Fig. 9 and set each indicator to zero.
- 14.2                      Mark the position of the differential bearing adjusting nuts (27) and then slacken each one slightly, to ensure that no spread is present. (i.e. dial indicators remain at zero).
- 14.3                      Re-tighten each differential bearing adjusting nut (27) back to its marked position, and then tighten a further notch on each end to pre-load the differential bearings (28). (A spring balance reading of  $2\frac{1}{2}$  lb. pull, i.e. rolling resistance at the O/D of the differential cage, which equates to 8.75 lb.ins. pre-load). The sum of the dial indicator readings should total between 0.002" and 0.004". The adjuster nut slots should line up with one of the two split pin holes in the bevel casing straps (41).
- 14.4                      Fit the two differential adjusting nut split pins (42) as shown in Fig. 10.
- 14.5                      Set up a dial indicator on spiral bevel wheel (crownwheel) (21A) tooth and recheck that the backlash is still as previously set.



**FIG. 10                      LOCKING THE DIFFERENTIAL ADJUSTMENT**

## 15 GEAR IDENTIFICATION AND CROWN WHEEL AND PINION MESH SETTING INSTRUCTIONS

### 15.1 GEAR IDENTIFICATION

Because gears are now produced by the Gleason and Oerlikon method of manufacture, the following identification features are given to show the differences between the types of gears.

#### (a) Gleason Gears

Gear teeth taper towards centre (toe end of teeth)  
No suffix letter identification in part number e.g. R8579/1/2  
No identification groove on pinion shank and crown wheel back face

#### (b) Oerlikon Gears

Gear teeth parallel to pitch line  
Part number has suffix identification letter 'N' e.g. R8579/1N/2N  
Pinion shank and crown wheel back face have identification groove

**NOTE:** The Oerlikon gears are cut in two forms: N-form and G-form. At present all gears except the following part numbers are cut in N-form.

The D66 gears cut in 'G' form are as follows:

R8939/1N/2N, R8859/1N/2N. The only difference between the two forms is the mesh positions as shown in the relevant mesh checking diagrams in the following section.

### 15.2 CHECKING CROWN WHEEL AND PINION MESH

- (a) Apply a thin coating of engineer's marking compound to several consecutive crown wheel teeth.
- (b) Turn the crown wheel for a few revolutions, in both directions, to make a positive tooth contact impression on the crown wheel and pinion teeth.
- (c) Inspect the deposits of marking compound on the pinion and crown wheel teeth and compare them with the relevant following diagrams.

In all cases the action (if any) to be taken is shown below:

**FIG A** Indicates correct mesh  
No further action required

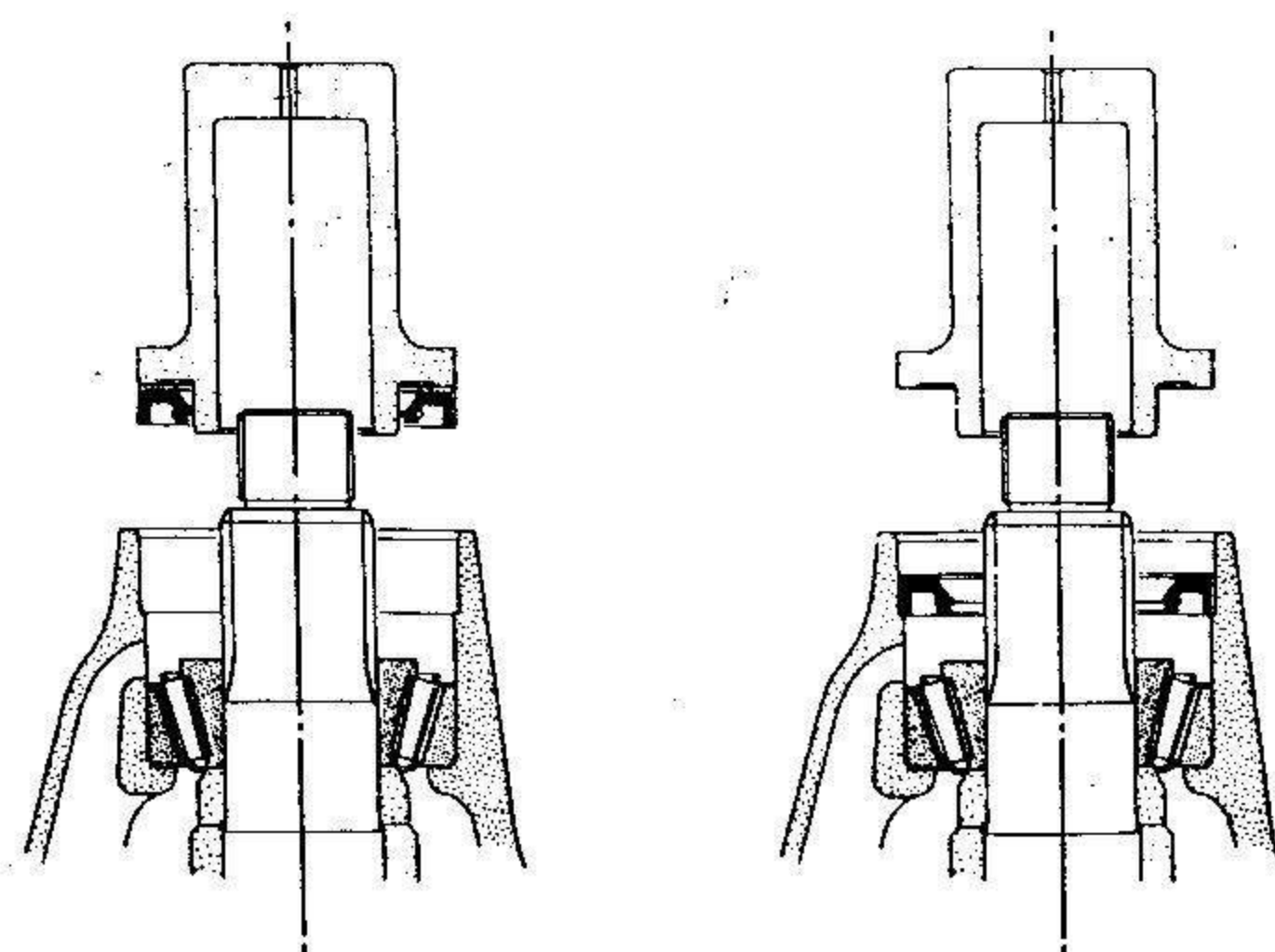
**FIG B** Indicates pinion and crown wheels are too far out of mesh. To remedy, move pinion inwards towards crown wheel. To maintain backlash, move crown wheel away from pinion in direction of Arrow B.

**FIG C** Indicates pinion and crown wheel too far into mesh. To remedy, move the pinion outwards away from crown wheel. To maintain backlash, move crown wheel towards pinion in direction of Arrow B.

If any action is necessary, adjust the position of the pinion by altering the thickness of the pinion bearing housing shims which have a nominal thickness of 0.40 ins.

**16 HELICAL PINION ASSEMBLY (FIG. 2)**

- 16.1** Press the inner helical pinion bearing cap (53) into its bore in the pinion housing (15).
- 16.2** Press the helical pinion bearing cones (10A and 53A) into position on helical pinion (59).
- 16.3** Select a 0.050" nominal shim pack (5) and place in position on the bearing retainer (4).
- 16.4** Tap the bearing retainer into position in its bore in the helical gear casing (9) and secure with the washers (8) and setscrews (7).
- 16.5** Using a 5/8" A/F socket and torque wrench, tighten the setscrews to 50/55 lb.ft.
- 16.6** Fit the oil seal (3) into the bearing housing (4) using a suitable fitting tool (Tool No. E411 is available, if required) as follows:
- (a) The seal must be fitted using a circular tool which bears on the seal close to its outside diameter where the casing is strongest. The correct fitting tool (E411) or one of a similar design should be used. Failure to use a suitable tool will result in distortion of seal casing, uneven wear of lip, and leakage. See Fig.11.
  - (b) The seal must remain square to the bore during fitting. If the seal enters at an angle it will almost certainly result in distortion of the casing which cannot be corrected by straightening up the seal further down the bore. Where possible the seal should be fitted under a press, which reduces the likelihood of this problem.
  - (c) The seal must be truly square in bore after fitting. A displaced seal will act as an oil pump.



**FIG. 11**

**SEAL FITTING INTO GEAR CARRIER**

- (d) When replacing a seal, always check the coupling flange (2) for damage in the region polished by the oil seal lip; even slight damage in this area can cause leakage. Very slight marks may be polished out with fine emery cloth, but it is essential that the polishing marks are parallel to the seal lip. Where there is more serious damage, it is permissible to fit two seals back-to-back if there is room in the housing, i.e. outer seal with spring facing outwards, inner seal with spring facing inwards. The outer seal acts as a spacer and ensures that the inner seal is fitted square and that it runs on a different part of the coupling flange.
- (e) The lip of the seal or the journal of the coupling flange should be smeared with clean gear oil prior to assembly. If the seal is assembled dry it can burn out in a matter of minutes, before oil reaches it.
- 16.7 Turn the housing assembly over and fit the inner helical gear bearing cup (10) into the bore provided until it abuts the bearing retainer (4).
- 16.8 Fit the three dowels (52) in position in the helical gear housing (15).
- 16.9 Lightly oil the helical pinion bearing cones (53A and 10A) then place the pinion assembly into position on the inner bearing cup (53) and with the pinion teeth in the mesh with the helical gear teeth.
- 16.10 Carefully guide the helical pinion housing assembly over the pinion, ensuring the dowels locate correctly in bevel pinion housing (15).
- 16.11 Secure in position with the washers (8) and setscrews (7).
- 16.12 Using a 5/8" A/F socket and torque wrench, progressively tighten the setscrews using diagonal selection to a torque of 50/55 lb.ft.
- 16.13 Fit the coupling flange (2) and secure in position with the combined washer and stake nut (1).
- 16.14 Using an A/F spanner tighten the nut to a torque of 800/900 lb.ft.
- 16.15 Mount a dial indicator on the helical gear housing (9) front face, with the pointer positioned on the end of the helical pinion (55). Rock the pinion in and out of the casing and note the dial indicator reading.
- The correct 'end float' of pinion bearings is between limits 0.002/0.004 ins (0.05/0.102mm).
- If the end float is below the limit, the shim pack requires more shims to be added.
- If the end float is greater than the limit, shims need to be deducted from the pack.
- 16.16 When the correct end float has been obtained, lock the nut in place by staking the nut flange into the slot provided, using a round nosed chisel.
- 17 FINAL ASSEMBLY (FIGS. 1 and 2)
- 17.1 If any axle casing studs (39) have been removed, re-fit using a 7/16" - 20 UNF stud runner. Tighten the studs to a torque of 30/36 lb.ft.
- 17.2 Coat one side of the axle casing joint (34) with 'Red Hermatite' jointing compound and fit Hermatite coated face towards axle casing onto the axle casing studs (39). Coat the other side of joint with Red Hermatite.
- 17.3 With the drive head assembly suitably supported, offer to the axle casing, securing with the washers (49) and nuts (50).
- 17.4 Using an 11/16" A/F socket and torque wrench, progressively tighten the nuts (50), using diagonal selection, to a torque of 45/50 lb.ft.

- 17.5 Re-fit the oil drain plug.
- 17.6 Re-fit the drive shaft (38).
- 17.7 Fit a new planet carrier 'O' ring (81) then fit the planet carrier assembly to the hub.
- 17.8 Secure the planet assembly with the washers (38) and setscrews (85). Tighten the setscrews to a torque of 105-110 lb.ft.
- 17.9 Fit the planet carrier dowels and peen over the holes in three equi-spaced places to prevent the dowels coming out in service.
- 17.10 Repeat Ops. 5 to 9 for other hub.
- 17.11 Fill the axle with oil, hubs first then drive head. See Lubrication Chart for specification and schedule.
- 17.12 Fit the filler plug (86) and washer (84) then return axle to vehicle.

## REAR AXLE HUB

| <b>Description</b>                                   | <b>Sub-Section</b> |
|--|--------------------|
| Description  | 1                  |
| Lubrication  | 2                  |
| Routine Maintenance                                  | 3                  |
| Draining the oil                                     | 4                  |
| Dismantling the planet carrier assembly              | 5                  |
| Inspection   | 6                  |
| Dismantling the hub, annulus and brake drum assembly | 7                  |
| Removing the brake drum assembly                     | 8                  |
| Brake drum removal                                   | 9                  |
| Pivot pins removal                                   | 10                 |
| Dismantling the brake shoe and camshaft assembly     | 11                 |
| Dismantling the brake bracket and camshaft assembly  | 12                 |
| Inspection   | 13                 |
| Brake bracket and cam assembly                       | 14                 |
| Brake shoe assembly                                  | 15                 |
| Final assembly of brakes                             | 16                 |
| Adjusting the brakes                                 | 17                 |
| Hub and annulus assembly                             | 18                 |
| Adjusting the hub end float                          | 19                 |
| Planet carrier assembly                              | 20                 |



**REAR AXLE HUB  
TYPE IS REDUCTION UNIT (TWIN TYRE VERSION)**

**1 DESCRIPTION**

The hub gears are driven by a 'floating' sun pinion splined to the drive shaft. The pinion mates with three planet pinions mounted on a robust carrier which is bolted onto the wheel hub (23). The annulus is in two pieces and is splined on to the axle arm (42). It also serves to support the outer hub bearing (21/21A). The hub is fully floating, running on generous sized taper roller bearings which are secured and adjusted by means of a special split nut (17) with pinch bolt locking.

The brakes can be serviced without disturbing the hub. The brake drums are of a special alloy cast iron, carried on the outside of the hub flanges.

**2 LUBRICATION**

Fill each hub separately in turn.

- a) With filler hole at the top, fill with 4 pints, 2.25 litres, of oil
- b) Fit the filler plug, then turn until the level line is horizontal
- c) Leave to settle for 15 minutes. Remove the plug and check level
- d) Top up if necessary and fit the plug

**3 ROUTINE MAINTENANCE**

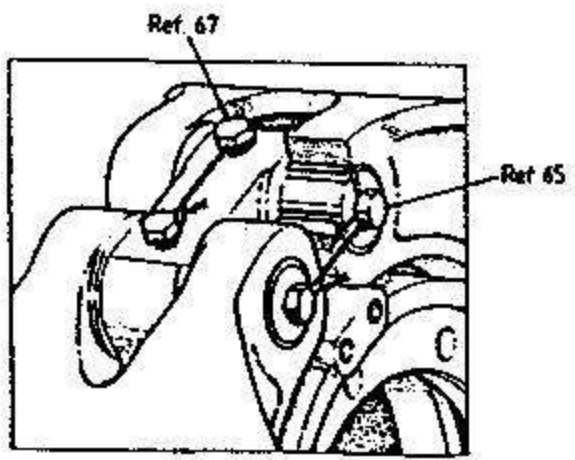
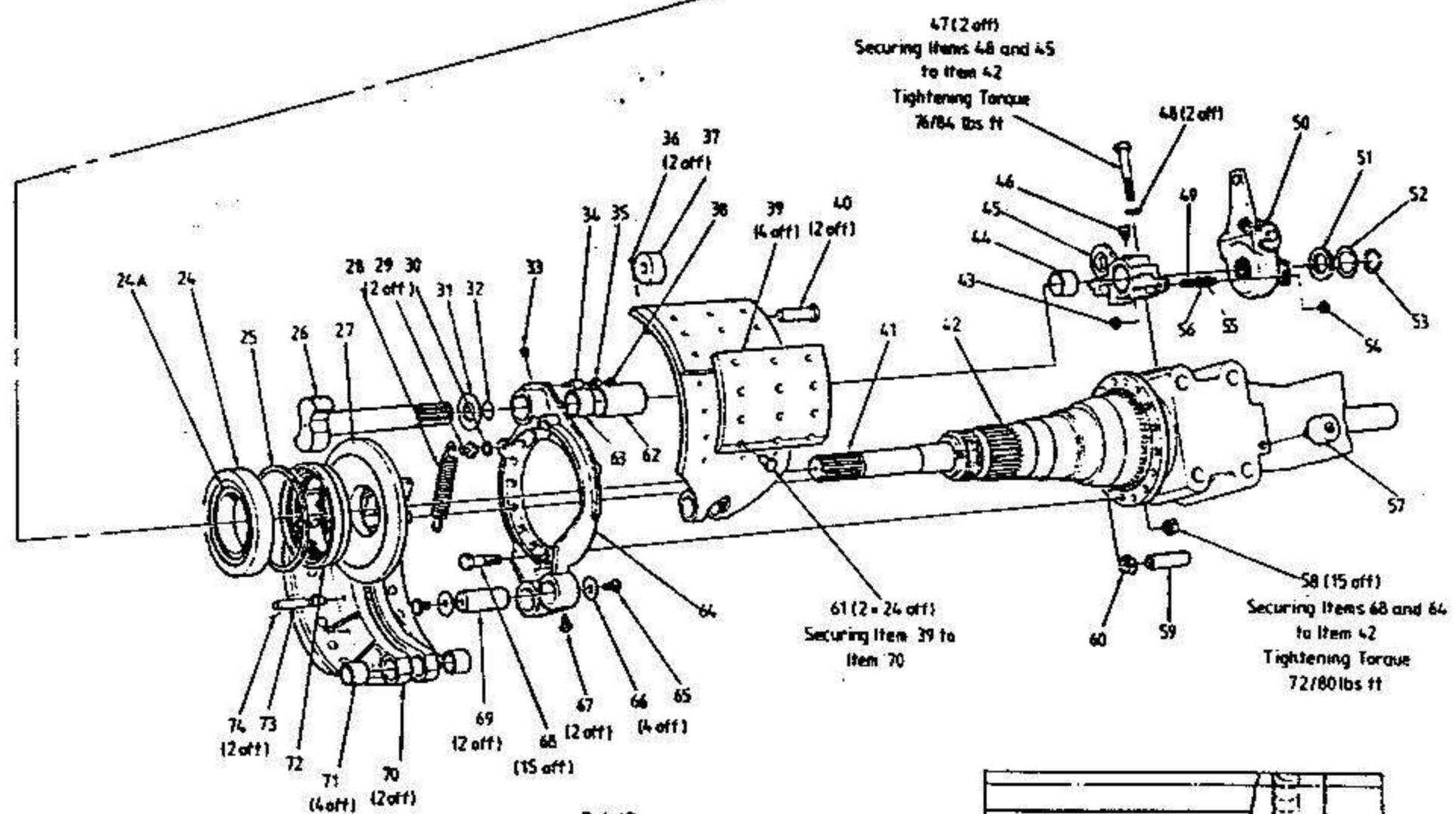
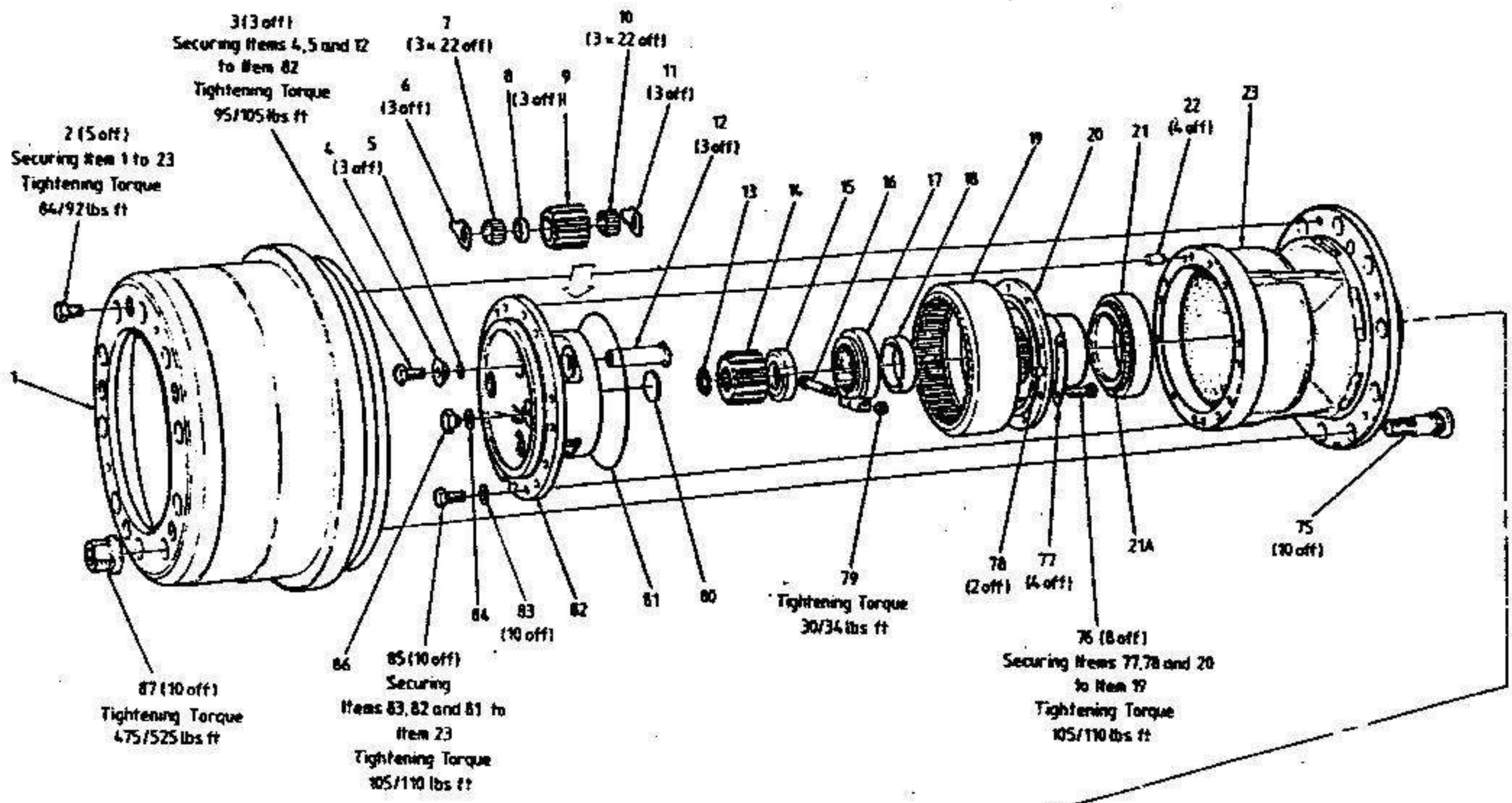
At the first vehicle service (1000 miles - 1600 Km), then at intervals of 25,000 miles - 40,000 Km.

Check - hub bearing end float for excess. (Para. 19).

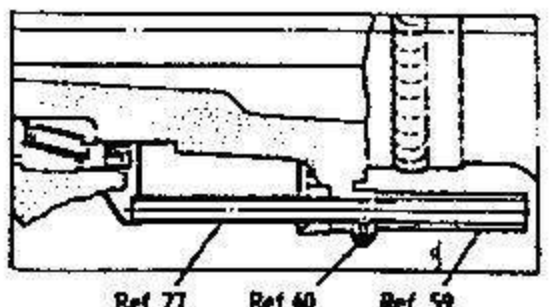
NOTE: On dismantling, clean all parts in paraffin or other suitable agent and place on a clean work surface.

**4 DRAINING THE OIL**

- 4.1 Before attempting to remove the road wheels, drive the vehicle on to a level solid concrete floor, preferably after a short run to warm the oil.
- 4.2. Chock the appropriate wheels.
- 4.3. Whilst the road wheels are still on the ground, loosen the ten wheelnuts (87) of each wheel slightly.
- 4.4 Jack up the axle and support with suitably placed timbers.
- 4.5 Back off the brakes.
- 4.6 Remove the wheelnuts (87) and pull off the road wheels. Care must be taken during this operation.
- 4.7 Place suitable drip trays under the hubs (approx. 3 pints - 1.7 litres).



View showing Wire locking of Pivot Pin Lockscrews (Item 67) and Brake Shoe Pivot Pin Setscrews (Item 65).



Cross section view of Oil Collector Drain positioned at BDC.

FIG. 1 HUB ASSEMBLY

- 4.8 Using a 1 1/16" A/F socket, unscrew and remove the planet carrier level plug (86) and washer (84).
- 4.9 Using a 3/4" A/F socket, unscrew and remove the drain plug and washer.
- 4.10 When hub is empty, remove the drip tray and dispose of the old oil.

## 5 DISMANTLING THE PLANET CARRIER ASSEMBLY

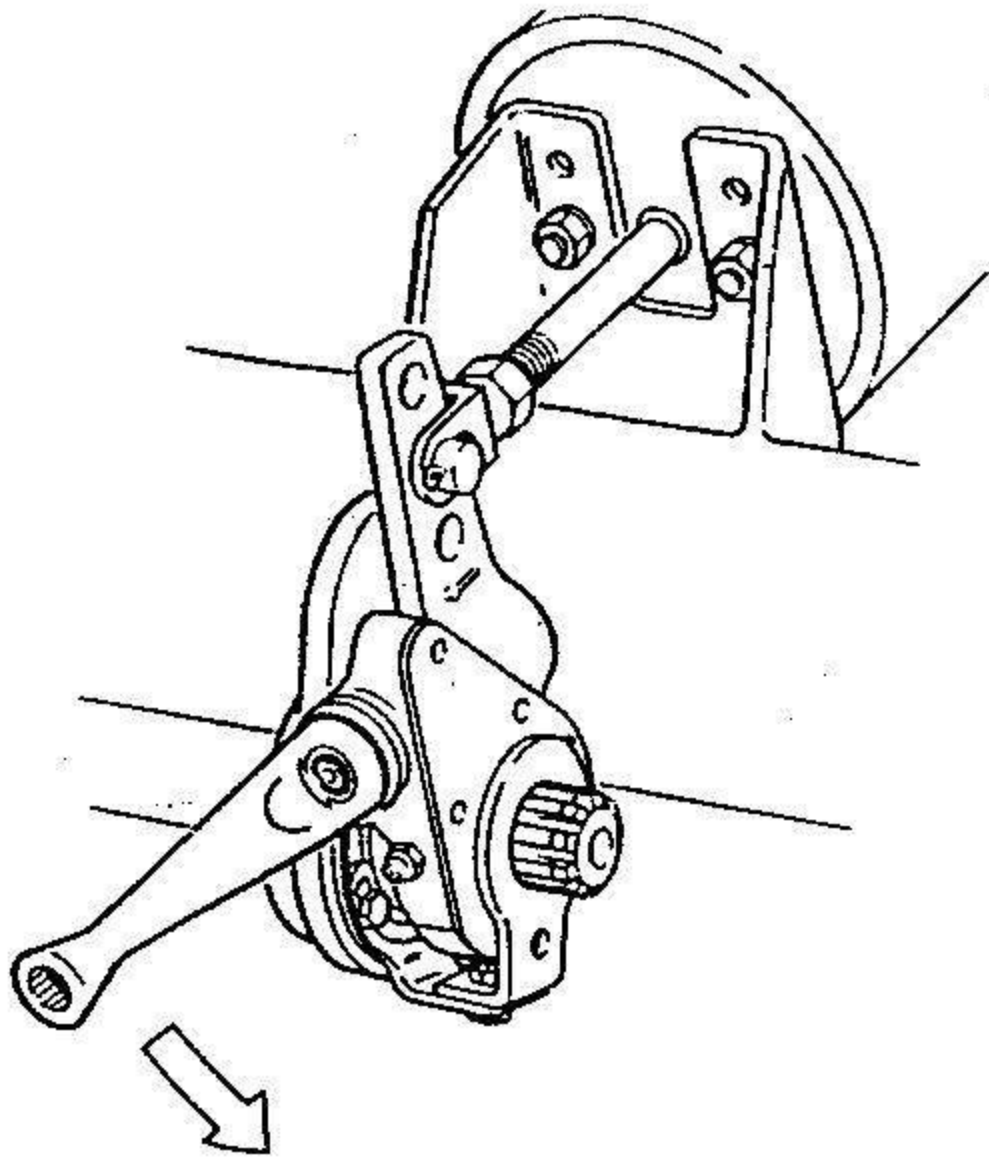
- 5.1 Using a 3/4" A/F socket, unscrew and remove the ten planet carrier setscrews (85) and washers (83).
- 5.2 Screw two of the planet carrier setscrews (85) into the tapped holes provided in the planet carrier flange (82) and tighten evenly to extract planet carrier assembly from the hub (23).
- 5.3 Using a suitable pry bar, remove and discard the planet carrier 'O' ring (81).
- 5.4 Inspect the four planet carrier dowels (22) for signs of wear and/or damage and, if renewal is necessary, drive out towards the inboard side, using a suitable drift.
- 5.5 Using a 3/4" A/F socket, unscrew one of the planet pin setscrews (3) and remove along with planet pin collar (4) and 'O' ring (5). Discard the 'O' ring.
- 5.6 Using a soft metal drift, drive the planet pin (12) inward to remove. Care must be taken not to damage the setscrew thread.
- 5.7 Carefully lift the planet wheel (9) out through the opening in the planet carrier (82), taking care not to lose any of the forty four needle rollers (7 and 10) in the planet wheel bore.
- 5.8 Remove the needle rollers and spacer (7, 8 and 10) from the planet wheel bore.
- 5.9 Remove the two planet wheel thrust washers (6 and 11) from the planet carrier (82).
- 5.10 Repeat the above operations for other two planet wheel assemblies.

## 6 INSPECTION

Inspect all dismantled parts for wear and/or damage, renewing where required, paying particular attention to check for scoring on the planet pin (12), pitting on the needle roller bearings (7 and 10), excessive scoring and wear on the planet wheels (9).

## 7 DISMANTLING THE HUB, ANNULUS AND BRAKE DRUM ASSEMBLY

- 7.1 Using a 3/4" A/F socket, unscrew and remove the five brake drum retaining screws (2).
- 7.2 Release the brake adjustment by turning the hexagon adjuster screw in the slack adjuster (50) using a 12mm A/F spanner and applying an anti-clockwise movement (Fig. 2).  
NOTE: A pressure of 30/35 Nm is required to overcome the ratchet clutch within the slack adjuster. (If 18 Nm or less is required, the slack adjuster needs either renewing or reconditioning).
- 7.3 Screw the two 1/2" UNF bolts into the tapped holes provided in the brake drum; tighten evenly to split the drum from the hub (23). Support the brake drum with suitable lifting/handling gear (approx. weight 105 lb ), then pull the drum along the hub to remove.



**FIG. 2                      BACKING OFF THE BRAKE**

- 7.4 Pull out the drive shaft (41) complete with the sun gear (14) and circlip (13). If the sun gear (14) needs renewing, take off the circlip (13) and tap the sun gear off the splines of the drive shaft (41).
- 7.5 Remove the sun gear thrust washer (15) from the end of the axle arm (42).
- 7.6 Remove the axle tube nut (17) as follows:
  - a) Using a 9/16" A/F socket, loosen the axle tube.  
Pinch bolt nut (79).
  - b) Using service tool no. E399, unscrew and remove the axle tube nut (17).
- 7.7 With the hub suitably supported, the annulus carrier assembly (19 to 21A, 76 to 78) can be removed from the axle arm as follows:
  - a) Screw two 1/2" UNF x 1 1/2" bolts into each of the three tapped holes provided in the annulus carrier (20), evenly tighten the three bolts using a 3/4" A/F socket to draw the annulus carrier assembly complete with the outer bearing cone (21A) off the axle arm splines, and pull the assembly off the axle arm (42).
- 7.8 With the hub assembly still supported in the horizontal position, it can be withdrawn from the axle arm (42).
- 7.9 Pull off the hub outer bearing cone (21A) from the annulus carrier (20).
- 7.10 If for any reason for annulus gear (19) needs to be separated from the annulus carrier (20), straighten the tabs on the four annulus gear setscrew lockplate (77) using a suitable pry bar. Using a 3/4" A/F socket, unscrew and remove the eight annulus gear setscrews (76). Discard the four lockplates (77).
- 7.11 The annulus gear (19) can then be knocked from its register on the annulus carrier (20) using a hide faced mallet.

- 7.12 Inspect the annulus gear dowels (78) for wear/damage and pull out for renewal if required.
- 7.13 Remove the hub oil seal (72) from the hub (23). To do this, place a 'bearing bridge' (a bar or disc of  $\frac{1}{4}$ " plate cut to rest on top of the bearing cone 24A) over the bearing cone (24A) and lever the seal out using two 'heal bars'. See Fig. 3.

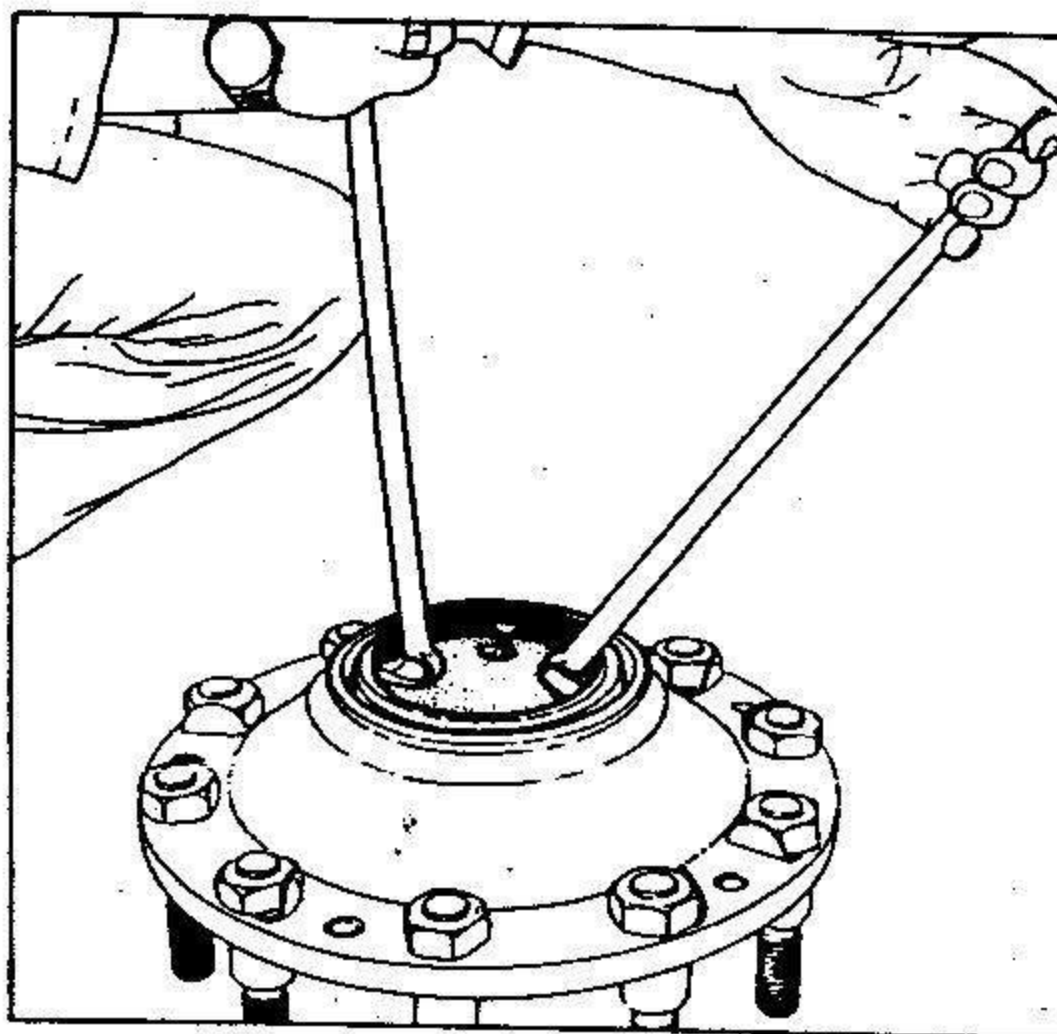


FIG. 3 LEVERING OUT THE HUB SEAL

- 7.14 Remove the oil seal spacer (25).
- 7.15 Remove the hub inner bearing cone (24A).
- 7.16 Inspect the hub inner and outer bearing cups (21 and 24) for wear/damage and knock out with a suitable soft metal drift for renewal if required.  
NOTE: If either the bearing cup or cone needs renewing a new matched cup and cone must be fitted.
- 7.17 Check the wheel studs (75) for signs of misalignment, looseness or wear. If for any reason the wheel studs need renewing, they can be readily removed by striking the threaded end of the stud with a hide faced mallet.

## 8 REMOVING THE BRAKE ASSEMBLY

The removal of the brake assembly can be done without the need to completely dismantle.

- 8.1 Disconnect the brake cylinder push rod from the slack adjuster (50) by removing the split pin from the clevis and then remove the clevis.
- 8.2 Using circlip pliers, remove the brake cam circlip (53).
- 8.3 Remove the brake cam end washer (52) and spring (51).

- 8.4 Using a 9/16" A/F socket, unscrew and remove the slack adjuster anchor bracket peg locknut and peg (49, 54, 55, 56).
- 8.5 Using a hide faced mallet, tap the slack adjuster (50) off the brake cam shaft (26).
- 8.6 Using a hide faced mallet, knock the splined end of the brake cam shaft (26) toward the outboard side of the axle to release the brake cam from between the brake shoe rollers (37) thus enabling it to be pulled out of the assembly along with the brake cam washer (31).
- 8.7 Remove the brake cam washer (31) from the brake cam shaft (26).
- 8.8 Slacken the clip (60) on the oil collector tube extension (59) and pull both items off the hub oil collector (27).
- 8.9 Using a suitable pry bar, remove the hub oil collector (27) from the axle arm (42).
- 8.10 Using a 3/4" A/F socket, unscrew and remove the fifteen brake backplate nuts (58) and bolts (68). Suitable lifting gear may be required to remove the assembly.

## 9 BRAKE DRUM REMOVAL

Operations below can be carried out with the hub assembly in place.

- 9.1 Chock the appropriate wheels.
- 9.2 Whilst the road wheels are still on the ground, loosen the ten wheel nuts (87) slightly.
- 9.3 Jack up the vehicle and remove the road wheel nuts and road wheels.
- 9.4 Back off the brake adjustment.
- 9.5 Using a 3/4" A/F socket, unscrew and remove the five brake drum retaining screws (2).
- 9.6 Support the brake drum (1) - (approx. weight 105 lb., 48 KG) with lifting handling gear.
- 9.7 Insert two 7/16" UNF x 1 1/2 extractor bolts in the tapped holes provided in the brake drum and tighten to draw the brake drum from the hub.
- 9.8 Clean the inner face of the brake drum with a clean damp cloth.

## 10 PIVOT PINS REMOVAL

- 10.1 Cut, remove and discard the lockwire securing two of the four brake shoe pivot bush setscrews (65).
- 10.2 Using a 9/16" A/F socket, unscrew and remove the two brake shoe pivot bush setscrews (65) and washers (66) from one end of the brake shoe pivot pins (69).
- 10.3 Repeat Operations 1 and 2 for the other two brake shoe pivot bush setscrews and washers (65 and 66) on the other end of the brake shoe pivot pins (69).
- 10.4 Cut, remove and discard the lockwire securing the two brake shoe pivot pin lockscrews (67).
- 10.5 Using a 9/16" A/F socket, unscrew and remove the two brake shoe pivot pin lockscrews (67).
- 10.6 Using a soft metal drift, drive out in turn the two brake shoe pivot pins (69). Care must be taken during this operation not to damage the pivot pin setscrew hole thread in the end of the pivot pin.

10.7 The removal of the brake shoe pivot pins (69) reduces the brake shoe return spring (28) pressure on the brake shoe assemblies, enabling the brake shoe return springs (28) to be unhooked from their anchor pins (29 and 73).

10.8 The brake shoe assemblies can now be lifted from the brake bracket (64).

## 11 DISMANTLING THE BRAKE SHOE AND CAMSHAFT ASSEMBLY

11.1 Inspect the brake linings (39) for wear/damage. The minimum allowable thickness of the liner is 5/16" (8 mm) measured at the centre of the brake shoe.

11.2 If new linings are required, drill out, using a ¼" dia. twist drill and discard the 24 off brake shoe rivets (61).

11.3 Inspect the brake shoe bushes (71) for wear/damage and, using service tool number E320 or other suitable bumper, knock out for renewal if required.

11.4 Pull out the brake shoe roller pin split pin (36).

11.5 Using a soft metal drift, knock out the brake shoe roller pin (40) thus releasing the brake shoe roller (37). Inspect both roller and pin for wear/damage and renew if required.

11.6 Remove the brake shoe anchor pin split pin (74) and pull out the brake shoe anchor pin (73).

11.7 Repeat Operations 11.1 to 11.6 for the other brake shoe assembly.

## 12 DISMANTLING BRAKE BRACKET AND CAMSHAFT ASSEMBLY

12.1 Disconnect the air chamber from the slack adjuster (50).

12.2 Using circlip pliers, remove the brake camshaft circlip (53) and pull off the washer and spring (52 and 51).

12.3 The slack adjuster (50) can now be tapped from its position on the brake camshaft splines (26) using a hide faced mallet.

12.4 Pull the brake camshaft (26) from the brake bracket (64).

12.5 Remove the cam head washer (31) from the brake camshaft (26).

12.6 Using a suitable pry bar, remove and discard the cam head 'O' ring (32) from the brake bracket (64).

12.7 Inspect the brake cam bush (63) for signs of wear/corrosion and, if renewal is required, knock out of the brake bracket (64) using service tool no. E316 or other suitable bumper tool.

12.8 Inspect the brake cam bracket bush (44) for signs of wear/corrosion. If no wear/corrosion is evident, continue with Operation 12.12.

If wear is evident, use a ¾" A/F socket to remove the two brake cam bracket setscrews and washers (47 and 48).

12.9 Remove the brake cam bracket (45) from the axle arm (42).

12.10 Remove the brake cam bracket lubricator (46).

12.11 Using a soft metal drift, drive the damaged bush (44) out of the brake cam bracket.

12.12 Check the condition of the brake bracket anchor pins (29) and washers (30) for damage or excessive corrosion. Using a  $\frac{3}{4}$ " A/F socket, unscrew and remove for renewal if required.

12.13 If for any reason, the brake bracket (64) needs to be removed, use a  $\frac{3}{4}$ " A/F socket, unscrew and remove the nuts (58) from the fifteen brake bracket bolts (68). Pull out the bolts (68) and knock the brake bracket (64) from its register on the axle arm (42).

NOTE: The hub oil collector (27) should have been removed prior to this operation (see para. 8.9).

### 13 INSPECTION

After carefully cleaning the various parts, they should be inspected for wear and renewed if necessary.

### 14 BRAKE BRACKET AND CAM ASSEMBLY

14.1 If the brake cam bracket (45) has been removed, fit a new brake cam bracket bush (44) into the bore using service tool no. E316, taking care to line up the lubrication holes in the bush (44) and bracket boss.

14.2 Fit a new brake cam lubricator (46) into the brake cam bracket (45) if required using a  $\frac{7}{16}$ " A/F socket.

14.3 Locate the brake cam bracket (45) on to axle arm (42). Fit two brake cam bracket setscrews and washers (47 and 48).

### 15 BRAKE SHOE ASSEMBLY

15.1 Using service tool no. E320 or other suitable bumper tool, fit the two brake shoe bushes (71) into one of the brake shoes (70), flush with the inner faces of the lugs.

15.2 Repeat Operation 1 for the other brake shoe.

15.3 If new liners (39) are to be fitted, proceed as follows:  
NOTE: For ease of assembly ensure that the four sizes of rivets are stored in separate containers.

15.4 Place the brake shoe (70) outer face uppermost on the bench.

15.5 Position the first liner (39) on the shoe and locate in place by fitting SL368/4  $\frac{3}{4}$ " (19 mm) overall length rivets (61) in the centre line of holes (4 off). Then fit SL368/6,  $\frac{11}{16}$ " (17.5 mm) overall length rivets (61) into the outer lines of holes (8 off).

Repeat for second liner half.

15.6 Tap the rivets (61) fully home using a suitable thin drift and hammer.

15.7 Turn the brake shoe (70) in to its side and check the amount of rivet (61) protrusion from the inner curved face of the brake shoe. Correct protrusion is  $\frac{3}{16}$ " (5 mm).

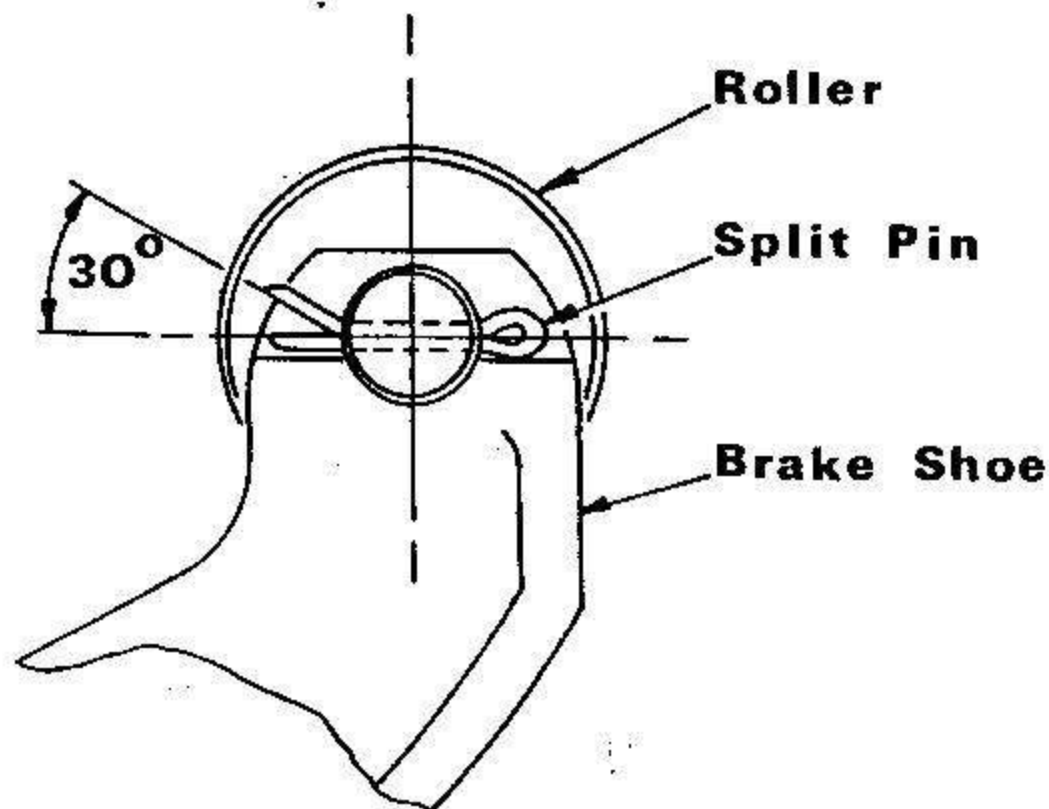
Rivets (61) which DO NOT protrude  $\frac{3}{16}$ " (5 mm) should be removed and replaced with longer or shorter rivets as required.



**NOTE:**

If any holes are fitted with the shortest rivet SL368/12 and they protrude **MORE THAN 3/16" (5 mm)**, then either the brake shoe and/or liner (70 and 39) are defective and must be replaced. When all rivets (61) protrude the correct amount, insert a thin, 11/64" dia. (4.4 mm) max., screwdriver or steel rod into the end of each rivet (61) in turn and lever sideways to slightly deform the end of the rivets. This retains the rivets in position during the final peening operation.

- 15.8 Place the assembled shoe, liners underneath, on a riveting machine or suitable hand equipment and peen over the rivets to secure the liners to the brake shoe. **NOTE:** Due to limited access, the centre rivets will have to be peened using hand peening equipment.
- 15.9 After riveting, check the brake shoe to liner clearance, using feeler gauges. Permissible clearance is 0.000/0.004" (0/0.102 mm).
- 15.10 Smear the bore of one of the brake shoe rollers (37) with high melting point grease (Duckhams Keenomax L2 or equivalent). Locate the roller in position, fit the brake shoe roller pin (40) so that the headed portion will be towards the brake bracket (64) when fitted. Secure in place with a brake shoe roller pin split pin (36). Splay the pin to approx. 30 degrees as shown in Fig. 4 to avoid fracture of leg.



**FIG. 4 SECURING BRAKE PIN ROLLER PIN**

- 15.11 Repeat Operation 15.10 for the other brake shoe assembly.
- 16 **FINAL ASSEMBLY OF BRAKE**
- 16.1 Wipe clean the inner surfaces of the brake shoe bushes (71) and smear with Duckhams Keenomax L2 or equivalent high melting point grease. Ensure all indentations are full.
- 16.2 Slide one of the brake shoe pivot bush setscrew washers (66) on to one of the brake shoe pivot bush setscrews (65) then screw into one end of one of the brake shoe pivot pins (69) finger tight.

- 16.3 Position the first brake shoe (70) on the brake bracket (45). Insert the partially assembled pivot pin into the pivot pin hole either side of the brake shoe passing through the brake bracket and into the other bushed hole as shown in Fig. 5.

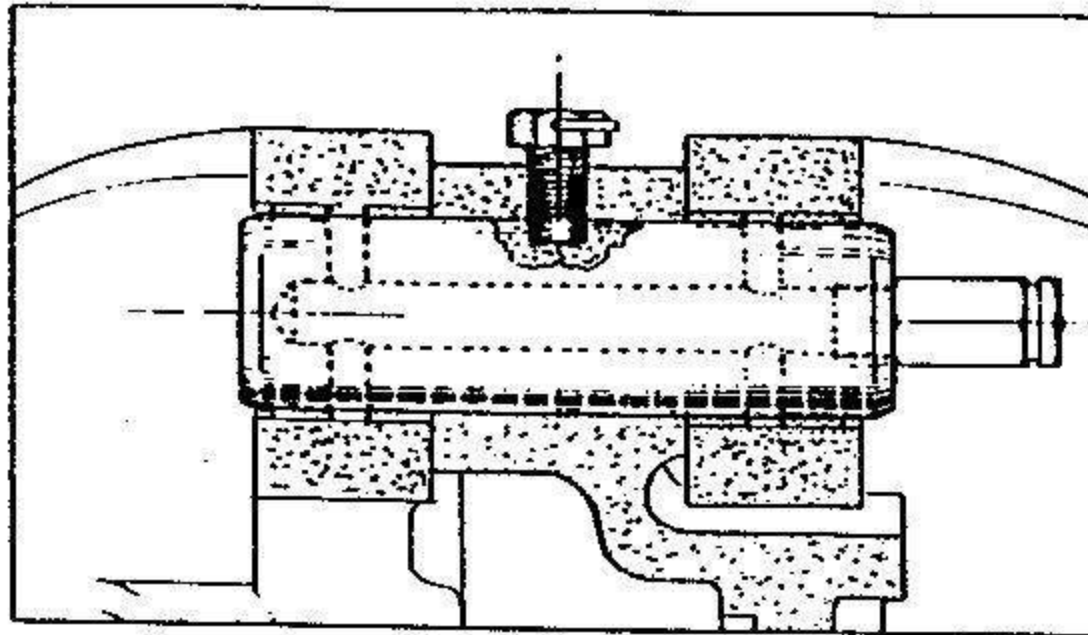


FIG. 5 SECTION THROUGH BRAKE PIVOT PIN

- 16.4 Using the pivot pin setscrew (65), rotate the pivot pin until the countersunk hole in the pivot pin is in line with the threaded hole on the brake bracket (64).
- 16.5 Screw a brake shoe pivot pin lock screw (67) into the threaded hole in the brake bracket (64), to locate in countersunk hole in the pivot pin (69), thus locking the pivot pin. Using a 9/16" A/F socket, tighten the lock screw.
- IMPORTANT NOTE:** Care must be taken during this operation as misalignment can cause brake drum obstruction.
- 16.6 Fit the second brake shoe pivot pin setscrew and washer (66 and 65) into the other end of the pivot pin (69). Tighten using a 9/16" A/F socket.
- 16.7 Repeat the above operations for the other brake shoe assembly.
- 16.8 When both brake shoe assemblies are fitted, secure the lock screws (67) and pivot pin setscrews (65) with 18 SWG (1.25 mm) lockwire as shown in Fig.1.
- 16.9 Seat the brake shoe rollers (37) in position on the brake cam (26) so that they lie in the depressions as shown in Fig. 6. This ensure that the cam is in its correct operating position.

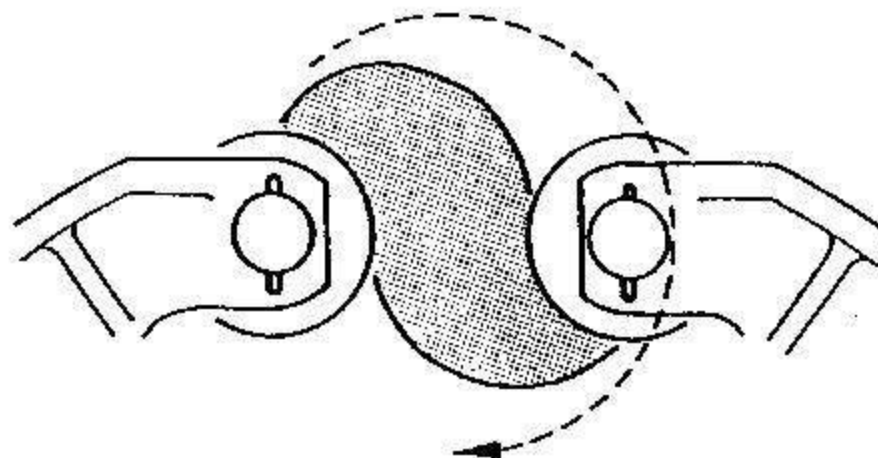


FIG. 6 BRAKE SHOE ROLLER TO CAM LOCATION