Chapter 5 Frame and forks

Contents

Specifications

Frame	
Type	Duplex cradle
Front forks	
Stanchion diameter	34.715 - 34.690 mm (1.3667 -1.3657 in)
Lower leg internal diameter	34.750 - 34.790 mm (1.3681 - 1.3696 in)
Stanchion/lower leg clearance	0.045 - 0.100 mm (0.0017 - 0.004 in)
Front fork oil capacity (per leg)	
Model	*Quantity*
750S and 850T	0.050 ltr (1.7/1.4 US/Imp oz)
850T3	0.060 ltr (2.0/1.7 US/Imp oz)
750S3 and V-1000	0.070 ltr (2.4/2.0 US/Imp oz)
Le Mans	0.120 ltr (4.0/3.4 US/Imp oz)
Damper oil type	Dexron (R) ATF
Front fork spring free length	
V-1000	
Part No. 14 52 66 00	421 ± 2.5 mm (16.575 ± 0.10 in)
Part No. 18 52 66 00	415 ± 2.5 mm (16.339 ± 0.10 in)
All others	418.500 - 423.500 mm (16.476 - 16.672 in)
Rear suspension	
Type	Swinging arm supported on hydraulic suspension units
Spring free length:	
V-1000 and 850T3	270 mm (10.6 in)
750S and S3	277 ± 5 mm (10.9 ± 0.2 in)
850T	300 mm (11.8 in)
Le Mans	279 mm (10.9 in)

1 General description

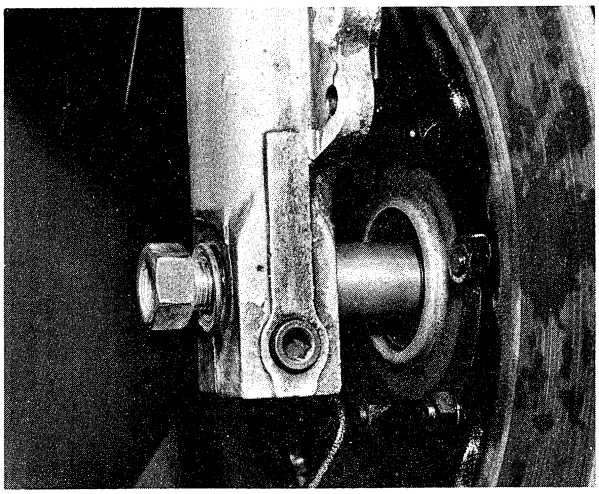
The frame utilised on the Moto Guzzi models covered in this manual is of the duplex cradle type, fabricated from tubular members. The two lower horizontal members, to which the engine/gearbox unit and centre stand are bolted, are detachable from the main frame unit to allow easy engine removal.

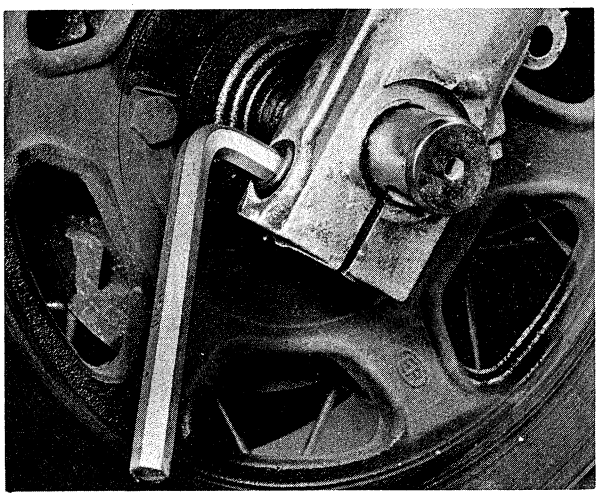
The front forks are of the traditional telescopic type but utilise an unconventional method of damping. The hydraulic dampers are sealed units working independently from the oil contained in each fork leg, which acts only as a lubricating medium.

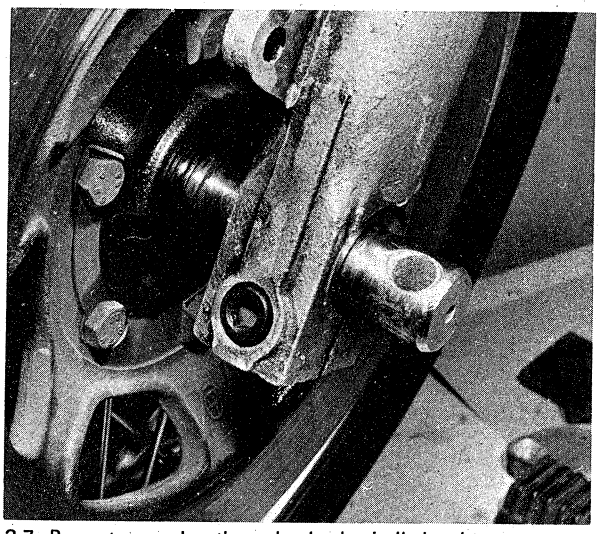
Rear suspension is provided by a swinging arm fork pivoting on tapered roller bearings, and supported on adjustable hydraulically-damped rear suspension units. The right-hand arm of the fork also serves as a shroud for the driveshaft and as a mounting for the bevel drive housing.

2 Front forks: removal from the frame

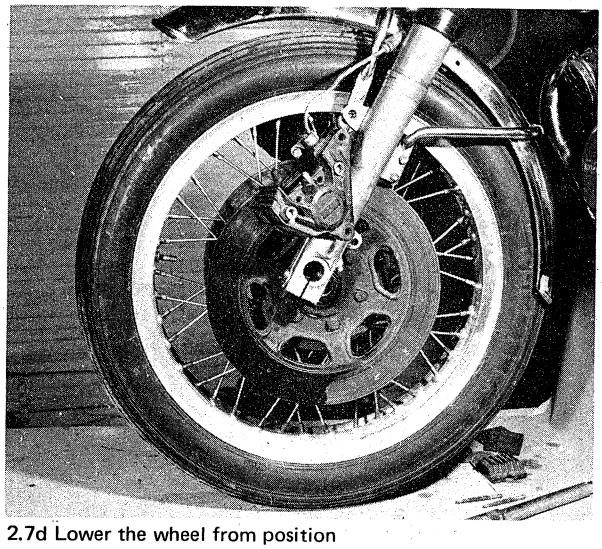
1 It is necessary to remove the complete fork assembly from the frame only when the steering head bearings require attention, or if the frame or forks have to be renewed due to damage.
2 Place the machine on the centre stand and position wooden blocks below the engine sump so that the front wheel is well clear of the ground. On touring models detach the handlebar screen by removing the mounting bolts. On Le Mans models, detach the cockpit fairing, taking care not to damage the seal around the headlamp rim.
3 Remove the petrol tank to prevent damage to the painted surface and to improve access to the steering head lug. Disconnect the battery to prevent short circuits occurring when removing the electrical leads to the instruments. Disconnect the speedometer cable, and tachometer cable (where fitted) by unscrewing the knurled securing rings.
4 Disconnect the wiring leads to the instruments and warning lamp console either at the instruments or at the snap connectors. Choose the most appropriate method for each wire. To gain access to the wiring within the headlamp shell remove the glass/reflector unit complete with the headlamp rim. The complete assembly is retained by a single screw, which passes through the base of the rim into the headlamp shell. Pull the socket from the rear of the headlamp shell and pull out the pilot bulb (where fitted) to detach the glass/reflector unit completely. The instruments and panel are retained on the fork upper yoke by two bolts or screws passing through rubber sleeves. Note the position of the sleeves and washers on removal. When detaching the wiring leads note carefully their original positions, to aid reassembly.
5 Detach the controls from the handlebars, making disconnections only where necessary. If cable or wire length permits, detach the controls and thread them through as necessary, so they may be placed out of the way to the rear of the machine. This will save additional work on reassembly. When removing the front brake master cylinder unit ensure that the reservoir cap is tight, and keep the reservoir upright, to prevent spillage of the fluid. Hydraulic fluid is a very good paint stripper! Tie the master cylinder unit to a convenient frame part until the right-hand disc caliper is detached. The two components may be removed together without detaching the connecting hose and so necessitating rebleeding of the brakes on reassembly.
6 Except on Le Mans and 750S models, detach the handlebars by removing the two half clamps held by two screws each.
7 On twin front disc models, remove one of the caliper units, by unscrewing the two main bolts. **Do not** disconnect the brake hose. Remove the nut and washer from the front wheel spindle. Loosen the two clamping screws which secure the spindle, and with the front wheel supported, withdraw the spindle. If necessary, pass a tommy bar through the hole in the spindle head to aid removal. Pull the wheel spacer from position and lower the wheel away from the front forks.
8 Remove the single bolt which secures the right-hand front brake switch junction to the lower yoke. Detach the brake hose clamp(s) from the mudguard. On machines with integrated braking, detach the hose guide from the left-hand side of the frame, below the head lug.
9 The front brake caliper is secured to the fork leg by two bolts. Remove the bolts and tie up the caliper so that it does not hang on the brake pipe or hose. Detach the mudguard after removing the bolts which pass into the fork legs. The caliper(s) may now be moved rearwards, the right-hand one being detached from the machine complete with the master cylinder, and the left-hand one being tied to a suitable part of the frame where it is away from further dismantling.
10 On Le Mans and 750S models, slacken the clamping screws which secure the separate handlebar 'clip-ons' to each fork leg. When the fork legs are moved downwards, the handlebar stubs may be removed from the stanchions.
11 Loosen the two clamp bolts which secure each fork leg to the yokes. The legs may now be removed from the yokes by gently easing them downwards. If necessary, aid removal by using a rawhide mallet.
12 On machines fitted with an hydraulic steering damper, free the damper at the fork end by removing the domed nut or bolt. Where an adjustable damper is utilised, detach the control quadrant from the lower end of the rod and withdraw the rod and steering damper knob.
13 Slacken the pinch bolt which passes through the rear of the fork upper yoke. Remove the sleeve nut from the top of the steering stem and lift the upper yoke from position. The headlamp shell, complete with fork shrouds, should be supported as the yoke is lifted away and then removed.
14 To remove the lower yoke and steering stem, unscrew the adjuster nut from the upper end of the steering stem and remove the dust cap. Lower the yoke downwards complete with the steering stem and steering head bearing lower inner race. The upper bearing will stay in the outer race.


2.7a Remove front wheel spindle nut and washer and ...

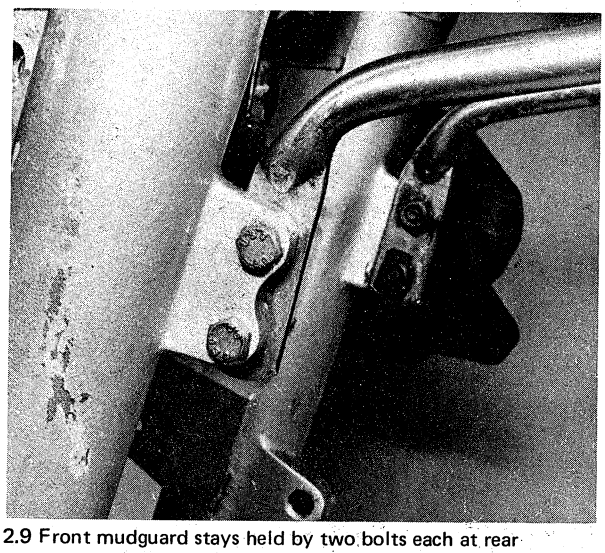

2.7b ... slacken off the fork clamp bolts



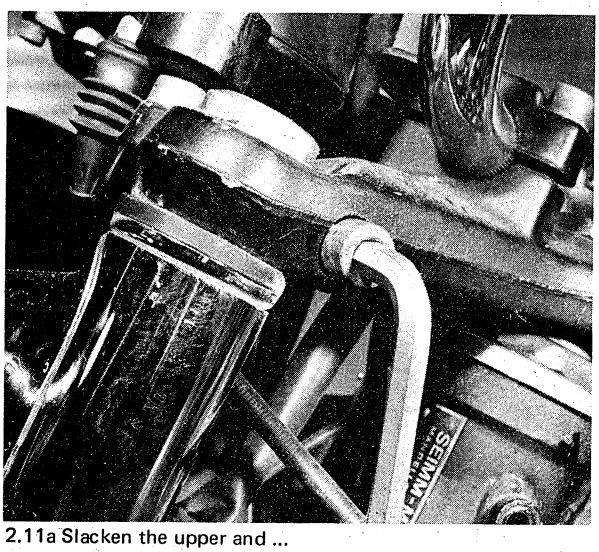
2.7c Pass a tommy bar through wheel spindle head to remove



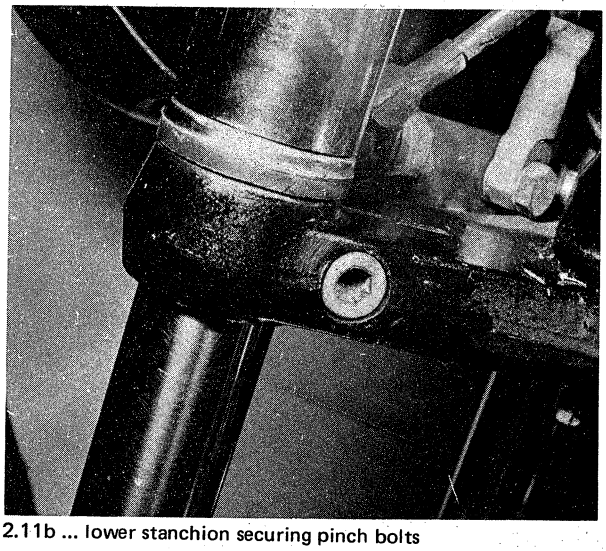
2.7d Lower the wheel from position



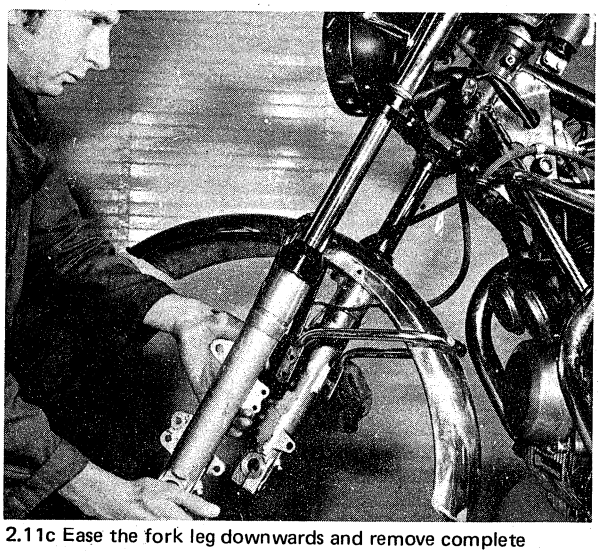
2.9 Front mudguard stays held by two bolts each at rear



2.11a Slacken the upper and ...



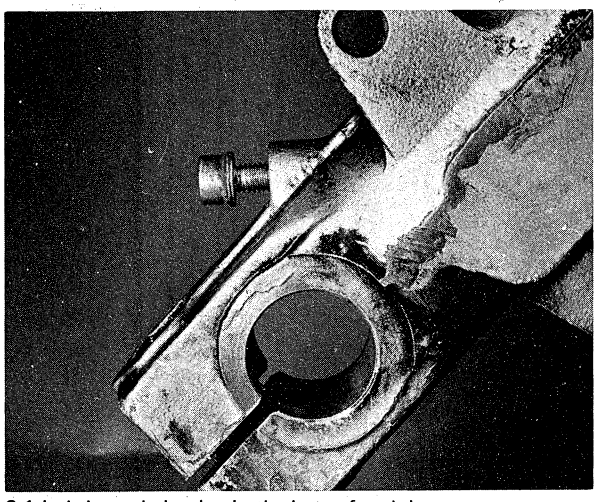
2.11b ... lower stanchion securing pinch bolts

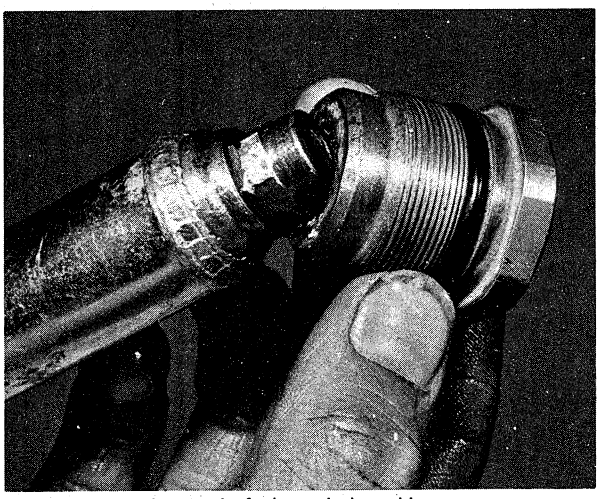


2.11c Ease the fork leg downwards and remove complete

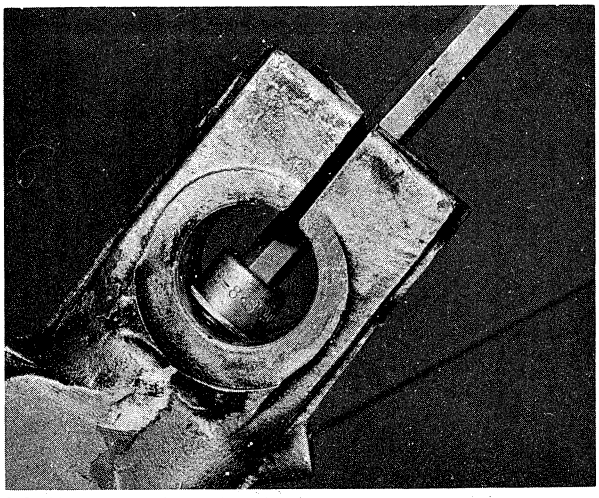
3 Front forks: dismantling the fork legs

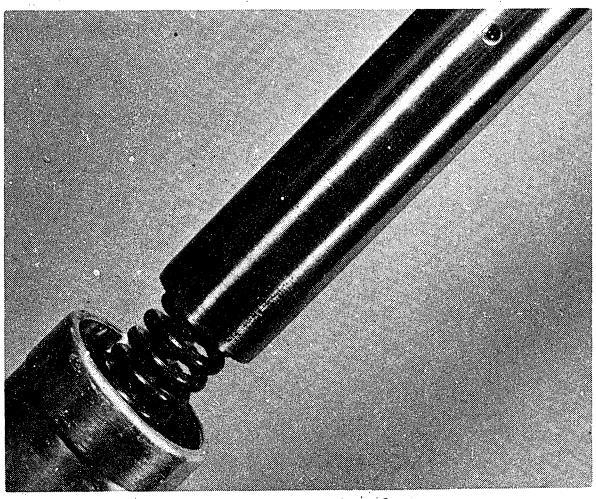
1 The front fork legs may be removed from the machine without dismantling the steering yokes or disturbing the instruments, and headlamp, by following the procedure described in the previous Section, paragraphs 7, 8, 9, 10 and 11. The fork legs should be dismantled individually, to prevent the accidental interchange of matched components. Before dismantling either leg, remove the drain screw from the base of the lower leg and allow the fluid to drain into a suitable container. This is not the damping fluid but merely the lubricating oil.
2 Remove the socket screw from the centre of the stanchion top bolt and then remove the bolt itself. If necessary, place the stanchion in the jaws of a vice, protected by a piece of inner tubing, to loosen the bolts. Invert the fork leg and remove the socket screw which locates the end of the internal damper rod.
3 Prise off the dust cap from the fork lower leg and withdraw the stanchion, complete with damper assembly and fork spring. Pull the spring and damper from the stanchion. To remove the spring from the damper rod, compress the spring slightly and using a pair of circlip pliers displace the circlip from the fork end. The spring guide and spring are then free for removal. The spring seat into which the damper rod and spring fit can be displaced from the inside of the fork lower leg by inverting the leg and jarring it lightly on the workbench


3.1 Lubricate drain plug in the base of each leg


3.2a Damper unit seats in fork top bolt and is ...


3.2b ... retained by a socket screw


3.2c Unscrew socket bolt in lower leg


3.3a Separate stanchion from upper leg after ...

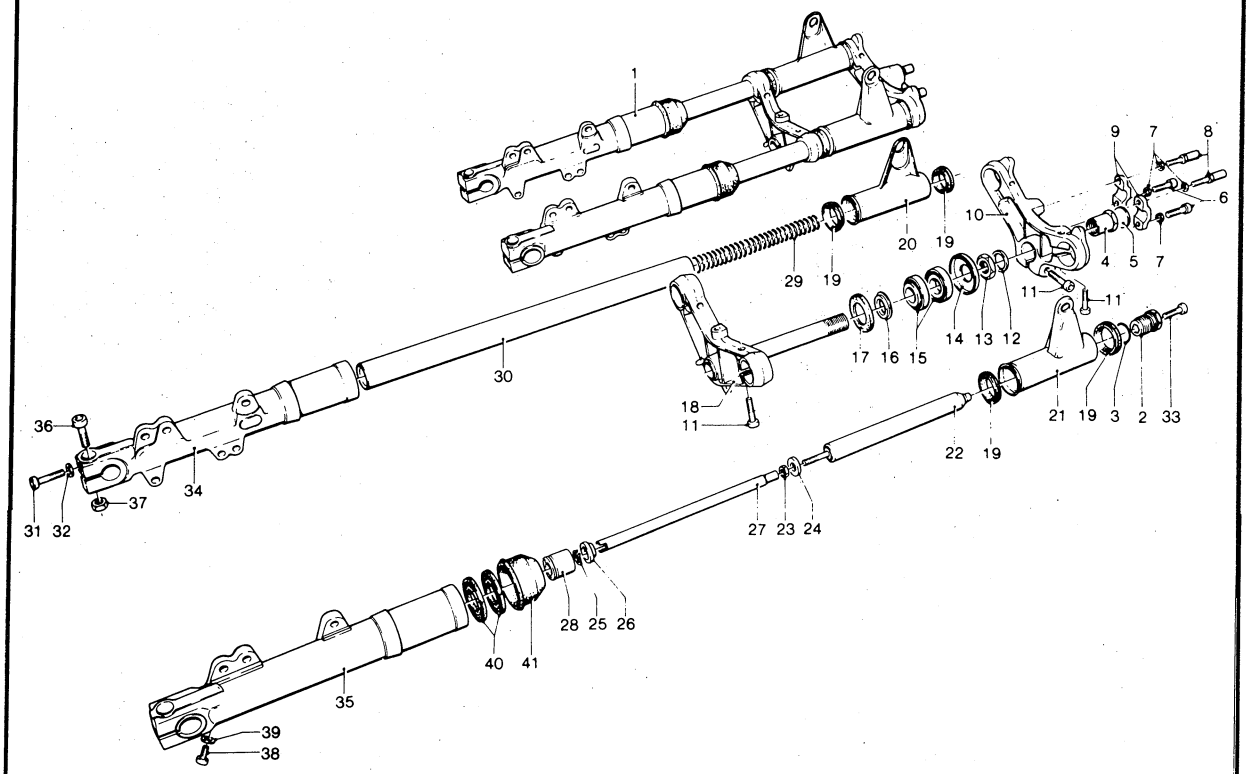
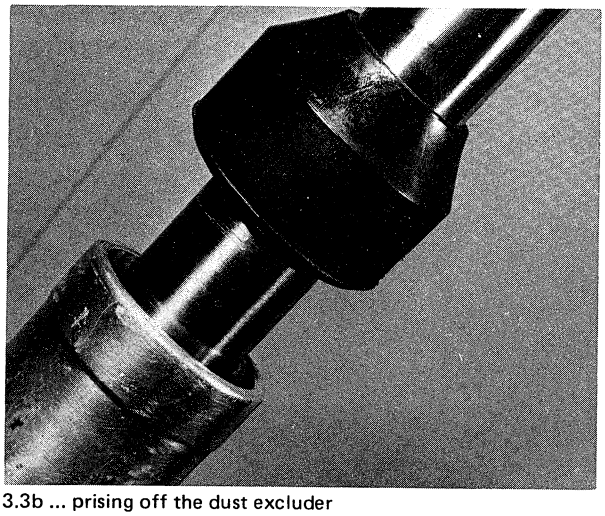
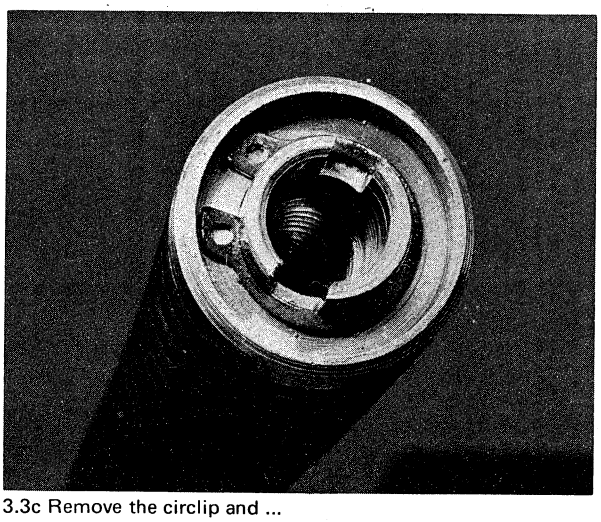


Fig. 5.1. Front forks - component parts

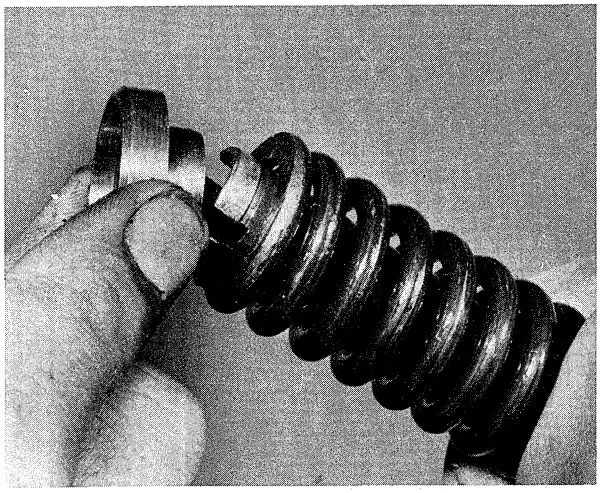
1 *Front forks - complete*
2 *Stanchion top bolt - 2 off*
3 *'O' ring - 2 off*
4 *Crown sleeve nut*
5 *Rubber cap*
6 *Socket screw - 2 off*
7 *Washer - 4 off*
8 *Extended screw - 2 off*
9 *Clamp - 2 off*
10 *Upper (crown) yoke*
11 *Pinch bolt - 5 off*
12 *Washer*
13 *Adjuster nut*
14 *Shroud*
15 *Tapered roller bearing - 2 off*
16 *Shim*
17 *Dust excluder*
18 *Lower yoke*
19 *Shroud seat - 4 off*
20 *RH fork shroud*
21 *LH fork shroud*
22 *Damper unit - 2 off*
23 *Locknut - 2 off*
24 *Rubber cushion - 2 off*
25 *Circlip - 2 off*
26 *Spring seat - 2 off*
27 *Damper rod - 2 off*
28 *Rod seat - 2 off*
29 *Fork spring - 2 off*
30 *Stanchion - 2 off*
31 *Socket screw - 2 off*
32 *Sealing washer - 2 off*
33 *Socket screw - 2 off*
34 *RH lower leg*
35 *LH lower leg*
36 *Socket screw - 2 off*
37 *Nut - 2 off*
38 *Nut - 2 off*
39 *Sealing washer - 2 off*
40 *Oil seal - 4 off*
41 *Dust excluder - 2 off*



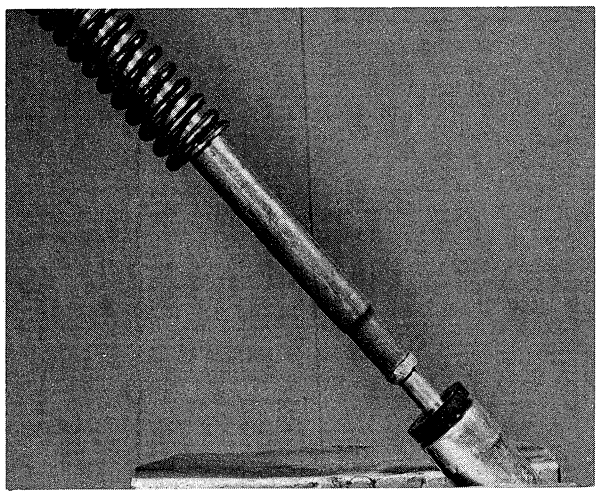
3.3b ... prising off the dust excluder



3.3c Remove the circlip and ...



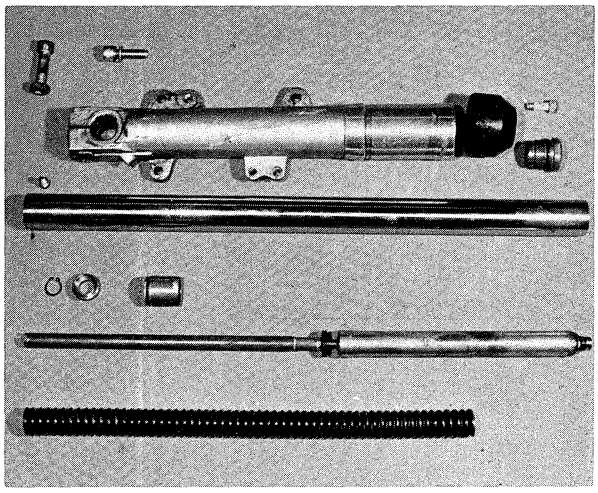
3.3d ... the spring lower seat to free ...



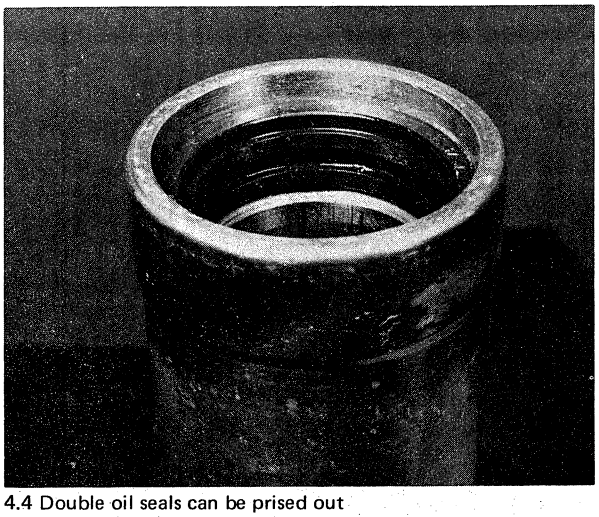
3.3e ... the fork spring from the damper rod

4 Front forks: examination and renovation

1 Check that the damper units are in good condition. Both should offer substantial resistance in both directions, the greater resistance being on extension. The damper units should give equal amounts of resistance to movement. If the damper units require renewal, they may be unscrewed from their rods after loosening the locknuts. Always replace the dampers as a pair.
2 Check the fit of the stanchions in the fork legs. If any lateral movement is evident, the worn components must be renewed, as no bushes are fitted. If the stanchions have become bent in an accident, they should be renewed. Although straightening is often possible the risk of subsequent fracture cannot be accepted.
3 The free length of each fork spring is given in the Specifications. If the springs appear weakened or are of different lengths, check them against a new spring. If the spring length difference is marked, renew the springs as a pair.
4 The two oilseals fitted to each lower leg must be renewed if oil leakage has occurred. The seals may be prised from position, using a screwdriver. Refit the seals with the spring facing side inwards.
5 Cracked or perished dust excluders should be renewed as they prevent road dirt from reaching the oil seals and help prevent scoring of the fork stanchions.



4.1 Front fork components - general view



4.4 Double oil seals can be prised out

5 Steering head bearings: examination and renewal

1 When the fork has been removed, the upper bearing inner race remains in the steering head and the lower inner race remains on the steering column. Both outer races remain in the steering head.

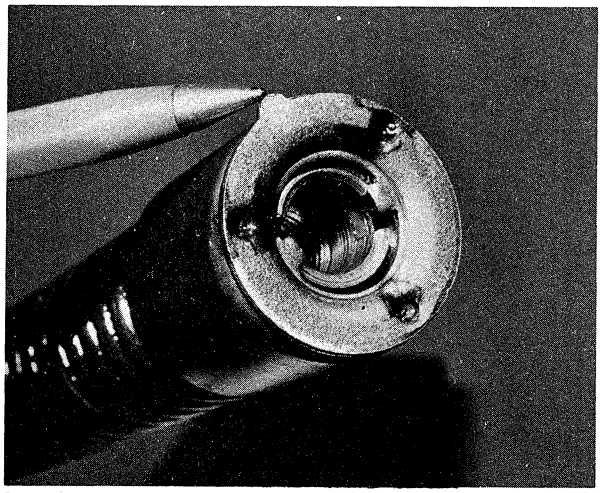
The upper bearing inner race may be lifted out of the outer race. The lower bearing inner race must be pulled off the steering column but only if it requires renewal.
2 Clean and examine the outer bearing tracks whilst in the steering head. Since the forks rotate through only a small angle, the commonest damage to the bearings is brinelling. This is indenting of the roller tracks by the rollers, generally due to maladjustment. It can be felt, when turning the forks, by the steering seeming to 'index' in one position.
3 Outer races must be driven out using a soft metal drift. When refitting, clean the housings and make sure that the races seat squarely. Do not interchange parts of bearings.
4 Grease the bearings before reassembly. Fit the lower bearing inner race onto the steering column and place the upper bearing inner race into the steering head. Insert the steering column carefully into the steering head, holding the upper bearing in place. Continue reassembly in reverse order of dismantling.

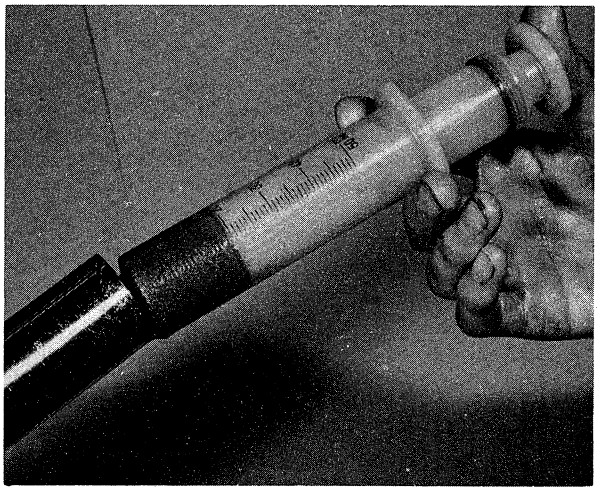
6 Front forks: reassembly and replacement

1 It is essential to observe absolute cleanliness when reassembling the fork legs. Reassemble in the reverse order of that given for dismantling.
2 When replacing the spring seat and spring guides on the damper rod, ensure that the cutaways engage correctly with the ears on the rod end. Note the locating projection on the spring seat which must align with the recess in the inside of the fork leg. Before refitting the stanchion top bolts and the damper retaining screws, refill each fork leg with the specified quantity and grade of lubricant. Check that both drain plugs are tightened, before filling.
3 Before fully tightening the front wheel spindle clamps and the fork yoke pinch bolts, bounce the forks several times to ensure that they work freely and are clamped in their original settings. Complete the final tightening from the front wheel spindle clamps upwards. This will help align the fork legs correctly.
4 Before the machine is used on the road, check the adjustment of the steering head bearings. If they are too slack, judder will occur. There should be no detectable play in the head races when the handlebars are pulled and pushed, with the front brake applied hard.
5 Overtight head races are equally undesirable. It is possible to unwittingly apply a loading of several tons on the head bearings by overtightening, even though the handlebars appear to turn quite freely. Overtight bearings will cause the machine to roll at low speeds and give generally imprecise handling with a tendency to weave. Adjustment is correct if there is no perceptible play in the bearings and the handlebars will swing to full lock in either direction, when the machine is on the centre stand with the front wheel clear of the ground. Only a slight tap should cause the handlebars to swing.

7 Frame: examination

1 When the machine is stripped for overhaul, an excellent opportunity arises to inspect the frame for signs of cracks or damage. Look especially closely around the steering head and rear swinging arm pivots. Frame repairs must be entrusted to a specialist, who will have the equipment necessary to ensure correct alignment. In the event of damage, replacement is the only safe course.
2 If the front forks are removed, a quick visual alignment may be made by inserting a close-fitting tube in the steering head. When viewed from the front of the machine, the tube should align exactly with the centre line of the frame. Deviation will indicate damage to the front of the frame. Since the rear wheel of the Moto Guzzi does not have to be adjusted, wheel misalignment will indicate frame distortion. More accurate checking must be carried out with the frame stripped completely.


6.1a Note projection on the spring seat


6.1b Do not omit to fill each fork leg with lubricant

8 Swinging arm: removal, examination and renovation

1 The rear fork assembly pivots on tapered roller bearings, fitted each side of the fork tubular cross-member. They bear on adjustable screw pivot stubs fitted into the lugs welded to the rear frame tube junctions.
2 When wear necessitates bearing renewal, rear suspension removal should be carried out as follows. Place the machine on the centre stand, raised on blocks so that the weight of the machine is biased towards the front wheel. Ensure that the machine is resting securely. If necessary, place a block below the front wheel to prevent the machine rolling forwards, off the centre stand.
3 Loosen the clamp which secures each silencer to the H section balance pipe. Unscrew the silencer mounting bolts and pull the silencers from position.
4 On V-1000 models, disconnect the parking brake cable at the operating lever on the caliper. Remove the caliper as a unit after detaching the two bolts. On all models with drum rear brakes, disconnect the brake rod by unscrewing the knurled adjuster nut and applying the rear brake pedal. Push out the trunnion from the operating arm to avoid loss.
5 On all models, loosen and remove the rear wheel spindle nut and then loosen the pinch bolt which passes through the left-hand arm of the rear fork. Withdraw the wheel spindle by passing a tommy bar through the hole in the spindle head. On disc rear brake models, move the caliper backwards slightly to clear the anchor lug on the swinging arm fork and then rotate the wheel backwards so that the caliper moves around the disc. When the caliper is free of the disc, move it forwards and tie it to a suitable portion of the frame. The hose clip on the fork member should be detached to free the cable.

6 Remove the wheel spacer from the centre of the wheel hub and then pull the rear wheel across to the left and off the drive splines. On all but 750S models, where the rear portion of the mudguard can be hinged up, it will be necessary to tilt the machine over to the right-hand side, to allow the wheel to clear the mudguard. An assistant should be enlisted to help during this operation.

7 Detach the lower end of the right-hand suspension unit from the bevel drive box after removing the nut and washer from the stud. Loosening of the upper mounting bolt may be necessary in order to give sufficient lateral movement of the damper. Support the weight of the drive box and remove the four securing nuts. Lift the bevel drive box away to the rear. Drainage of the lubricant is not required, provided that the bevel box is stored in an upright position with the input shaft pointing slightly upwards.

8 Remove the two socket screws on both sides of the machine which secure the footrest brackets, or on touring machines the silencer and rear crashbar mounting plate. It is necessary to remove these bolts and nuts only because they obstruct movement of the swinging arm cross-member during removal.

9 Detach the left-hand rear suspension unit from the swinging arm unit. Support the end of the swinging arm on a wooden block to prevent it dropping and fouling the frame lugs. Unscrew completely, and detach the two screw clips which secure the gaiter to the gearbox output boss and the swinging arm. Pull the rubber gaiter forwards off the swinging arm boss.

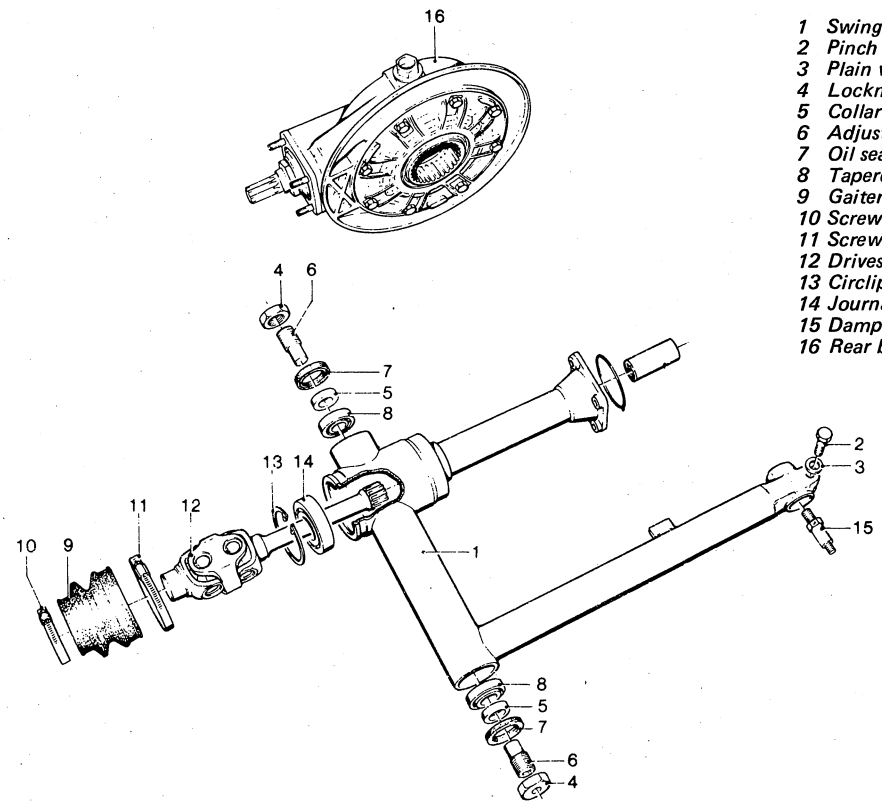
10 Loosen and remove the swinging arm pivot adjuster locknuts. These are usually very tight. The swinging arm, together with the final driveshaft, may be withdrawn towards the rear after unscrewing the two pivot stubs. Tilt the assembly to clear the frame lugs.

11 Remove the final driveshaft and universal joint from the swinging arm. The lower boss of the universal joint should be a tight push fit in the ball bearing contained within the swinging arm fork. Use a wooden drift to remove the joint. If the joint boss is loose in the bearing inner race, wear has developed. See Section 9 of this Chapter for further details.

12 Remove the spacer collar from one side of the swinging arm cross-member and prise out the oil seal with a screwdriver. Lift the tapered bearing cage/inner race from position. Repeat for the other bearing assembly. Do not allow the bearings to become interchanged.

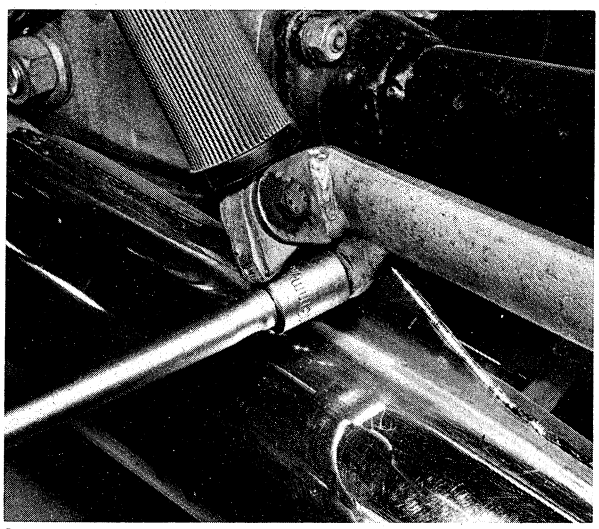
13 Wash the bearings thoroughly in petrol before examination is carried out. These bearings have a very long life provided lubrication is not neglected. Slight wear may be taken up by adjustment of the pivot stubs. Check for looseness of the rollers and for pitting or scoring of the roller tracks. If the bearings require renewal, the outer races must be pulled from position, using a special extractor. Neither race can be drifted from place, access being impossible due to the crossmember design. Many motorcycle repair specialists will have a suitable expanding puller and will be willing to carry out this operation for a nominal sum.

14 The swinging arm fork may be refitted by reversing the dismantling procedure. Ensure that the bearings are greased thoroughly before refitting the seals as no provision is given for subsequent lubrication. Adjustment of the tapered roller bearings must be made before the bevel drive box or suspension units are refitted. Screw in each pivot stub until the swinging arm fork is central in the frame. Check this by measuring the distance the pivot stubs protrude outwards, using a vernier gauge or ruler. Screw the pivot stubs further inwards an equal amount until a small amount of resistance in the bearings can be felt when raising and lowering the swinging arm fork. At this point there should be no perceptible side-to-side play. Fit and tighten the locknuts without allowing the pivot stubs to turn.

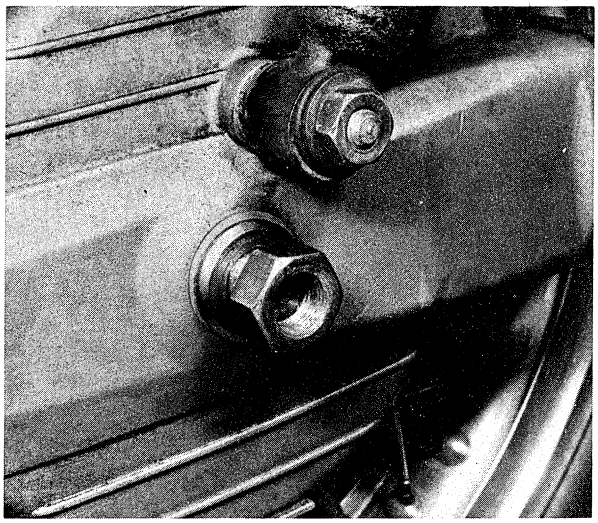


1 *Swinging arm*
2 *Pinch bolt*
3 *Plain washer*
4 *Locknut - 2 off*
5 *Collar - 2 off*
6 *Adjuster pivot stub - 2 off*
7 *Oil seal - 2 off*
8 *Tapered roller bearing - 2 off*
9 *Gaiter*
10 *Screw clip*
11 *Screw clip*
12 *Driveshaft/universal joint*
13 *Circlip*
14 *Journal ball bearing*
15 *Damper mounting*
16 *Rear bevel drive - complete*

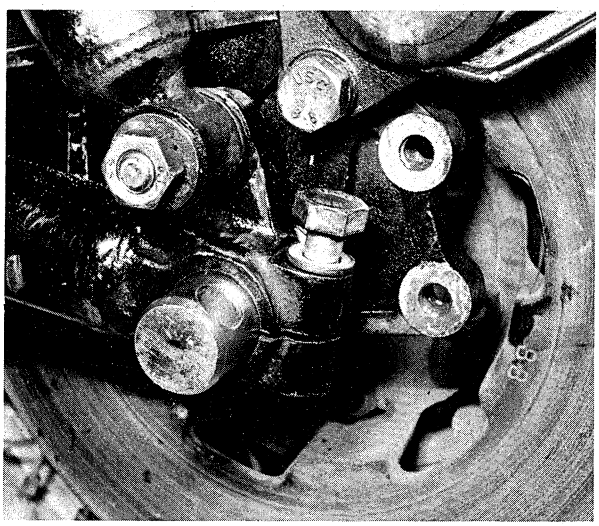
Fig. 5.2. Rear swinging arm and final drive assembly



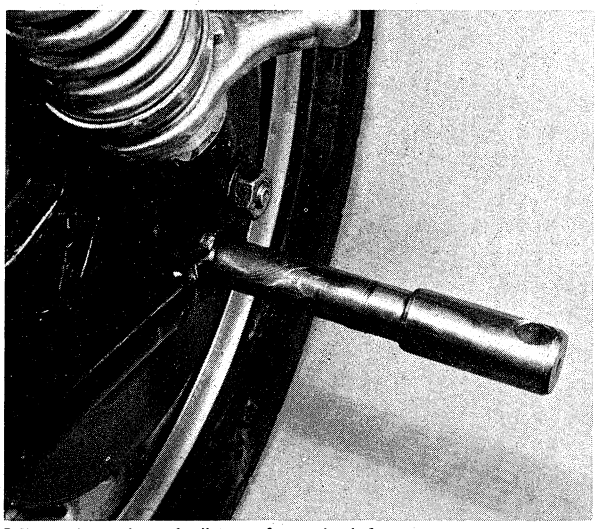
8.3 Loosen the silencer clamps and remove the single mounting bolt



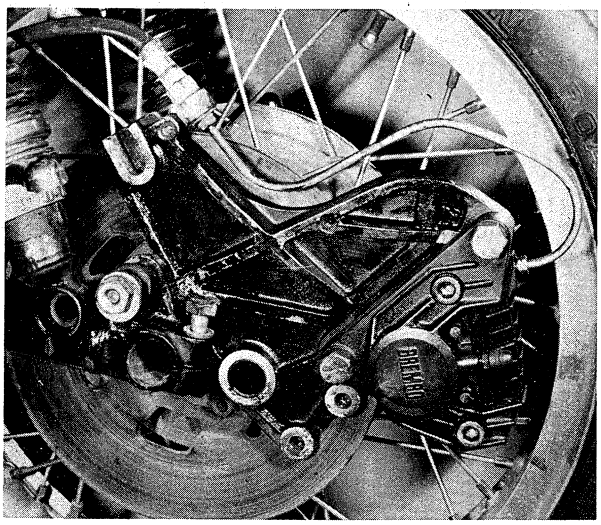
8.5a Remove the rear wheel nut and washer ...



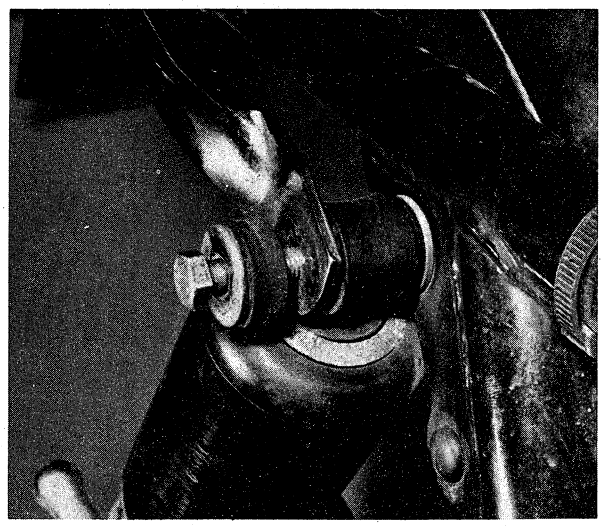
8.5b ... loosen the spindle clamp bolt and ...



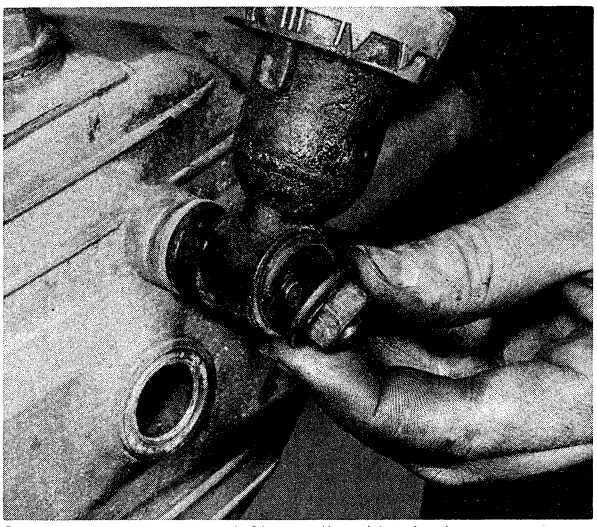
8.5c ... draw the spindle out from the left



8.5d Pull the caliper back off the brake disc

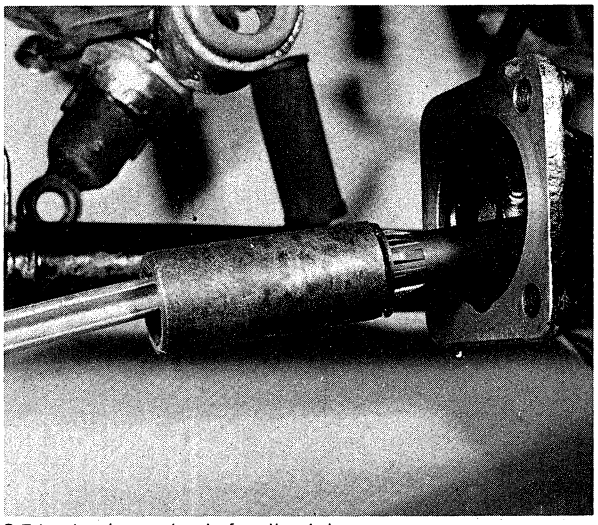


8.7a The rear suspension dampers are retained by a bolt and ...

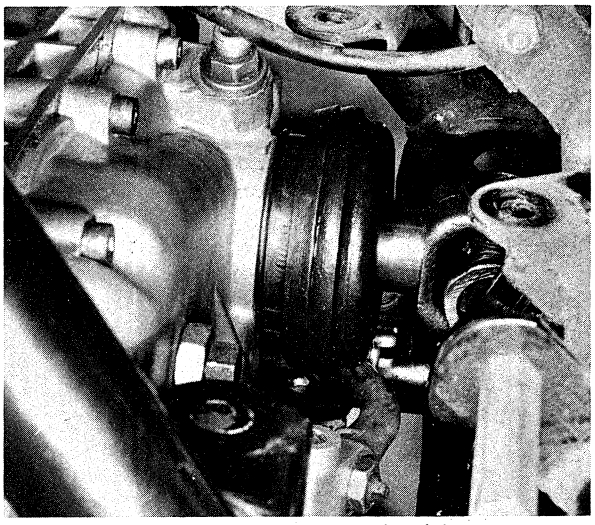


8.7b ... by a nut on a stud. Note split rubber bushes

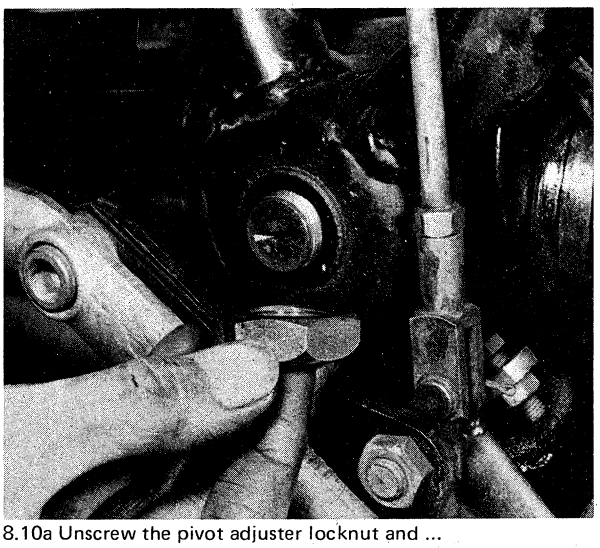
8.7c Detach the bevel drive box and ...



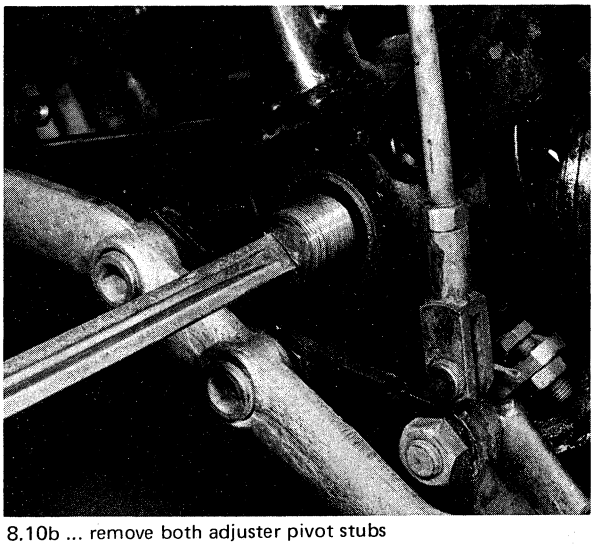
8.7d ... hook out the shaft splined sleeve



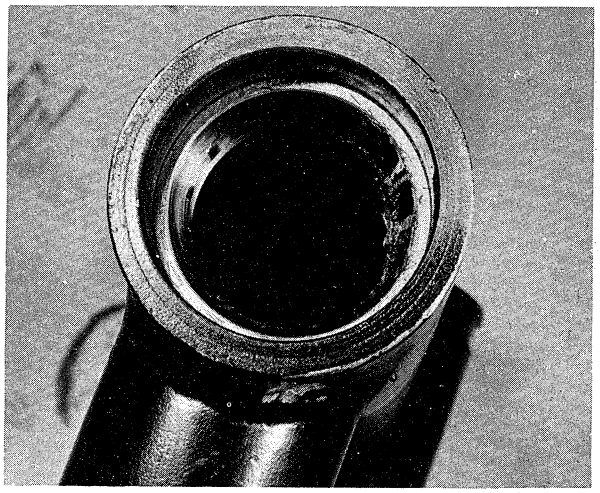
8.9 Pull back the rubber gaiter at the gearbox joint

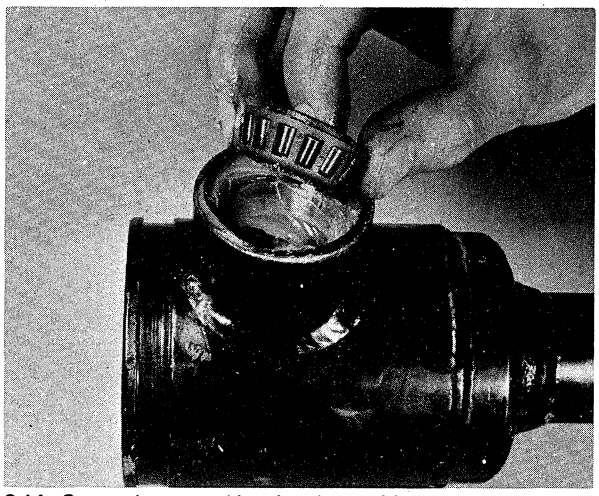


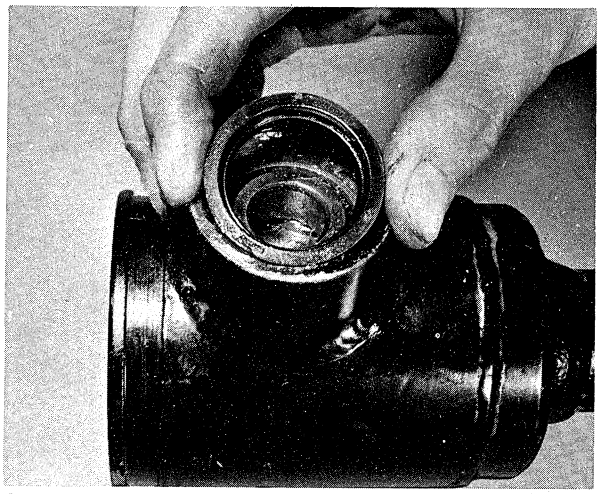
8.10a Unscrew the pivot adjuster locknut and ...

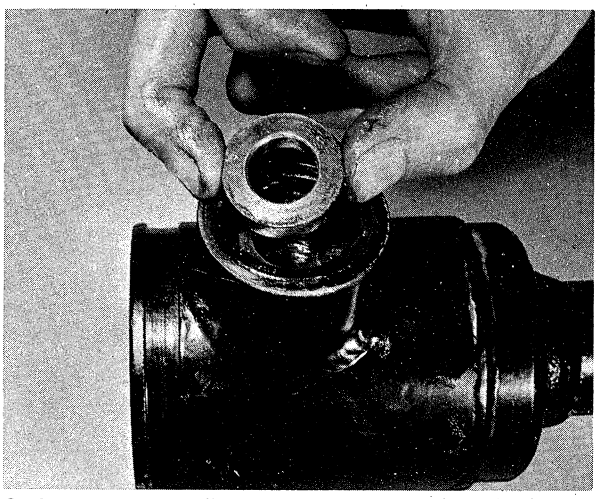


8.10b ... remove both adjuster pivot stubs


8.13 Check the outer races for indentation and scoring

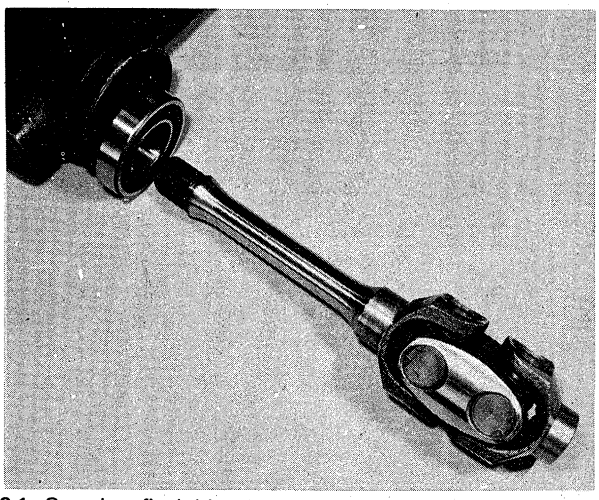

8.14a Grease the tapered bearing thoroughly

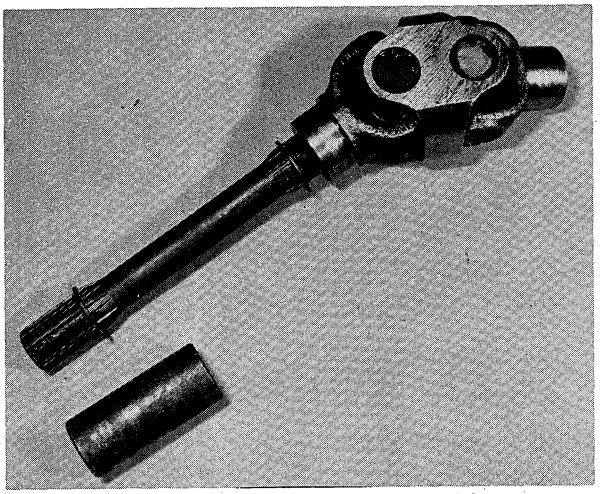

8.14b Refit the oil seals followed by ...


8.14c ... the spacer collars

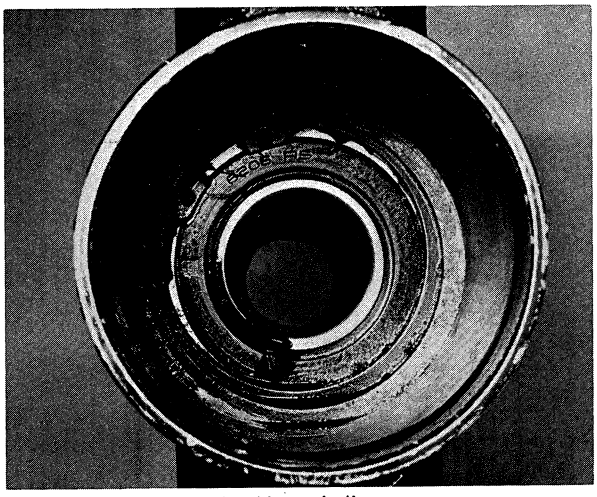
9 Final driveshaft: examination and renovation

1 The final driveshaft may be removed for inspection after detaching the swinging arm and bevel drive box, as described in the previous Section.
2 If wear in the universal joint is evident, the complete assembly must be renewed. On all but V-1000 models the driveshaft is a separate item to the joint and need only be renewed if the coupling splines at either end are badly worn
3 Check the fit of the driveshaft ball bearing inner race with the inner boss on the universal joint. The boss should be a tight drive fit in the race. Looseness at this point is not an uncommon occurrence. The only remedy is to renew one or both of the components. The use of a locking fluid is unlikely to provide a reliable remedy unless the clearance is very small. The bearing is retained within the swinging arm fork by a large internal circlip. Removal of the circlip may prove difficult unless a pair of long handled circlip pliers is available. The bearing may be drifted out, using a long punch inserted from the bevel drive end.
4 When refitting the driveshaft, grease the internal and external splines of the coupling sleeve and shaft with graphite grease.


9.1a One piece final drive shaft - V-1000 models



9.1b Two piece final drive shaft - All 5-speed models



9.3 Shaft bearing is retained by a circlip

10 Rear bevel drive - examination and renovation

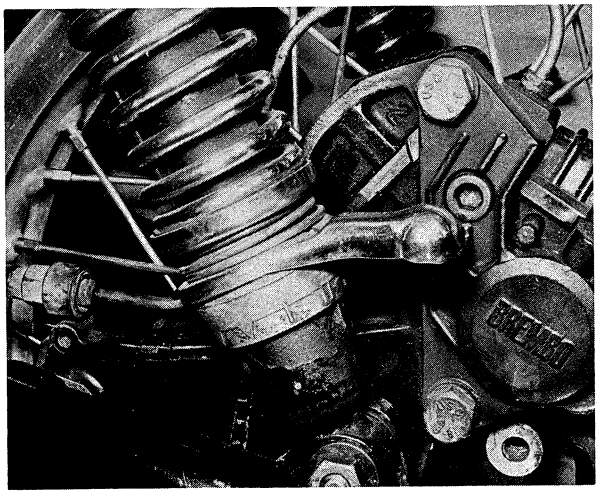
1 Dismantling the bevel drive is beyond the scope of this book and the majority of amateur mechanics. Wear or damage will be indicated by a high pitched whine. 'Backlash' between the crownwheel and pinion may be assessed by holding the output shaft firmly and rotating the input shaft in both directions. Any lateral play in the crownwheel can be felt by pulling and pushing the output driveshaft.
2 A faulty output shaft oil seal will be indicated by excessive oil in the brake drum, or around the wheel spindle nut.
3 The helical drive coupling and rear wheel drive splines should be examined for wear or damage.

11 Rear suspension units: adjustment, removal and examination

1 The hydraulically-damped rear suspension units may be adjusted to suit the road conditions and the load carried. On all but the 750, V-1000 and Le Mans models, the units are adjustable to five positions by means of a lever integral with the suspension unit. On Le Mans, V-1000 and 750 machines, the units are adjusted by means of a special 'C' spanner supplied with the tool kit. Three different load settings are possible in these latter cases. Both units **must** be set to the same position. Faulty dampers may be suspected if handling becomes unpredictable, or if the rear end of the machine bounces up and down when depressed and released. Oil leaks will indicate a faulty oil seal.
2 The damper units fitted to V-1000, Le Mans and 750 models, should be returned to the manufacturers for overhaul as their dismantling requires the use of special tools. The five position dampers can, however, be partially dismantled for inspection. Place one unit in position No. 1 and compress the spring to allow removal of the upper spring seat. Two people should carry out this operation because the springs are heavy. Remove the spring and adjuster cam.
3 Check damper action by pulling and pushing on the damper rod. It should require more effort to pull it out than to push it in. In both directions, the action must be uniform over the total length of the stroke. If oil is escaping, the damper rod seal is faulty. It is not possible to renovate the dampers, they can only be renewed.
4 Check the spring free length (see Specifications). Stronger springs are available for use when heavy loads are habitually carried.
5 The conical rubber bushes which support the damper mounting eyes should be renewed if they have perished or become compacted.

12 Centre stand: examination

1 The centre stand pivots on two short bolts passing through lugs on the lower frame tubes. Each bolt is fitted with a separate bush. Two return springs are provided, each of which is anchored to a drilled plate which also serves as a stop when the stand is in the extended position.
2 Check the pivot bolts for security. Occasionally, remove the bolts and lubricate the bushes to prevent premature wear. If the spring becomes weakened or the hook ends have worn, it should be renewed.



11.1 Rear suspension units are adjustable for ride

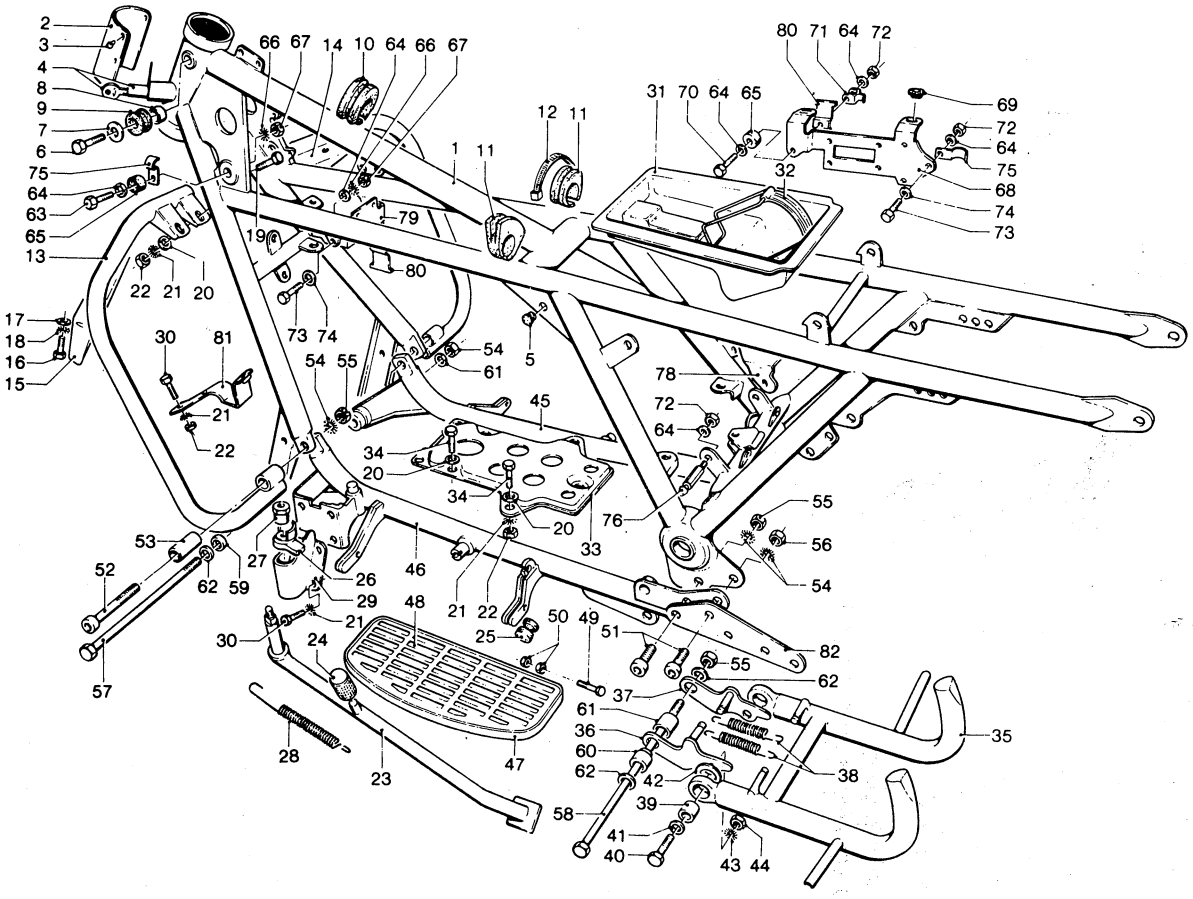
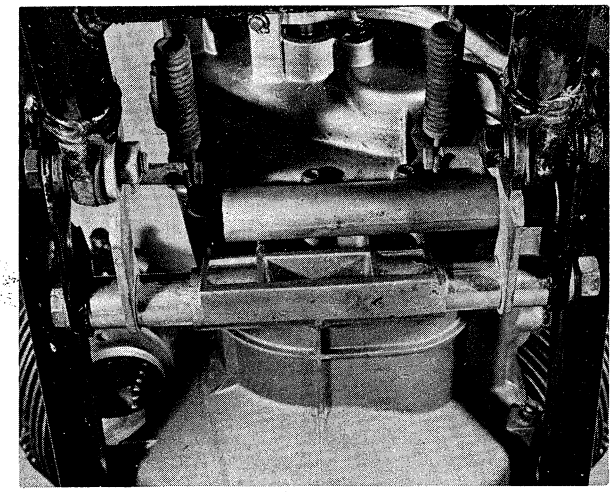


Fig. 5.3. Frame assembly

1 *Frame*
2 *Frame number plate*
3 *Rivet - 2 off*
4 *Steering lock*
5 *Bung - 4 off*
6 *Bolt - 2 off*
7 *Plain washer - 2 off*
8 *Sleeve - 2 off*
9 *Rubber sleeve - 2 off*
10 *Tank seat*
11 *Tank seat - 2 off*
12 *Strap - 3 off*
13 *Crash bar - complete*
14 *RH crash bar*
15 *LH crash bar*
16 *Bolt - 4 off*
17 *Washer - 9 off*
18 *Star washer - 4 off*
19 *Bolt - 2 off*
20 *Washer - 9 off*
21 *Star washer - 7 off*
22 *Nut - 7 off*
23 *Prop stand arm*
24 *Rubber*
25 *Buffer*
26 *Push plate*
27 *Sleeve nut*
28 *Return spring*
29 *Stand mounting bracket*
30 *Bolt - 6 off*
31 *Tool tray*
32 *Strap*
33 *Battery mounting plate*
34 *Bolt - 7 off*
35 *Centre stand*
36 *LH spring plate*
37 *RH spring plate*
38 *Return spring - 2 off*
39 *Bush - 2 off*
40 *Bolt - 2 off*
41 *Washer - 2 off*
42 *Star washer - 2 off*
43 *Star washer - 2 off*
44 *Nut - 2 off*
45 *RH sub frame member*
46 *LH sub frame member*
47 *Footboard - 2 off*
48 *Rubber inlay - 2 off*
49 *Pivot bolt - 4 off*
50 *Nut - 8 off*
51 *Socket screw - 4 off*
52 *Socket screw - 2 off*
53 *Spacer - 2 off*
54 *Star washer - 6 off*
55 *Nut - 8 off*
56 *Nut*
57 *Front engine bolt*
58 *Rear gearbox bolt*
59 *Spacer*
60 *Spacer - 2 off*
61 *Spacer - 2 off*
62 *Washer - 3 off*
63 *Bolt - 2 off*
64 *Washer - 7 off*
65 *Rubber sleeve - 2 off*
66 *Star washer - 6 off*
67 *Nut - 4 off*
68 *Rectifier bracket*
69 *Rubber cushion - 2 off*
70 *Bolt - 2 off*
71 *Clip*
72 *Nut - 3 off*
73 *Bolt - 2 off*
74 *Washer*
75 *Clip - 2 off*
76 *Retaining pin - 2 off*
77
78 *Bracket*
79 *Coil bracket*
80 *Clip*
81 *Bracket - 2 off*
82



12.1 Arrangement of centre stand mountings

13 Prop stand: examination

1 The prop stand fitted to all but the touring models is of a conventional type, retained at the front left-hand side of the machine by the engine forward mounting bolt. 850 California models employ a side stand, pivoting from a separate bracket in front of the left-hand footboard. A locking device prevents the stand retracting when the weight of the machine is on it. The V-1000 prop stand is similar to that of the 850 California model but incorporates a cable pull mechanism which operates the caliper parking brake.
2 Check that the stand extends and retracts correctly, lubricating the pivot where necessary with oil or grease. Ensure that the extension spring is in good condition. A stand which falls when the machine is being ridden may have disasterous results when cornering, almost certainly unseating the rider.
3 Refer to Chapter 6, Section 16 for details of the V-1000 stand-operated parking brake.

14 Footrests and foortboards

1 On touring models, footboards are provided for the rider in place of the more normal footrests. Each footboard is mounted on two pivot bolts, retained by a nut and locknut. By this means the footboards may be adjusted to fold upwards easily and so present less resistance when grounding is experienced in cornering. The passenger foot rests are incorporated in the rear crashbar, which has footrest rubbers placed over the lower horizontal portion. To replace the rubbers, undo the lower and upper mounting bolts of each crashbar and pull the rubbers from place. Soap or French Chalk may be used to aid fitting of new rubbers onto the bars.
2 All other models have footrests mounted on a forged bar, one of which is secured to each side of the machine by the bolts retaining the rear of the engine sub-frame assembly. The rear footrests are hinged on the bars to allow folding when not in use. The footrest rubbers may be renewed as individual components as can the folding portion of the rear footrests. The hinge is formed by a simple nut and bolt.

15 Dualseat: removal

1 Lift the dualseat and remove the two bolts which serve as pivot pins. The seat can then be lifted away from the machine.
2 Before refitting the seat, lubricate the pivots and also the mechanism which locks the seat when down.

16 Steering head lock

1 The only maintenance possible for the lock is to lubricate the barrel occasionally - not the keyhole. Use a light universal oil.
2 If the key is lost it is possible to obtain a replacement, provided the key number is known. If no number is available or the lock malfunctions the lock securing dowel must be drilled out and a new lock fitted.

17 Instrument drive cables: examination and replacement

1 Drive cables should be examined and lubricated occasionally. The outer sheath should be examined for cracks or damage, the inner cable for broken or frayed strands. Jerky or sluggish instrument movement is generally caused by a faulty cable.
2 Detach the cable at the drive end, and withdraw the inner cable. Clean and examine the cable. Re-lubricate it with high melting point grease, but do not grease the top six inches of cable, at the instrument end, or grease will work its way into the instrument head and ruin the movement.
3 Route the cables as they were originally. Make sure that the steering turns freely.

18 Instruments: removal

1 Before removal of the instruments is undertaken disconnect the battery to prevent inadvertent shorting of any of the circuits involved. Detach the speedometer drive cable and where fitted the tachometer drive cable. Both are retained by knurled gland nuts.
2 Detach the bulb holders and bulbs and the electrical connections, where necessary, after removing the base of the lighting console. It is held by four knurled rings on all models except on the V-1000 model, which utilises four screws.
3 Remove the two bolts securing the instrument console to the front forks and lift the assembly away. Note the sequence of rubber bushes, sleeves and washers.
4 The instruments cannot be repaired. Remember that it is necessary to have a functioning speedometer accurate within $\pm$ 10% at 30 mph, in the UK. If the odometer continues to record when the speedometer fails to function, the instrument head is faulty and requires renewal or repair.

19 Cleaning the machine

1 After removing all surface dirt with a rag or sponge which is washed frequently in clean water, the machine should be allowed to dry thoroughly. Application of car polish or wax to the cycle parts will give a good finish, particularly if the machine receives this attention at regular intervals.
2 The plated parts should require only a wipe with a damp rag, but if they are badly corroded, as may occur during the winter when the roads are salted, it is permissible to use one of the proprietary chrome cleaners. These often have an oily base which will help to prevent corrosion from recurring.

3 If the engine parts are particularly oily, use a cleaning compound such as Gunk or Jizer. Apply the compound whilst the parts are dry and work it in with a brush so that it has an opportunity to penetrate and soak into the film of oil and grease. Finish off by washing down liberally, taking care that water does not enter the carburettors, air cleaners or the electrics. If desired, the now clean aluminium alloy parts can be enhanced still further when they are dry by using a special polish such as Solvol Autosol. This will restore the full lustre.

4 If possible, the machine should be wiped down immediately after it has been used in the wet, so that it is not garaged under damp conditions which will promote rusting. Remember there is less chance of water entering the control cables and causing stiffness if they are lubricated regularly as described in the Routine Maintenance Section.

20 Fault diagnosis: frame and forks

Symptom	Cause	Remedy
Machine veers either to the left or the right with hands off handlebars	Bent frame Twisted forks	Check and renew. Check and renew if necessary.
Machine rolls at low speed	Overtight steering head bearings	Slacken until adjustment is correct.
Machine judders when front brake is applied	Slack steering head bearings	Tighten until adjustment is correct.
Machine pitches on uneven surfaces	Ineffective fork dampers Ineffective rear suspension units Suspension too soft	Renew sealed units. Check whether units still have damping action. Raise suspension unit adjustment one notch.
Fork action stiff	Fork legs out of alignment (twisted in yokes)	Slacken yoke clamps, and fork top bolts. Pump fork several times then retighten from bottom upwards.
Machine wanders. Steering imprecise Rear wheel tends to hop	Worn swinging arm pivot	Dismantle and renew bearings and pivot shaft.