Chapter H

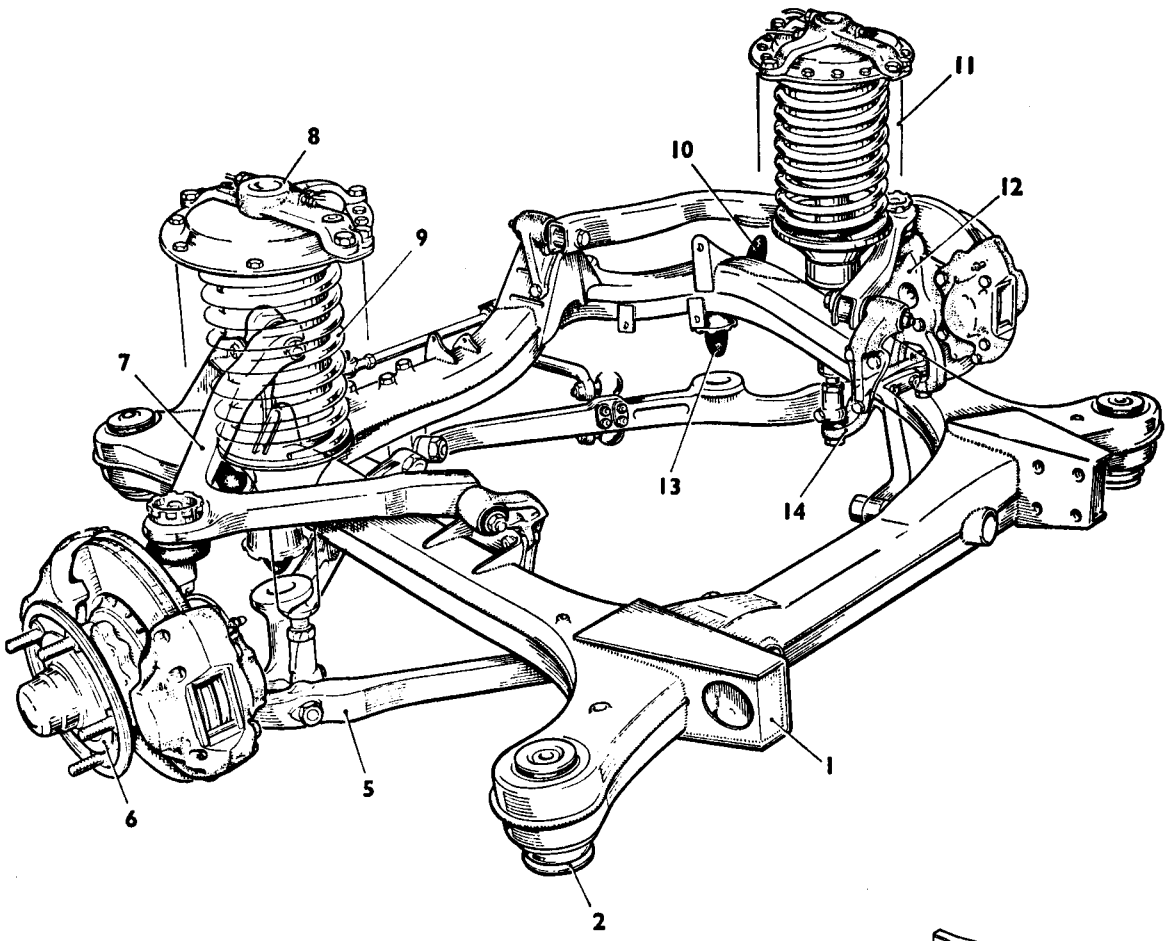
SUB-FRAMES AND SUSPENSION

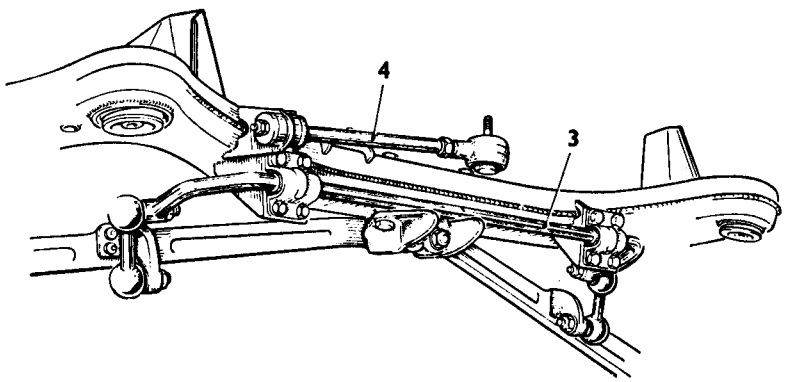
Printed in England

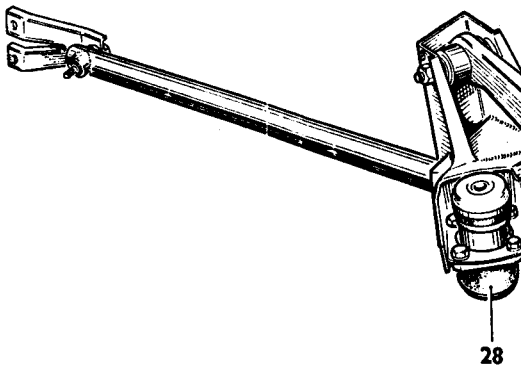
April 1970

Fig. H1 Front and rear sub-frame and suspension assemblies

T.S.D. 2476







1 Front sub-frame
2 Resilient metal (Vibrashock) mount
3 Front stabiliser (anti-roll) bar
4 Lateral location (Panhard) rod
5 Lower triangle levers
6 Front hub units
7 Upper triangle levers
8 Front height control ram
9 Front coil spring and damper assembly
10 Rebound stop
11 Spring pot
12 Yoke/stub axle
13 Bump stop
14 Suspension lower ball joint housing

15 Horizontal compliance cushions
16 Rear suspension cross-member
17 Horizontal compliance damper (hydraulic)
18 Suspension cross-member link (radius rod)
19 Rebound strap
20 Bump stop
21 Rear coil spring and damper assembly
22 Spring pot
23 Rear height control ram
24 Final drive unit and half-shafts
25 Final drive cross-member with rubber bonded metal mounts
26 Rear hub unit
27 Trailing arm
28 Resilient metal mounts – rear suspension cross-member
29 Torque reaction arm

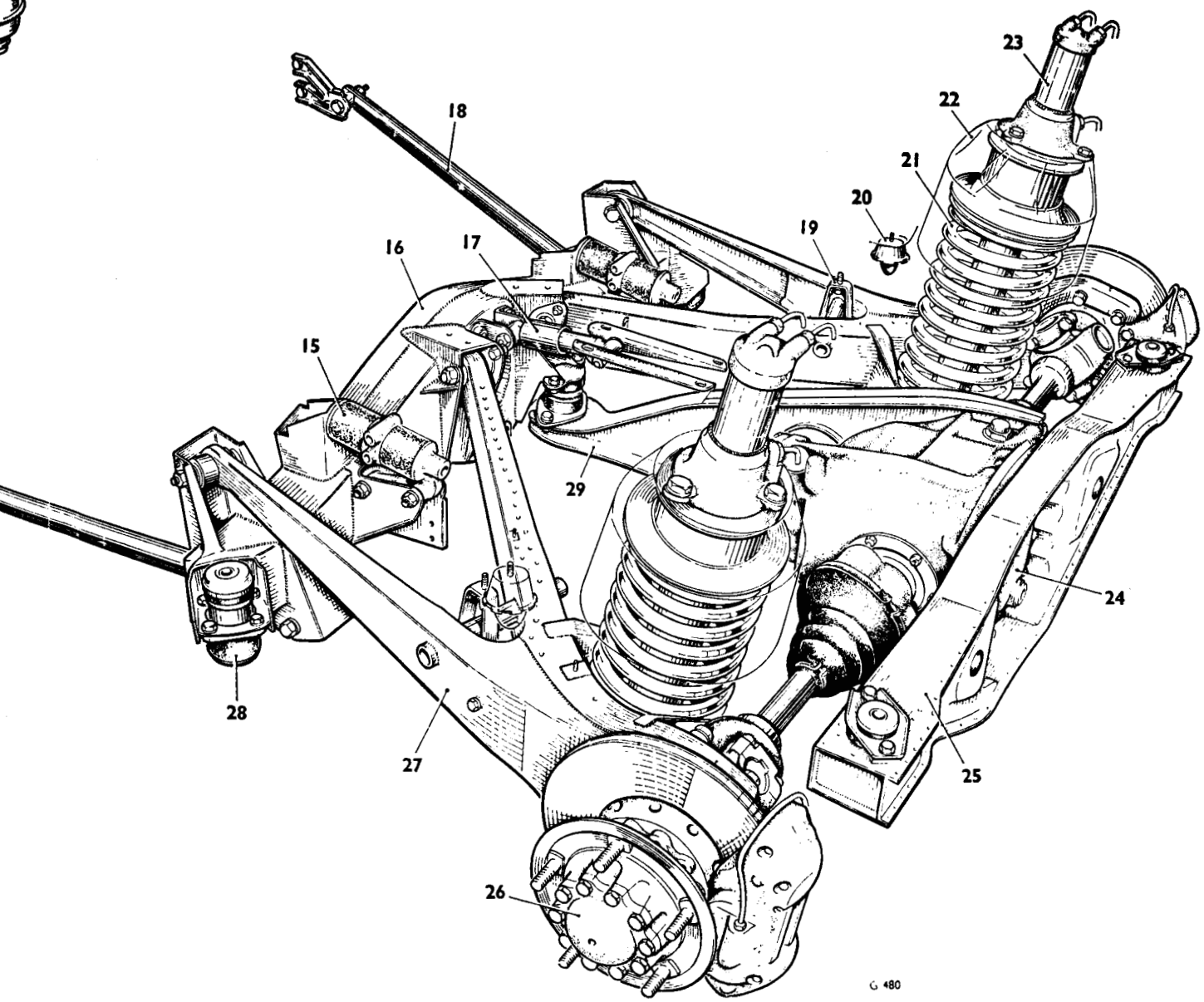


FIG. H1 FRONT AND REAR SUB-FRAME AND SUSPENSION ASSEMBLIES

Printed in England

April 1970

T.S.D. 2476

Chapter H
SUB-FRAMES AND SUSPENSION

Section H1
SUB-FRAMES AND SUSPENSION

Front sub-frame, engine and transmission— To remove as a unit

1. Disconnect the battery.
2. Remove the bonnet as described in Chapter S – Body.
3. De-pressurise the hydraulic system (*see Chapter G – Hydraulic System*).
4. **On cars fitted with refrigeration,** release the pressure from the system and disconnect the pipes from the compressor (*see Chapter C – Air Conditioning*).
5. **On all cars** drain the cooling system. There are three drain points, one at the base of the radiator bottom tank and one on either side of the crankcase.

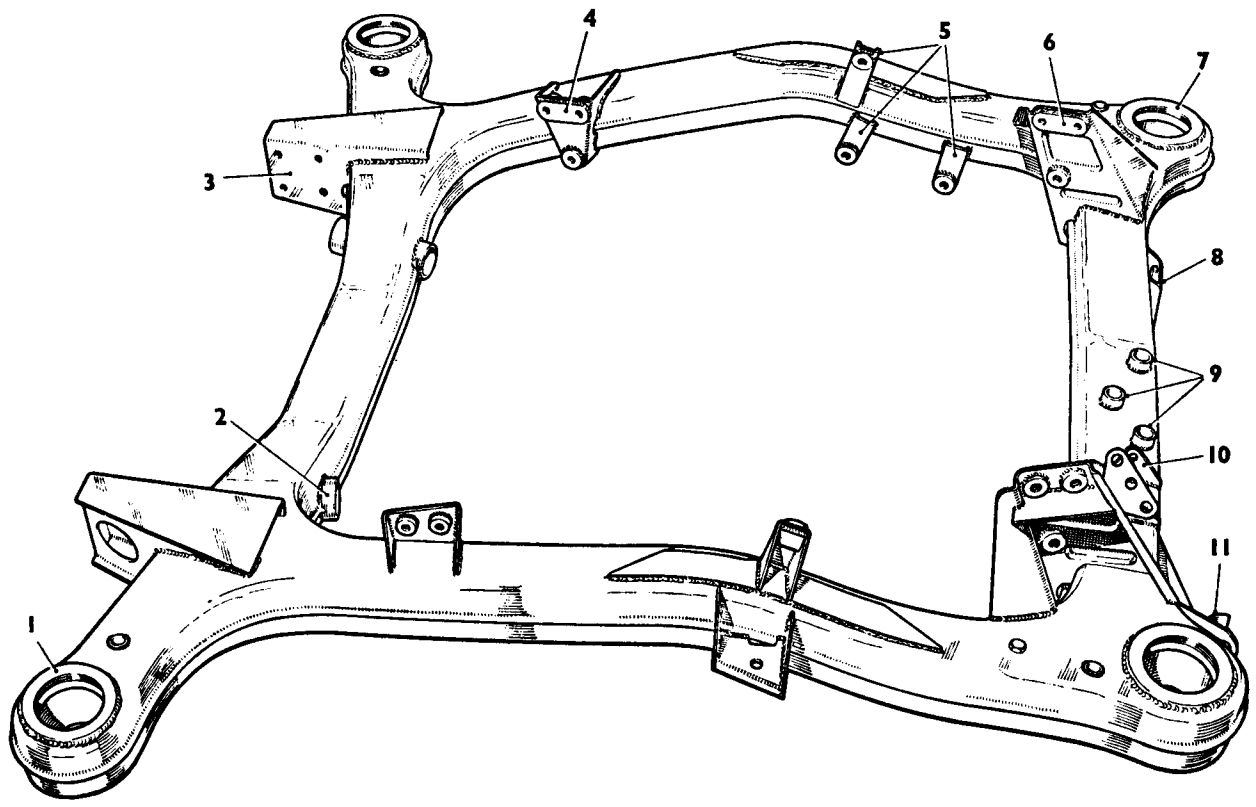
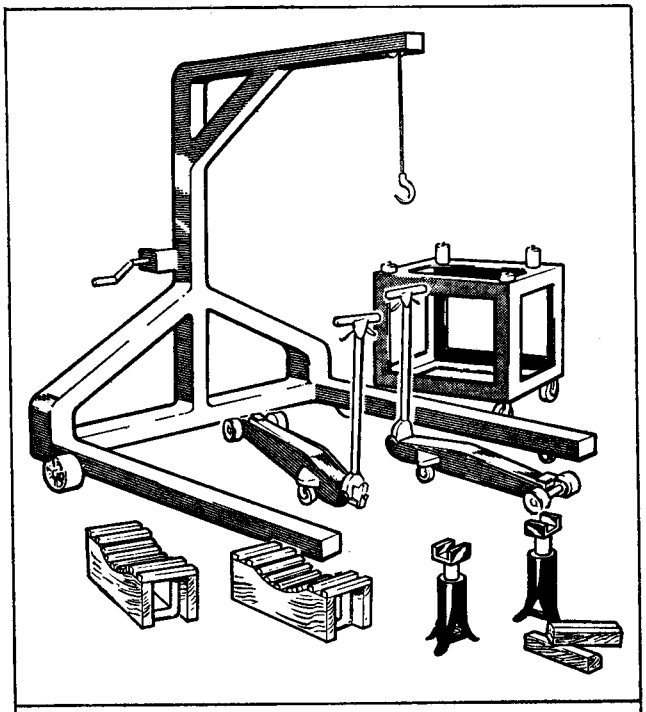


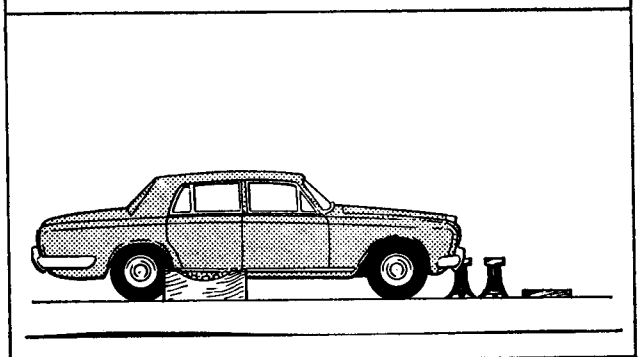
FIG. H2 PICTORIAL VIEW OF FRONT SUB-FRAME

1 Sub-frame rear mounting points
2 Rear lower triangle levers mounting points
3 Engine rear mounting brackets
4 Upper triangle levers rear mounting brackets
5 Steering box/idler box mounting brackets
6 Upper triangle levers front mounting brackets
7 Sub-frame front mounting points
8 Front stabiliser bar mounting brackets
9 Front lower triangle levers mounting points
10 Front height control valve bracket
11 Panhard rod mounting bracket

Chapter H

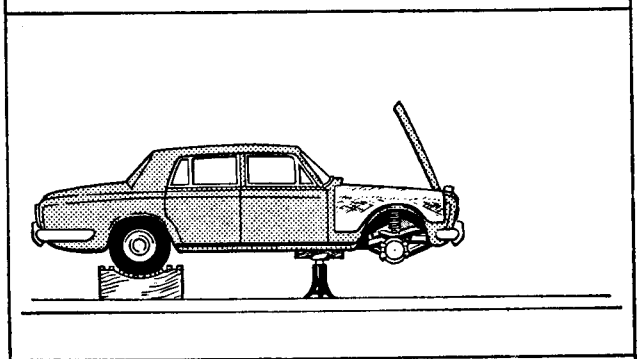


Equipment required—Mobile crane, two hydraulic jacks, two stands, two sill shaped blocks, engine stand and two wooden cradles.



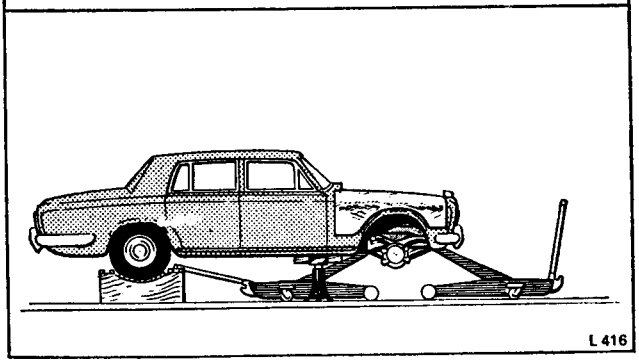
Operations 1 – 10

Disconnect battery, discharge refrigeration and disconnect coolant hoses.



Operations 11 – 14

Place car on wooden cradles and stands.



Operations 32 – 35

Place hydraulic jacks beneath transmission and lower triangle levers pivot point.

FIG. H3A FRONT SUB-FRAME, ENGINE AND TRANSMISSION REMOVAL

Printed in England

April 1970

T.S.D. 2476

Operations 36 – 37

Unscrew and remove sub-frame centre bolts. Check all hoses, etc., are disconnected; then lower jacks simultaneously.

Operations 38 – 39

Using crane, lift car body clear of engine, transmission and sub-frame; remove unit from beneath car.

Operation 40

Using crane, lift engine, transmission and sub-frame on to mobile stand.

Operation 41

Remove the engine and transmission from sub-frame.

Operations 4 – 15

(*see Engine and transmission – To fit to sub-frame.*)

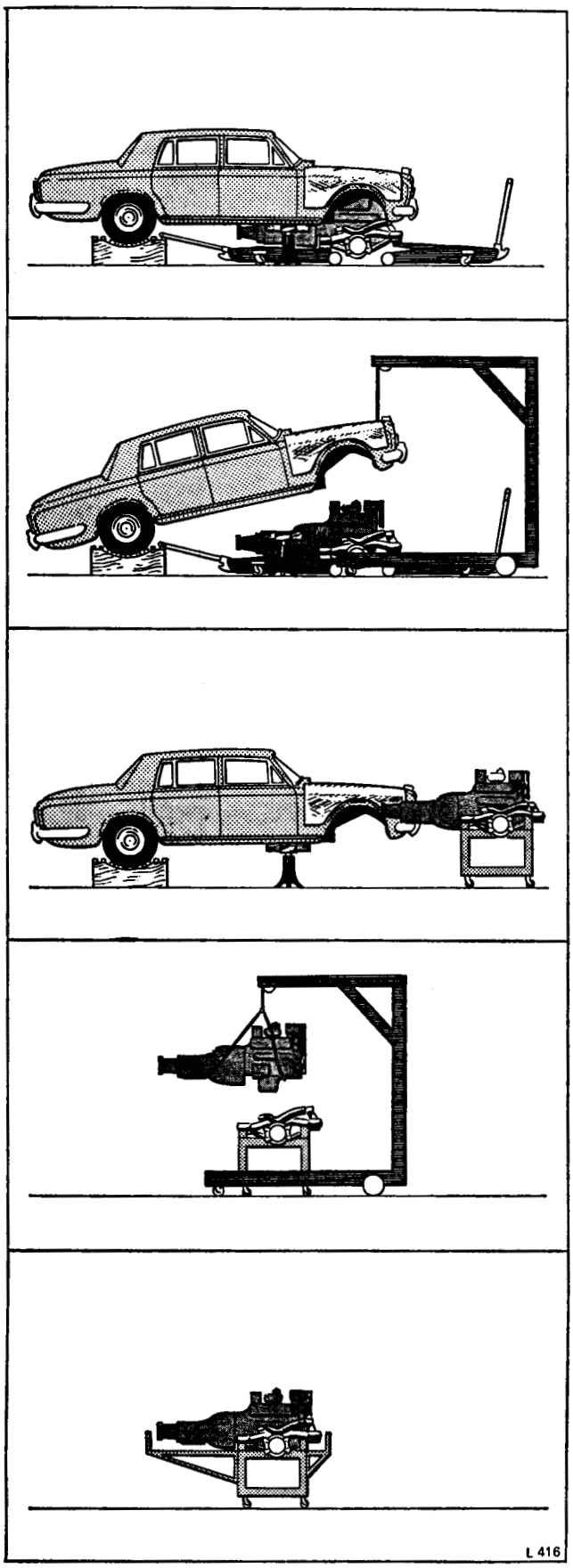


FIG. H3B FRONT SUB-FRAME, ENGINE AND TRANSMISSION REMOVAL

6. Remove the air silencer/cleaner hose by releasing the large hose clips at each end and by removing the two setscrews securing the hose bracket to the cylinder head.

7. Blank off the choke butterfly housing and the air silencer/cleaner outlet, to prevent ingress of foreign matter.

8. Disconnect the heater hoses from the cylinder head and remove the hoses from the coolant system.

9. **On cars fitted with torque converter transmission,** disconnect the coolant hose at the outlet connection of the fluid cooler.

10. **On cars fitted with exhaust emission control,** the pipe connecting the air filter of the carburetter weakening device to the 'A' or 'B' bank carburetter float chamber must be disconnected.

11. Using a hydraulic jack, raise the rear of the car sufficiently to place the wooden cradles (*see Fig. H3*) beneath each rear wheel. Lower and remove the jack.

12. Position the jack head and a piece of hardwood beneath the lower triangle levers pivot point then raise the front of the car.

13. Position a stand fitted with a piece of hardwood (*see Fig. H3*) beneath the sill just rearward of the front wheel arch.

14. Lower the car onto the stands and remove the jack.

15. **On all cars,** disconnect the exhaust downtake pipes from the manifolds and at the rear of the front silencer box; remove the exhaust.

16. Disconnect the engine electrical system loom at the nine-way socket and plug situated on the right-hand valance plate (*see Fig. H5*).

Note The importance of cleanliness when working on the hydraulic system cannot be over emphasised.

All connections must be cleaned with **methylated spirit** prior to being disconnected.

All pipes and apertures must be suitably blanked off immediately they are disconnected or exposed.

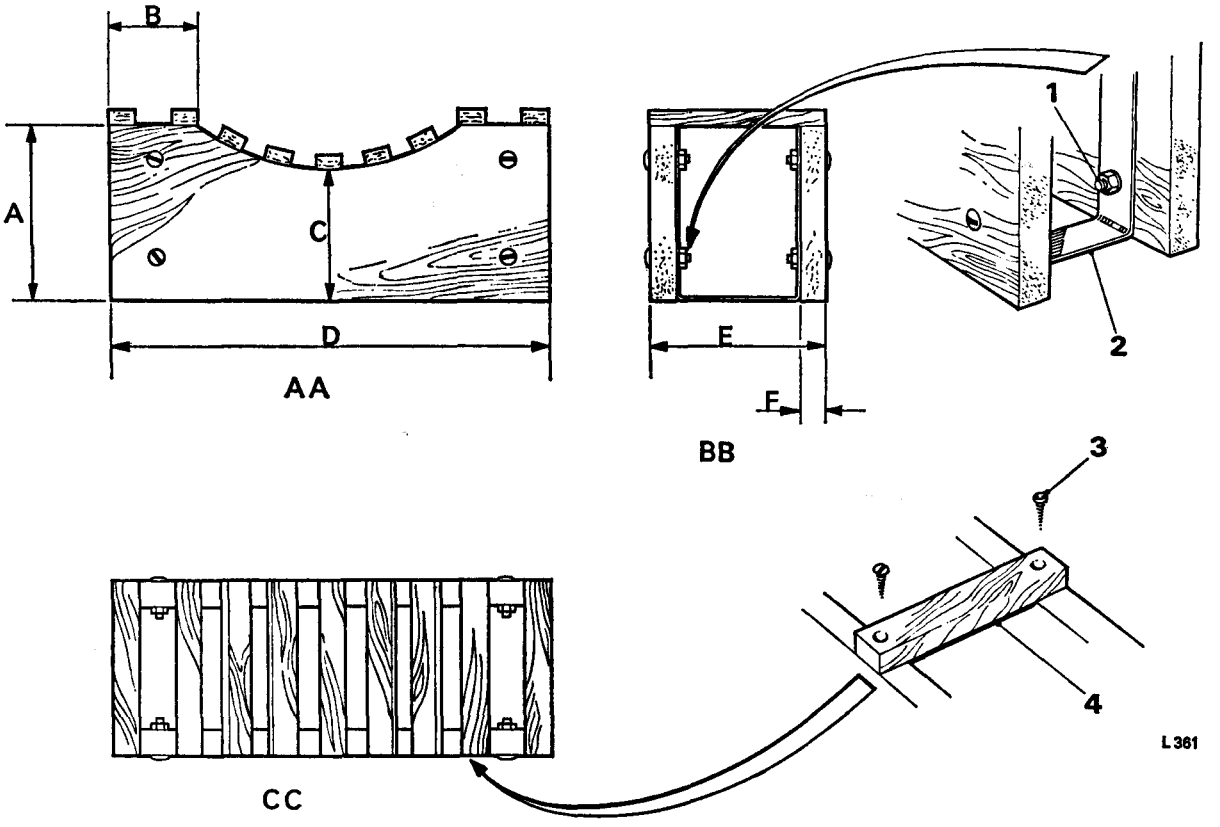


FIG. H4 WOODEN CRADLE DIMENSIONS

A-A Side view
A 12 in. (30,48 cm.)
B 5 in. (12,70 cm.)

B-B End view
C 9 in. (22,86 cm.)
D 36 in. (91,44 cm.)

C-C Plan view
E 12 in. (30,48 cm.)
F 1.50 in. (38,10 mm.)

1 Nut, bolt and washer (8 off) **2** Steel bracing (2 off) **3** Wood screws
4 Cross-piece 12 in. × 1½ in. × 1 in. (30,48 cm. × 38,10 mm. × 25,4 mm.)

Printed in England

April 1970

T.S.D. 2476

The blanks should be thoroughly cleaned with **methylated spirit** before use and all foreign matter, e.g. grease, oil, paint or grit removed.

The ingress of foreign matter will seriously impair the efficiency of the hydraulic system (*see Chapter G – Hydraulic System*).

17. Disconnect the pipes between the hydraulic accumulators and the braking and height control systems at the junction on the left-hand body side-member. Blank off the pipes and apertures.

18. Disconnect the hoses between the brake fluid reservoir at the brake pump end of the hose. Immediately blank off the hoses to prevent the hydraulic fluid draining from the reservoir.

19. **On right-hand drive cars,** the two flexible hoses on the right-hand side of the sub-frame for the braking system must be removed.

On left-hand drive cars, these hydraulic pipes are situated on the left-hand side of the sub-frame.

20. **On all cars,** disconnect the low pressure return pipes connecting the accumulators to the hydraulic fluid reservoir. Immediately blank off the pipes and apertures.

21. Disconnect the three flexible hoses on the right-hand side of the front sub-frame cross-member.

22. Disconnect the fuel supply pipes from the fuel pumps, at the point just rearward of the right-hand front wheel arch, then blank off the pipe.

23. Remove the accelerator control rod and tie-bar situated at the rear of 'A' bank cylinder head. The control rod and tie-bar are mounted on the bracket supporting the electrically operated starter switch to the valance.

24. **On cars fitted with the Saginaw steering pump,** disconnect the steering pump fluid cooler pipes; blank off the pipes and apertures.

25. Unscrew and remove the speedometer flexible drive cable from the transmission rear extension.

26. Unscrew and withdraw the multi-pin plug and socket from the transmission gear change actuator motor.

27. Unscrew and remove the nuts and bolts securing the propeller shaft to the transmission output flange; separate the flanges.

28. Unscrew and remove the two nuts and bolts securing the upper part of the steering column to the intermediate link.

29. Release the panhard rod at its inner end by unscrewing the nut from the shouldered bolt; push the rod away from the body bracket.

Note Do not alter the setting of the rod.

30. **On cars between Car Serial Numbers 6000 and 6404,** disconnect the hand brake cable and the hand brake pulleys.

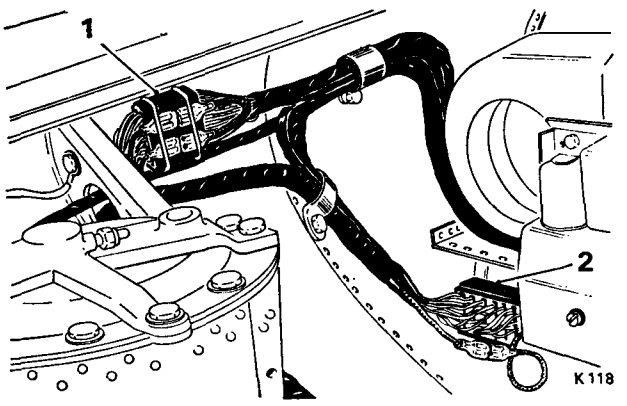


FIG. H5 ENGINE LOOM PLUG AND SOCKET

1 Connector block **2** Connector block

31. Remove the front road springs as described in Section H4 – Front road spring – To remove.

32. Place a hydraulic jack under the lower triangle levers pivot point.

33. Disconnect the battery cable from the starter motor solenoid and from the bracket on the bell housing.

34. Detach the earth strap from the bell housing.

35. Place a second hydraulic jack fitted with a block of hardwood beneath the transmission sump; remove the front wheels.

36. Unscrew and remove the sub-frame centre bolts.

37. Check that all hoses, pipes, etc., are disconnected, then lower **both** hydraulic jacks simultaneously.

38. Using an overhead crane, place a sling through both bonnet hinges and carefully lift the front of the car sufficiently to allow the engine, transmission and sub-frame assembly to be wheeled from beneath the car.

39. Lower the car back onto the stands; remove the slings.

40. Using the overhead crane, lift the engine, transmission and sub-frame onto the special mobile stand (RH 7761).

41. Remove the engine and transmission from the sub-frame as described in 'Engine and transmission – To remove from sub-frame'.

Front sub-frame resilient metal mounts— To fit (with sub-frame, engine and transmission removed)

1. Use the centralising fixture (RH 7846) to centralise each mount in turn, prior to fitting to the sub-frame. This enables the mount centre tube to be

correctly aligned to the corresponding sub-frame mounting point of the body and prevents any side-loading of the mount when the centre bolt is tightened.

2. Fit and torque tighten the new mounts using the special spanner (RH 7774) (*see Chapter P – Torque Tightening Figures*), ensure that the shoulder on the mount abuts the shoulder of the sub-frame mounting points.

Engine and transmission—To remove from sub-frame

The engine and gearbox unit can be removed from the sub-frame by the following procedure.

1. Disconnect the supply hose at the steering box and drain the fluid into a clean container. Slacken or remove the steering pump belts and rotate the pump pulley by hand until all the fluid is pumped out. On completion disconnect the hoses at the steering pump.

2. Place two slings around the engine, one at the front of the crankcase and the other at the rear of the bell housing. Using an overhead pulley, take the weight of the engine and transmission unit with the slings.

3. Remove the bolts and setscrews securing the engine front mounting to the steering box torque arm and the setscrews securing the two rear mountings.

4. Carefully check that nothing impedes the removal of the engine.

5. Lift the engine and transmission out of the sub-frame. If it is found necessary to remove the steering and idler box together with the torque arm as an assembly from the sub-frame, ensure that the positions of the boxes are marked relative to the mounting points on the sub-frame, otherwise vertical adjustment of the boxes will be lost.

Engine and transmission—To fit to sub-frame

1. Fit the pipes to the steering pump, taking care not to over-tighten the pipes at the unions, otherwise damage to the conical seatings may occur, resulting in leakage of fluid.

2. Attach the rear engine mounts and mounting brackets to the engine prior to lowering the engine and transmission into the sub-frame; the bolts should be tightened only when the engine is in position.

3. Remove the cooling fan from the engine.

4. Fit the engine pulleys sighting assembly (RH 7762) to the front of the sub-frame mobile stand.

5. Fit the transmission outlet flange sighting assembly (RH 7763) to the rear of the stand.

6. The front sighting assembly comprises two circular sight pieces, the lower one 6 in. (15,24 cm.) in diameter, aligns with the crankshaft pulley, and the upper one, 1.125 in. (2,85 cm.) in diameter, aligns with the fan extension cone.

7. The rear sighting assembly comprises a circular sight piece 4.625 in. (11,75 cm.) in diameter with a flanged section which fits into the transmission output flange.

8. These two sighting assemblies are used to determine whether the engine and transmission unit are correctly aligned in relation to the front sub-frame and they would show any discrepancy in sub-frame alignment due to accidental damage, etc. When installing the engine in the sub-frame, ensure that any packing piece which may have been removed from beneath the engine mounting foot and stop plate is fitted. For example a 0.125 in. (3,18 mm.) packing piece is fitted if the steering and idler boxes are set below the middle range of adjustment. A packing piece is not necessary if the boxes are set above the mid-position.

9. The engine mounting stop plate should be set to a 0.050 in. (1,270 mm.) gap.

10. Before fitting the sub-frame, engine and transmission assembly to the body and prior to centralising and fitting the mounts, fit four alignment fixtures (RH 7844) to the sub-frame mounting points. The fixtures have holes at their centres corresponding in size to those of the body mounting points (bobbins) within the body underframe. The centre pin of the fixtures is used to align the movable bobbins with the sub-frame mounting points. This bobbin movement is only fractional and is restricted by the size of the hole in the body underframe, immediately beneath the bobbin.

11. It should be noted that if the rear suspension cross-member has not been disturbed, parallel and diagonal dimensions (*see Fig. H28*) may be used to align the front sub-frame to the rear, in conjunction with the above setting, but should the rear suspension cross-member have been disturbed or removed for overhaul purposes it will be necessary to centralise, as near as possible, the sub-frame mount bolts and bobbins to the larger holes of the body underframe mentioned previously.

12. On completion, centralise the new mounts, using the fixture (RH 7846), then fit and torque tighten them in position in the sub-frame using the slotted spanner (RH 7774) to between 125 lb.ft. and 150 lb.ft. (17,28 kg.m. and 20,74 kg.m.).

Note When installing the engine in the sub-frame, ensure that any packing pieces are fitted which may have been removed from beneath the engine mounting feet and stop plates.

Printed in England

April 1970

T.S.D. 2476

Front sub-frame, engine and transmission— To fit as a unit

Reverse the procedure given for removal, noting the following points.

1. When fitting the sub-frame to the body sub-frame mounting points, ensure that the main bearing washer for each mount is in position, together with any additional washers it may have been necessary to fit in order to correct individual differences of the body sub-frame mounting points.

Note It is important that the mounts remain centralised, i.e. concentric within themselves, and that any sideways pre-loading is avoided.

2. Prior to fitting the bolt, ensure that the steady brackets of the rear mounts are in position together with the distance piece. The steady brackets at the front and rear sub-frame mounts must first be secured to the body, after which the mount centre bolts can be torque tightened.

3. Fit the panhard rod so that when the end of the rod attached to the sub-frame is fully tightened, it is possible to slide, without effort, the bolt into the other end of the rod through the body holes and rubber bush.

4. Connect the steering column and ensure that the steering wheel is in the straight-ahead position.

5. Connect the gear change motor multi-pin plug and socket.

6. Connect the speedometer cable.

7. Inspect the brake hoses; renew any hoses showing signs of deterioration, then connect the hoses.

8. Fill the transmission with an approved lubricant (*see Chapter D – Lubricants and Chapter T – Torque Converter Transmission*).

9. Fit all coolant and heater hoses and tighten the worm drive clips.

10. Connect the power steering system fluid cooler pipes.

11. Fill the steering pump reservoir with fluid.

12. Connect the transmission fluid coolant pipe.

13. Fit and secure the exhaust pipes.

14. Connect the electrical connections.

15. Fill the coolant system – (50% anti-freeze and 50% water).

16. Examine all hose joints for leaks.

17. Connect all refrigeration pipes (if refrigeration is fitted).

18. Charge the refrigeration system (*if fitted, see Chapter C – Air Conditioning*).

19 Bleed the hydraulic systems (*see Chapter G – Hydraulic System*).

Front sub-frame resilient metal mounts To remove (sub-frame in position)

1. Place the car on a ramp.
2. Apply the hand brake and chock the rear wheels.
3. Remove the gear range selector thermal cut-out (*see Chapter M – Electrical System*).
4. Raise the bonnet and place protective covers on the wings.
5. Load the wing troughs with ballast, preferably in sandbag form, of no less than 800 lb. (363 kg.) minimum total weight. (The ballast is required to overcome the action of the road springs to expand when a mount centre bolt is removed).
6. Raise the ramp and position a jack, protected with a hardwood block, beneath a point on the sub-frame near to the mount which is to be renewed, i.e. as near as possible to the mount from the position adjacent to the jig location point. The jack will take the weight of the sub-frame assembly and load of the coil road springs.
7. Remove the nuts and bolts together with the washers and distance pieces from the steady bracket mounting points on the body.
8. Remove the centre bolt from the mount, collect the steady bracket and lower distance piece.
9. Using tube spanner (RH 7774) unscrew and remove the mount assembly.

Note On some early cars when removing the mounts it may be necessary to try the 7-toothed spanner at each engagement position before the correct rotational position is found.

10. Retain the 2.500 in. (6,35 cm.) diameter upper distance piece and any packing washers which may be already in position.

Front sub-frame resilient metal mounts— To fit

1. Centralise the new mount in the fixture (RH 7846), then fit the mount in position and torque tighten, using the tube spanner (RH 7774), to between 125 lb.ft. and 150 lb.ft. (17,28 kg.m. and 20,74 kg.m.).

Note It is important that the mount centre is not disturbed when fitting the mount in position in the frame.

2. Fit the steady bracket and lower distance piece in position, then fit but do not tighten the centre bolt. Ensure that the upper washer is in position (*see Fig. H6*), together with any additional packing washers previously removed.
3. First tighten the steady bracket bolts to the body, then torque tighten the mount centre bolt.
4. Remove the jack and repeat the procedure for the other three mounts if required.

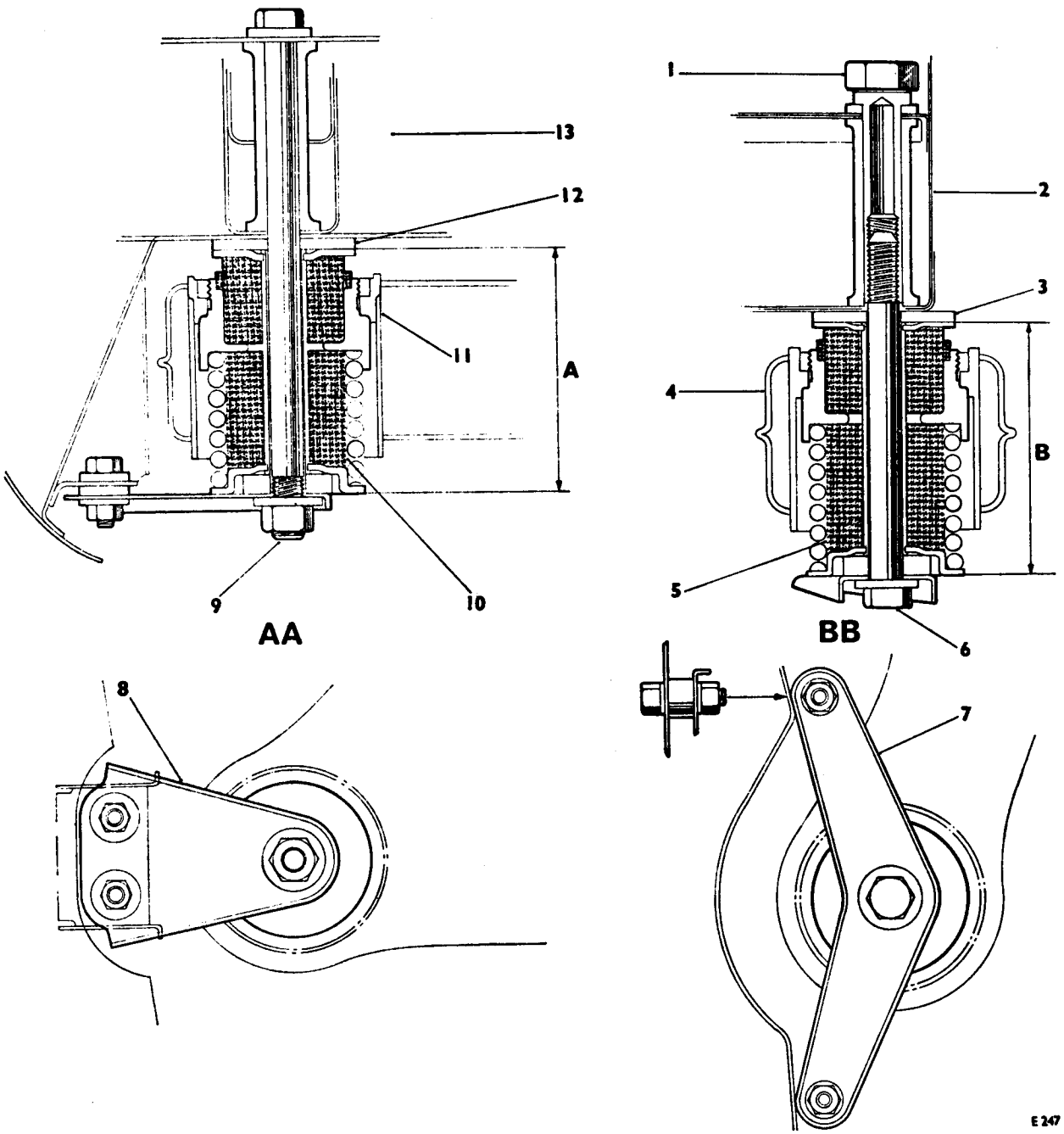


FIG. H6 FRONT SUB-FRAME RESILIENT MOUNTS

A-A Front mount assembly
A 4.277 in. (10,864 cm.)
B-B Rear mount assembly
B 4.483 in. (11,387 cm.)
1 Extension nut
2 Body underframe with bobbin
3 Packing piece
4 Sub-frame
5 Resilient metal mount
6 Bolt
7 Steady bracket
8 Steady bracket
9 Bolt
10 Resilient metal mount
11 Sub-frame
12 Packing piece
13 Body underframe with bobbin

Printed in England

April 1970

T.S.D. 2476

Section H2
FRONT 'MONITUBE' SHOCK DAMPER AND BALL JOINT

Service

The front 'Monitube' shock dampers are sealed units for which no servicing is required. Should loss of damping effect be evident, the faulty shock damper must be removed and a new unit fitted. The new unit is supplied together with the coil spring seating rings and upper damper securing nut.

Important The front shock damper supports the road spring, it is necessary to compress the spring in order to lift it from its seating before removing the damper.

Shock damper—To remove

1. Position the car on a ramp, apply the hand brake and chock the rear wheels.
2. Remove the gear range selector thermal cut-out (*see Chapter M – Electrical System*).
3. On cars fitted with front automatic height control, de-pressurise the hydraulic system (*see Chapter G – Hydraulic System, Section G1 – Special precautions*).
4. On all cars, remove the height control ram from the appropriate spring pot (*see Chapter G – Hydraulic System*). **Do not remove the spring pot cover.**
5. Position a hydraulic jack and extension fitted with a protective hardwood block beneath the pivot points of the lower front triangle levers, then raise the car.
6. Position suitable blocks to support the shaped wooden beams (RH 8920) placed beneath the sill of the body just rearward of the front wheels (*see Fig. H10*).
7. Carefully lower the car onto the sill boards.
8. Using the special tool (RH 8030) remove the nut and washer from the top of the damper piston rod.
9. Fit the front height control ram in position but do not secure.

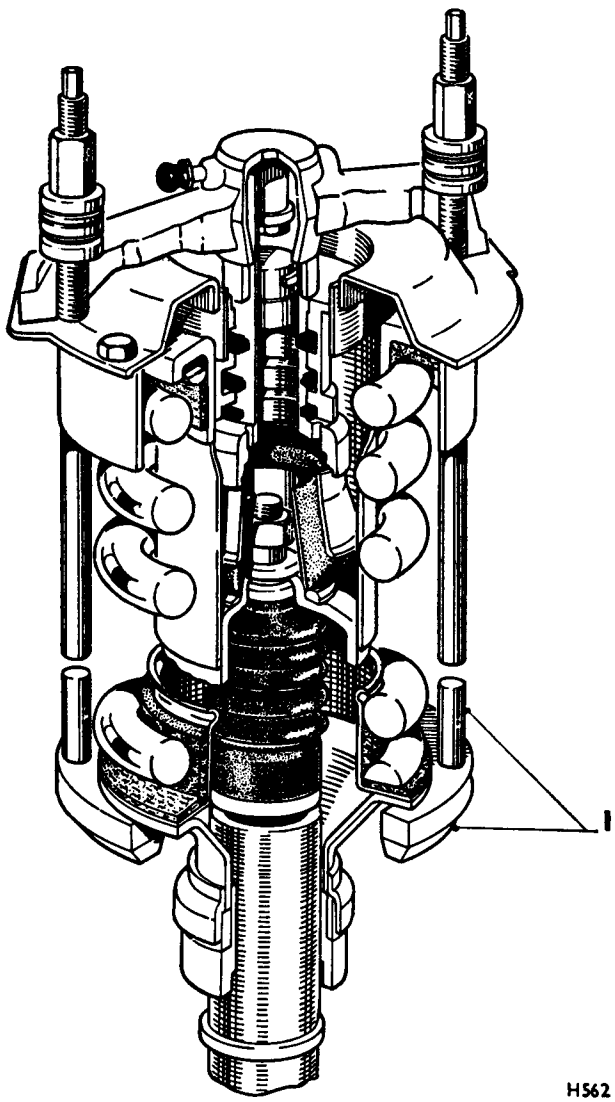


FIG. H7 SPRING COMPRESSING TOOL IN POSITION

1 Compressing tool with long studs and split base plate

10. Fit the road spring compressing tool (RH 7889) (*see Fig. H7*) in position. It is most important that each long bolt of the compressor is screwed fully into the base plate of the tool.
11. Secure the halves of the base plate by fitting the $\frac{5}{16}$ in. U.N.F. setscrews provided.
12. Using the nuts, thrust races and special washers provided, compress the spring sufficiently to enable the split adjusting washers to be removed.
13. Remove the split pin, castellated nut and washer which secures the damper ball pin to the lower triangle levers.
14. Use the extractor tool (RH 8100) to separate the seal between the taper of the damper ball pin and the taper bore of the ball joint housing.
15. Remove the bolt which locates the lower triangle levers adjacent to the lower ball joint lever.
16. Slacken the dowel bolt which serves also to align and secure the lower triangle levers to the lower ball joint lever. The lower ball joint lever will then swivel clear.
17. Push the damper upwards until the ball pin is clear of the mating bore in the lever, then lower the damper from the car by moving it sideways and downwards to clear the lever; retain the split washer(s).

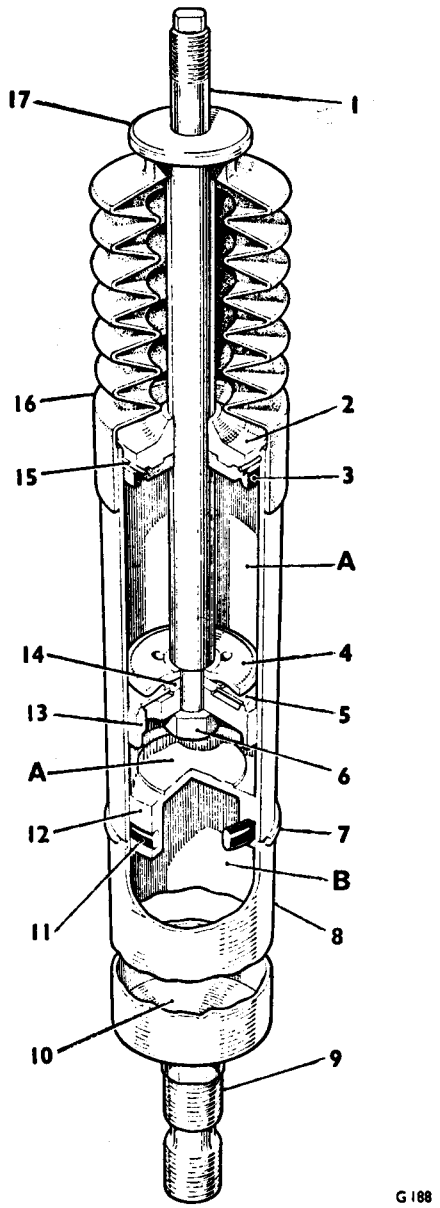


FIG. H8 'MONITUBE' SHOCK DAMPER

A Fluid	**8** Outer tube
B Gas	**9** Stem
1 Piston rod	**10** Cap
2 Rod guide	**11** Sealing ring
3 Seal	**12** Diaphragm
4 Abutment	**13** Piston
5 Valve	**14** Valve seat
6 Nut	**15** Snap ring
7 Retaining ring	**16** Dust cover
17 Cap	

Note Different types of shock damper have been fitted to the front suspension.

(a) **Early cars** have a screwed adjustment of the damper stem into the ball pin housing.

(b) **Later cars** do not have the previous adjustment method, but fine adjustment is achieved by adding distance washers 0.064 in. (1,62 mm.) thick to the existing number of thick washers under the road spring seal.

To determine which type of damper is fitted, a convenient method is to observe the damper lower ball joint. Early dampers have a large lock-nut above the ball joint housing, later dampers having none.

There are different types of dampers to accommodate variable road conditions. Each type of damper is colour coded by a coloured band on the damper surface. Care should be taken to ensure that the correct type of damper is fitted. The colour code for the dampers is given in the following table.

DAMPER IDENTIFICATION

Front	Rear	Use
White	White	All cars including U.S.A. and Canada, except those fitted with heavy duty suspension.
Yellow	Yellow	Cars fitted with heavy duty suspension.

Printed in England

April 1970

T.S.D. 2476

Damper ball joint—To remove

Early cars. If a ball joint is found to be faulty or worn, it is recommended to renew both the shock damper and ball joint with those fitted to later cars.

Later cars. Remove the ball joint by unscrewing the ball joint housing from the damper stem.

At this stage the opportunity should be taken to examine the condition of the damper ball joint as described in 'Damper ball joint - To maintain'.

Front shock damper—To fit

Reverse the procedure given for removal, noting the following points.

1. Fit the new damper and the existing split washer(s) necessary to obtain the correct car height adjustment. Avoid all damage to the damper piston rod.
2. Screw the ball joint onto the damper and tighten the joint.
3. Torque tighten the upper damper securing nut.
4. Torque tighten the castellated nut on the tapered end of the ball pin, if necessary further tighten the nut to enable a new split pin to be fitted.
5. Torque tighten the lower ball joint housing dowel bolt and nut. Torque tighten the nut and bolt securing the housing lever adjacent to the lower triangle levers.

Warning

(a) Each shock damper contains NITROGEN gas under pressure. On no account should the damper be subjected to undue force of any description. Do not clamp the damper in a vice.

If the spring support has siezed onto the damper, renew the shock damper and spring support.

(b) To render a shock damper safe for disposal, drill a small hole 1.00 in. (25,4 mm.) from the closed end of the outer tube (see Fig. H9). The escaping gas should not be allowed to come into contact with eyes or skin whilst under pressure.

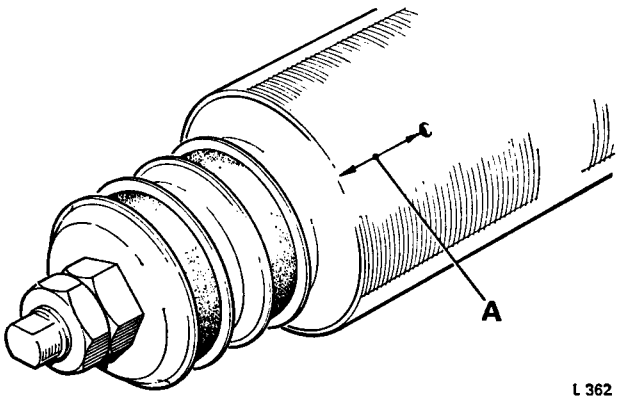
Immediately the hole has been drilled, stand clear and allow the NITROGEN gas to disperse to atmosphere.

Damper ball joint—To maintain

The ball joint is a sealed unit for which no maintenance is necessary other than to replace the seal. Check the ball joint for wear and play. If it is considered serviceable and only seal replacement is necessary, all parts of the joint visible after the seal has been removed should be washed in clean petroleum. Do not remove the joint assembly from the housing unless it is necessary to fit a new assembly.

Damper ball joint seal—To fit

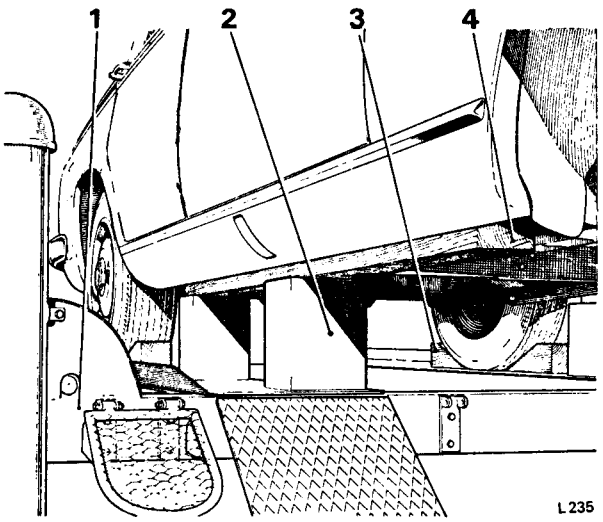
1. With the ball pin removed from the lower ball joint housing, remove the retaining clip and seal.
2. Remove all traces of grease and foreign matter from the visible parts of the joint with a little petroleum applied with a stiff brush. Remove all traces of petroleum with compressed air.
3. Fill the joint housing with the approved Dextragrease Super G.P. to the level of the face of the



L 362

FIG. H9 DAMPER DISPOSAL

A 1.00 in. (25,4 mm.) from closed end of damper



L 235

FIG. H10 METHOD OF SUPPORTING CAR BENEATH SILLS

1 Ramp
2 Wooden block
3 Chock
4 Sill board

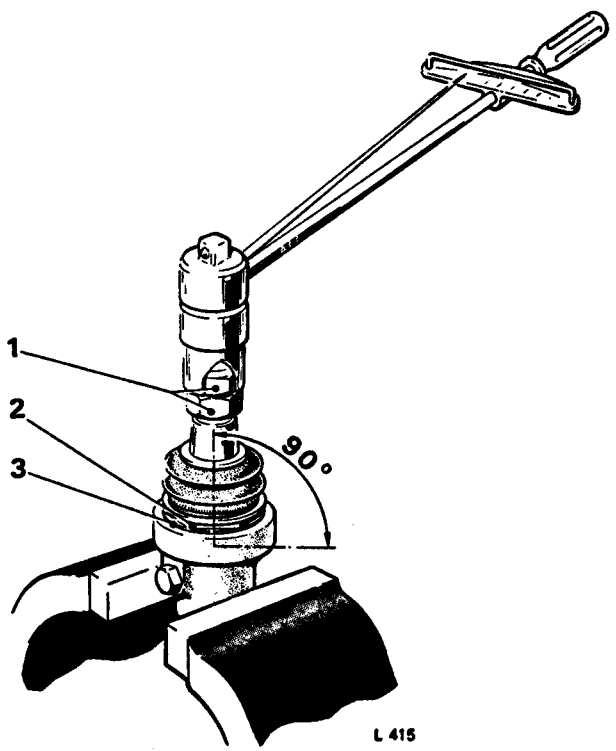


FIG. H11 SETTING DAMPER BALL JOINT PRE-LOAD

1 Two lock-nuts
2 Hexagon (normally used for tightening purposes)
3 Shim(s)

housing. Smear the inside of the seal with grease, particularly the hole for the ball pin; fit a new seal and spring clip.

4. Fit the ball joint assembly to the damper lower ball joint housing described in 'Damper ball joint – To fit'.

Damper ball joint—To fit

1. Fit and lightly clamp the ball joint housing in a vice as shown in Figure H11.

2. Fit the ball pin to the housing without any distance pieces and carefully tighten until between 30 lb.in. and 60 lb.in. (0,35 kg.m. and 0,69 kg.m.) is necessary to rotate the ball pin in its housing.

This torque figure should be measured after the ball pin has been rotated through four complete revolutions to bed in with the axis of the ball pin at right-angles to the large hexagon face.

3. Measure the gap between the face of the ball hexagon and the housing.

4. Remove the ball pin and fit adjusting shims equal in thickness to the gap measured previously.

5. Fit the ball pin into the housing and torque tighten the assembly to between 120 lb.ft. and 130 lb.ft. (16,6 kg.m. and 18,0 kg.m.) using the special spanner (RH 7874).

6. Check the torque load necessary to rotate the ball pin as described in Operation 2 and if necessary, adjust by adding or removing shims between the face of the ball hexagon and the housing.

Printed in England

April 1970

T.S.D. 2476

Section H3
UPPER AND LOWER TRIANGLE LEVERS (AND BALL JOINTS)

Lower triangle levers—To remove

1. Place the car on a ramp, apply the hand brake and chock the rear wheels.

2. Remove the gear range selector thermal cut-out (*see Chapter M – Electrical System*).

3. Compress the road coil spring using the special tool (RH 7889). Disconnect the shock damper at its lower point (*see Section H2 – Front 'Monitube' Shock Damper*). When disconnecting the damper from the lower triangle lever ball joint housing, **do not** disturb the ball joint or car height adjustment, which is set to the correct height.

4. Support the hub and remove the single setscrew and nut, bolt and washer securing the ball joint housing lever to the triangle levers.

5. Disconnect the track rod outer ball joint from the side steering lever secured to the hub, using the special extractor (RH 8080).

6. Remove the large nut securing the lower rear triangle lever to the bearing pin. Flats are provided on the pin to enable a spanner to be used to prevent rotation while unscrewing the nut.

7. Remove the triangle lever. Remove the front triangle lever as described in Operation 6 (*see Fig. H12*).

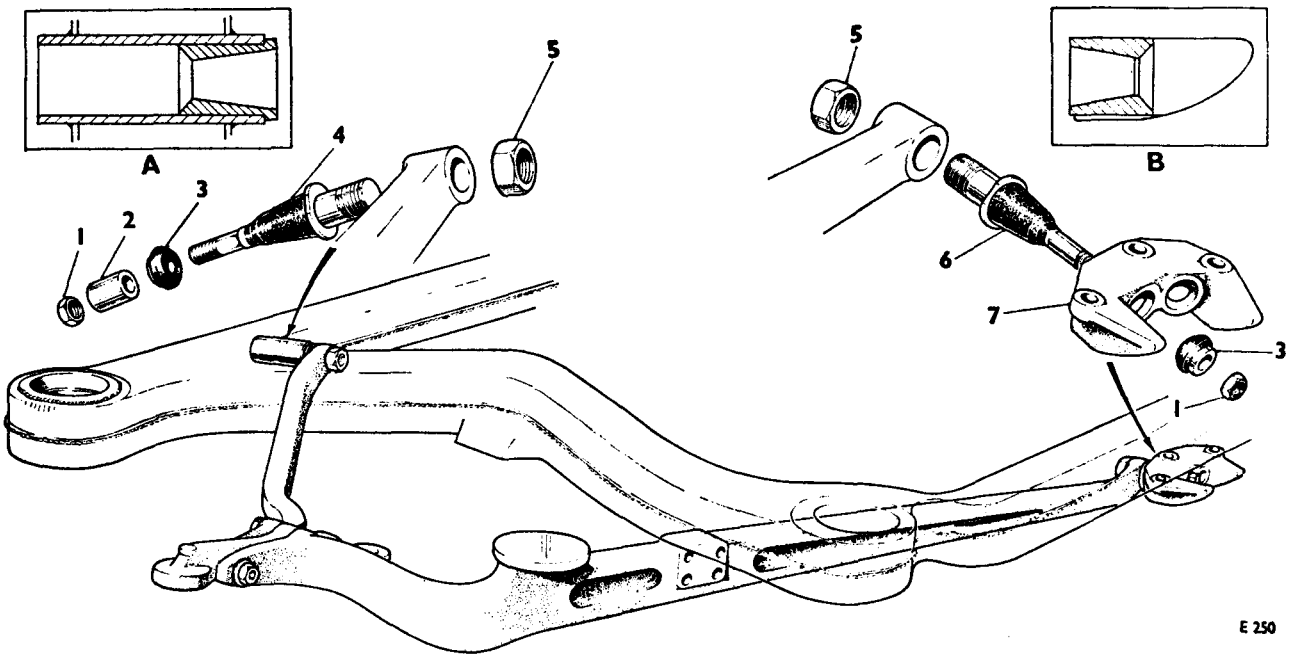


FIG. H12 LOWER TRIANGLE LEVERS MOUNTING POINTS

1 Nut
2 Distance piece
3 Rubber bonded steel washer
4 Rubber bonded steel bearing pin
5 Nut
6 Rubber bonded steel bearing pin
7 Front mounting bracket
A Inset – section through rear mounting point
B Inset – section through front mounting bracket

8. Remove each rubber bonded steel bearing pin together with its rubber bonded steel washer.

Lower triangle levers—To fit

Reverse the procedure given for removal, noting the following points.

1. Fit the bearing pins to their mountings on the sub-frame and torque tighten the nuts to between 42 lb.ft. and 45 lb.ft. (5,81 kg.m. and 6,22 kg.m.).
2. The nuts for securing the triangle levers should be fitted but not torque tightened until the car assumes 'showroom' condition (*see Section H8 – Suspension settings*).
3. With the car in 'showroom' condition slacken the nuts slightly to allow the rubber to 'relax', then torque tighten the nuts to 150 lb.ft. (20,74 kg.m.).
4. After fitting the triangle levers to the sub-frame fit the hub unit.

Note With the car standing on a smooth level surface carry out the suspension checks (*see Section H8 – Suspension settings*).

Lower triangle levers ball joint assembly—To remove

1. With the hub unit removed from the front suspension, remove the split pin and nut securing the ball joint assembly to the front stub axle yoke.
2. Using the extractor tool (RH 8100) separate the seal between the tapered end of the ball joint and the stub axle yoke.
3. Remove the ball joint lever from the yoke.
4. Unscrew and remove the ball pin assembly from the lever using the special tool (RH 7813); retain the adjusting washers.
5. Thoroughly clean the ball joint housing.

Lower triangle levers ball joint assembly—To fit

The ball joint is supplied as a complete unit together with seal and packed with lubricant.

1. Fit the ball joint assembly to the ball joint housing lever **without** the adjusting washer; the conical face of the ball pin should just abut the conical seating of the lever.
2. Carefully torque tighten the ball joint until a torque of 35 lb.in. to 75 lb.in. (0,42 kg.m. to 0,83 kg.m.) is required to rotate the ball assembly. This measurement should be taken after four complete revolutions of the ball pin, using the special fixture (RH 7811) which is designed for use with a spring balance, it ensures also that the ball joint remains at 90° to its seating, in order to obtain the desired figures.
3. The remaining gap should then be measured and a suitable adjusting washer(s) selected.
4. Remove the joint and fit the adjusting washer(s).
5. Fit the joint and torque tighten to between 250 lb.ft. and 300 lb.ft. (35 kg.m. and 42 kg.m.), using the special spanner (RH 7813).
6. Fit the fixture (RH 7811) and check the torque load required to rotate the ball assembly (*see Operation 2*). Adjust if necessary.

Note During these operations the ball joint sealing boot should remain in position and must not be disturbed or damaged.

Ball joint seals—To fit

If any of the ball joint seals are perished or cracked, while the ball joint itself is in good condition, it is permissible to renew the seals only. Remove all foreign matter prior to fitting the new seal from visible parts of the joint assembly with a little petroleum applied with a stiff brush. Remove all traces of petroleum with compressed air.

The upper ball joint can be cleaned in position. After cleaning, lubricate the joints with an approved grease in the following manner.

1. Fill the joint housing of the lower ball joint to the level of the joint face and also smear the inside of the seal, particularly in the area of the hole for the ball pin, with an approved grease (e.g. Dextragrease Super G.P.).
2. Fit the seal and connect the ball joint to the yoke. Care should be taken when fitting the seal spring ring that the seal is not damaged.

Upper triangle levers—To remove

1. Support the front hub assembly and remove the nut securing the upper triangle lever ball joint assembly to the stub axle yoke.
2. Separate the seal between the stub axle yoke taper bore and taper pin of the upper triangle lever ball joint assembly, using the extractor (RH 8100).
3. Support the upper triangle levers.

Note The ball joint housing will remain attached to the stub axle yoke and to the hub unit.

4. Remove the triangle levers and cantilever brackets as an assembly (*see Fig. H13*). The cantilever brackets are secured to the sub-frame by setscrews.
5. Retain any adjusting washers (shims) fitted between the levers and the sub-frame brackets.

Note Castor and camber settings are obtained by selective fitting of adjusting washers (shims) between the cantilever bracket of the upper triangle lever bearing pin and the sub-frame (*see Fig. H13*).

6. Remove the nuts securing the bearing pins to the triangle levers, remove the pins.

Printed in England

April 1970

T.S.D. 2476

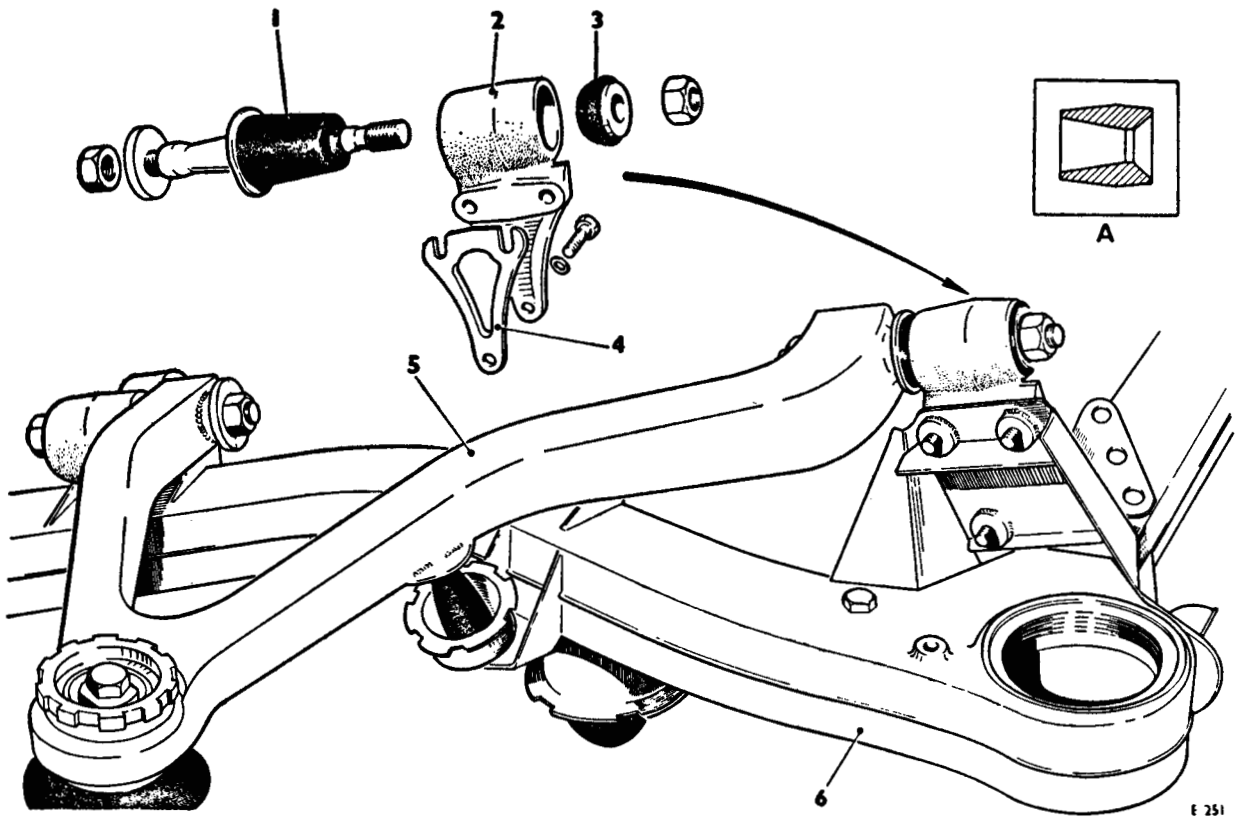


FIG. H13 UPPER TRIANGLE LEVERS MOUNTING POINTS

1 Rubber bonded steel bearing pin
2 Cantilever bracket
3 Rubber bonded steel washer
4 Shim – castor/camber settings
5 Upper traingle levers
6 Front sub-frame
A Inset – section through cantilever bracket

Upper triangle levers—To fit

Reverse the procedure given for removal, noting the following points.

1. Ensure that the existing castor/camber setting adjusting washers (shims) are fitted. A check must be carried out on completion of the work, when the car is in 'showroom' condition.
2. Fully torque tighten the nuts securing the bearing pins to the cantilever brackets to between 42 lb.ft. and 45 lb.ft. (5,81 kg.m. and 6,22 kg.m.).
3. Fit but do **not** torque tighten the triangle lever retaining nuts to the bearing pins until the suspension is fully assembled and the car assumes its 'showroom' condition.
4. When the car is in this condition, slacken the nuts slightly and then torque tighten to 150 lb.ft. (20,74 kg.m.).

Ball joint assembly—To remove

1. Remove the upper triangle levers as described under 'Upper triangle levers – To remove'.
2. Using the special tool (RH 7775) unlock and remove the slotted nut.
3. Using the special tool (RH 7768) press out the ball joint assembly from the triangle lever.

Ball joint assembly—To fit *(see Fig. H13)*

1. Using a new sealed ball joint assembly unit complete with seal and lubricant, fit the special tool (RH 7768) around the ball joint and clamp it together.
2. Fit the triangle lever to the ball joint and using the special tool (RH 7768), press the triangle lever squarely on to the ball joint until the triangle lever boss abuts the shoulder of the ball joint.
3. Remove the tool and torque tighten the slotted nut using the special tool (RH 7775) to between 150 lb.ft. and 175 lb.ft. (20,74 kg.m. and 23,5 kg.m.).

Note Care should be taken to avoid damaging the joint sealing boot.

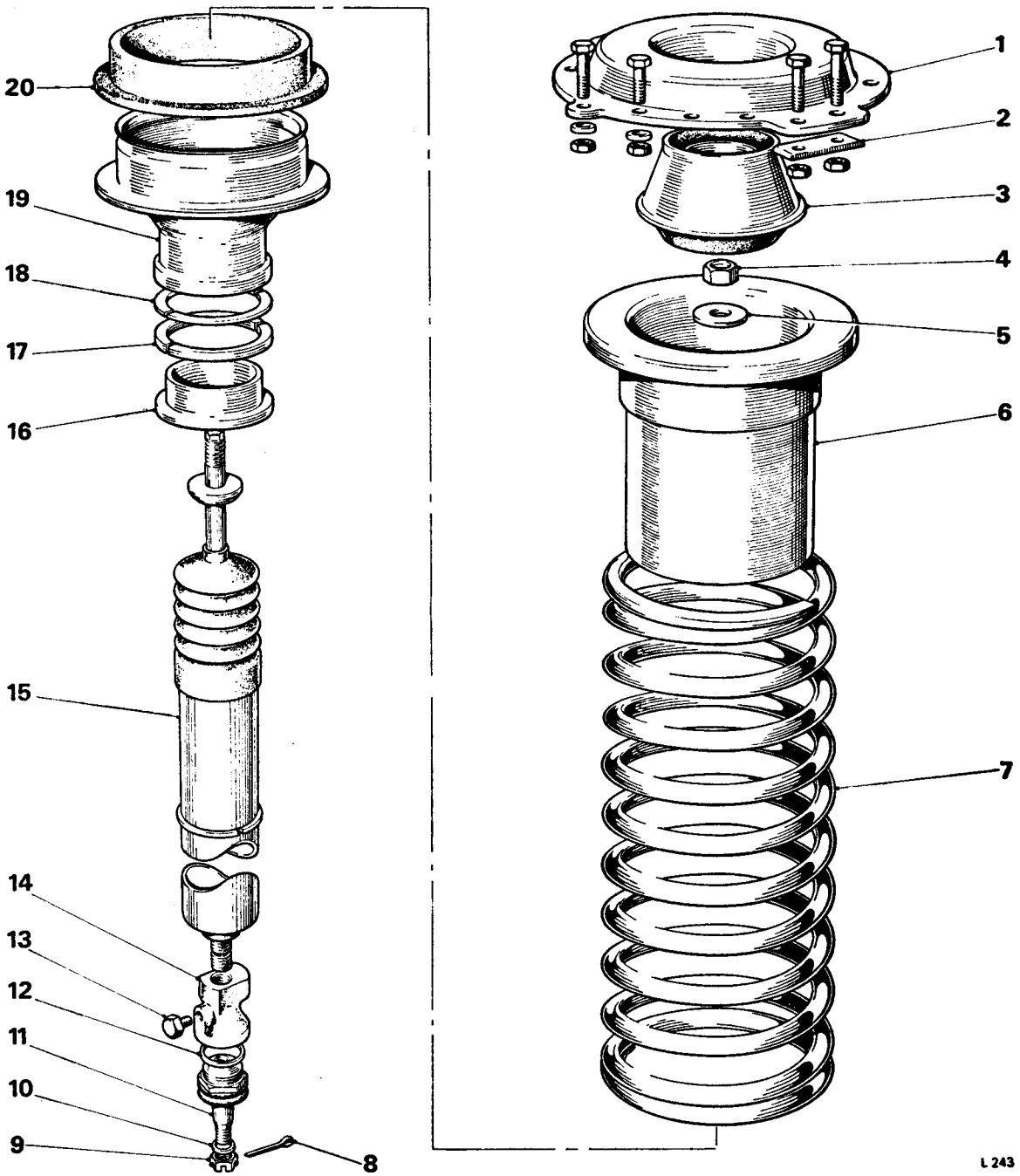


FIG. H14 EXPLODED VIEW FRONT ROAD SPRING

1 Spring pot cover plate
2 Clamping plate
3 Isolator – coil spring
4 Nut – damper
5 Heavy washer
6 Spring support assembly
7 Spring
8 Ball joint split pin
9 Castellated nut
10 Heavy washer
11 Ball joint
12 Ball joint adjusting washer
13 Plug
14 Ball joint housing
15 Shock damper
16 Damper sleeve
17 Distance pieces
18 Adjusting washers
19 Spring support assembly
20 Canvas spring seating

Printed in England

(Revised October 1970)

T.S.D. 2476

Section H4
FRONT ROAD SPRINGS

Front road spring—To remove

1. Position the car on a ramp, apply the hand brake and chock the rear wheels.
2. Remove the gear range selector thermal cut-out (*see Chapter M – Electrical System*).
3. On cars fitted with front automatic height control, de-pressurise the hydraulic system (*see Chapter G – Special precautions*).
4. Position a hydraulic jack and extension, fitted with a wood block beneath the pivot points of the lower front triangle levers; raise the front of the car.
5. Position suitable blocks, to support the shaped beams (RH 7820) beneath the sills of the body just rearward of the front wheel arches.
6. Lower the car until the weight is supported on the sill beams.
7. Fit the road spring compressing tool (RH 7889) into position (*see Fig. H15*). It is important that each long bolt of the compressor is screwed fully into the base plate of the tool.
8. Secure the halves of the base plate using the $\frac{5}{16}$ in. U.N.F. screws provided.
9. Using the nuts, thrust races and special washers provided with the tool, compress the spring sufficiently to enable the split adjusting washers to be removed.
10. Remove the split pin, castellated nut and washer which secures the damper ball pin to the lower triangle levers.
11. Using the special extractor tool (RH 8100) separate the seal between the taper of the damper ball pin and the ball pin housing.
12. Unscrew the setscrews around the top of the height control ram and cover plate, then disconnect and blank off the hydraulic pipe from the ram (cars fitted with front automatic height control only).
13. Remove the assembly from the car by moving it upwards and out through the top of the spring pot.
14. Position the assembly in the compressing tool (RH 7909) and decompress the spring so that the special tool (RH 7889) can be removed.
15. Examine the condition of the isolator and spring seating, if the isolator has been contaminated by oil or

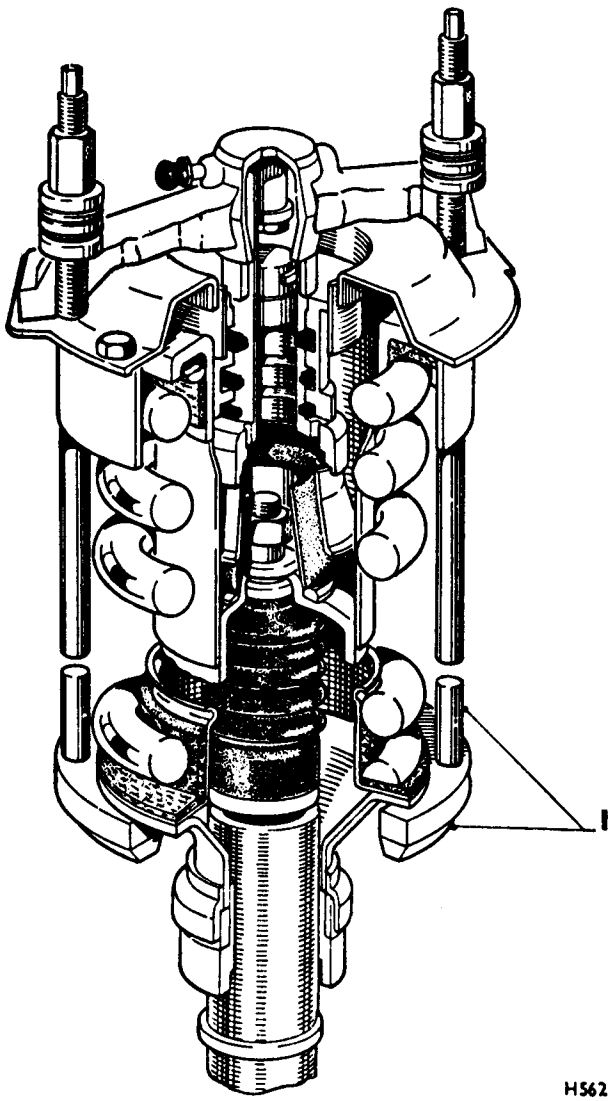


FIG. H15 SPRING COMPRESSING TOOL IN POSITION

1 Compressing tool with long studs and split base plate

brake fluid and shows signs of swelling, or if the bonded rubber is parting from the inner or outer cones, they should be renewed.

16. If the damper is to be removed, when the assembly is removed from the compressing tool, remove the height control ram and cover plate.

17. Unscrew and remove the nut and washer from the top of the damper piston rod using the special tool (RH 8030); remove the damper from the spring.

Front road spring—To fit

Reverse the procedure given for removal, noting the following points.

1. Fit new spring seatings and spring isolator if necessary.

2. Ensure that the correct split adjusting washer(s) are used if the original spring is fitted. If a new spring is fitted, fit the split washer(s) supplied with the new spring.

3. Care should be taken to avoid any side loading when fitting the damper which could result in damage to the seal or any damage to the piston rod.

4. It is important that the front rebound stops are in position when fitting the road spring. Avoid over-travelling the suspension ball joints to prevent damage to the joint seals.

5. After fitting the damper and spring, place the car on a level surface and 'bounce' the front end to allow the spring to bed-in.

6. Check the car height and steering geometry as described in Section H8 – Suspension Settings.

Note The circlip which is fitted to the front dampers carries the lower spring support sleeves. When assembling these sleeves, liberally coat the mating surfaces of the sleeves and dampers with an approved grease. This will assist fitting and any subsequent removal of the sleeves.

Section H5
FRONT HUBS

Printed in England

April 1970

T.S.D. 2476

Front hub—To remove *(see Fig. H16)*

1. Apply the hand brake and chock the rear wheels.
2. Remove the gear range selector thermal cut-out, as described in Chapter M – Electrical System.
3. Carefully position a jack beneath the front lower triangle lever pivot points at the centre of the car; a hardwood block should be placed between the jack head and the pivot points before raising the car.
4. Remove the combined wheel disc/hub cap, and slacken the road wheel nuts, but do not remove the road wheel.
5. Raise the car and place suitable blocks to support the sill boards (RH 7820) beneath the body sills. In addition, place supports beneath the outer ends of the front lower triangle levers.
6. Remove the wheel nuts and road wheel(s).
7. Using a screwdriver inserted between the lip of the hub dust cover and the hub flange, prise off the dust cover. Care must be taken when removing the dust cover to avoid damaging the earthing contact inside the cover.
8. Remove the sealing band split pin, castellated nut and keyed washer from the stub axle. It will be necessary to break the sealing band in order to remove it from the split pin.

   Note The right-hand stub axle has right-hand threads, the left-hand stub axle left-hand threads.

9. The brake disc is secured to the hub by setscrews, therefore it will be necessary to remove the brake calipers in order to withdraw the hub from the stub axle. (*See Chapter G – Hydraulic System*).
10. Withdraw the hub from the stub axle complete with bearings and grease retainer.
11. Retain the chamfered distance piece.
12. Place the hub on a suitable working surface; inspect the brake disc and pads of the brake calipers for wear or scoring.
13. Ensure that the brake disc setscrews are torque tightened to the correct figure (*see Chapter P – Torque Tightening Figures*).

Front hub—To fit

1. Fit the distance piece, with the chamfered edge leading, onto the stub axle to abut the shoulder adjacent to the yoke.
2. Position the hub onto the stub axle, fit the key washer, then finger tighten the castellated nut sufficiently to remove any hub end-float.
3. Using a dial test indicator mounted adjacent to the brake disc, measure the run-out of the disc at the maximum radius possible; this must not exceed 0.007 in. (0,178 mm.) total indicator reading.

   Note The reading obtained is a measure of the tolerances of all the components and if the run-out figure exceeds this measurement, dismantle the hub and brake disc to investigate the cause of the run-out.

4. If the run-out figure is within limits, remove the hub from the stub axle and pack the hub with approximately 1½ oz. (42,64 gm.) of the approved grease. The grease should be liberally smeared on the bearings and on the inner wall of the hub so that it is not disturbed when the hub is fitted to the stub axle.
5. Fit the hub, key washer and castellated nut.
6. Using a 0.004 in. (0,102 mm.) feeler gauge inserted between the outer bearing and key washer, or a suitable dial test indicator equipment, tighten the castellated nut sufficiently to grip the feeler gauge lightly or to give a reading of 0.002 in. to 0.006 in. (0,051 mm. to 0,152 mm.) end-float on the dial test indicator.

   Continuous rotation of the hub is essential during this operation to ensure that the taper rollers seat correctly.
7. When the correct end-float is obtained, unscrew the castellated nut to align the nearest slot in the nut with the nearest hole in the stub axle.
8. Measure the end-float by either of the two methods, and select a suitable key washer to give the correct end-float.

   Note Key washers are provided in thicknesses of 0.138 in. and 0.140 in. (3,51 mm. and 3,56 mm.). Incorrect setting of the bearings, either too slack or too tight will result in premature bearing wear.

9. Fit a new split pin and sealing band. Bend back the split pin legs and crimp the ends of the sealing band to lock the nut in position.
10. Smear approximately ½ oz. (14,21 gm.) of the approved grease into the base of the dust cover. Fit the dust cover by tapping into position on the hub with a nylon hammer. Whilst fitting this cover, ensure that the earthing strip is in the correct position to make contact with the stub axle end face.

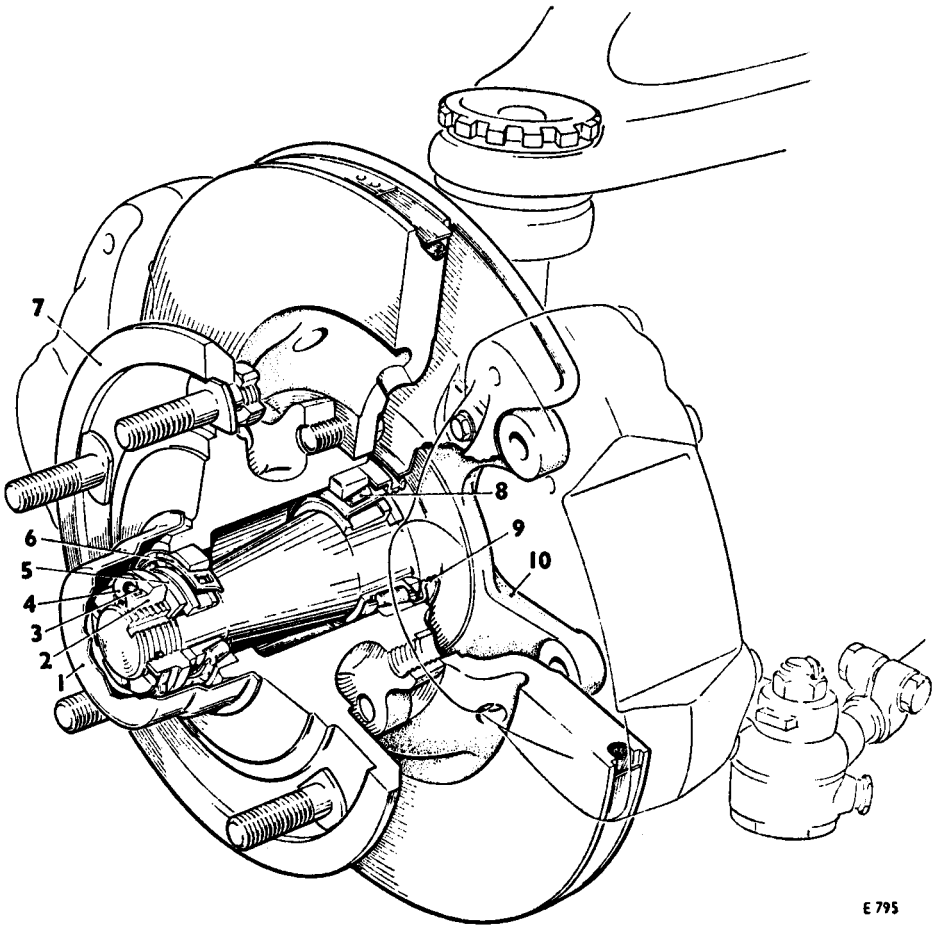


FIG. H16 CUT-AWAY VIEW FRONT HUB

1 Dust cover
2 Castellated nut
3 Sealing band
4 Split pin
5 Keyed distance piece
6 Outer taper roller bearing
7 Hub
8 Inner taper roller bearing
9 Acme threaded seal
10 Stub axle/yoke

11. To fit the brake calipers, reverse the procedure given for removal. Ensure that the disc faces are free from foreign matter, e.g. grease or oil, etc.
12. Fit the road wheel; screw on the wheel nuts but do not tighten.
13. Lower the car from the jack and supports and fully tighten the road wheel nuts to the torque figure given in Chapter P – Torque Tightening Figures.
14. Fit the wheel disc/hub cover plate.

Front hub—To dismantle

1. Remove the hub.
2. Lift out the bearing inner race from the outer bearing.
3. Using a screwdriver prise the grease retainer from the inner end of the hub and lift out the inner race of the inner bearing.

Note Each grease retainer is clearly marked 'Off-side Right-hand' or 'Near-side Left-hand' to ensure that they are fitted to the correct side of the car.

4. Using a soft metal drift, drive out the outer races of the inner and outer taper roller bearings.
5. Thoroughly clean the hub and any components to be refitted.

Front hub—To assemble

1. Press the new bearing outer races squarely into the hub with the smaller end of the taper bore leading. Ensure that the races are fully seating on the rear shoulders of the hub.
2. Lubricate the new inner races and roller cages with the approved grease and fit them to the mating outer races in the hub.

Note When fitting bearings to more than one hub at a time, ensure that each bearing set remains separate from the other set, as all bearings are supplied in matched sets.

3. Press the correct grease retainer squarely into position in the hub until the leading edge abuts the bearing outer race.

Printed in England

April 1970

T.S.D. 2476

Section H6
PANHARD ROD

Panhard rod—To remove *(see Figs. H17 and 18)*

1. Place the car on a ramp.
2. Apply the hand brake and chock the rear wheels.
3. Remove the gear range selector thermal cut-out as described in Chapter M – Electrical System.
4. Remove the full nut and half nut from the outer end of the rod; retain the large washer and polyurethane pad.
5. Remove the shouldered bolt, nut and washer securing the bushed inner end of the rod to the central mounting bracket; withdraw the rod from the car.
6. Inspect the polyurethane pads (*see Fig. H17*) and rubber-bonded metal bush for deterioration and, if necessary, renew.

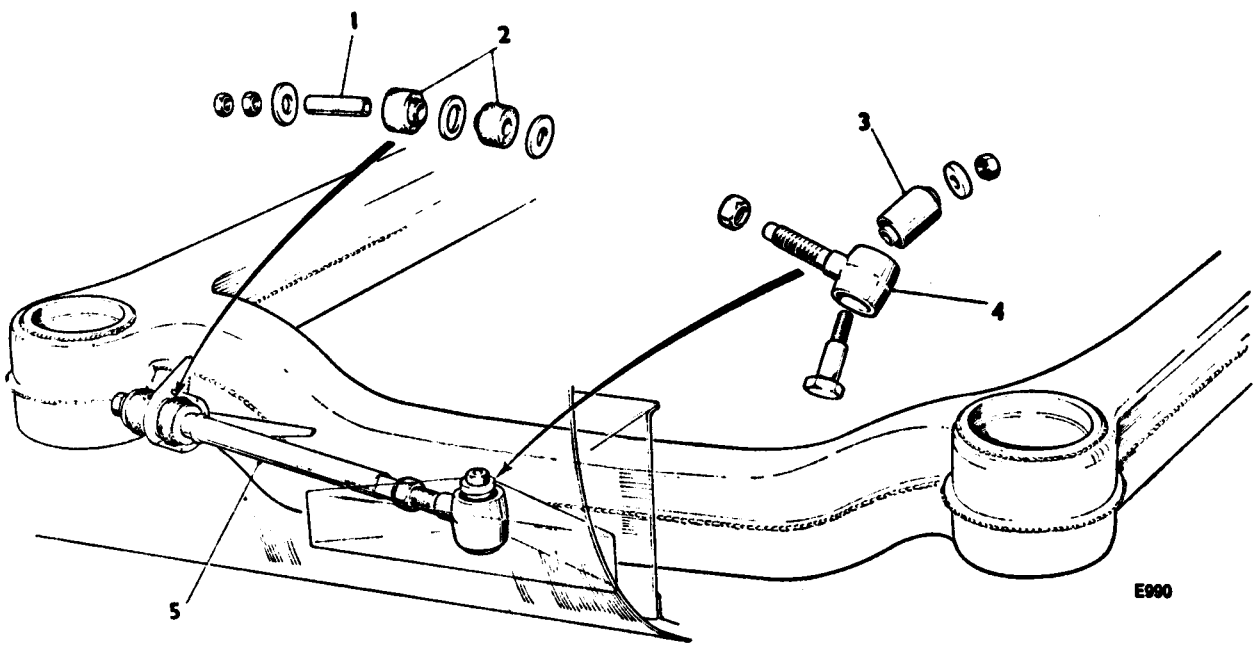


FIG. H17 EXPLODED VIEW PANHARD ROD

1 Distance piece
2 Polyurethane pads
3 Rubber-bonded metal bush
4 Bush housing
5 Panhard rod

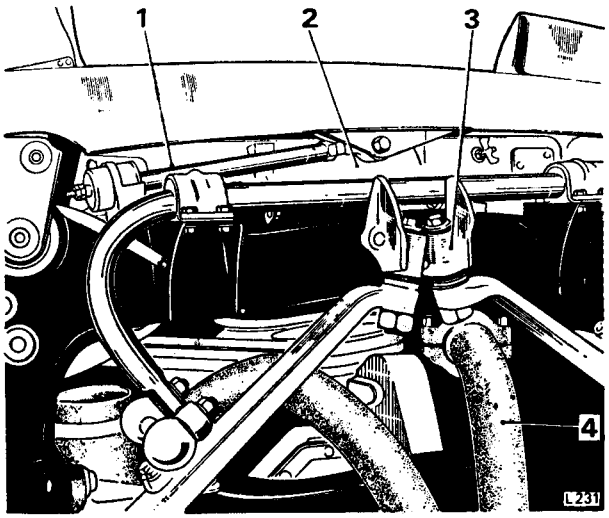


FIG. H18 PANHARD ROD IN POSITION

1 Panhard rod
2 Radiator bottom tank
3 Lower triangle levers inner pivots

7. When renewing the bush, ensure that it is pressed into position so that the outer sleeve is flush with the ends of the extension piece bore.

Panhard rod—To fit

To fit the rod, reverse the procedure given for removal, noting the following points.

1. The length of the rod must be adjusted after the end of the rod has been fitted to the front of the sub-frame and fully tightened.
2. Adjust the inner end of the rod using the extension piece so that the centre bolt passes through the body (and rubber-bonded metal bush) quite freely.
3. After adjusting the rod, push the bolt upwards into position.
4. Fit the washer, and torque tighten the nut.
5. Torque tighten the nut on the outer end of the rod; fit and tighten the lock-nut.

Note If the rod has been removed to renew the polyurethane pads it is necessary to adjust the length of the rod.

Printed in England

April 1970

T.S.D. 2476

Section H7
FRONT STABILISER BAR

Front stabiliser bar—To remove
(see Fig. H19)

1. Unscrew and remove the nuts and washers securing the links to the bar and brackets.
2. Using the special tool (RH 8019) separate the seal between the tapers of the links and the adjoining rod and brackets.
3. Disconnect the control link fitted between the stabiliser bar and the front height control valve. Do not alter the length of this link.
4. Unscrew and remove the setscrews and washers from the two securing brackets.
5. Remove the brackets and rubber bearing bushes.
6. Remove the stabiliser bar from the suspension.

Note Cars after Serial Number 7400 and onwards are not fitted with a front height control valve.

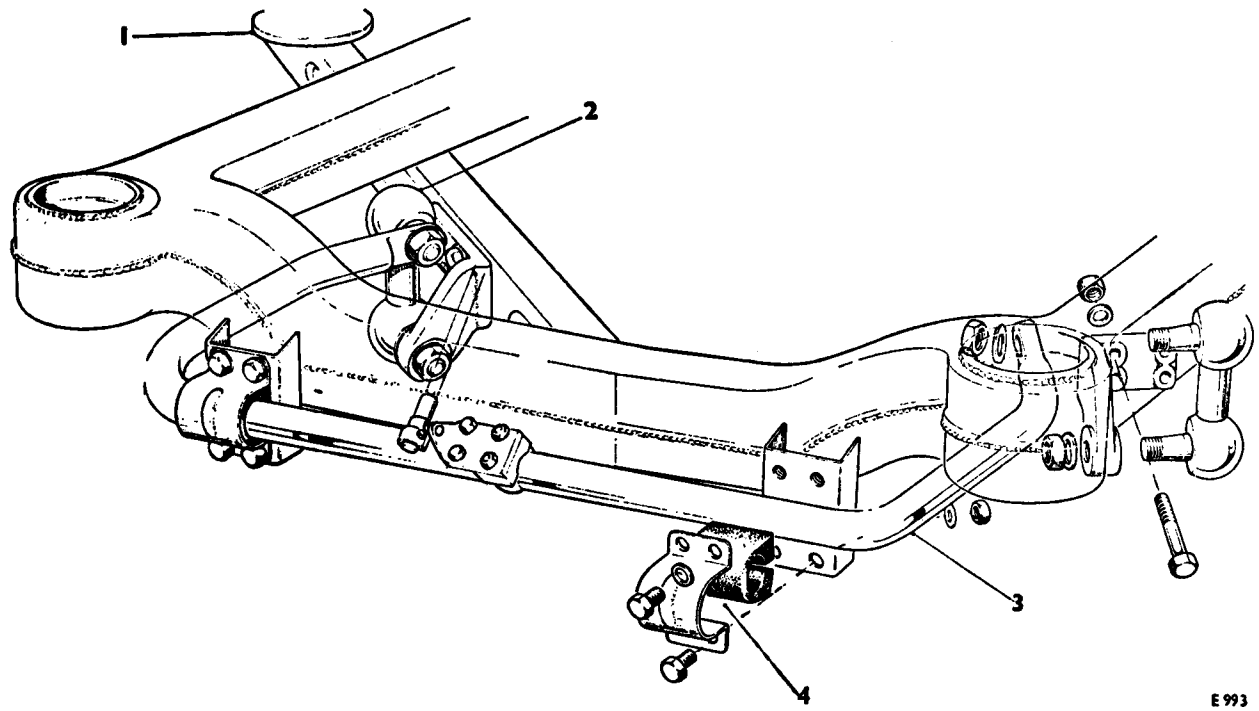


FIG. H19 EXPLODED VIEW FRONT STABILISER BAR

1 Lower triangle lever
2 Link
3 Stabiliser bar
4 Rubber bush

Front stabiliser bar—To fit

Reverse the procedure given for removal, noting the following points.

1. Before fitting the original rubber bearing bushes and links, inspect the rubbers for signs of perishing and renew if necessary.

2. For levelled car height settings and setting the height control valve (if fitted) when reconnecting the control link, refer to Chapter G – Hydraulic System.

Note Great care must be taken when manually operating the front height control valve due to the close proximity of the engine cooling fan. When the engine is running the valve operating link must not be pushed upward too far or a foul will occur between the valve operating lever and the engine cooling fan.

Cars after Serial Numbers SRH 6004 and onwards and Coachbuilt cars CRH 5011 and onwards are fitted with a front stabiliser bar of increased diameter.

Note This modification is **not** fitted to cars built for use in the U.S.A. or Canada, or to cars fitted with heavy duty suspension.

This necessitates a corresponding increase in the size of the bearing bush and securing brackets. A special washer is fitted under the head of the set-screws securing the bracket and longer setscrews have been fitted. The front height control valve (if fitted) clamp brackets, clamp and 'U' bolt have been modified to accommodate the increased diameter rod.

Note This modification is **not** fitted to cars built for use in the U.S.A. or Canada, or to cars fitted with heavy duty suspension.

Printed in England

April 1970

T.S.D. 2476

Section H8
SUSPENSION SETTINGS

Suspension settings—'Showroom' condition

Car height front—To check

The car height is the distance measured between points '1' and '2' in Figure H20. This vertical height must be checked whenever the suspension has been disturbed, e.g. whenever a coil road spring has been renewed or replaced. This height can be checked only if the car rear height is approximately correct.

There are two conditions of car height. Each condition is separately checked.

The first condition is the 'showroom standing height', this term applies when the car is stationary with the engine switched off, unladen and the automatic height control system discharged.

The second condition is the 'levelled height', this term applies when the car is fully laden, the engine running and the automatic height control system fully charged. This height remains constant regardless of the number of occupants and/or luggage.

The second condition requires the car height check to be carried out with the automatic height control system operating. This condition is described in Chapter G Hydraulic System.

Preparation

In addition to discharging the automatic height control system (*see Chapter G - Hydraulic System*), the car must be standing on a smooth level surface and the tyres inflated to the recommended pressures.

Cars with front automatic height control system fitted.

1. The car must be ballasted at the centre of the front seats with 150 lb. (68 kg.) weight, fully topped up with lubricant, coolant and 10 gallons (45,46 litres) of fuel in the fuel tank and with the tools in the luggage compartment.

Cars without front automatic height control system.

All cars after Car Serial Numbers SRX 7404, DRX 7416 and LRX 7378 have no front automatic height control system.

The car must be ballasted with 300 lb. (136 kg.) equally divided between the two front seats, fully topped up with lubricant and coolant and 10 gallons (45,46 litres) of fuel in the fuel tank and the tools in the luggage compartment.

2. Measure the height from the level surface on which the car stands to the faces of the machine fixture locating pads under the front sub-frame.

This height should be between 3.400 in. and 3.650 in. (8,64 cm. and 9,27 cm.).

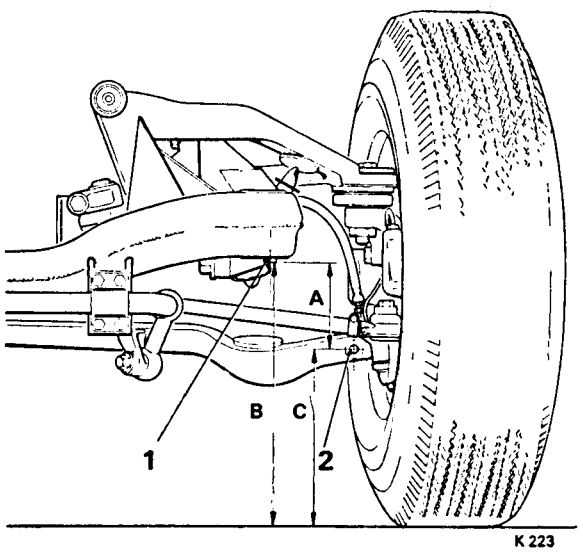


FIG. H20 FRONT CAR HEIGHT CHECKING POINTS

A 3.525 in. ± 0.125 in. (8,96 cm. ± 0,318 cm.)
1 Measurement to bolt centre
2 Measurement to sub-frame boss

Car height—To adjust

On early cars an adjustment of up to 0.46 in. (11,57 mm.) can be obtained by means of the screwed adjuster at the bottom of each front shock damper.

1. Unlock the lock-nut (*see Fig. H14*).
2. Hold the bottom of the damper with a spanner.

Note A total movement of 0.312 in. (7,94 mm.) is available at the bottom of the damper. This movement is limited by the shoulders of the damper stem abutting the roll pins of the ball adjuster. Do not attempt to force the screwed adjuster beyond the limits imposed by the pins or damage to the damper stem threads will occur. Further adjustment to the car height can be obtained as follows.

1. By selection increase or decrease the thickness of the split washer fitted around the shock damper beneath the road spring seating (*see Fig. H14*). Split packing washers are available in the following thicknesses: 0.250 in. (6,35 mm.), 0.500 in. (12,70 mm.), 0.750 in. (19,10 mm.) and 1.00 in. (2,54 cm.).
2. Do not fit washers totalling more than 1.00 in. (2,54 cm.) thickness.

To adjust the height by fitting packing washers, fit the road spring compressor tool (RH 7789) to the spring pot and compress the spring to lift it and its seating from the damper collar.

3. Refer to Section H2 – Front 'Monitube' shock damper and ball joint, for initial preparation.
4. The selected packing washers used in conjunction with the screwed adjuster will enable the required car height to be obtained.

Note A packing washer 0.250 in. (6,35 mm.) thick gives a change in car height of 0.37 in. (9,40 mm.). After setting the front and rear height, the second condition should be carried out referring to Chapter G – Hydraulic System.

5. On later cars there is no adjustment by means of the screwed adjuster at the bottom of the shock damper. Fine adjustment is obtained by inserting washers 0.064 in. (1.63 mm.) thick to those already fitted beneath the road spring seat. Ensure that the smallest packing washers are fitted to the top of the assembly so that the spring retains them in position.

Front wheel toe-in—To adjust

Check the toe-in as follows.

1. Place the car on a level surface and the steering wheel in the straight-ahead position.
2. Remove the gear range selector thermal cut-out as described in Chapter M – Electrical System.
3. Move the car forward not less than half a revolution of the front wheels, then take a first reading using optical alignment equipment.
4. Move the car forward a further half a revolution of the front wheels and take a second reading. The true toe-in is the average of the two readings.

Note Moving the car backward instead of forward will give an incorrect reading.

The toe-in should be between 0.062 in. and 0.141 in. (1,575 mm. and 3,57 mm.) with the car in a 'levelled' or 'showroom' condition. If the toe-in setting is incorrect the following procedure should be used.

5. Disconnect a track rod outer ball joint from the side steering lever using the special extractor tool (RH 8080), then slacken the pinch bolt from the outer end of the track rod and screw the track rod inward or outward as necessary.

Note To obtain the correct setting if more than **one** complete turn of the track rod end is necessary to obtain the desired adjustment, the number of turns must be divided equally between both track rod ends in order to retain the steering wheel straight ahead position.

6. When the adjustment is completed re-tighten the pinch bolt, lock-nuts and track rod end.
7. Re-check the toe-in as described in Operations 3 and 4.

Castor and camber angles—Preparation—To adjust

The Castor and Camber angles must be checked at the same time as adjustment of one affects the other

1. Set the front wheels on turntables and the rear wheels on suitable turntables or blocks of the same height.
2. With the car at 'levelled' or 'showroom' height, using suitable spirit level gauge equipment which fits directly to the stub axle, raise the car and fit the gauge.

Castor and camber angles—To adjust

Using a suitable gauge check the castor and camber angles, following the instructions provided with the gauge.

To correct the castor angle, add or remove shims as required, between the upper triangle lever cantilever bracket and the sub-frame. The correct castor angle is given in the table. The shims are available in varying thicknesses and are slotted for ease of removal and fitting. The thicknesses are 0.032 in. (0,79 mm.), 0.064 in. (1.588 mm.) and 0.128 in. (3,25 mm.).

The camber angle will alter as the castor angle is adjusted.

Printed in England

April 1970

T.S.D. 2476

Carry out the following procedure for both sides of the car.

Check the camber angle of each wheel, which should be 1° + or − ¼° and may be directly read from the gauge. If the camber angle is incorrect it will be necessary to adjust the castor angle by selective fitting of the shims described earlier, until both the castor and camber angles are within the correct limits.

The maximum difference allowed between both sides of the car for both the castor and camber angles is ¼°.

Front Suspension Data	Cars produced prior to Car Serial Numbers SRH 3349 CRH 3449	Cars produced after Car Serial Numbers SRH 3349 CRH 3449
Camber Angle	1° Negative ± ¼°	1° Negative ± ¼°
Castor Angle	1½° Positive ± ¼°	3° Positive ± ¼°
Pivot Pin Inclination	6½°	6½°
Toe-in	0.062 in. to 0.141 in. (1,57 mm. to 3,58 mm.)	0.062 in. to 0.141 in. (1,57 mm. to 3,58 mm.)

Lock and stop adjustment *(see Fig. H21)*

After checking the castor and camber angles, and before moving the car from the turntables it is advisable to check the angles of full steering lock. The angles should be 41° inside lock and 33½° outside lock. If any of the angles are too great, packing pieces must be added to the ends of the lower triangle levers.

1. If the right-hand wheel outside lock or the left-hand wheel inside lock is too great, add packing pieces to the right-hand lower triangle lever.
2. If the left-hand wheel outside lock or the right-hand wheel inside lock is too great, add a packing piece to the left-hand lower lever. There are three packing pieces available, 0.032 in., 0.048 in. and 0.064 in. (0,794 mm., 1,191 mm. and 1,588 mm.) thick. The smallest of the three should be selected first when adjusting.

Lock stop packing—To fit *(see Fig. H21)*

1. Remove the nut and washer.
2. Clear the abutment faces, ensuring that they are free from foreign matter, e.g. grit, grease or oil.
3. Fit the lock stop packing.
4. Fit and torque tighten the nut and washer.

Track rod ball joint relative height—To adjust

The steering geometry is designed to ensure that the alignment of the front wheels is contained within the prescribed limits during vertical oscillation of the front suspension. Adjustment to maintain these limits can be obtained by raising or lowering the steering and idler boxes on the sub-frame mounting points (*see Fig. H22*). Incorrect settings may cause increase in car 'shake' or the steering to wander during high speed driving. Castor and camber angles must be corrected before any adjustment is attempted.

Note On early production cars it is necessary to fit both the steering and idler boxes at the top of their slots when this check is carried out in order to approximate the necessary setting.

1. Lock the steering cross-beam in the straight-ahead position with the special clamping fixture (RH 8015), then position the front wheels on small turntables to permit lateral movement and to cope with any alteration of track.
2. Place sufficient ballast to the front of the car to move the suspension 2.00 in. (5,08 cm.) towards the bump stops.

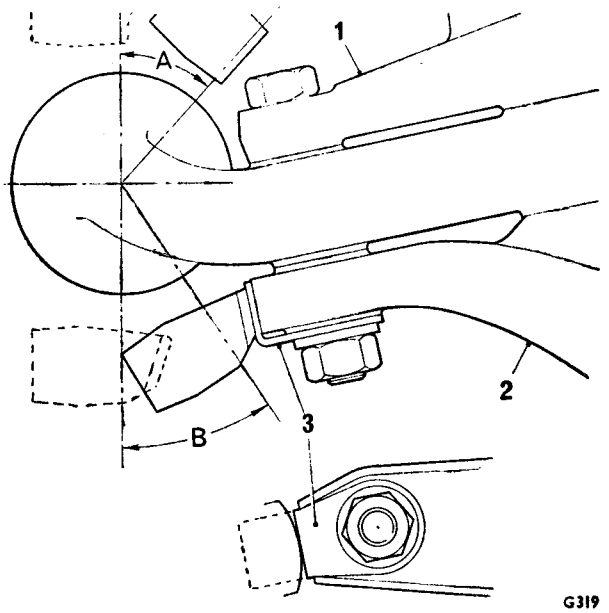


FIG. H21 STEERING LOCK STOP PACKING PIECE

1 Rear lower triangle lever
2 Front lower triangle lever
3 Packing piece
A 41° inside lock
B 33½° outside lock

3. Position a hydraulic jack beneath the central pivot point of the lower triangle levers and fit a hardwood block to the jack head.
4. Raise the jack until contact is just made with the pivot pin.
5. Remove one of the front wheel disc/hub caps and unscrew three of the wheel nuts; fit the three special nuts of the mirror support plate.
6. Fit the mirror support plate (RH 7839) to the special nuts so that the mirror bar is at its lowest position; secure the plate using the three wheel nuts.
7. Fit the mirror to the bar.
8. Fit the telescope to the special mounting bracket (RH 7840) which fits into the body sill at the jacking point.
9. Adjust both the mirror and the telescope until the measurement marks are centralised when viewed through the telescope.
10. Note the reading on the scale attached to the telescope, no further adjustment must be made to the mirror.
11. Raise the car with the jack approximately 5.00 in. (12,7 cm.), i.e. 3.00 in. (7,6 cm.) above the car front height then adjust the telescope to align with the marks on the mirror. Note the reading.

The toe-in for one wheel is the difference between the two readings.

Note From rebound to bump the difference in readings should be less than 0.050 in. (1,27 mm.) and more toe-in should be present at rebound than at bump.

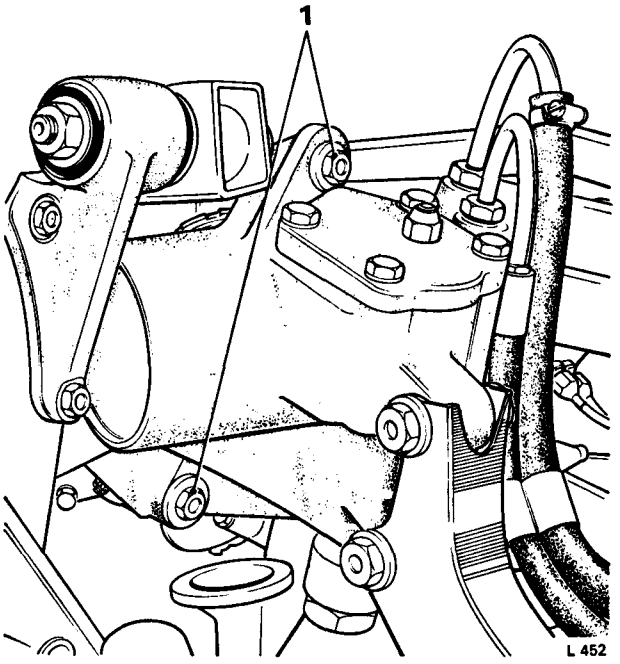


FIG. H22 STEERING BOX MOUNTING/ ADJUSTING POINTS

1 Adjusting points – 2 shown, 1 hidden

If the difference in reading is excessive and there is more toe-in at rebound (rebound is the downward movement of the suspension and bump is the upward movement of the suspension), lower the steering box or idler box on the slotted holes as appropriate and make a further check.

Alternatively, if there is more toe-in in the bump position, raise the steering or idler boxes.

12. Raising or lowering a steering or idler box on its slots adjusts the height of the track rod inner ball joint adjacent to it but doing so also affects the height of the opposing track rod inner ball joint. Therefore it is recommended that the following procedure be adopted to obtain the desired setting for each wheel.
13. Position a screw jack under the appropriate side of the steering box torque arm and raise the jack to just abut the arm. Release, but do not remove the three securing bolts of the steering or idler box and the securing bolts at each end of the torque arm.
14. Raise or lower the jack head the necessary amount, then tighten the securing bolts of the box.
15. Before attempting adjustment to the other side of the car, clamp a dial test indicator to a height gauge and obtain a reading on the indicator from a level surface to the base of the track rod inner ball pin, then zero the indicator. Remove the gauge and indicator, then proceed to adjust the height of the opposing steering or idler box in a similar manner to that described earlier.
16. On completion, tighten the box securing bolts, then, using a different height gauge and dial test indicator, check the height of the adjacent track rod inner ball pin from the level surface, obtain a reading and zero the dial.
17. It is now necessary to make final adjustment to the height of the steering and idler boxes in turn until zero reading is obtained on each indicator, situated at the base of the track rod inner ball joints.
18. On completion, torque tighten the steering and idler box mounting bolts and the torque arm securing bolts.
19. It may be advantageous for future reference, to mark the positions of the steering and idler boxes relative to the sub-frame.
20. Remove the ballast and optical equipment and the steering levers clamping fixture.
21. If the idler box and steering box are set below the mid-point in their adjustment slots, fit a 0.125 in. (3,18 mm.) packing piece between the engine front mounting foot and the stop plate situated on the steering box and idler box torque arm.
22. Check the toe-in and adjust if necessary.

Printed in England

April 1970

T.S.D. 2476

Section H9
BUMP AND REBOUND RUBBERS

Bump and rebound rubbers—To remove
(see Fig. H23)

1. Place the car on a ramp.
2. Apply the hand brake.
3. Chock the rear wheels.
4. Remove the gear range selector thermal cut-out as described in Chapter M – Electrical System.
5. Raise the ramp.
6. Remove the nut retaining the rubber to the sub-frame, using the special 'C' spanner (RH 7849 or RH 7850) fitted in the slots provided in the outer lip of the rubbers.
7. Remove the rubber.

Bump and rebound rubber—To fit

Reverse the procedure given for removal.

Bump and rebound rubbers—Types

The rebound rubbers are the smaller of the two and are fitted to all models of Silver Shadow and Bentley T Series cars.

The bump rubbers are the larger of the two and come into two categories.

A — Conical rubber pad fitted to all cars other than cars fitted with heavy duty suspension.

B — Conical rubber pad, greater in length and flat topped, fitted to cars with heavy duty suspension.

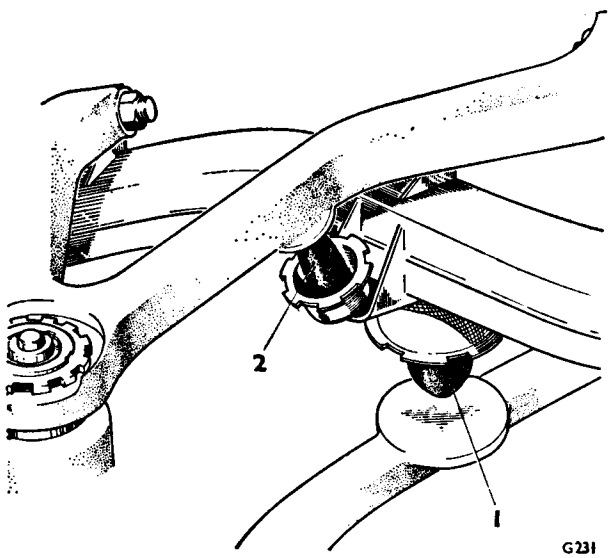


FIG H23 BUMP AND REBOUND RUBBERS IN POSITION

1 Bump rubber
2 Rebound rubber

Section H10
TRAILING ARMS AND MOUNTING POINTS

Camber and toe-in settings

There are two methods of fitting the trailing arms to the rear cross-member and setting the camber and toe-in.

The first method of setting the components utilises various checking equipment, including squares, rule and height gauges, etc.

The second method requires the use of the special fixture (RH 7854), in addition, optical toe-in and gravitational camber setting equipment is needed.

The settings can only be achieved using either of the two methods. Although the camber and toe-in can be checked on the car, it is not possible to adjust them without removal of the cross-member and trailing arms from the car (*see Section H11 – Rear cross-member*).

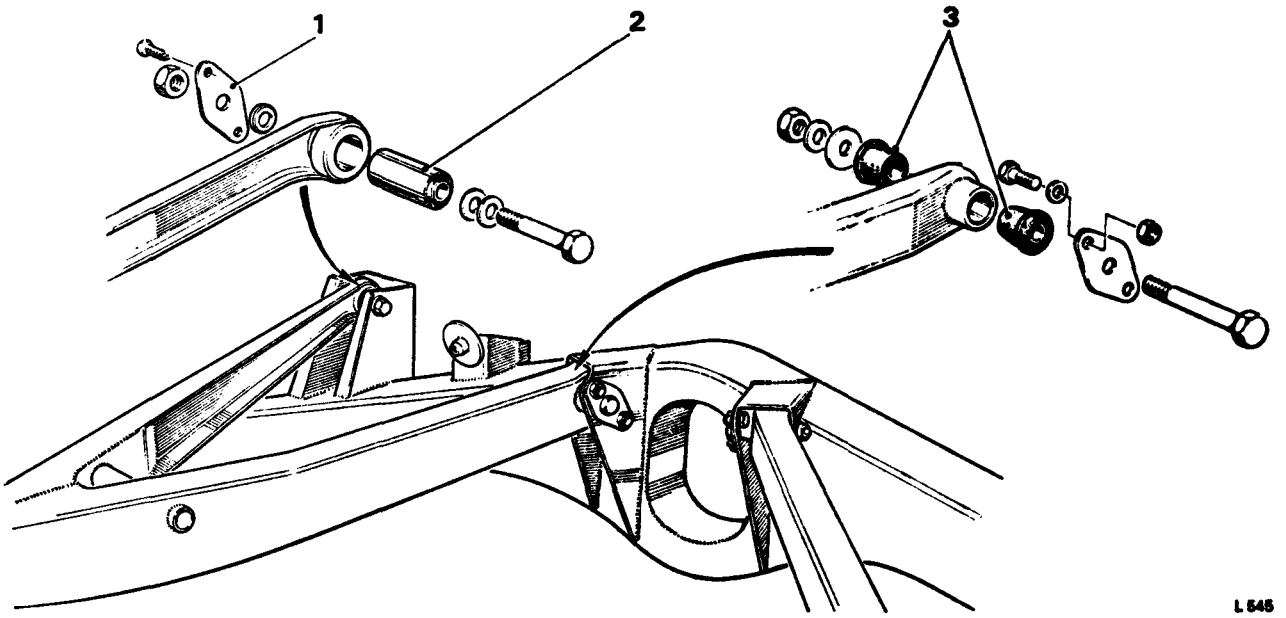


FIG. H24 TRAILING ARM MOUNTING POINTS

1 Locking plate
2 Rubber-bonded metal bush
3 Cone-shaped rubber-bonded metal bushes

Printed in England

April 1970

T.S.D. 2476

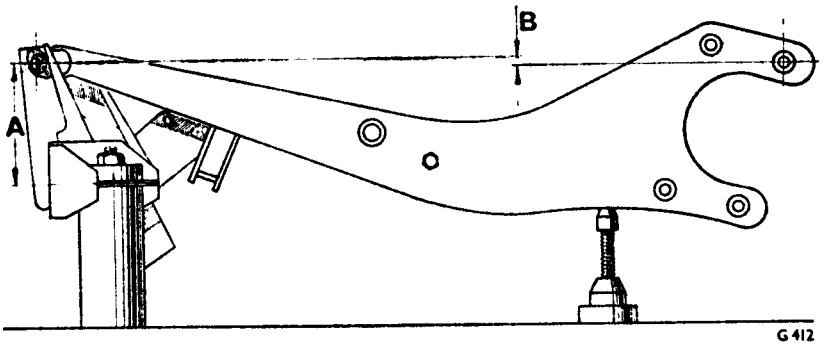


FIG. H25 ALIGNING THE TRAILING ARMS TO THE SUSPENSION CROSS-MEMBER (NORMAL RIDE) PRIOR TO SETTING CAMBER AND TOE-IN

A 5.312 in. (13,492 cm.) **B** 0.269 in. (6,83 mm.)

Trailing arms—To set (without the fixture)

Camber—To set

1. Place the cross-member on a surface table, locating suitable cubes under the cross-member resilient metal mounting platform to ensure that the cross-member is in the vertical plane.

2. Mount the trailing arms and set the arms in the 'normal ride' position (*see Fig. H25*).

3. Tighten the centre bolt of the inner bush and the bolts of the locking plate. Leave the centre bolt of the outer bushes 'nipped' only.

4. In addition, the centre line between the cross-member mounting points should be marked along the surface table, in order that accurate measurements can be taken between the hub unit mounting tubes of the trailing arms.

5. Using an accurate square or gravitational camber setting equipment, check each trailing arm for Zero $\pm\frac{1}{4}°$ negative camber. The trailing arms must be within $\frac{1}{4}°$ of each other. 'Nip' the trailing arm mounting bolts.

Note The square or gravitational camber setting equipment must abut the outer faces of the hub unit mounting tubes of the trailing arms.

Toe-in—To check

1. Using a flat rule placed across the hub mounting tubes to give the equivalent of the diameter of the road wheel, 17.0 in. (43,18 cm.), and with the aid of a square positioned 8.5 in. (21,6 cm.) from the centre line of the hub unit mounting tubes, measure the distance from the base of the square to the centre line on the table (*see Fig. H26*).

2. Repeat the measurement from the other end of the rule.

3. Compare the measurement from each end of the rule to the centre line.

4. Adjust the trailing arm outer mounting point to the cross-member by moving and tightening the centre bolt until the toe-in for one road wheel is between $\frac{1}{32}$ in. (0,794 mm.) and zero. (The locking plate must be in position on the outer bolts). Adjustments to the toe-in will alter the camber, so it is necessary to re-adjust both camber and toe-in until a satisfactory position is obtained.

5. Repeat the procedure for the other trailing arm until a satisfactory reading of camber and toe-in for both road wheels is obtained.

The maximum permissible difference between toe-in for both sides of the car is 0.015 in (0,381 mm.).

6. On completion, torque tighten all the centre bolts, repeat the checks, then loosely attach the outer locking plates into position.

7. The outer locking plate is locked into position by two self-tapping screws. Use the locking plate as a template while drilling the 0.156 in. (3,97 mm.) diameter holes in the cross-member bracket for the self-tapping screws.

8. Fit the screws into each locking plate.

Trailing arms—To set (using the fixture)

1. Attach the trailing arms to the cross-member and seat the assembly on the trailing arm setting fixture (RH 7854). The fixture automatically sets the trailing arms to car 'normal ride' position relative to the cross-member.

2. Tighten the inner mounting centre bolts and the inner mounting locking plates.

Note The fixture must be set upon a surface table, or alternatively, set up such that it is level (adjustable feet are provided on the fixture for this purpose) in order that the gravitational equipment may be used.

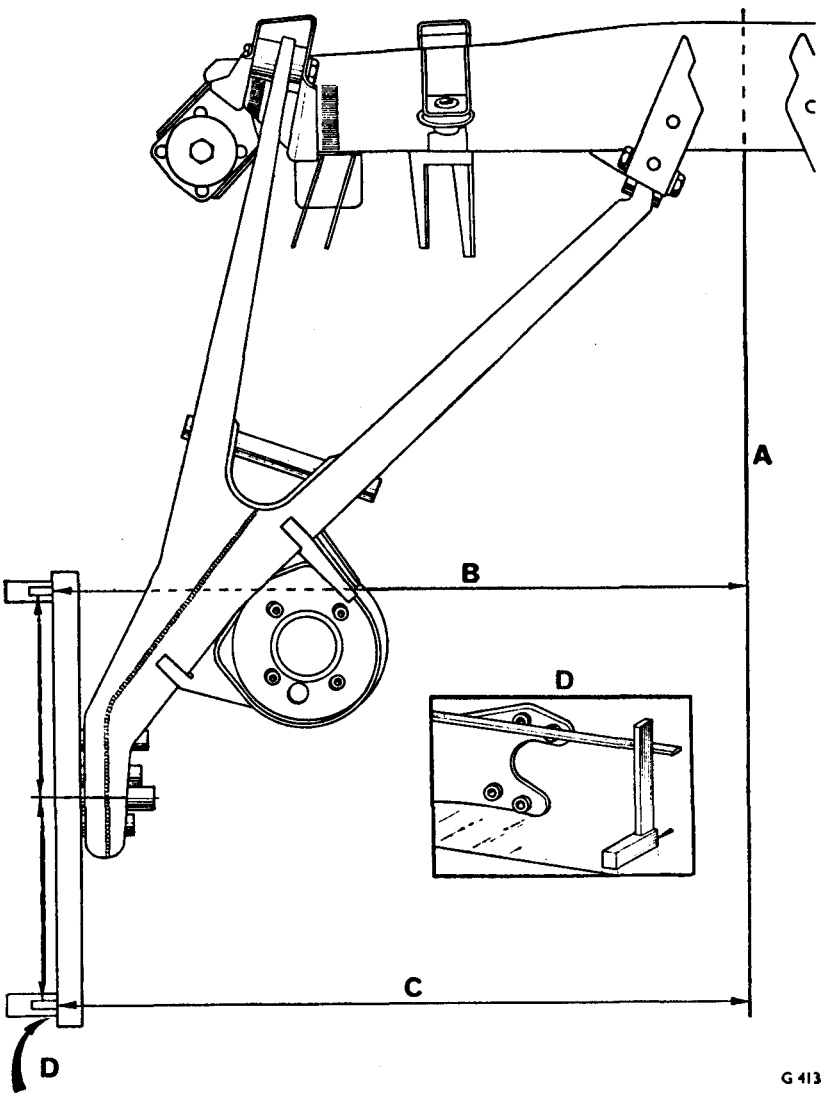


FIG. H26 METHOD OF CHECKING TOE-IN—REAR SUSPENSION

A Centre Line (marked on surface table)

B and C Horizintal measurements from baseof square to centre line

D Inset showing position of rule to square

E and F 8.500 in. (21,6 cm.) about wheel centre

3. From this point toe-in and camber settings may be achieved using the method previously described, or by using the gravitational alignment gauge for camber, locating on the four boss faces or by locating directly on the hub if fitted temporarily.

4. If the hub is fitted, a slave wheel rim can also be fitted, thus a conventional optical alignment gauge may be used to give a toe-in reading between the trailing arms.

5. The toe-in reading is taken using the image of the telescope reflected from the mirror set at the mid-point of the fixture, thus giving half the total toe-in reading. (Using the mirror set at this point ensures eventually a total toe-in reading equidistant about the car centre line). The trailing arm is adjusted accordingly as described in 'Trailing arms – To set (without the fixture)' and the procedure repeated for the other trailing arm, using the opposite side of the double sided mirror.

6. Tighten and lock the trailing arm outer bolts into position as described in 'Trailing arms – To set (without the fixture)'.

Section H11
REAR CROSS-MEMBER

Printed in England

April 1970

T.S.D. 2476

Cross-member resilient metal mounts —To remove

It is possible to remove the mounts one at a time with the cross-member in position without disturbing suspension settings or hydraulic components, etc.

1. Position the car on a ramp.
2. Apply the hand brake and chock the rear wheels.
3. Remove the gear range selector thermal cut-out as described in Chapter M – Electrical System.
4. Fit a screw-jack, with a hardwood block fitted to the jack head, beneath the rear cross-member as near as possible to the mounting points.
5. Adjust the screw-jack to support the cross-member at this point.
6. Position ballast (sandbags) in the boot of the car to overcome the action of the road springs, whilst the resilient metal mount is removed.

   Note The ballast will maintain the correct distances between the mount cross-member mounting point and the faces of the upper and lower sill brackets.

7. Place a piece of wood between the cross-member and the body heel board to prevent the cross-member from tilting forward.
8. Remove the centre-bolt and nut from the mount, then remove the lower steady bracket from the sill. Unscrew and remove the setscrews from the central mounting flange of the mount.
9. Remove the resilient metal mount.

Cross-member resilient metal mounts —To fit

Reverse the procedure given for removal, noting the following points.

1. Load the new mount by supporting it on the central flange and pressing the mount lower face upward sufficiently to enable a split ring packing (RH 7848) 0.234 in. (5,94 mm.) thick to be fitted between the upper main cushion top cup and the limiting cushion which encircles the main cushion (*see Fig. H27*). Care must be taken not to bend the central flange.
2. Centralise the mounting in the special fixture (RH 7847) so that the radial run-out of the cylindrical portion of the central pressing does not exceed 0.025 in. (0,64 mm.). Ensure that the two upper and one lower abutment washers are fitted as shown in Figure H27.
3. Fit and torque tighten the mount to the cross-member mounting point (*see Fig. H27*) and ensure that the cross-member is not disturbed.
4. Fit and secure the lower steady bracket, finger tighten the mount centre bolt.
5. Torque tighten the mount centre bolt (*see Chapter P – Torque Tightening Figures*).
6. Remove the split packings and the wooden wedge from between the cross-member and body heel-board.

Repeat the procedure for the other mount if necessary.

Cross-member and trailing arm assembly —To remove

If the car has suffered accident damage, and the rear suspension and cross-member have been removed for thorough inspection, it is necessary to disconnect

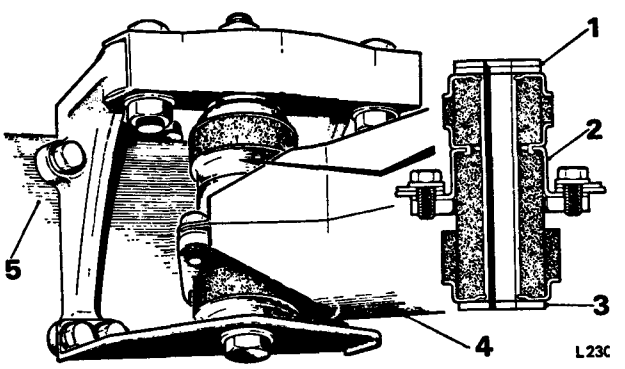


FIG. H27 REAR SUSPENSION CROSS-MEMBER MOUNT

1 Abutment washers
2 Resilient metal mount
3 Abutment washer
4 Suspension cross-member
5 Body sill

and remove all units of the suspension, e.g. rear hub units to facilitate the removal of the cross-member and trailing arms assembly from beneath the car.

1. Place the car on a ramp and chock the front wheels.
2. Remove the gear range selector thermal cut-out as described in Chapter M – Electrical System.
3. De-pressurise the hydraulic system as described in Chapter G – Hydraulic System.
4. Disconnect and remove the rear portion of the exhaust system.
5. If fitted, remove the rear stabiliser bar (*see Section H15 – Rear Stabiliser Bar*).
6. Remove the rear road wheels and hubs (*see Chapter J – Final Drive*).
7. Remove the damper and spring as described in Section H12 – Rear 'Monitube' shock damper and Section H13 – Rear road springs. It is important to disconnect the damper at its lower end before removing the rebound strap to avoid possible damage to the damper piston rod through overtravel.
8. Disconnect the hand brake cables from the cable mounting points on the trailing arms.
9. Disconnect the torque arm from the cross-member.
10. Remove the propeller shaft (*see Chapter F – Propeller Shaft*).
11. Disconnect the flexible hydraulic pipes either at the junction on the cross-member, or alternatively at the point where they join the body underframe (*see Chapter G – Hydraulic System*).
12. Remove the supplementary hydraulic compliance damper (if fitted); refer to 'Horizontal compliance cushions and damper – To remove', in this Section.
13. Remove the resilient metal horizontal compliance cushions; refer to 'Horizontal compliance cushions (resilient metal type) – To renew'.
14. Disconnect and remove the tubular links.
15. Support both sides of the cross-member; remove the steady bracket and centre bolt of each mount.
16. Lower the cross-member and trailing arms assembly.

Cross-member and trailing arm assembly —To fit

1. Fit and set the trailing arms to the rear suspension cross-member as described in Section 10 – Trailing arms and mounting points.
2. Fit the horizontal compliance cushion assemblies to the cross-member as described in 'Horizontal compliance cushions (resilient metal type)' of this Section.
3. Load the vertical resilient metal mount by supporting it on its central flange and pressing the mount lower face upward sufficiently to enable a split ring packing (RH 7848) 0.234 in. (5,94 mm.) thick, to be fitted. This split ring should be fitted between the upper main cushion top cup and the limiting cushion which encircles the main cushion. Care must be taken not to bend the central flange.
4. Centralise the mounting in the special fixture (RH 7847) so that the radial run-out does not exceed 0.025 in. (0,64 mm.).
5. Repeat the procedure for the other vertical mount; fit the mounts to the cross-member.
6. Ensure that the tubes of the bridge pieces of the cross-member mounting points on the body are free to move, otherwise it will not be possible to manoeuvre the cross-member into position without side loading the mounts.

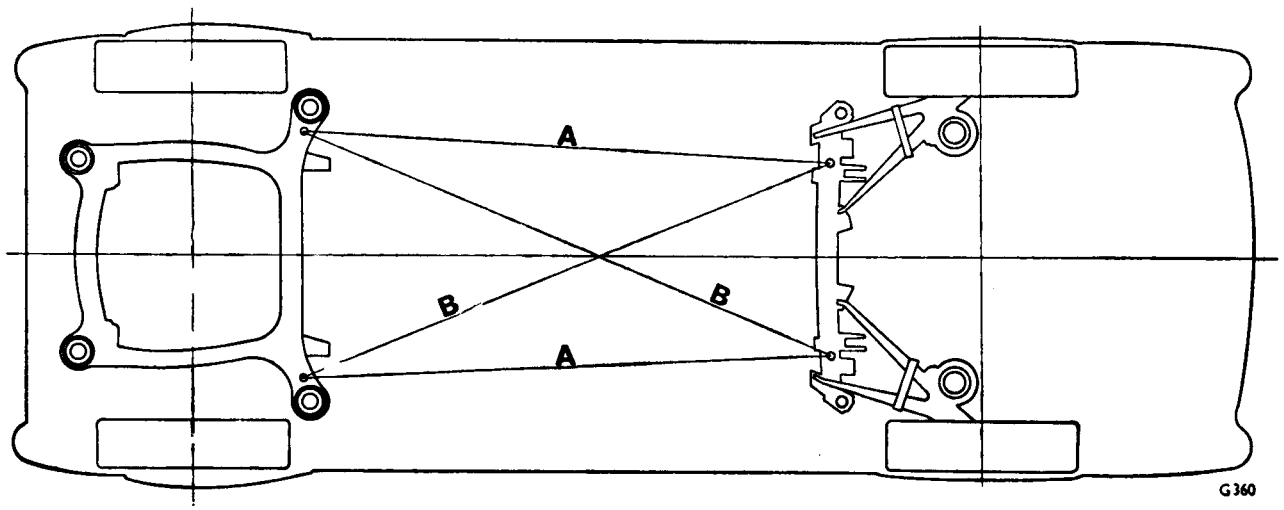


FIG. H28 METHOD OF ALIGNING SUB-FRAMES

A Measurements to be equal with 0.062 in. (1,59 mm.)

B Measurements to be equal within 0.062 in. (1,59 mm.)

Printed in England

April 1970

T.S.D. 2476

7. Support the cross-member and trailing arm assembly by jacks at four points, two adjacent to, but not beneath the mounting points and two beneath the outer ends of the trailing arms.

8. Raise the cross-member into position with two abutment washers fitted to each mount. Locate each mount by threading the centre bolts, fitted with the steady brackets and lower abutment washer, through the mounting points (*see Fig. H27*).

9. Ensure that the mounts are not disturbed radially and that the cross-member remains vertical.

10. When the cross-member is raised to within 0.125 in. (3,18 mm.) of its final position, align it to the front sub-frame by manoeuvring and measuring the longitudinal and diagonal distances between the front sub-frame and cross-member (*see Fig. H28*).

11. Raise the cross-member to abut the bridge pieces.

12. Locate and secure the steady brackets to the body sills, then torque tighten the mount centre bolts.

13. Fit and tighten the cross-member links to the cross-member and sill mounting points.

14. Fit the compliance cushions whilst the packing pieces (RH 7848) are still in position, as described in 'Compliance cushions assembly – To fit', on page H36.

15. Fit the supplementary compliance hydraulic damper (if fitted).

16. Fit the propeller shaft (*see Chapter F – Propeller Shaft*).

17. Fit the torque arm to the cross-member (*see Chapter J – Final Drive*).

18. Fit the rear 'Monitube' shock dampers and road springs (*refer to Section H12 and H13 respectively*).

19. Fit the hubs and road wheels (*refer to Chapter J - Final Drive*).

20. Fit the exhaust system.

21. Fit the hand brake cables.

22. Fit the hydraulic pipes (*refer to Chapter G - Hydraulic System*).

Cross-member links—To maintain

Check the condition of the bushes when the rear suspension is removed from the car. If they are not considered serviceable, fit new link assemblies and bushes.

Horizontal compliance cushions and dampers

Two types of horizontal compliance cushions and damper are fitted, the resilient metal type and the hydraulic type (*see Fig. H31*).

The hydraulic damper is not fitted to cars having the Torque Converter Transmission.

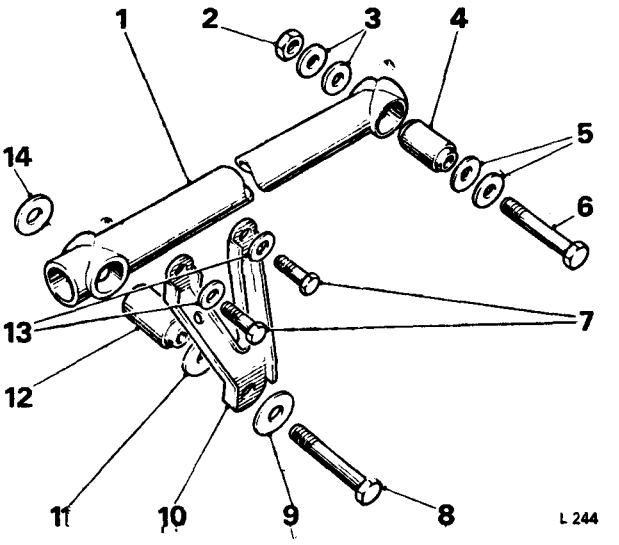


FIG. H29 EXPLODED VIEW—TUBULAR LINKS

1 Tubular link	8 Setscrew
2 Nut	9 Washer
3 Washers	10 Bracket
4 Bush	11 Washer
5 Washers	12 Bush
6 Bolt	13 Washers
7 Setscrews	14 Washer

Horizontal compliance cushions (resilient metal type)—To fit—rear cross-member removed from car

1. Assemble the centre abutment block, rear cushion and rear abutment bracket, by securing with a $\frac{5}{16}$ in. U.N.F. **slave** setscrew passing through the forged bracket and screwing into the centre abutment block.

2. Tighten the screw until the length of the rear cushion is between 1.990 in. and 2.010 in. (5,055 cm. and 5,105 cm.).

3. Fit the assembly to the cross-member together with the front cushion.

Pre-load the front cushion by using a $\frac{5}{16}$ in. U.N.F. **slave** setscrew. Screw the setscrew into the centre abutment block until it is possible to fit the rear abutment bracket to the cross-member bracket (*see Fig. H31*).

Note The rear abutment bracket is secured to the cross-member by two bolts, nuts and washers.

4. Remove the slave setscrew from the front cushion **only**. This is important as once the cross-member is fitted to the body the slave setscrew is inaccessible. The rear slave setscrew should remain in position until later.

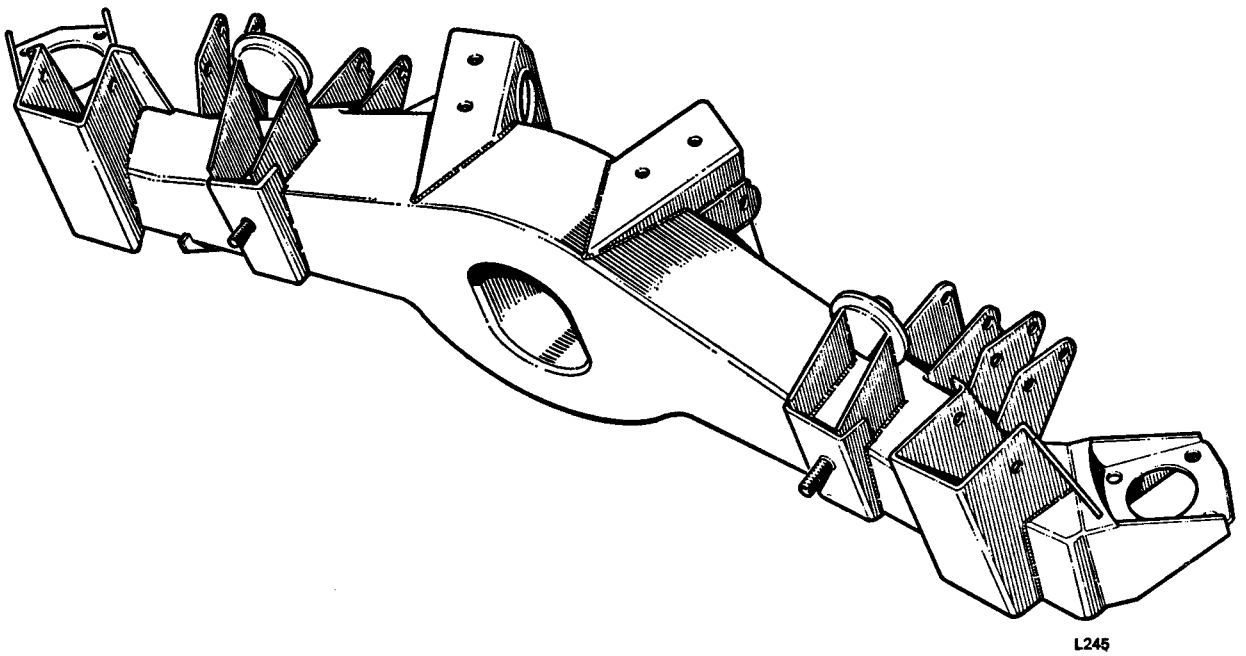


FIG. H30 VIEW OF REAR SUSPENSION CROSS-MEMBER

5. Repeat the procedure for the other compliance cushions and trailing arms.

After the rear cross-member, trailing arms and links have been fitted, fit the compliance cushions assembly to the body as follows.

Compliance cushions assembly—To fit

1. With the split packing pieces still in position in the rear cross-member resilient metal mounts, fit packing pieces as necessary between the centre abutment blocks and body brackets on the seat pan (*see Fig. H31*). The number of packing pieces is determined by the visible gaps, packing pieces are supplied in two thicknesses.

2. Fit the clamping plates to the outside of the body brackets. Fit the two securing bolts through the clamping plates, body brackets, packing pieces and central abutment block.

3. Fit and torque tighten the nuts, then repeat the procedure for the other horizontal compliance cushion assembly.

4. Remove the slave setscrew from each compliance cushion assembly and the split packing pieces from the cross-member main resilient metal mounts when the car is standing on its road wheels.

Horizontal compliance cushions (resilient metal type)—To renew

With rear cross-member in position on the car

In the case of accident damage to the mounting brackets it is necessary to remove the cross-member.

1. Fit a slave setscrew $\frac{5}{16}$ in. U.N.F. through the rear abutment bracket of one of the horizontal compliance assemblies and tighten sufficiently to compress the rear cushion to approximately 2.000 in. (5,08 cm.).

Note In order to fit the slave setscrew it may be necessary to raise the body. For this purpose, place the special sill beams (RH 7820) between the inner body sill and the jack.

If the cushions have collapsed, it will be necessary to move the top of the cross-member rearward until the 2.000 in. (5,08 cm.) required is obtained. To do this wedge pieces of wood between the cross-member trailing arm outer mounting brackets and the body heel-board.

2. From the other compliance cushion assembly situated at the opposite end of the cross-member, remove the rear abutment, central abutment block and cushions. Retain the packing pieces.

3. Fit a new rear (long) cushion and central abutment bracket to the rear abutment bracket, then, using a slave setscrew, compress the cushion until it is 2.000 in. (5,08 cm.) in length.

4. Fit the short cushion to the front abutment bracket on the cross-member, followed by the central abutment block assembly.

5. Fit and tighten the bolts to secure the rear abutment bracket to the cross-member.

6. Fit the packing pieces, previously removed, to their respective positions on each side of the central

Printed in England

April 1970

T.S.D. 2476

abutment block, then fit and tighten the two bolts, using clamping plates to secure the compliance cushion assembly to the body bracket.

Do not remove the slave setscrews at this stage.

7. Remove the rear abutment bracket, rear cushion and centre block with slave setscrew as an assembly from the remaining compliance cushion assembly; remove the front cushion.

8. Using the slave setscrews to compress the rear cushion to 2.00 in. (5,08 cm.) in length, fit new cushions and the abutment pieces to the cross-member and body brackets as described in 'Compliance cushions assembly – To fit'.

9. Remove the slave setscrews from each compliance cushion assembly, the wooden wedge between the cross-member and heel-board, sill beams (RH 7820) and jacks.

Horizontal compliance damper (hydraulic) —To remove

The hydraulic compliance damper should be renewed with the cross-member in position in the car as follows.

1. Remove the nut from the bolt securing the damper to the cross-member bracket.
2. Withdraw the bolt and retain the small washers.
3. Remove the nut from the bolt securing the damper to the seat pan floor brackets.
4. Withdraw the bolt and retain the small washers.
5. Withdraw the damper front end mounting point from its brackets on the cross-member and retain the two heavy washers.
6. Withdraw the damper rear-end mounting point from its brackets on the seat pan floor and retain the four heavy washers.

Note The rubber bushes are an integral part of the damper, and need not be renewed during the life of the damper.

Horizontal compliance damper (hydraulic) —To fit

1. Fit the two heavy washers to the faces of the damper front-end mounting point and slide it between the brackets on the cross-member.
2. Fit the bolts, nuts and washers, and finger tighten.
3. Fit the four heavy washers to the faces of the damper rear-end mounting point and slide it between the brackets on the seat pan floor. It will be necessary to compress the damper slightly to align the holes in the mounting bracket with the hole in the damper mounting point.
4. Fit the bolt, nut and washer.

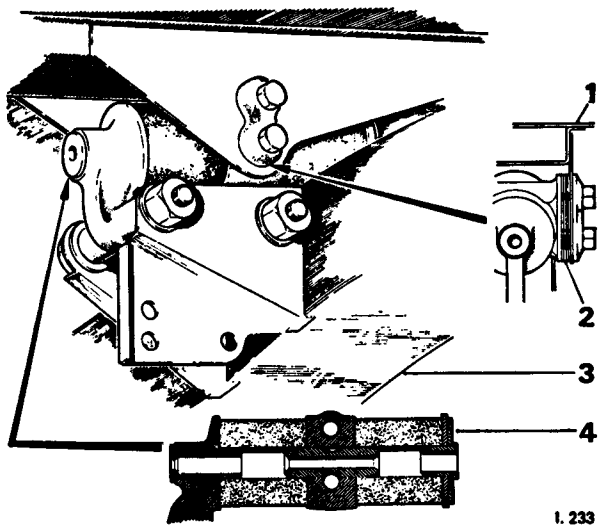


FIG. H31 HORIZONTAL COMPLIANCE CUSHIONS

1 Body underframe
2 Packing pieces
3 Rear suspension cross-member
4 Sectional view compliance cushions assembly

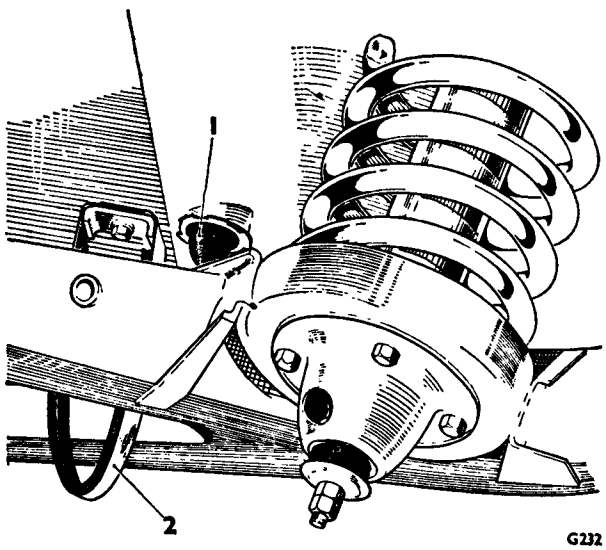


FIG. H32 BUMP STOP AND REBOUND STRAP

1 Bump stop **2** Rebound strap

5. Torque tighten the securing bolts.

Note The body brackets, positioning the damper relative to the cross-member, have been set to a dimension of between 5.745 in. and 5.805 in. (14,59 cm. and 14,75 cm.), measured between the damper mounting bolt centres. **This dimension must be maintained.**

Bump rubber and rebound strap

Bump rubber—To remove *(see Fig. H32)*

1. Unscrew the bump rubber using special spanner (RH 7849).

Bump rubber—To fit

Reverse the procedure given for removal.

Rebound strap—To remove *(see Fig. H32)*

1. Unscrew and remove the rebound strap securing setscrews.

2. Open the jaws of the rebound strap and pull downwards.

Rebound strap—To fit

Reverse the procedure given for removal, noting the following points.

1. Care should be taken when fitting the rebound straps, that they do not 'rub' against the trailing arm stop tube.

2. Lubricate the rebound strap with a suitable rubber lubricant.

Printed in England

April 1970

T.S.D. 2476

Section H12
REAR 'MONITUBE' SHOCK DAMPER

Shock damper—To remove

Cars prior to Car Serial Numbers SRH 4168, CBH 4106, SRX 6122 and CRX 6102.

Access to the upper nuts securing the damper is from the underside of the rear height control ram located on the top of the road spring housing within the luggage compartment. The lower retaining nuts are situated immediately beneath the road spring lower housing.

Remove the damper as follows.

1. Position the car on a ramp and chock the road wheels.

2. De-pressurise the hydraulic systems (*see Chapter G – Hydraulic System*).

Remove a height control ram as follows.

3. Remove the trim from the corners of the luggage compartment.

4. Remove the pipes from the height control ram body and blank off each pipe and port.

5. Remove the screws securing the height control ram.

Note The three setscrews must be released progressively and evenly.

6. Fit three suspension assembly alignment screws (2 long – RH 7858 and 1 short – RH 7859) through the control ram setscrew holes and screw directly into the road spring housing. The short screw fits into the hole to the rear of the ram, i.e. the front hole when viewed from the luggage compartment. The screw extensions should pass through the spring housing and enter alignment holes in a location flange integral with the coil spring isolator tube.

7. Raise the ram body sufficiently to enable the spanner (RH 8051) to be fitted to the slotted part of the ram piston. Unscrew the ram piston from the spring isolator tube nut. Leave the alignment screws in position to facilitate assembly.

8. Unlock and remove the damper upper lock-nut; remove the full nut and the upper rubber bush and retainers.

9. Support the damper lower retaining plate; remove the four securing setscrews.

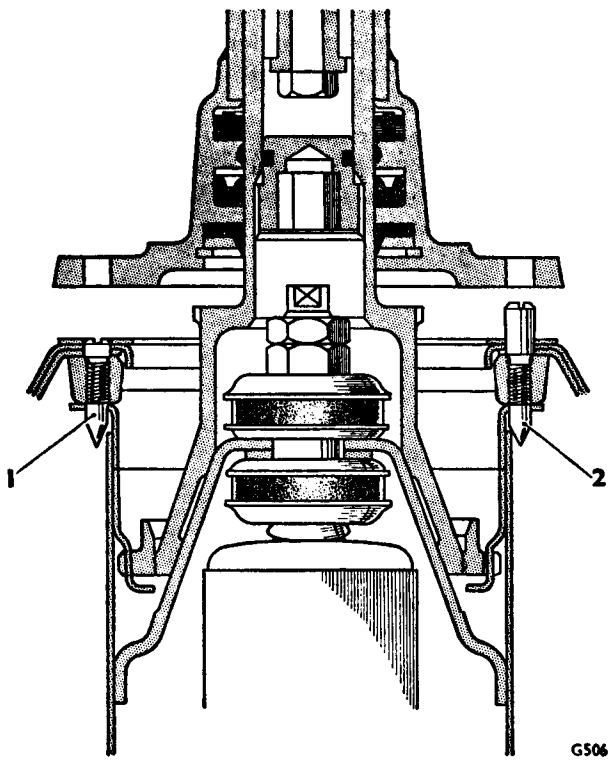


FIG. H33 METHOD OF ALIGNING HEIGHT CONTROL RAM AND SUSPENSION COMPONENTS

1 Short alignment screw (1 off)
2 Long alignment screw (2 off)

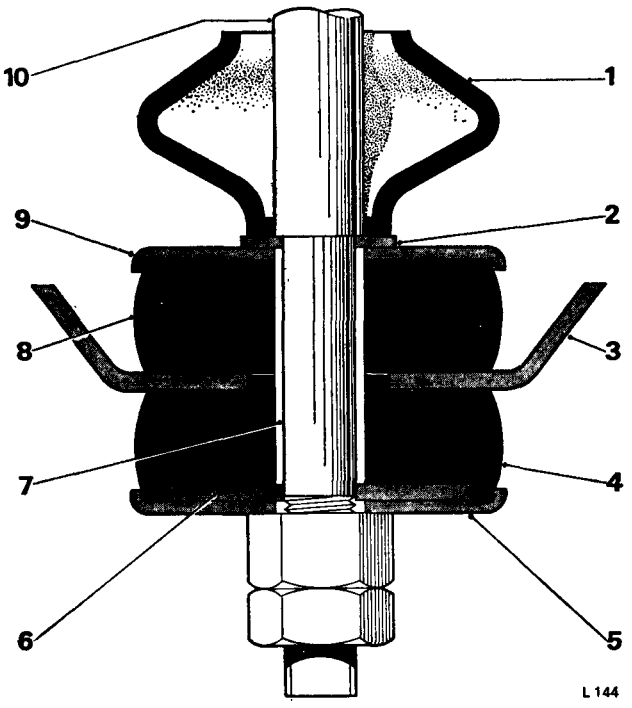


FIG. H34 DAMPER LOWER MOUNT

1 Rubber boot
2 Abutment washer
3 Support bracket
4 Bush
5 Cup washer
6 Lower abutment washer
7 Distance piece
8 Bush
9 Cup washer
10 Damper spindle

10. Allow the damper to extend by supporting and lowering the retaining plate from the trailing arm spring housing; withdraw the damper with retainer from the centre of the road spring.

11. Remove the lock-nut and full nut from the lower end of the damper; remove the rubber bushes, retainers, and retaining plate.

12. Collect the remaining rubber and retainer from the top of the damper.

Shock damper—To fit

Fit the damper by reversing the procedure given for removal, noting the following points.

1. Ensure that the rubber bushes and retainers are fitted to each side of the damper securing points and that the retainers for the rubbers seat correctly at the securing points.

2. At the upper and lower ends of the damper, fit and tighten the full nut and lock-nut. The top of the lock-nut must be level with the top of the damper stem thread (*see Fig. H33*).

3. When fitting the height control ram, position the ram outer body to just seat at the top of the longer assembly alignment screws.

4. Use the spanner (RH 8051) to torque tighten the ram piston to the road spring isolator tube nut to between 80 lb.ft. and 90 lb.ft. (11,1 kg.m. and 12,4 kg.m.); lower the ram outer body onto the spring housing.

5. Remove one alignment screw at a time, fitting the correct setscrew in its place. Finally, progressively tighten the ram securing screws.

6. Bleed the hydraulic system as described in Chapter G – Hydraulic System.

Shock damper—To remove

Cars after Car Serial Numbers SRH 4168, CBH 4106, SRX 6122 and CRX 6102.

1. Repeat the Operations 1 to 5 previously described in 'Cars prior to Car Serial Numbers SRH 4168, CBH 4106, SRX 6122 and CRX 6102. Shock damper – To remove'.

2. Raise the ram body sufficiently to enable the special spanner (RH 8051) to be fitted to the lugs on the ram piston; unscrew the ram piston from the isolator.

3. Unlock and remove the damper upper lock-nut; remove the full nut, the rubber bush and retainer.

4. Support the damper lower bracket and remove the four setscrews.

5. Allow the damper to extend by supporting and lowering the retaining plate from the trailing arm spring housing, then withdraw the damper and bracket from the centre of the road spring.

6. Remove the lock-nut and full nut from the lower end of the damper; remove the rubber bushes, retainers and 'O' ring.

7. Collect the remaining rubber bush, retainer and 'O' ring from the top of the damper.

Shock damper—To fit

Fit the damper by reversing the procedure given for removal, noting the following points.

1. Ensure that the rubber bushes, 'O' rings and retainers are fitted correctly and are in good condition.

2. At the upper and lower ends of the damper, fit and tighten the full nuts and lock-nuts so that the top of the lock-nut is level with the top of the damper stem thread (*see Fig. H33*).

3. Using the special spanner (RH 8051), torque tighten the ram piston to the isolator to between 100 lb.ft. and 150 lb.ft. (13,8 kg.m. and 20,7 kg.m.). Release the ram outer body onto the spring housing, then progressively tighten the ram securing screws.

The special spanner (RH 8051) is used also to align the road spring, damper and isolator to the height control ram.

4. Bleed the hydraulic system as described in Chapter G – Hydraulic System.

For cars produced prior to Car Serial Numbers SRH 4168, CBH 4106, SRX 6122 and CRX 6102, a modified type of rear shock damper mounting is available.

The mounting utilises larger and slightly softer mounting rubbers, these should be fitted in the event of complaints of rear suspension noise. The material required for this Operation can be obtained in Modification Kit No. 5; refer to Parts List.

Lower mounting—To fit *(see Fig. H34)*

Reverse the procedure given for removal, noting the following points.

1. Fit the original special abutment washer to the damper lower spindle.
2. Fit a large cup washer and a bush to the spindle, then fit the original distance piece.
3. Fit the damper lower support bracket.
4. Fit the bush and washer, then a second cup washer.
5. Fit the nut and lock-nut.
6. Fit the damper support bracket to the car.
7. Repeat the procedure on the remaining rear damper.

Note When fitting a new damper it is most important that the special abutment washer supplied with the damper assembly is fitted to the damper stem. Under no circumstances use an ordinary $\frac{7}{16}$ in. (11,11 mm.) plain washer in place of the special abutment washer.

Printed in England

April 1970

T.S.D. 2476

Section H13
REAR ROAD SPRINGS

Coil road springs are fitted to the rear suspension and are supplied with packing pieces to compensate for minor variations in spring load during manufacture. The packing pieces, 0.048 in. (1,19 mm.) thick, may be fitted at either end of the spring adjacent to the rubber/canvas seatings. The maximum number of packing pieces which can be fitted to any one spring is twenty.

Note Rear suspension springs with a higher rate than standard springs are fitted to cars destined for countries in which difficult terrain may be experienced.

These springs are fitted in conjunction with the damper marked with a yellow paint band as described in Section H12 – Rear 'Monitube' shock dampers.

On all cars, a rear spring of slightly increased poundage is fitted to the driver's side of the car.

Road spring—To remove

1. Place the car on a ramp and chock both sides of the front wheels.

2. Remove the gear range selector thermal cut-out as described in Chapter M – Electrical System.

3. De-pressurise the hydraulic system (*see Chapter G – Hydraulic System*). Remove the height control ram and rear damper as described in Section H12 – Rear 'Monitube' shock dampers.

4. Disconnect the height control valve linkage at the trailing arm mounting points.

5. When removing the left-hand side rear spring, it will be necessary to remove the exhaust system from the mounting point immediately behind the body centre member.

6. Remove the setscrew securing the rebound strap to the underside of the body floor (*see Fig. H32*).

7. Disconnect the hand brake cable at two points.
   (a) The first pivot point on the hand brake mechanism of the rear brake calipers.
   (b) The support bracket integral with the trailing arm.

8. Disconnect the half-shafts at the outer ends and secure them to the final drive cross-member with strong cord. Do not pull the ball and trunnion joints outward.

9. Position a hydraulic jack with an extension and a hardwood block on the jack head centrally beneath the final drive casing. Carefully raise the car until the road wheels are just about to clear the ramp.

10. Position support blocks and the sill boards (RH 7820) beneath the body sills, forward of the rear wheels.

Note Care must be taken while work is being carried out on the car **not** to leave the car jacked so high that the wheels clear the ramp, otherwise damage may result around the trailing arm mounting points or the height control ball pin brackets.

11. Prise the bottom end of the spring from its seating on the trailing arm, taking care not to damage the lower rubber/canvas seating. Remove the spring and isolator assembly from the road spring housing.

12. Collect the rubber/canvas seating and packing pieces.

13. Remove the lower spring seating from the trailing arm.

Road spring—To fit

Carefully reverse the procedure given for its removal, noting the following points.

1. Ensure that the rubber/canvas seatings and the rubber isolator are in good condition; renew if necessary.

2. If six, or less, spring packings are to be fitted with the spring, ensure that a spring upper seating of standard size, i.e. 0.750 in. (1,80 cm.) in depth, is fitted to the top of the spring and that a standard spring lower seating is fitted to the base of the spring. Divide the packings equally between the top and bottom and seat them between the rubber/canvas seatings and the coil spring. If an odd number of packings are fitted, fit the greater number of packings to the top. This will facilitate adjustment to the car height when it may be necessary to adjust the number of packing pieces at the base of the spring.

3. If spring selection indicates that seven or more packings should be fitted with the spring, fit the special short rubber/canvas seating, i.e. 0.250 in. (6,35 mm.), to abut the spring upper housing. Fit the packings, then fit the standard rubber/canvas seating on the top of the spring (*see Fig. H35*).

Printed in England

April 1970

T.S.D. 2476

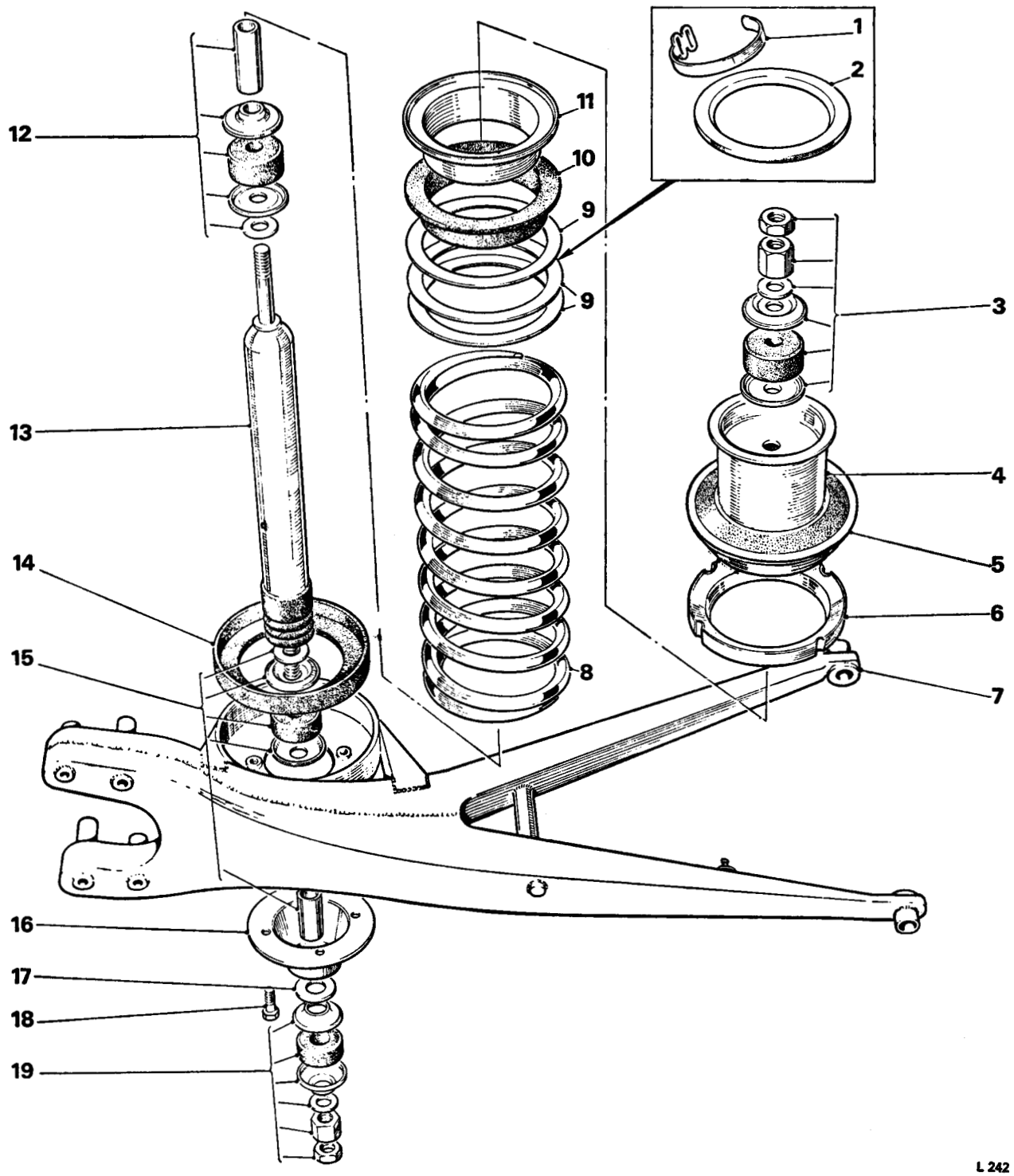


FIG. H35 EXPLODED VIEW REAR ROAD SPRING AND COMPONENTS (Early Cars)

1 Clip
2 Canvas spring seat
3 Damper upper mount nuts and rubbers
4 Isolator and cone
5 Cone
6 Isolator retainer
7 Trailing arm
8 Spring
9 Adjusting washers
10 Canvas seat
11 Spring seat
12 Upper mount components
13 Shock damper
14 Canvas seat
15 Damper lower mount components
16 Damper bracket
17 Packing piece
18 Setscrews (4)
19 Damper lower mount components

4. To prevent the packings from moving during assembly, they should be clipped together using thin pipe clips at three equi-spaced points; the length of clip required is determined by the number of packings to be fitted.

Note When using the extra spring seating, it must be remembered that the seating is approximately equal to the thickness of two packings. To allow for this, remove two packings from the number originally indicated during spring selection.

5. The standard rubber/canvas seating is used at the base of the spring and further fine adjustment to car rear height can be made by fitting up to three packings between the spring base and spring lower seating (*see Section H14 – Car height – Rear*).

6. A maximum of twenty packings is permissible to be used with any one spring.

7. Fit the spring, spring isolator and packing pieces into position.

Note On early cars, the top flange of the spring isolator is provided with holes to engage the three alignment screws which are fitted to the spring housing. These ensure correct alignment between the road spring and isolator and the ram.

8. Pass the damper through the spring and lock it in position at the top end only (*see Section H12 – Rear 'Monitube' shock dampers and Figures H33 and H34*).

Fit the ram to the isolator and spring housing as described in Section H12 – Rear 'Monitube' shock dampers.

Note It is most important to ensure that the correct securing setscrews are fitted to the ram.

9. Lower the car to enable the rebound straps to be fitted; connect the lower end of the damper to the trailing arm spring seating.

10. Ensure that the half-shaft universal couplings are seated correctly when fitted to the hub yokes and that the bearing retaining straps are seated correctly in the slots provided in the bearing caps.

11. With the car standing on a level surface, check the car height and make the necessary adjustments (*see Section H14 – Car height – Rear*).

Printed in England

April 1970

T.S.D. 2476

Section H14
CAR HEIGHT — REAR

Introduction

The car rear height is the vertical height of point 'B' above point 'A' (*see Fig. H36*). This must be checked whenever the rear suspension is disturbed, e.g. whenever a coil spring is removed.

Note The height can be checked accurately only if the car front height is approximately correct.

There are two conditions of car height. Each condition is separately checked.

The first condition is the 'showroom standing height', this term applies when the car is stationary with the engine switched off, unladen, and the automatic height control system discharged.

The second condition is the 'levelled height', this term applies when the car is fully laden, the engine running and the automatic height control system fully charged. This height remains constant regardless of the number of occupants and/or luggage.

The first condition, the subject of this Section, should be carried out with the automatic height control system inoperative, i.e. either with the hydraulic system completely discharged or with the height control system valve linkages disconnected and moved to the discharge positions (down at the rear, up at the front).

The second car height condition is checked with the automatic height control system operating; this condition is described in Chapter G – Hydraulic System.

Preparation

Preparation of the car for the height check is described in Section H8 – Suspension Settings.

To check the rear height measure the height from the level surface on which the car stands, to the rearmost bottom bolt which secures the forged brackets of the rear suspension cross-member to the body sill (*see Fig. H36*). This height should be between 0.625 in. and 0.875 in. (15,875 mm. and 22,225 mm.) less than the distance from the level surface to the rearmost bottom bolt which secures the rear hub assembly to the trailing arm. The maximum permissible difference in height between each side of the car is 0.187 in. (4,76 mm.).

If the 'showroom' height condition is incorrect at the rear, add or remove spring packings as necessary. One packing piece makes approximately 0.065 in. (1,67 mm.) difference to the car height. The packing pieces are described in Section H13 – Rear road springs.

'Showroom' height—To adjust

To adjust the 'showroom' height, proceed as follows.

1. Place the car on a ramp and chock the front wheels.
2. De-pressurise the hydraulic systems (*see Chapter G – Hydraulic System*).
3. Disconnect the damper at the lower end.
4. Disconnect the height control valve linkage at the trailing arm mounting points.
5. Remove the rear section of the exhaust system. Disconnect it at the joint situated immediately behind the body centre member.
6. Remove the setscrew securing the suspension rebound strap to the body floor.
7. Disconnect the hand brake cable at the first pivot point on the hand brake mechanism of the rear brake calipers and at the support bracket integral with the trailing arm.
8. Disconnect the half shafts at the outer joints and secure them to the final drive cross-member with strong cord. Do not pull the ball and trunnion joints outward.
9. Position a hydraulic jack with an extension centrally beneath the final drive casing. Fit a hardwood block on the jack head, then raise the car until the wheels are just about to clear the ramp. Position support blocks and the special sill boards (RH 7820) beneath the body sills forward of the rear wheels.

Note While work is being carried out on the car, care must be taken **not** to leave the car jacked too high so that the wheels clear the ramp, otherwise damage may result to the trailing arm mounting points or the height control ball pin brackets.

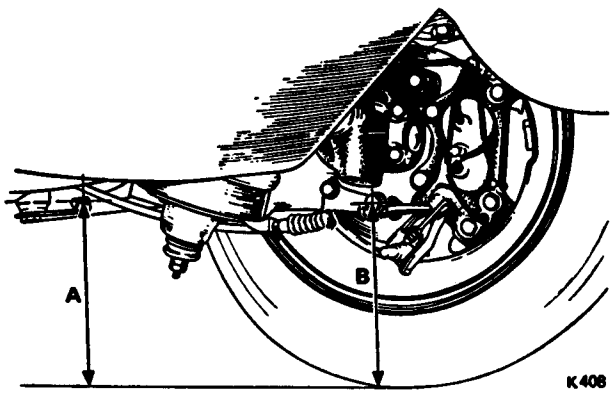


FIG. H36 CAR HEIGHT CHECKING POINTS—REAR

A Datum to centre of forging securing bolt
B Datum to centre of axle yoke securing bolt

10. Push the damper operating rod upward as far as possible into the spring, then wedge it in position using a lever inserted through the coils of the spring and beneath the rod. Take care not to bend the rod during this operation.

11. Raise the spring vertically from its lower seating, then fit or remove packing pieces as necessary between the spring and rubber/canvas seating.

Note Do not fit more than **three** packings to the bottom of the spring to correct the car height; if more than three are required they must be fitted to the top of the spring.

12. Instructions for removing the spring and for fitting the upper packing pieces are described fully in Section H13 – Rear Road Springs.

13. Re-check the car height.

Printed in England

April 1970

T.S.D. 2476

Section H15
REAR STABILISER BAR

Cars from Car Serial Number SRH 4258 and onwards, and CRH 5011 and onwards, are fitted with a rear stabiliser bar.

Convertible models, cars exported to U.S.A. and Canada, and those fitted with Heavy Duty type suspension do not have a rear stabiliser bar fitted.

Rear stabiliser bar—To remove *(See Fig. H37)*

1. Unscrew, but do not fully remove, the reach nut which secures the link to the trailing arm.
2. Using a hammer and soft metal drift placed behind the link, separate the seal between the link taper and the trailing arm.
3. Remove the reach nut and repeat Operations 1 and 2 on the other link.
4. Remove the setscrews and washers from the two brackets.
5. Remove the brackets, rubber bearing bushes and the stabiliser bar.
6. If it is necessary to remove the link from the stabiliser bar, repeat the procedures given in Operations 1, 2 and 3.

Rear stabiliser bar—To fit

To fit the rear stabiliser bar, reverse the procedure given for removal, noting the following points.

1. If it is intended to fit the original rubber bearing bushes and links, examine their condition and renew if necessary.

Note If the rear stabiliser bar does not require removal, no maintenance is necessary, except to check that all securing setscrews and nuts are tight at all times.

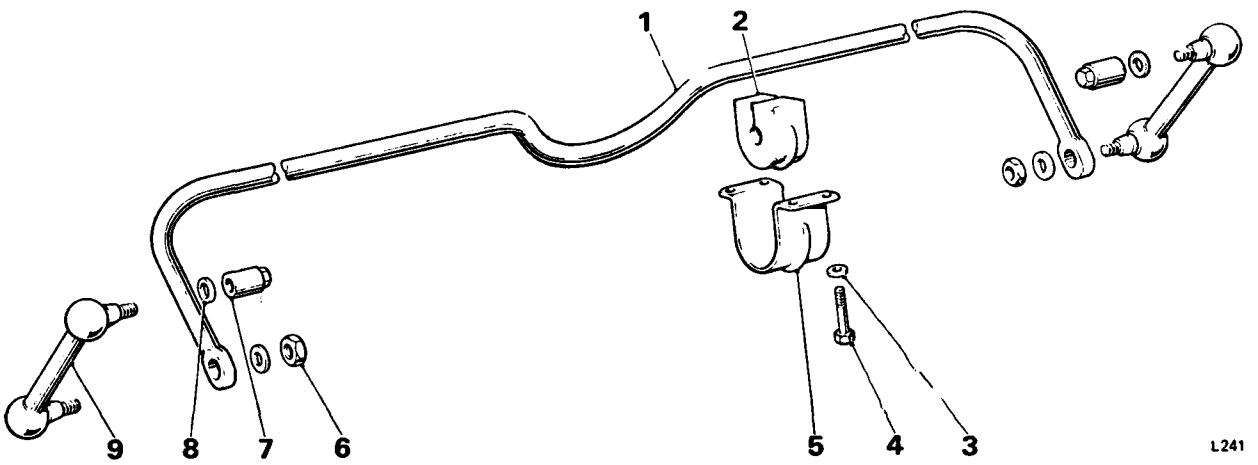


FIG. H37 EXPLODED VIEW REAR STABILISER BAR

1 Stabiliser bar
2 Rubber bearing
3 Washer
4 Setscrews
5 Bearing bracket
6 Nut
7 Reach nut
8 Washer
9 Link bolt assembly

Printed in England

January 1984

T.S.D. 2476

Section H16
ACCIDENT DAMAGE

The dimensioned illustrations in this Section are provided to assist in assessing accident damage to the front sub-frame, suspension components and rear suspension.

If it is suspected that the front sub-frame is damaged, it will be necessary to remove the sub-frame, front suspension, engine and transmission as one unit. To make the necessary checks refer to Section H1.

Components such as triangle levers may be removed individually (*see Section H3*), then checked and compared with appropriate illustration in this Section.

If damage to the rear cross-member or trailing arm is suspected, it will be necessary to remove them as a unit before checks can be carried out.

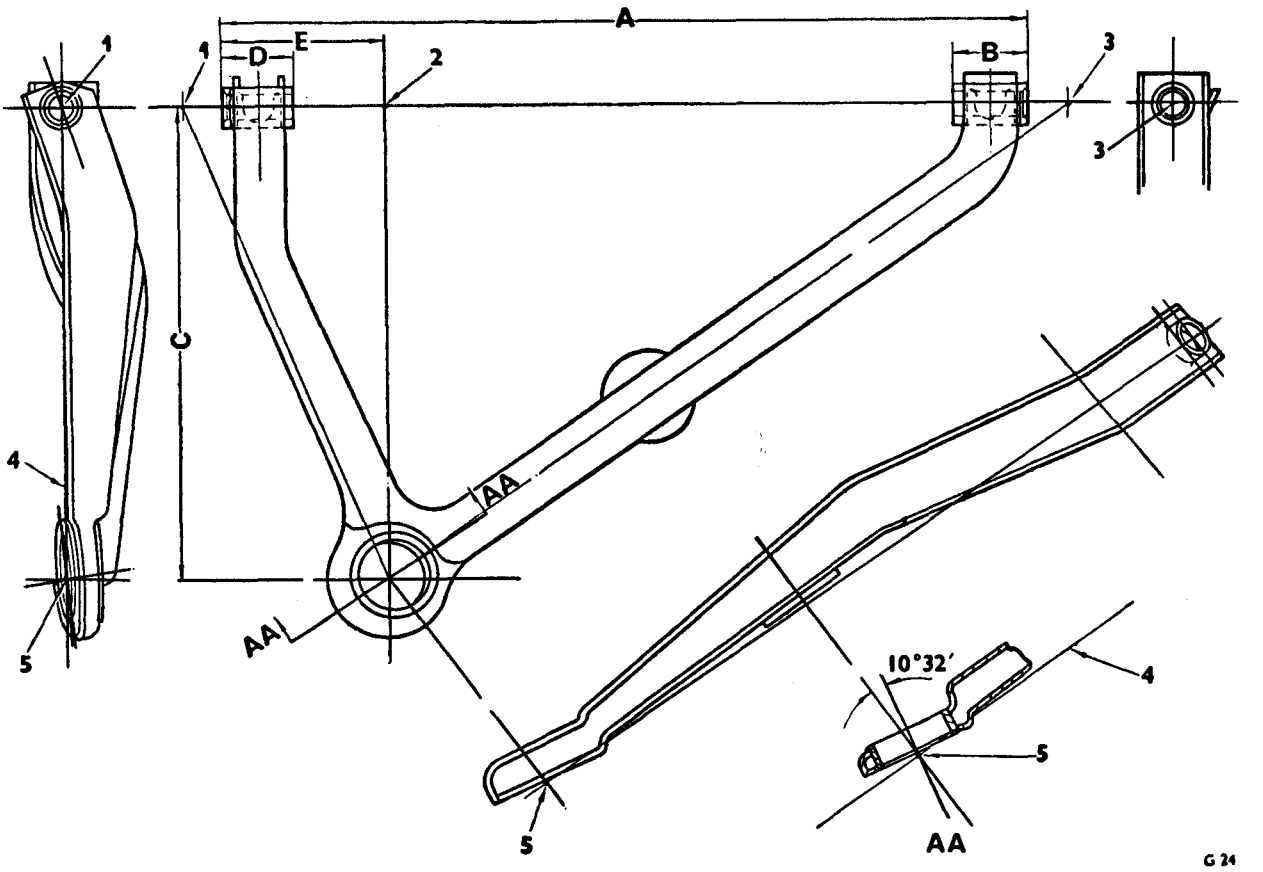


FIG.H38 CHECKING DIMENSIONS—UPPER TRIANGLE LEVERS

A	19.725in. (50,101cm.)	**1**	Point A
B	1.725in. (4,381cm.)	**2**	Point B
C	11.800in. (29,972cm.)	**3**	Point C
D	1.725in. (4,381cm.)	**4**	Reference line DB
E	4.000in. (10,160cm.)	**5**	Point D

Chapter H

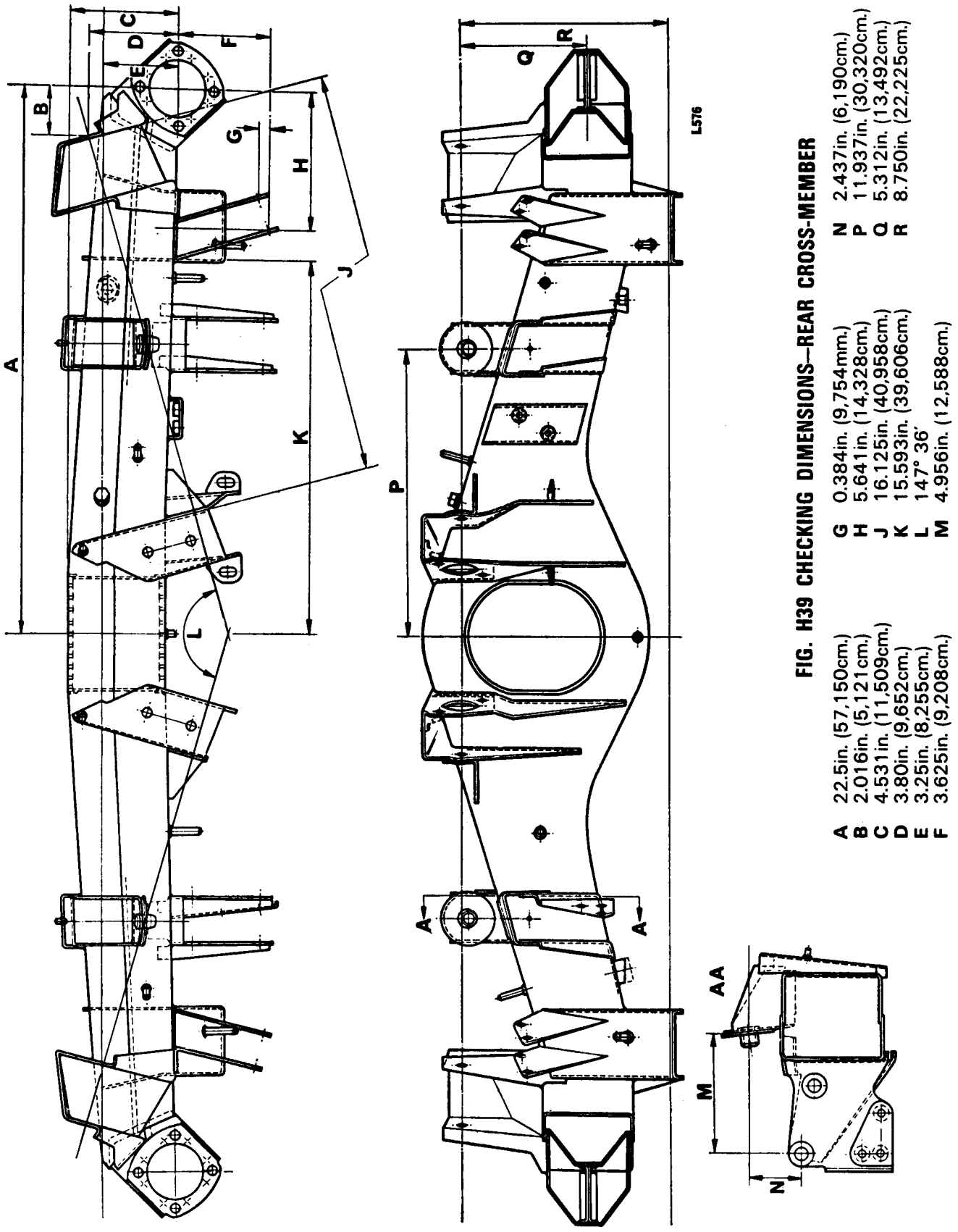


FIG. H39 CHECKING DIMENSIONS—REAR CROSS-MEMBER

A	22.5in. (57,150cm.)	**G**	0.384in. (9,754mm.)	**N**	2.437in. (6,190cm.)
B	2.016in. (5,121cm.)	**H**	5.641in. (14,328cm.)	**P**	11.937in. (30,320cm.)
C	4.531in. (11,509cm.)	**J**	16.125in. (40,958cm.)	**Q**	5.312in. (13,492cm.)
D	3.80in. (9,652cm.)	**K**	15.593in. (39,606cm.)	**R**	8.750in. (22,225cm.)
E	3.25in. (8,255cm.)	**L**	147° 36′		
F	3.625in. (9,208cm.)	**M**	4.956in. (12,588cm.)		

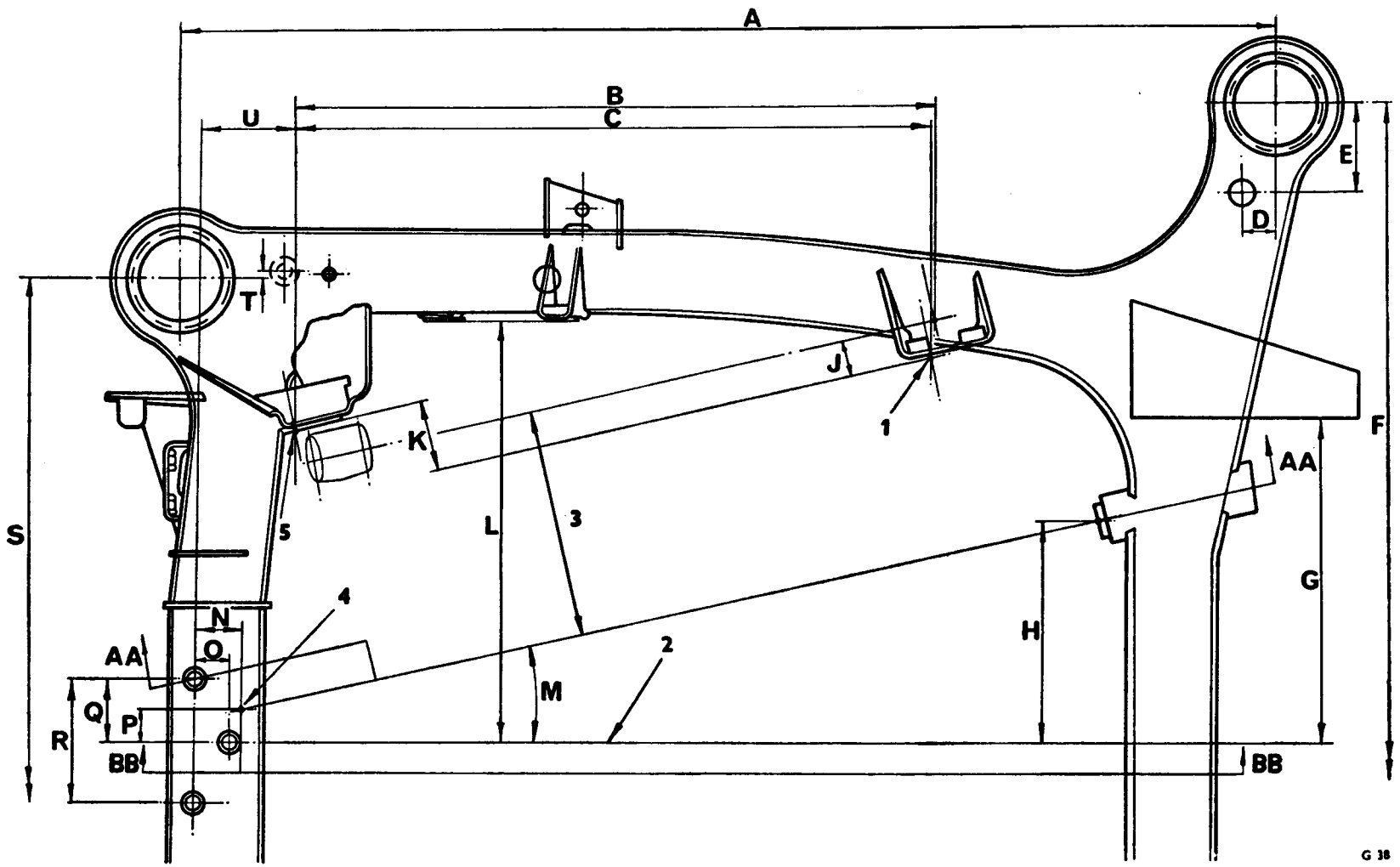


FIG. H40 CHECKING DIMENSIONS—FRONT SUB-FRAMES

A	37.832in. (96,093cm.)	**H**	7.727in. (19,627cm.)	**P**	1.062in. 2,697cm.)	**1**	Point D
B	21.990in. (55,855cm.)	**J**	1.333in. (3,386cm.)	**Q**	2.075in. (5,271cm.)	**2**	Centre line
C	21.945in. (55,740cm.)	**K**	2.40in. (6,096cm.)	**R**	4.150in. (10,541cm.)	**3**	Parallel axes
D	1.125in. (2,858cm.)	**L**	14.187in. (36,035cm.)	**S**	31.00in. (78,740cm.)	**4**	Point E
E	4.125in. (10,478cm.)	**M**	12° 30′	**T**	0.312in. (7,925mm.) centres	**5**	Point C
F	43.406in. (110,251cm.)	**N**	1.500in. (3,810cm.)	**U**	3.440in. (8,738cm.)		
G	11.250in. (28,575cm.)	**O**	1.125in. (2,858cm.)				

Chapter H

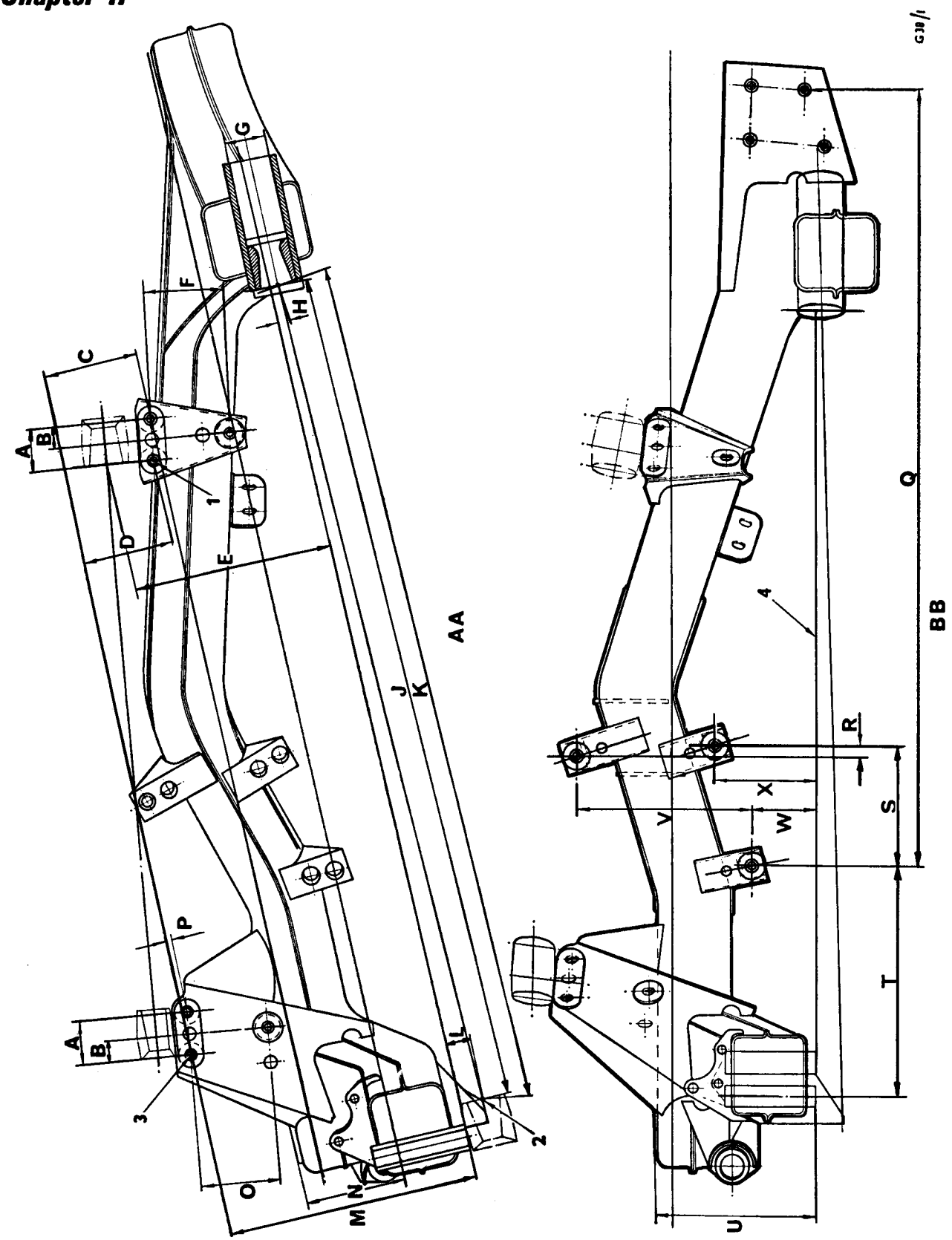


FIG. H41 CHECKING DIMENSIONS—FRONT SUB-FRAME

A	1.500in. (3,810cm.)	**H**	0.319in. (8,10mm.)	**P**	0.217in. (5,512mm.)	**W**	2.475in. (6,286cm.)
B	0.750in. (1,905cm.)	**J**	30.810in. (78,257cm.)	**Q**	31.141in. (79,098cm.)	**X**	3.600in. (9,144cm.)
C	3.81in. (9,677cm.)	**K**	30.800in. (78,232cm.)	**R**	0.406in. (10,312mm.)	**1**	Point D
D	3.593in. (9,126cm.)	**L**	0.812in. (20,63mm.)	**S**	4.400in. (11,176cm.)	**2**	Point E
E	7.388in. (18,766cm.)	**M**	9.246in. (23,485cm.)	**T**	8.525in. (21,654cm.)	**3**	Point C
F	2.875in. (7,303cm.)	**N**	3.531in. (8,969cm.)	**U**	6.156in. (15,636cm.)	**4**	Datum line Z
G	1.484in. (3,77cm.) dia.	**O**	2.875in. (7,303cm.)	**V**	6.468in. (16,428cm.)		

Printed in England

January 1984

T.S.D. 2476

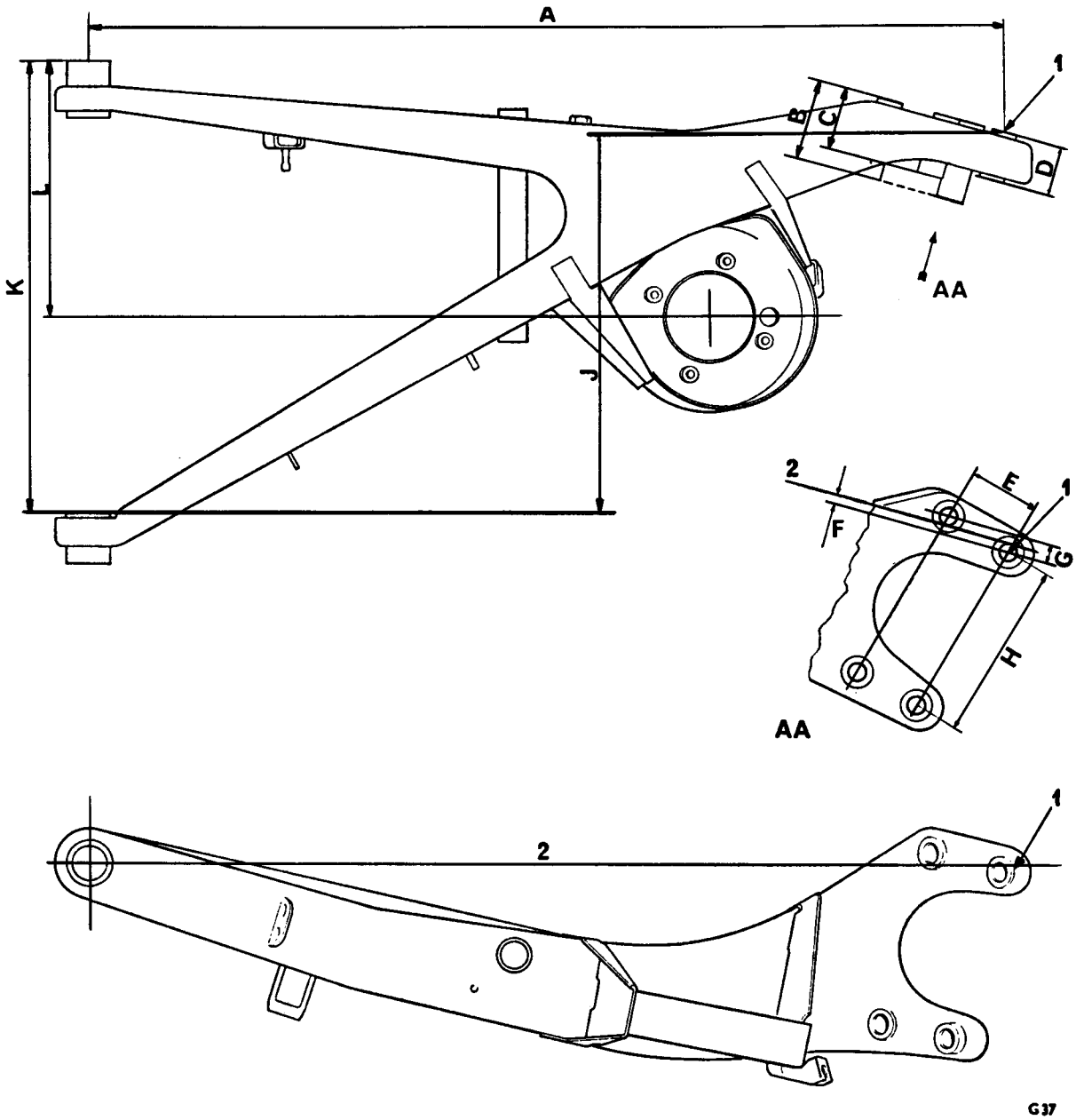
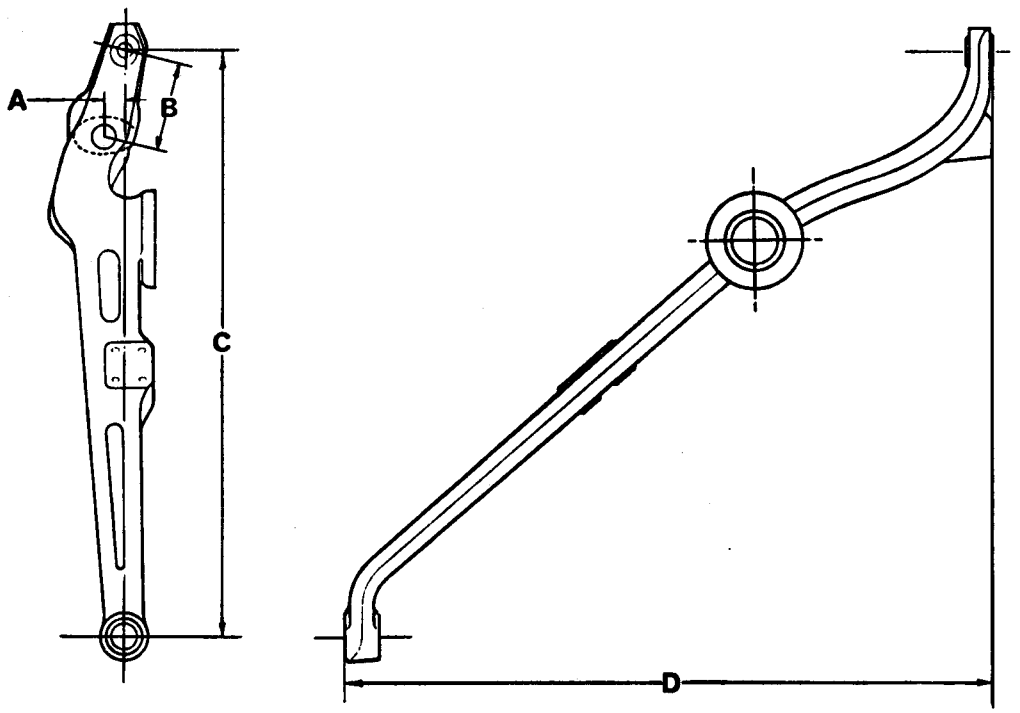


FIG. H42 CHECKING DIMENSIONS—RIGHT-HAND TRAILING ARM

A 32.445in. (82,410cm.)
B 2.737in. (6,952cm.)
C 2.112in. (5,365cm.)
D 1.612in. (4,095cm.)
E 2.500in. (6,350cm.) centres
F 0.269in. (6,83mm.)
G 0.647in. (1,643cm.)
H 6.325in. (16,066cm.) centres
J 13.150in. (33,401cm.)
K 16.050in. (40,767cm.)
L 9.171in. (23,294cm.)
1 Point Y
2 Datum line P

Chapter H



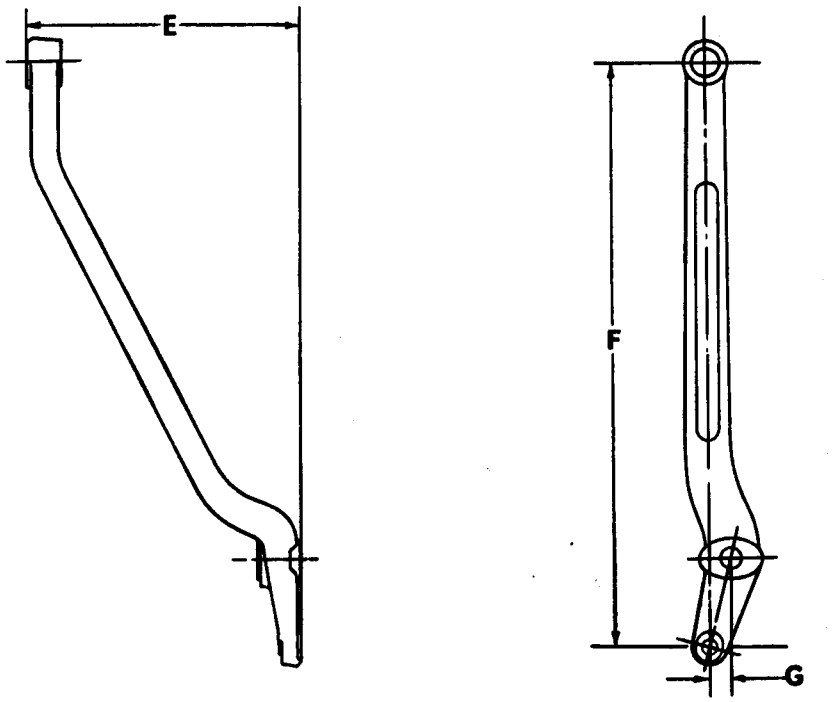


FIG. H43 CHECKING DIMENSIONS—FRONT AND REAR LOWER TRIANGLE LEVERS

A	0.650in. (1,651cm.)	**D**	20.238in. (51,405cm.)	**G**	0.650in. (1,651cm.)
B	2.812in. (7,143cm.)	**E**	8.337in. (21,176cm.)	**1**	Lower triangle lever–rear
C	18.50in. (46,990cm.)	**F**	18.50in. (46,990cm.)	**2**	Lower triangle lever–front

Printed in England

April 1970

T.S.D. 2476

Section H17
WORKSHOP TOOLS

The following is a list of special tools to be used when servicing or overhauling the front and rear sub-frame and suspension. General tools are not listed as these can be obtained locally.

FRONT SUB-FRAME

Tool No.	*Description*	*Tool No.*	*Description*
RH 7761	Mobile stand	RH 7846	Resilient metal mount centralising fixture
RH 7762 }	Engine and transmission/gearbox	RH 7849	'C' spanner
RH 7763 }	alignment fixtures	RH 7850	'C' spanner
RH 7768	Extraction and insertion tool – ball joint	RH 7874	Box spanner
RH 7774	Slotted tube spanner	RH 7889	Retainer – front road springs
RH 7775	Slotted spanner – upper triangle lever	RH 7909	Compressing tool – front road springs
RH 7811	Torque checking fixture	RH 8015	Locking fixture
RH 7813	Spanner – open ended	RH 8019	Extractor
RH 7820	Body sill boards	RH 8030	Box spanner and locking bar
RH 7839	Support plate with extension nuts	RH 8080	Extractor
RH 7840	Fixture	RH 8100	Extractor
RH 7844	Alignment fixture – 4 off per sub-frame		

REAR SUB-FRAME

Tool No.	*Description*	*Tool No.*	*Description*
RH 7847	Resilient metal mount centralising fixture	RH 8016 }	Extractor beam
RH 7848	Split packing ring	RH 8017 }	Hydraulic ram
RH 7849	'C' spanner	RH 8018 }	Bolt – 2 off
RH 7854	Alignment fixture	RH 8048	Special pin spanner and extension bar
RH 7858 }	Alignment screws (long) – 2 off	RH 8051	Hook wrench
RH 7859 }	Alignment screw (short) – 1 off		