SECTION H

THE REAR SUSPENSION

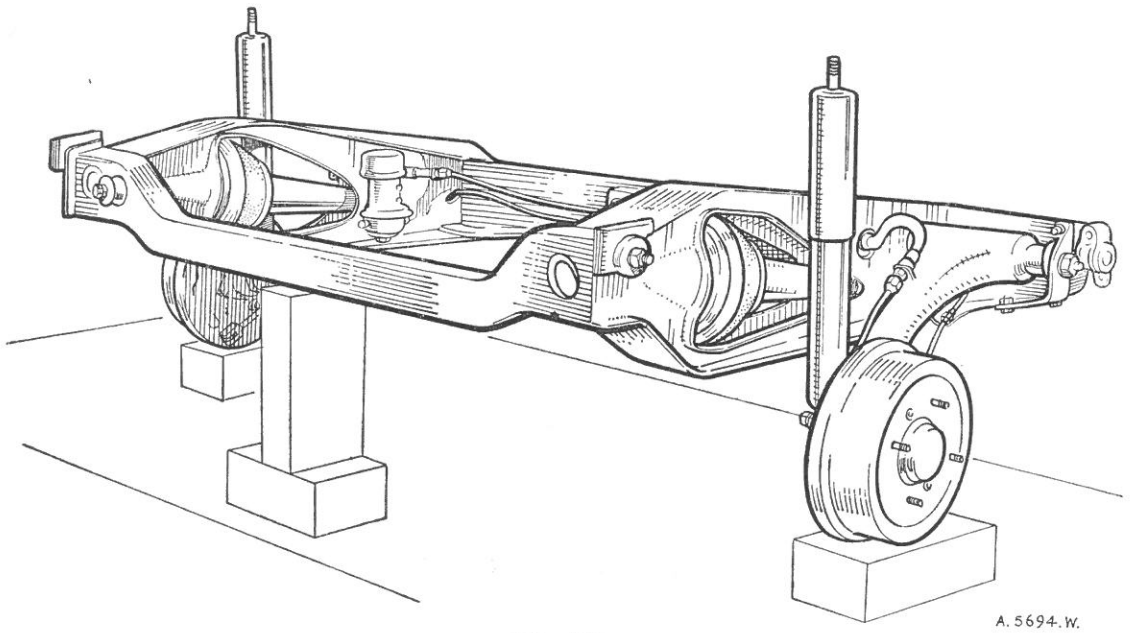


Fig. H.1

The rear sub-frame assembly (rubber suspension)

Section H.1

SUB-FRAME

Removing

Drain the fuel tank and disconnect and remove the earth lead from the battery and both leads from the fuel pump. Release the flexible hoses from both the inlet and delivery connections on the fuel pump.

Unscrew the tube nut to release the hydraulic pipe line from the pressure regulating valve mounted on the rear sub-frame front member.

Slacken off and remove the exhaust pipe to manifold clamp, and release the pipe from its fixing point on the gear change extension casing and from the two locations on the rear sub-frame. Take particular note of the number of spacing washers on the gear change casing fixing point. Remove the exhaust pipe assembly from the car.

Remove the end finishers from the sill panels and disconnect the rear dampers from inside the luggage compartment. To gain access to the left-hand damper nut remove the fuel tank as detailed in Section D.1.

Remove the two hand brake cable fairleads from the floor and disconnect the cables from the lever trunnion. Pull the cables through the floor from beneath the car.

Support the body with a sling, locating padded hooks under the rear wings or the luggage compartment top panel.

Withdraw the eight mounting bolts (two at each attachment point) and raise the body to release the complete sub-frame.

Refitting

Refitting is a reversal of the dismantling procedure, with particular attention being given to the following points.

Make certain that the tapped holes in the body are lined up with the holes in the mounting blocks.

The exhaust system must be refitted without the system being subjected to strain; this is most important. The refitting procedure given in Section A.5 must be followed.

Finally, bleed the hydraulic system and readjust the hand brake cables.

Section H.2

RADIUS ARMS

Removing

Release the telescopic rear damper upper mountings as detailed in Section L.2.

Raise the car and support it beneath the rear sub-frame side-member. Remove the road wheel and disconnect the brake hose from the bracket on the trailing arm.

With the radius arm hanging and thereby taking the load off the spring unit, the strut can be prised away from the spring unit flange and pulled out of its seating cup in the trailing arm boss. The nylon cup may be left in the arm when the strut is pulled away; it can, however, be removed with the fingers unless it is damaged and unfit for further service, when it may be necessary to prise it from the arm.

Disconnect the hand brake cable from the actuating lever on the brake backplate, remove the nut from the cable sector pivot and withdraw the sector and cable.

Remove the radius arm outer bracket shroud.

Remove the nut and washers from the trailing arm shaft, and the four set screws to release the arm outer support bracket.

Lift the arm assembly away from the car, taking care

not to lose the thrust washers and rubber seal fitted between the arm and the side-member.

Dismantling

Remove the dust seal and thrust washers from the ends of the shaft and withdraw the shaft. The radius arm is fitted with a needle-roller bearing on the inner end of the pivot and a bronze bush on the outer end. Should the bronze bush fitted in the bore of the arm be worn or the shaft show signs of ridging, the bush should be renewed and a new shaft fitted. Use Service tool 18G 583 to remove the old bush and Service tool 18G 584 to fit the new bush.

Before reaming the bush the needle bearing and grease tube **must** be removed. Fit the reamer guide bush 18G 588 A in place of the needle bearing and pass the reamer 18G 588 through the guide bush. After reaming, remove the reamer and guide bush and thoroughly clean out all swarf from the interior of the bore of the radius arm. Adequately lubricate all pivot components with grease to Ref. C and reassemble.

Oil is not a satisfactory lubricant at this point and must not be used.

The needle-bearing outer race is removed by the use of Service tool 18G 583 B in conjunction with Service tool 18G 583, and is replaced with Service tool 18G 620.

If the existing shaft is in good order, make certain that the lubricator is clear before refitting to the arm.

The rear hub stub shaft is pressed in.

Refitting

The radius arms may be replaced by carrying out the removal instructions in the reverse order, provided the following points are given special attention.

The nylon cup and dust seal must be repacked with Dextagrease Super G.P., supplied by BMC Service Ltd. in 1-lb. (·45-kg.) tins (Part No. 97H 2276), refitted to the ball end of the spring strut, and the dust seal lipped over the edge of the cup; this is most important. If the nylon seat is fitted into the arm and then followed by the strut ball end, the rubber seal cannot be lipped over the cup to make dust-sealing effective.

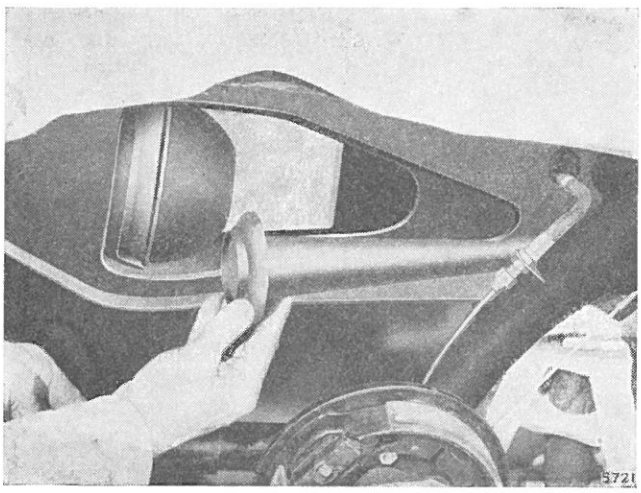


Fig. H.2

Extract the strut from the spring unit and pull it rearwards to disengage the ball end from the radius arm

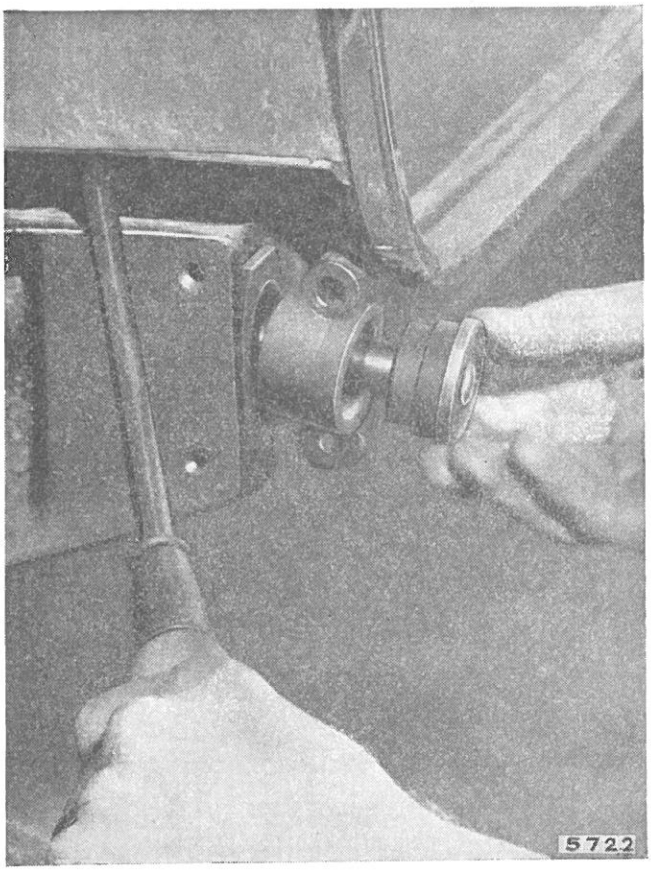


Fig. H.3

Removing the rear sub-frame front mounting support pin assembly

Refit the strut and the spring unit (see Section H.3).

Finally, bleed the hydraulic system.

Section H.3

SPRING UNITS
(Rubber suspension)

Removing

Release the telescopic damper from the inside of the luggage compartment as in Section L.2.

Raise the car, support it beneath the sub-frame side-member, and remove the road wheel.

With the radius arm hanging in its lowest position the spring strut can be extracted from the frame side-member and the spring unit removed.

The nylon seating can be prised out of the arm boss.

Refitting

Refitting is a reversal of the removal sequence.

The nylon seating must be fitted to the strut ball end and the rubber dust seal lipped over the edge of the seal before the strut is refitted.

Refit the strut and then insert the spring unit.

Make certain that the spring unit and spring strut are correctly located on their individual spigots whilst the radius arm is being raised to reconnect the upper end of the damper. Failure to observe this instruction may result in a vehicle having the appearance of being trimmed too high at the back, and would probably damage both the spring and spring strut beyond recovery.

Section H.4

SUB-FRAME MOUNTINGS

Front mounting

Jack up the car at a point between the bumper and the rear body panel.

Remove the radius arm as detailed in Section H.2.

Unscrew and remove the nut securing the mounting support pin to the sub-frame. Withdraw the mounting block to body screws. Prise the body and sub-frame apart sufficiently to enable the support pin, blocks, and rubbers to be extracted.

When refitting, insert the mounting block to body screws before tightening up the support pin nut.

Rear mounting

Jack up the car at a point between the bumper and the rear body panel.

Withdraw the mounting block to body screws and remove the nut from the end of the mounting support pin.

Prise the body and the frame apart sufficiently only to allow the block and rubbers to be removed.

When refitting, insert the mounting block to body screws before tightening up the support pin nut.

Section H.5

HUBS

Removing

Jack up the vehicle, and remove the road wheel and the brake-drum.

Prise off the grease-retaining cap.

Extract the split cotter pin and remove the slotted nut from the end of the stub shaft.

Withdraw the hub assembly using Service tool 18G 304 and adaptor bolts 18G 304 F.

Dismantling

To remove the hub bearings drift the inner races of both bearings from the hub bore. Remove the grease-retaining seal and extract the outer bearing races, using Service tool 18G 260 with adaptor 18G 260 C.

Reassembling

Make certain that the outer race of both bearings are fitted hard against the register in the hub bore.

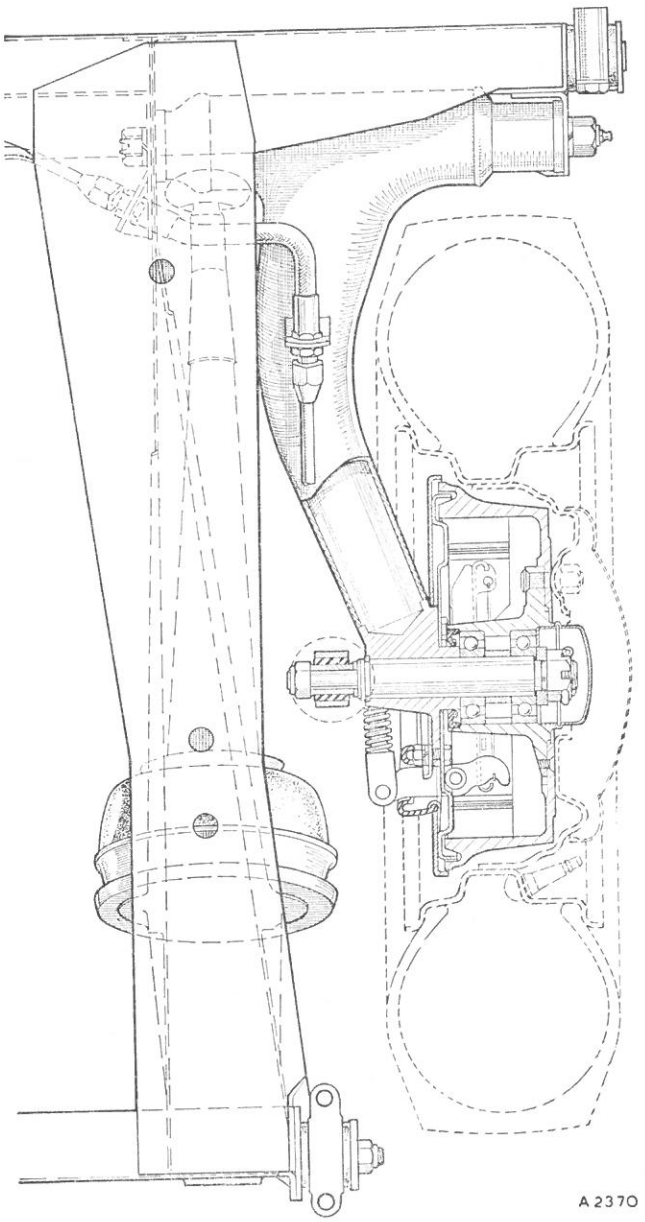


Fig. H.4

The rear radius arm, showing a section through the hub assembly

Refit the inner races and bearing spacer, at the same time repacking with grease to Ref. C. Fit a new grease-retaining seal in the hub bore if the old seal was damaged during removal.

Refitting

When refitting the hub and bearing assembly to the stub shaft care must be taken to ensure that the bearing spacer is lifted over the shoulder on the stub shaft before pressure is applied to push the assembly onto the shaft.

Place the thrust washer on the end of the stub shaft with the chamfered bore towards the bearing, refit the slotted nut, tighten up, and secure with the split cotter pin.

Repack the grease cap with grease to Ref. C before refitting.

Section H.6

SUSPENSION STRUTS

A circular-section washer is fitted between the body of the suspension strut and the shoulder of the knuckle end. When removing a defective strut make certain that a washer is also fitted to the new strut. It is important that only one washer is fitted to each of the rear struts.

Section H.7

HYDROLASTIC SUSPENSION

The system consists of two front and two rear displacer units intercoupled longitudinally. Each is made of sheet steel and rubber and consists of a piston, a diaphragm, a lower and upper chamber housing, and a conical spring of compressed rubber.

Contact of the front wheels with a road irregularity forces the piston to push the diaphragm up; increased pressure displaces some of the fluid from the bottom chamber to the top chamber. The rubber springs deflect due to the pressure increase and fluid displacement, and the resultant pressure increase causes fluid to discharge through the interconnecting pipe into the rear displacer unit.

The fluid entering the rear displacer forces the diaphragm to react against the piston, resulting in the car height at the rear being raised. These events are virtually simultaneous and the car therefore rides an obstruction without pitch motion of the body. The action of the suspension is similar when the rear wheels negotiate the irregularity.

The fluid used in the system is a mixture of water and alcohol into which an anti-corrosive agent has been introduced.

The front suspension also comprises upper and lower arms of unequal length located in the side-members of the front sub-frame with their outer ends attached by ball joints to the swivel hubs.

The rear suspension, in addition to the Hydrolastic units, consists of independent trailing arms with auxiliary coil springs.

Section H.8

DEPRESSURIZING, EVACUATING, AND PRESSURIZING THE HYDROLASTIC SYSTEM

Before any major work can be carried out on the suspension and its components, the hydrolastic system must be depressurized and in some cases evacuated. For this operation service equipment part number 18G 703 or 18G 682 must be connected to the pressure valves on the rear sub-frame.

Before using Service equipment 18G 703 check that the pressure/vacuum tank is filled to the level indicated at the rear of the unit. The vacuum and pressure valves are identified by colour only; vacuum (yellow) and pressure (black.)

Early service equipment (18G 682) has separate fillers for the pressure and vacuum tanks and are filled to the level shown on the dipstick. One side of the dipstick shows the level in the pressure tank and the other side the level in the vacuum tank.

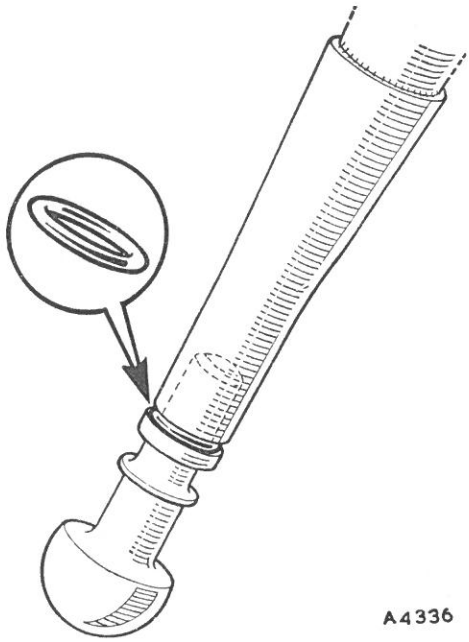


Fig. H.5

A suspension strut, showing the special circular-section washer fitted between the strut body and the knuckle shoulder

Top up to the correct levels with Hydrolastic Fluid, BMC Part No. 97H 2801.

The vacuum and pressure valves are identified by number or colour; vacuum (1) colour yellow, and pressure (2) colour black.

Depressurizing

(1) Remove the pressure valve dust cap and connect the black connector to the valve with the knurled knob unscrewed.
(2) Open the black valve (valve 2) and screw in the knurled knob to release the fluid from the suspension system into the units pressure tank.
(3) Close the black valve (valve 2). The gauge should read zero if all the pressure has been released.
(4) Remove the black connector and replace the pressure valve dust cap, and the plug in the black connector.
(5) Repeat the above procedure on the second valve to depressurize the other side of the system.

Evacuating

After fitting new interconnecting pipes, or displacer units it is essential that the air is evacuated from the system and a partial vacuum created. Service equipment 18G 703 or 18G 682 must be used for this purpose as follows:

(6) Remove the pressure valve dust cap and connect the yellow connector to the valve on the sub-frame.
(7) Close the yellow valve (valve 1) on the service unit.
(8) Operate the vacuum pump until a reading of 27 in. (68·6 cm.) of mercury is obtained on the vacuum gauge and all movement of fluid in the tube has stopped. Subtract ·5 in. (1·27 cm.) of mercury for every 500 ft. (152 m.) above sea level.

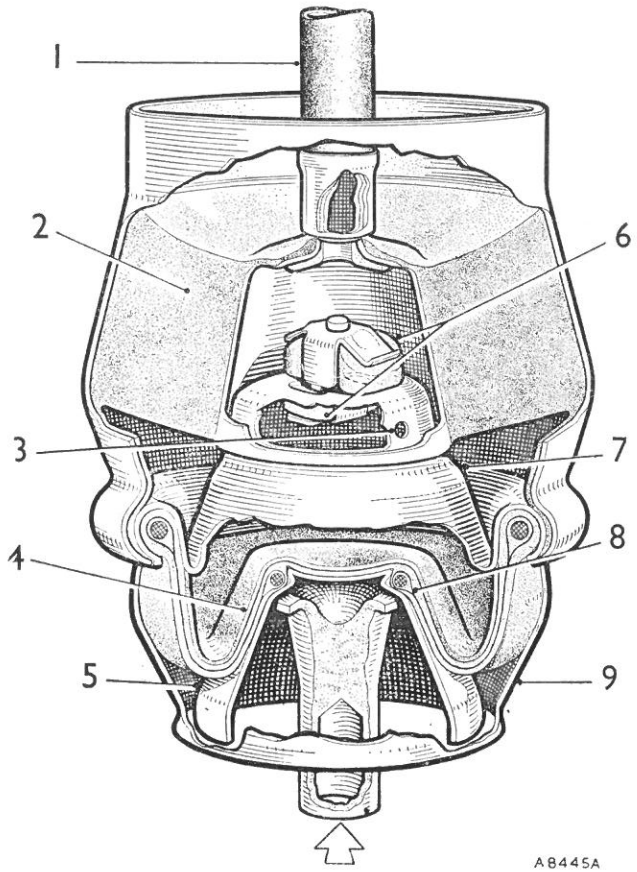


Fig. H.6

The hydrolastic displacer unit

1. Interconnecting pipe.
2. Rubber spring.
3. Damper bleed.
4. Butyl liner.
5. Tapered piston.
6. Damper valve.
7. Fluid separating member.
8. Rubber diaphragm.
9. Tapered cylinder.

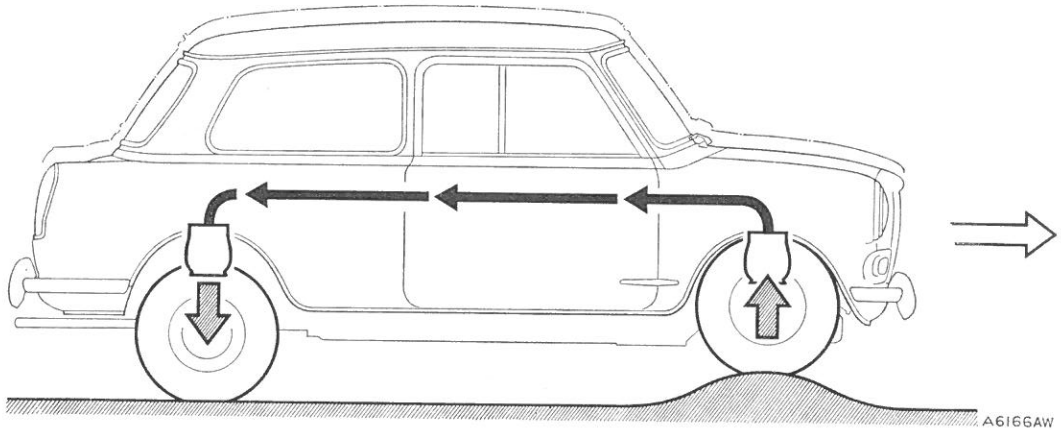


Fig. H.7

The tail rises in response to upward motion of the front wheel

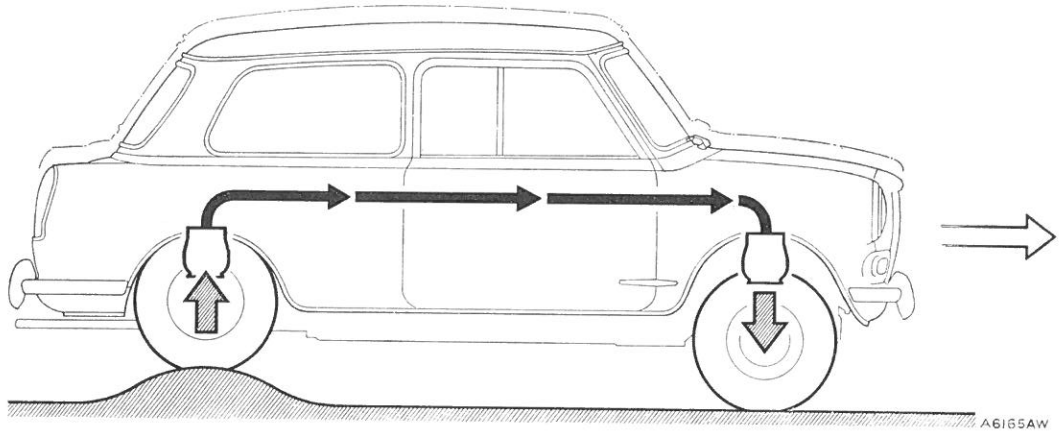


Fig. H.8

The nose rises in response to upward motion of the rear wheels

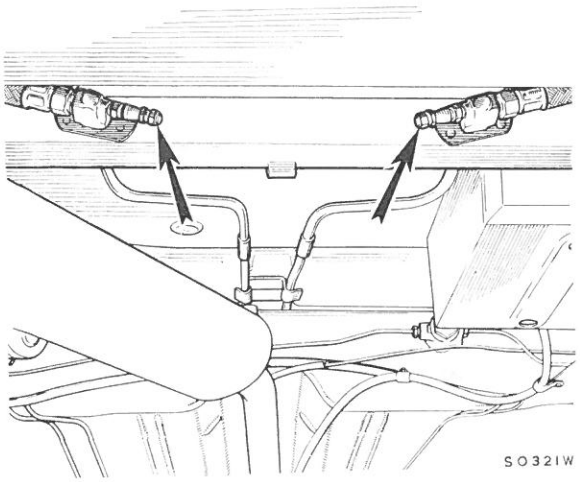


Fig. H.9

The hydrolastic system pressure valves on the rear sub-frame

(9) Open the yellow valve (valve 1). Wait one or two minutes until any further movement in the tube has stopped and remove the yellow connector.

(10) Replace the connector plug.

Pressurizing

Having carried out repairs and evacuated to ensure that all air is out of the system, pressurization should be carried out as follows with the car in the condition given in Section H.13 and resting on all four wheels.

(11) Connect the servicing unit black connector to the pressure valve on the rear sub-frame with the knurled knob unscrewed.

(12) Close the black valve (valve 2) and open the bleed valve.

(13) Operate the pressure pump until air is evacuated from the connecting tube and fluid appears at the bleed valve.

(14) Close the bleed valve and screw in the knurled knob.

(15) Increase the pressure until the normal operating pressure is obtained, see **'GENERAL DATA'.** If a new displacer unit has been fitted pressurize to the figures given in Section H.13.

(16) Unscrew the knurled knob and open the black valve (valve 2) to release the pressure in the connecting pipe.

(17) Remove the black connector and refit the sealing plug.

(18) When pressurizing above the normal pressure as item 15, wait 30 minutes to allow the vehicle to settle. Reconnect the black connector with the knurled knob unscrewed, close black valve (valve 2) screw in the knurled knob, open black valve (valve 2) until the normal pressure is shown on the gauge.

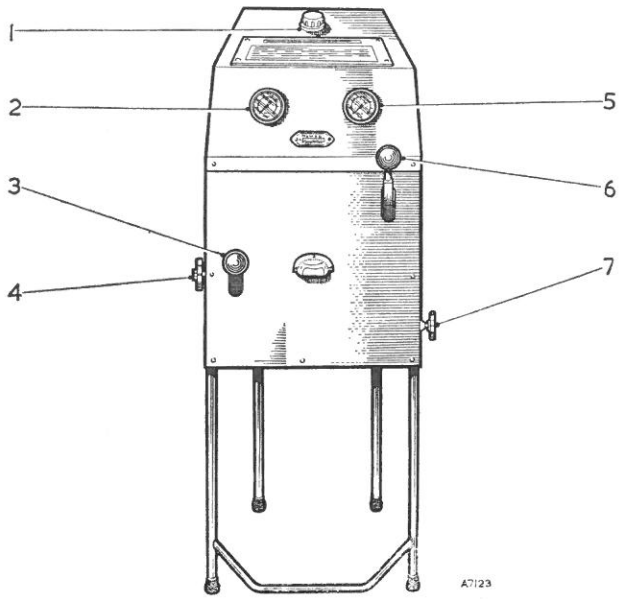


Fig. H.10

The suspension service unit

1. Combined vacuum/ pressure tank.
2. Pressure gauge.
3. Pressure pump handle.
4. Black valve (valve 2).
5. Vacuum gauge.
6. Vacuum pump handle.
7. Yellow valve (valve 1).

(19) Unscrew the knurled knob, open the black valve (valve 2) to release the pressure in the connecting pipe.

(20) Remove the black connector replace the connecting sealing plug and the valve dust cap.

●Service unit maintenance

Should the service equipment 18G 703 be used continuously it may be necessary to carry out the following maintenance.

Lubrication

(1) Remove the front panel.

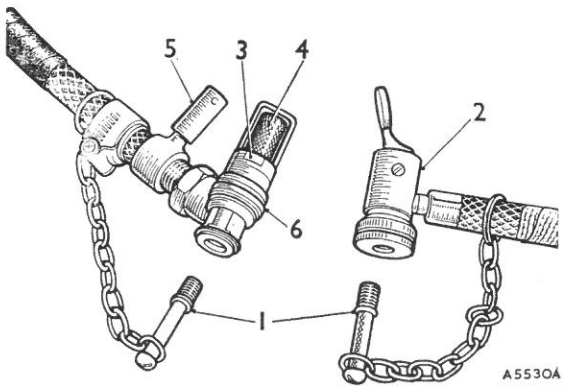


Fig. H.11

The suspension service unit connectors

1. Sealing plugs.
2. Evacuating connector.
3. Depressurizing and pressurizing connector.
4. Knurled knob.
5. Bleeding screw.
6. Locking slide.

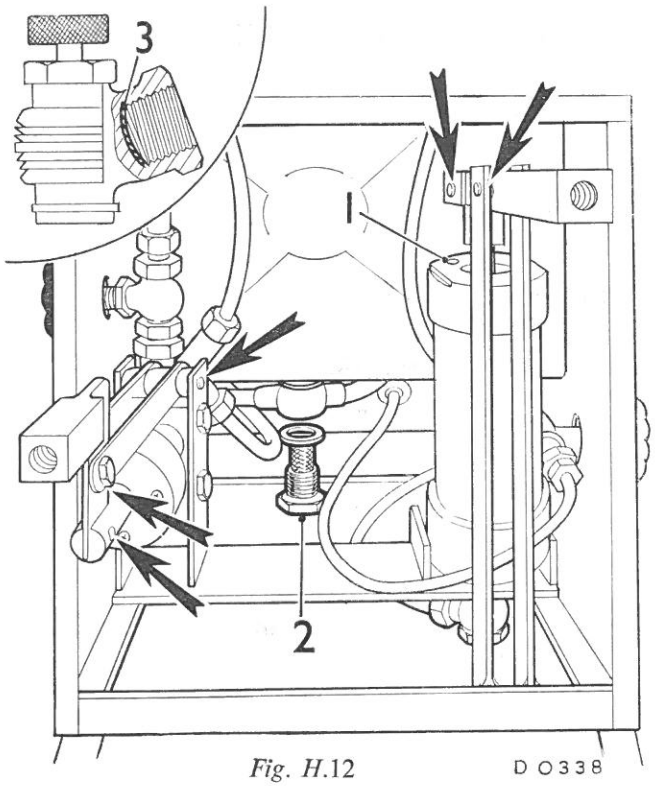


Fig. H.12 D 0338

Servicing points on unit 18G 703

1. Vacuum cylinder orifice.
2. Banjo bolt with filter.
3. Filter (black connector).
4. Lubrication points arrowed.

(2) Fill the vacuum pump with recommended vacuum oil S.A.E. 10 through the filler hole in the top of the pump when the lever is at the end of its downward stroke.

(3) Lubricate the service unit mechanism periodically (see Fig. H.12).

Cleaning filters

(4) Place a clean container under the unit and remove the banjo union bolt (2, Fig. H.12). Clean the filter and refit the bolt (2) with the sealing washers correctly located.

(5) Remove the black connector from the bleed valve body. Clean the filter (3) in the connector housing (Fig. H.12). When refitting use jointing compound to seal the thread.

(6) Service tool 18G 682 should be serviced in a similar manner.

IMPORTANT.—When the equipment is not in use both valves should be left open.●

Section H.9

DISPLACER UNITS

Removal

(1) Raise the car and support it beneath the sub-frame member.

(2) Remove the road wheel and remove the bump rubber from the sub-frame.

(3) Depressurize the Hydrolastic system, see Section H.8.

(4) Release the helper spring from the radius arm.

(5) Disconnect the flexible Hydrolastic hose from its union on the rear face of the sub-frame.

(6) Remove the displacer strut and turn the unit anti-clockwise and withdraw it from the frame.

Refitting

(7) Reverse the removal instructions.

(8) Rotate the displacer clockwise to lock it into the registers on the locating plate.

(9) Lubricate the strut ball and the nylon seat with Dextragrease G.P. and make sure the dust seal is fitted over the lip of the nylon cup.

(10) Evacuate and pressurize the system (Section H.8)

Section H.10

RADIUS ARMS
(Hydrolastic suspension)

Removal

(1) Raise the vehicle and support it beneath the sub-frame side-member.

(2) Depressurize the Hydrolastic system, see Section H.8.

(3) Remove the road wheel and release the helper spring from the radius arm.

(4) Disconnect the brake hose from the radius arm.

(5) Disconnect the hand brake cable and release the cable sector from the arm.

(6) Remove the bump rubber from the sub-frame and the end finisher from the sill panel.

(7) Remove the displacer strut.

(8) Remove the nut and washers from the arm pivot shaft and the four set screws to release the outer bracket.

(9) Lift the radius arm assembly away from the vehicle taking care not to lose the thrust washers and rubber seal fitted between the arm and the sub-frame side-member.

Dismantling is described in Section H.2.

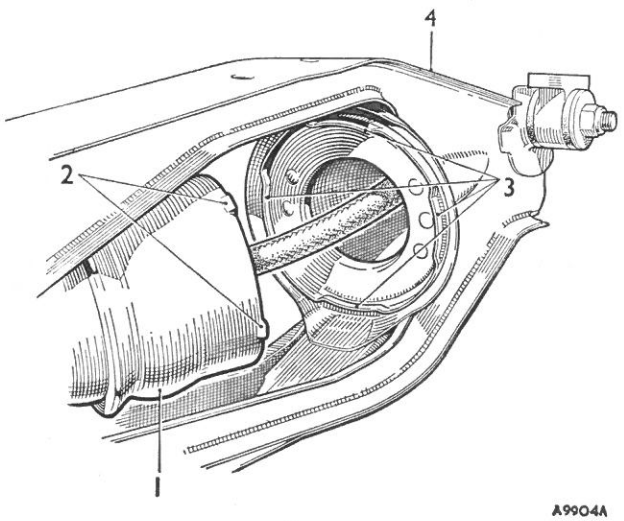


Fig. H.13

A rear displacer unit separated from the locating plate

1. Displacer unit.
2. Locating lugs.
3. Locating plate.
4. Sub-frame.

Refitting

(10) Reverse the removal instructions.
(11) Lubricate the strut ball end and the nylon seat with Dextragrease Super G.P. and make sure the dust seal is fitted over the lip of the nylon cup.
(12) Bleed the hydraulic brake system.
(13) Pressurize the Hydrolastic system, see Section H.8.

Section H.11

SUB-FRAME
(Hydrolastic Suspension)

Remove and refit the sub-frame as in Section H.1. with the following additional operations:

(1) Depressurize and evacuate the Hydrolastic system prior to any dismantling following the instructions in Section H.8.
(2) Disconnect both helper springs from the radius arms.
(3) Disconnect the pressure valves from the sub-frame.
(4) Evacuate and re-pressurize the Hydrolastic system when reassembly is complete, following the instructions in Section H.8.

Section H.12

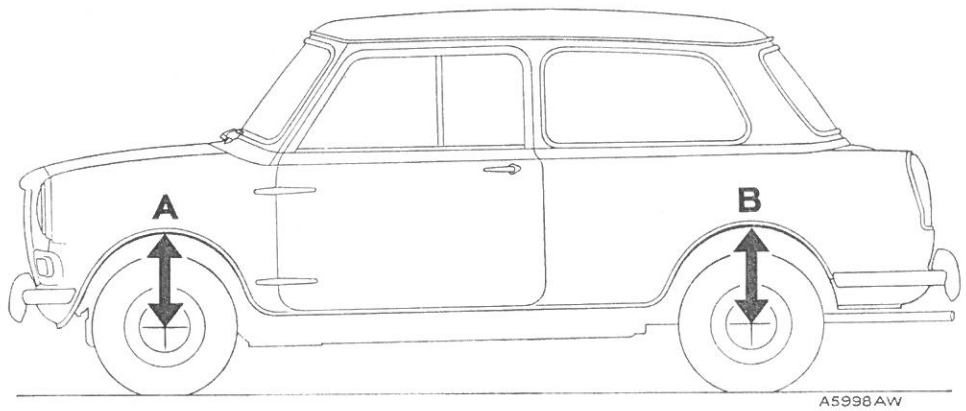
SCHRADER VALVE EXTENSION HOUSING
(Hydrolastic Suspension)

To rectify fluid leakage from the Schrader valve extension housing to the pipe elbow:

(1) Depressurize the Hydrolastic system, see Section H.8.
(2) Remove the Schrader valve extension housing from the pipe elbow and clean the threads of both the valve extension housing and the elbow.
(3) The threads of the valve extension housing must be lightly coated with Loctite Grade A after the housing has been re-started on its threads in the elbow. Under no circumstances must Loctite be applied to the valve extension housing before inserting it in the elbow.
(4) Tighten the valve extension housing to a torque of 16 to 20 lb. ft. (2·2 to 2·8 kg. m.) and leave for 24 hours at room temperature before pressurizing the system.
(5) Evacuate and pressurize the system, see Section H.8.

Section H.13

SUSPENSION PRESSURE AND WING HEIGHTS



CONDITION OF CAR

Water; oil; petrol (max.) 4 Imp. gal. (4·8 U.S. gal., 18·2 litres)

Wing heights (early models)		*Wing heights (later models)*	
A	B	A	B
$13\frac{1}{2}\pm\frac{1}{4}$ in. (343±6·35 mm.)	$13\frac{1}{2}\pm\frac{1}{4}$ in. (343±6·35 mm.)	$13\frac{1}{8}\pm\frac{1}{4}$ in. (333·4±6·35 mm.)	$13\frac{1}{8}\pm\frac{1}{4}$ in. (333·4±6·35 mm.)

NOTE.—It is most important that the Hydrolastic suspension system be pressurized to the figures given in 'GENERAL DATA'.

During the initial assembly, or subsequently if a new displacer unit is fitted, the system should be pressurized for a period of 30 minutes to 350 lb./sq. in. (24·6 kg./cm.²) on early models, and to 400 lb./sq. in. (28·1 kg./cm.²) on later models (see chart for commencing car numbers).

On all later cars, modified displacer units, helper springs and rear suspension struts are fitted. These components are not interchangeable individually with those fitted to earlier cars. The suspension pressure is also increased to suit the modified units (see **'GENERAL DATA'**).

Commencing car numbers:

Model	*R.H.D.*	*L.H.D.*
Riley Elf	829535	829540
Wolseley Hornet ..	827058	827060

To check and adjust the pressures

(1) Ensure that the car is resting on all four wheels and that the load condition is as described above.

(2) Use Service equipment 18G 703 and fit the **black** connector with the knurled knob unscrewed. Close valve 2 (black valve) and open the bleed valve. Use the pressure pump until air is evacuated from the connection tube and fluid appears. Close the bleed valve, operate the pressure pump until the working pressure is reached (see **'GENERAL DATA'**), and then screw in the knurled knob. If the pressure reading is low, operate the pressure pump until the correct working pressure is reached (see **'GENERAL DATA'**). If the pressure gauge reading is high, adjust to the correct working pressure by opening valve 2 (black valve). When the pressure reading is correct unscrew the knurled knob, open valve 2 (black valve), and remove the **black** connector. Replace the sealing plug in the **black** connector and the pressure dust cap on the suspension unit interconnecting pipe valve.

(3) The suspension pressure can also be checked using Service tool 18G 685. The tool must first be adjusted in the following manner. Connect the pump to a pressure gauge fitted with a Schrader valve from which the core has been removed. Fill the tool with Hydrolastic fluid and operate the hand lever of the tool, noting the pressure registered on the gauge. Adjust the valve seat until the working pressure of the system is registered on the gauge (see **'GENERAL DATA'**). Tighten the lock screw and replace the washer and screw.

Fit the connector to the suspension unit interconnecting valve and operate the hand lever until the relief valve in the tool commences to operate. The suspension will now be at its correct working pressure.

Checking wing heights

(4) Ensure that the load condition is as detailed above, and measure the wing heights at the positions indicated in the illustration.

NOTE.—Should the Hydrolastic suspension system suffer damage and the fluid be lost, the suspension arms on the damaged side of the vehicle will contact the bump rubbers at both front and rear. In this condition the car may be driven with complete safety at 30 m.p.h. (50 km.p.h.) over metalled roads.