

Section J — SUSPENSION — ALL MODELS

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J-1	Road spring

The driver side and passenger side front springs are not interchangeable, the free camber of the driver's side spring being greater to compensate for the extra weight (driver, etc.) carried on that side of the vehicle.

Front springs

1. Jack up the vehicle and support it on four jacking stands.

2. Remove the front wheel.

3. Support the front axle with a jack.

4. Remove the four nuts and two lock plates securing the spring to the axle. Allow the spring bottom plate to hang on the hydraulic damper boss.

5. Remove the self-locking nut from the shackle pin in each spring eye.

6. Remove the shackle pin from the front end of the spring.

7. Remove the shackle pin from the rear end of the spring; the pin is threaded into the inner shackle plate.

8. Remove the road spring complete.

9. Remove the self-locking nut from the shackle pin securing the shackle plates to the chassis. Unscrew the pin from the inner shackle plate and remove it together with the two plates.

To refit

1. If necessary, remove the shackle bushes from the chassis frame, with the aid of either a tubular drift or a suitable extractor; fit new bushes, which must be a *drive fit*.

2. If necessary, renew the rubber bushes in the spring eyes in a similar way.

3. Replace the spring by reversing the removal procedure, but do not fully tighten the shackle pins and locking nuts at this stage.

4. Lower the vehicle to the ground and move vehicle bodily backward and forward to settle the springs. Tighten the shackle pins and locking nuts.

If the shackle pins and locking nuts are tightened prior to lowering the vehicle to the ground, premature failure of the bushes will occur.

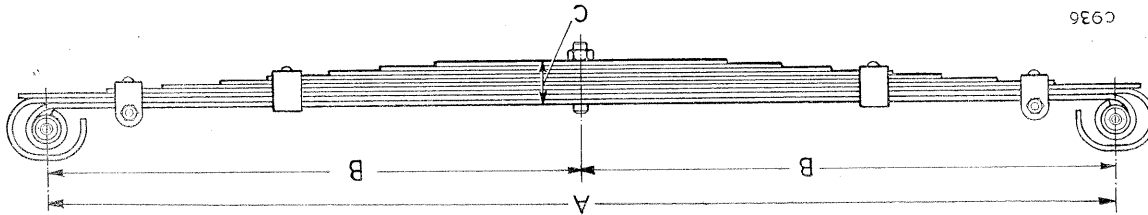


Fig. J-1—Road spring

- A—All models, Front 36,250 in. (925,5 mm), Rear 48 in. (1,22 m)
- B—All models, Front 18,125 in. (460 mm), Rear 24 in. (610 mm)
- C—88 models, Front 1,45 in. (37 mm), Rear 2,125 in. (54 mm)
- 109 models, Front 1,88 in. (48 mm), Rear 2,09 in. (53 mm)

Rear springs

The driver side and passenger side rear springs are not interchangeable, the tree camber of the driver's side spring being greater to compensate for the extra weight (driver, etc.) carried on that side of the vehicle.

To remove

1. Jack up the vehicle and support it on four jacking stands
2. Remove the rear wheel.
3. Support the rear axle with a jack.

4. Remove the four nuts and two lockplates securing the spring to the axle. Allow the spring bottom plate to hang on the hydraulic damper

remain in position, clipped to the pipe.

5. Remove the self-locking nut from the shackle pin in each spring eye.
6. Remove the shackle pin from the rear end of the spring, the pin is threaded into the inner shackle plate.
7. Remove the shackle pin from the front end of the spring.

8. Remove the road spring complete.
9. Remove the self-locking nut from the shackle pin securing the shackle plates to the chassis frame. Unscrew the pin from the inner shackle plate and remove it, together with the two plates.

To refit

1. If necessary, remove the shackle bush from the chassis frame bracket with the aid of a tubular drift or suitable extractor; fit a new bush, which must be a *drive fit*.
2. If necessary, renew the bushes in the spring eyes in a similar way.
3. Replace the spring by reversing the removal procedure, but do not fully tighten the shackle pins and locking nuts at this stage.
4. Lower the vehicle to the ground and move vehicle bodily backward and forward to settle the springs. Tighten the shackle pins and locking nuts.

If the shackle pins and locking nuts are tightened prior to lowering the vehicle to the ground, premature failure of the bushes will occur.

To overhaul

1. Remove the four leaf clips; except for the inner clips on the front springs which are bent over the top leaf, all the clips are secured by bolts and nuts.
2. Remove the spring bushes, using a tubular drift.

3. Remove the centre bolt and nut to release the spring leaves.
4. Clean (or preferably degrease) the leaves; carefully examine them for signs of failure cracks. Only the main and second leaves are supplied as replacement, so that should any other leaf be faulty, the complete spring must be renewed.

5. The recambering of road springs is not advised, but if no alternative is possible, the spring should be reset, if necessary, either to a new spring or to the data set out on Page J-4.
6. Grease each leaf with graphite grease and reassemble the spring by fitting the centre bolt and leaf clips; fit the spring bushes, which must be a *drive fit*.

Hydraulic dampers**To renew**

If it is suspected that a shock absorber is not functioning satisfactorily it should be removed and placed vertically in a vice, the lower eye being secured between the jaws of the vice. It should then be extended and compressed, when a uniform resistance throughout the stroke should be noted, in both directions. Should erratic or weak resistance be found, the shock absorber should be replaced.

The resistance felt when extending the shock absorber is very much greater than that encountered when compressing it.

No attempt must be made to strip or adjust the hydraulic dampers; if any trouble is experienced, a new damper must always be fitted and the original part returned for replacement.

1. Withdraw the hydraulic damper complete with four tapered rubber bushes and the retaining washers. Note that the top fixing is by self-locking nut and that the lower fixing is by split pin, except for the 109, where self-locking nuts and cup washers are used.
2. Renew the retaining washers as necessary.
3. Renew the rubber mounting bushes as necessary.
4. Fit the new damper with its outer sleeve uppermost.

Note that when the securing nut is fully tightened the compressed overall length of the two rubber bushes in the damper lug must be $1\frac{1}{8}$ in. (33 mm) for all upper and 109 lower, fixings; where split pins are used, the correct nip on the rubber bushes is pre-determined by the position of the split pin hole.

5. If the rubber bushes are not correctly nipped or if they are not tightened with the vehicle lowered on to level ground, premature failure of the bushes will occur.

Bump rubber

To renew

1. Remove the bump rubber secured to the underside of the chassis member.
2. Fit the new bump rubber and secure with the two bolts and self-locking nuts.

Operation J/14

Rear axle check strap

To renew

1. Remove the fabric check strap, complete with two clamping plates.
2. Fit the new check strap by reversing the removal procedure; take care that the strap is fitted to the rear of the brake pipe protection plate.

Operation J/16

Section K - CHASSIS - ALL MODELS

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Care should be taken when measuring diagonals, that exactly corresponding points are used on each side of the frame.

Front bumper
The channel-section front bumper is bolted to the chassis side members, so that it may be removed to facilitate repair after accidental damage.

To remove Battery and air cleaner support

- Operation K/4
1. Remove the air cleaner. Section M.
 2. Disconnect the battery leads, remove the securing cover and lift the battery clear. Note that there are two batteries and two supports on Diesel vehicles.
 3. Remove the battery and air cleaner support from the chassis frame (this action releases the earth leads).
- To replace**
- Operation K/6
1. Reverse the removal procedure.

To check Frame alignment

Operation K/2

Figs. K-2 and K-3 show the various dimensions that should be used as a guide in checking frame alignment. Fig. K-1 illustrates the diagonal measurements which may be taken to check the frame for "squareness". Extreme care must be taken when checking for malalignment.

When the body is removed, the frame may easily be checked against the measurements in Figs. K-1 and K-2. If the body is in position, measurements may be taken with the aid of a plumb-bob and chalk as follows:—

1. Place the vehicle on a level floor.
2. Hold the plumb line against one of the measuring points, with the bob slightly above the floor; mark the floor directly beneath the bob.
3. Repeat for other measuring points.
4. Move the vehicle away and measure between the chalk marks.

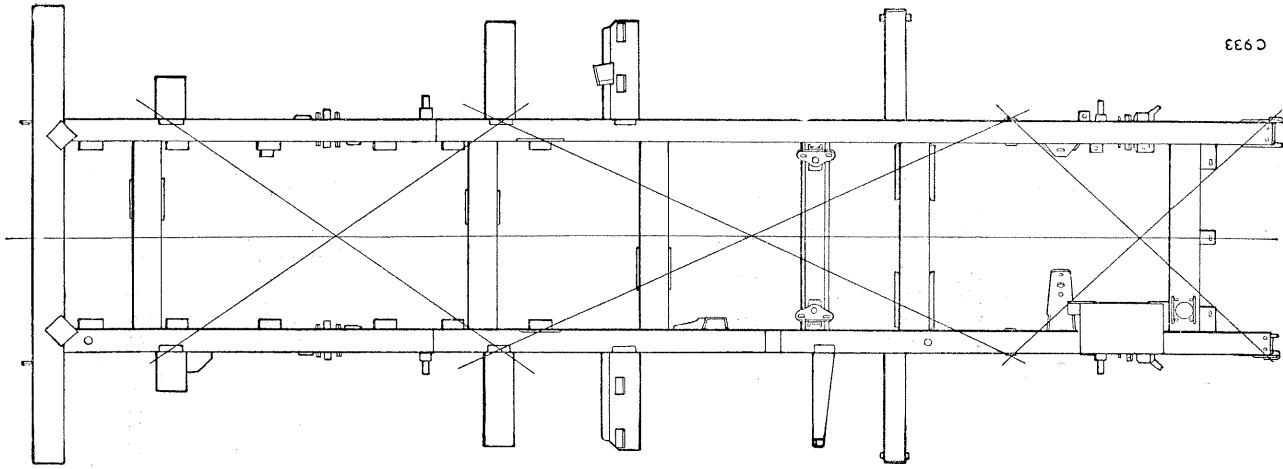


Fig. K-1—Chassis frame diagonal measurements

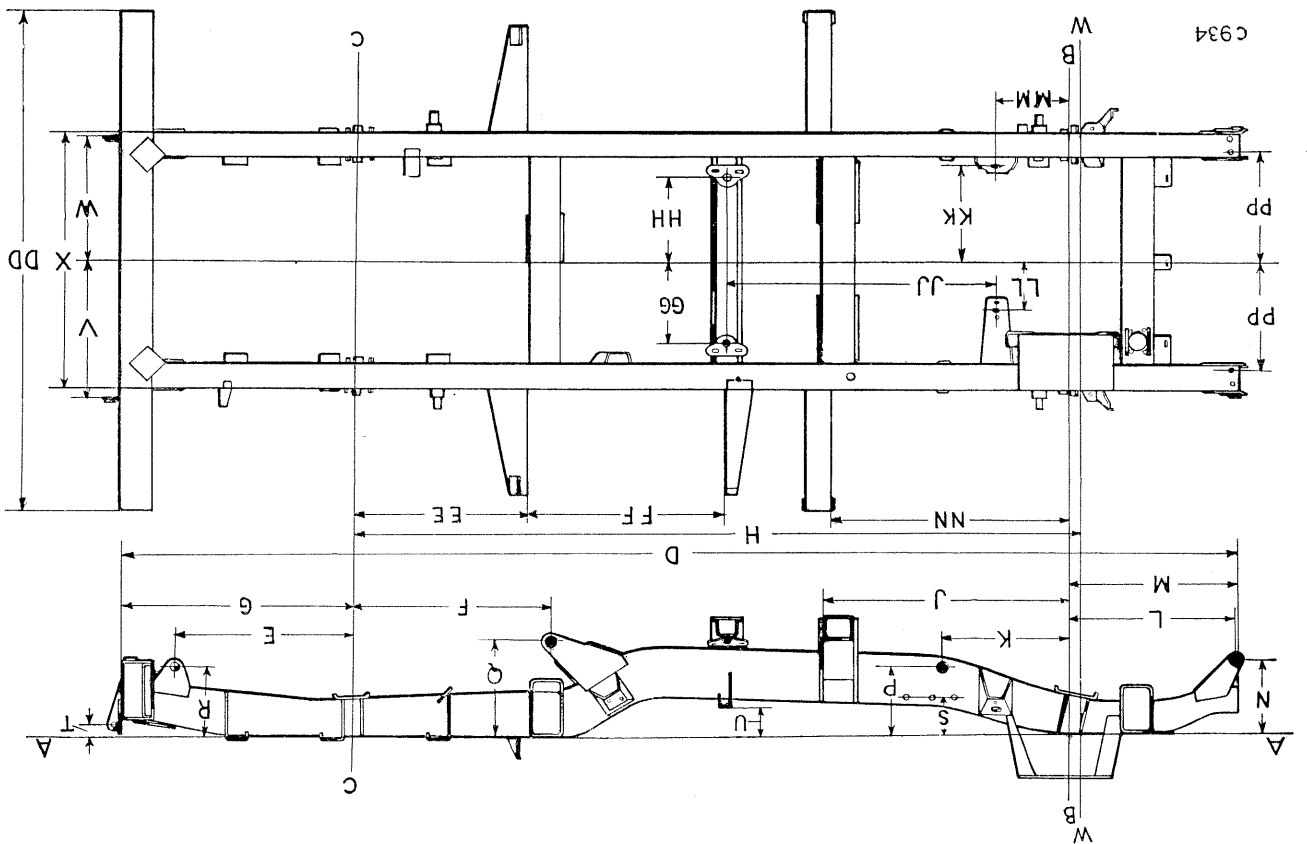


Fig. K-2—Chassis frame dimensions—88

- | | | | |
|------------------------------|------------|--|--------------------|
| AA—Datum line | (29 mm) | T—1 $\frac{3}{8}$ in. | (29 mm) |
| BB—Centre line of front axle | (83 mm) | U—3 $\frac{1}{8}$ in. | (83 mm) |
| CC—Centre line of rear axle | (432 mm) | V—17 in. | (432 mm) |
| DD—134 $\frac{3}{8}$ in. | (342 mm) | W—15 $\frac{1}{4}$ in. | (387 mm) |
| E—21 $\frac{1}{4}$ in. | (540 mm) | X—31 in. | (787 mm) |
| F—24 in. | (610 mm) | DD—60 $\frac{1}{2}$ in. | (1,53 mm) |
| G—28 $\frac{1}{4}$ in. | (713 mm) | EE—21 $\frac{1}{4}$ in. | (540 mm) |
| H—38 in. | (2,235 mm) | FF—23 $\frac{1}{4}$ in. | (603 mm) |
| J—29 $\frac{1}{4}$ in. | (743 mm) | GG—10 $\frac{1}{8}$ in. \pm $\frac{3}{32}$ in. | (257 mm \pm 0,8) |
| K—14 $\frac{1}{8}$ in. | (375 mm) | HH—10 in. \pm $\frac{3}{32}$ in. | (254 mm \pm 0,8) |
| L—20 in. | (508 mm) | JJ—32 $\frac{1}{8}$ in. \pm $\frac{3}{32}$ in. | (835 mm \pm 0,8) |
| M—20 $\frac{3}{8}$ in. | (523 mm) | KK—11 $\frac{1}{8}$ in. | (294 mm) |
| N—9 in. | (229 mm) | LL—6 $\frac{1}{8}$ in. | (167 mm) |
| P—8 $\frac{1}{8}$ in. | (213 mm) | MM—8 in. | (203 mm) |
| Q—11 $\frac{1}{8}$ in. | (297 mm) | NN—28 $\frac{1}{4}$ in. | (718 mm) |
| R—7 $\frac{1}{8}$ in. | (182 mm) | PP—13 $\frac{1}{8}$ in. \pm $\frac{3}{32}$ | (332 mm \pm 0,5) |
| S—4 $\frac{1}{8}$ in. | (121 mm) | | |

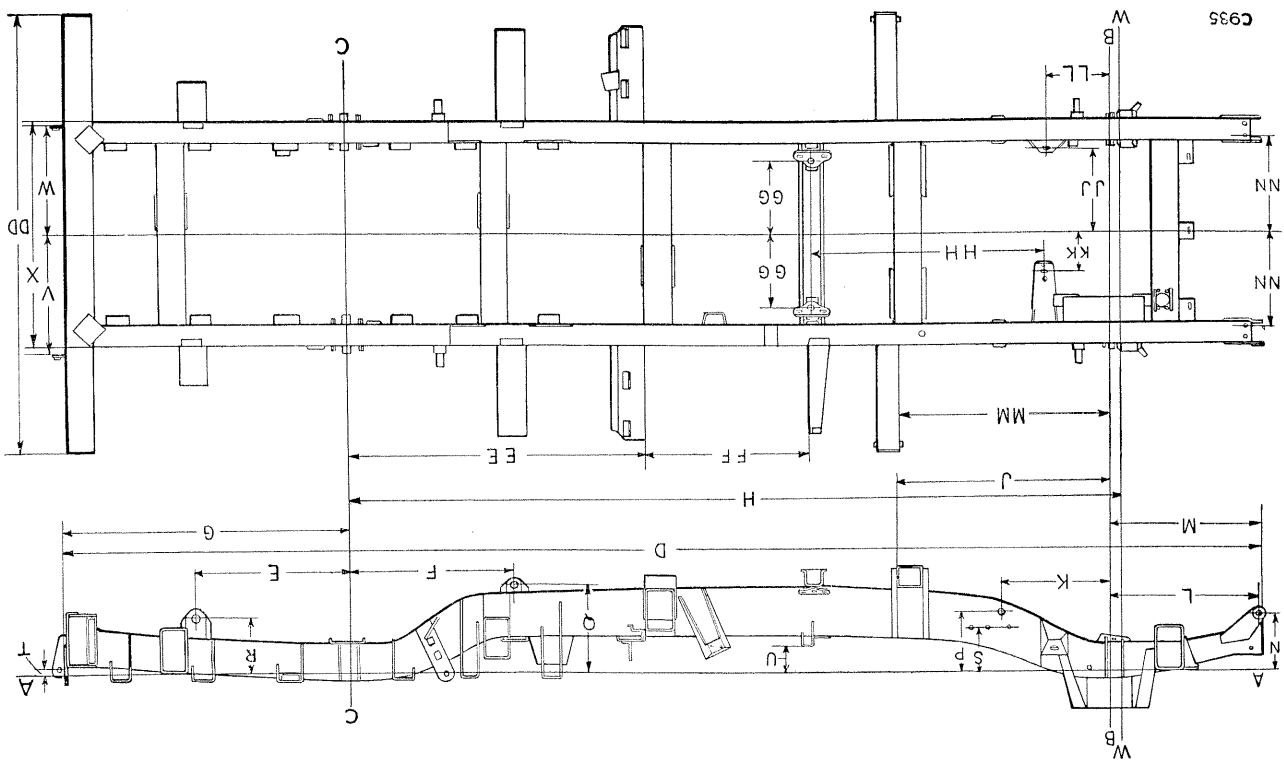


Fig. K-3—Chassis frame dimensions—109

AA—Datum line	166 3/4 in. (4,24 m)
BB—Centre line of front axle	21 1/4 in. (540 mm)
CC—Centre line of rear axle	24 in. (610 mm)
D	39 3/8 in. (1,00 m)
E	109 in. (2,77 m)
F	29 1/2 in. (743 mm)
G	14 3/8 in. (375 mm)
H	20 in. (508 mm)
I	20 3/4 in. (523 mm)
J	9 in. (229 mm)
K	8 3/8 in. (213 mm)
L	11 1/4 in. (297 mm)
M	8 1/8 in. (203 mm)
N	8 1/8 in. (203 mm)
NN	8 1/8 in. (203 mm)
NN	20 3/4 in. (523 mm)
Q	11 1/4 in. (297 mm)
R	8 1/8 in. (203 mm)
S	4 1/8 in. (121 mm)
T	1 5/8 in. (29 mm)
U	3 1/4 in. (83 mm)
V	17 in. (432 mm)
W	15 1/4 in. (387 mm)
X	31 in. (787 mm)
Y	60 1/2 in. (1,53 m)
Z	42 in. (1,07 m)
AA	23 1/2 in. (603 mm)
BB	10 1/2 in. (267 mm)
CC	11 1/8 in. (294 mm ± 0,8)
DD	11 1/8 in. (294 mm ± 0,8)
EE	6 1/8 in. (167 mm)
FF	8 in. (203 mm)
GG	28 1/4 in. (718 mm)
HH	32 1/2 in. (835 mm ± 0,8)
II	332 mm ± 0,50

Section L—COOLING SYSTEM—ALL MODELS

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Water pump, 2 litre Petrol

To remove

The following procedure for removing the water pump will be modified if an engine governor or heater unit is fitted. See Section T for details of these items of extra equipment.

1. Partially drain off the coolant.
2. Slacken the dynamo mounting bolts and adjusting link bolts and push the dynamo inwards.
3. Slacken the lower clip on the top hose and the clip securing the inlet manifold hose to the inlet elbow on the thermostat housing.
4. Remove the thermostat housing from the cylinder head complete with thermostat, outlet pipe, inlet elbow and joint washer.
5. Remove the copper tube and rubber joint ring from either the bottom face of the thermostat housing or the top face of the water pump casing.
6. Remove the fan blade, pulley and distance piece.

1. Remove the bearing location bolt, place the pump in a vice and drift out the impeller, bearing and spindle as an assembly from the pump body and from hub.
2. Cut through the seal and remove from spindle, insert the spindle into the water pump body, so that the impeller is in the position of the fan pulley. The spindle and bearing may now be drifted out of the impeller.

To strip

Operation L/4

7. Slacken the clip securing the bottom hose to the water pump inlet pipe and remove the bolt securing the pipe to the front cover.
8. Remove the water pump complete with joint washer and inlet pipe; as the pump casing is spigoted in the block, it will be necessary to oscillate it slightly as it is removed.
9. Remove the inlet pipe from the water pump.
10. The water pump may now be overhauled, or exchanged for a Service Pump Assembly, obtainable from our Parts Department.

To assemble

1. Examine the spindle and bearing assembly; it need not be renewed if the bearing is satisfactory and the spindle is free from excessive corrosion.

2. Insert a few drops of thick oil in the location hole in the bearing.

3. Press the spindle and bearing assembly into the front of the pump body with the longer end of the spindle leading. Locate it with the set bolt and spring washer.

4. The fan pulley hub must be pressed on to the spindle to a set dimension between the front face of the pulley hub and the mounting face of the water pump casing. This dimension must be: 4.140 in. (105 mm).

5. Fit the carbon ring and seal into the bore of the pump body with the carbon ring to the rear, and fit the rubber water deflector washer.

6. Press the impeller on to the spindle until there is .020 in. (0,5 mm) clearance between the vanes and the pump body face (check with a feeler gauge). The impeller must be a *press fit* on the spindle. If the impeller is loose on the spindle, replace either part as necessary.

7. Refit the inlet pipe to the water pump.

8. Examine the spindle and bearing assembly; it need not be renewed if the bearing is satisfactory and the spindle is free from excessive corrosion. Clean any corroded portion of the spindle and paint with chlorinated rubber primer to prevent further action. (Part No. 261483 for half-pint tin.) As an alternative, good quality aluminium paint or other anti-corrosive paint can be used in place of a rubber primer. A stainless steel deflector washer is fitted on later models.

1. Renew both joint washers.
2. When fitting the fan pulley, first engage the fan belt in the pulley groove.
3. On completion, run the engine and check and rectify any leaks.

Water pump, 2½ litre Petrol, 2 litre Diesel**To remove**

1. Partially drain off coolant.

2. Slacken the dynamo mounting bolts and adjusting link bolts and push the dynamo inwards.

3. Disconnect the hoses from pump.

4. Remove the fan blade, pulley and distance piece.

5. Remove the water pump complete with joint washer.

6. The water pump may now be overhauled, or exchanged for a Service Pump Assembly, obtainable from our Parts Department.

To strip**Operation L/12**

1. Remove the bearing location bolt, place the pump in a vice and drift out the impeller, bearing and spindle as an assembly from the pump body and from hub.

2. Cut through the seal and remove from spindle, insert the spindle into the water pump body, so that the impeller is in the position of the fan pulley. The spindle and bearing may now be drifted out of the impeller.

To assemble**Operation L/14**

1. Examine the spindle and bearing assembly; it need not be renewed if the bearing is satisfactory and the spindle is free from excessive corrosion.

2. Insert a few drops of thick oil in the location hole in the bearing.

3. Press the spindle and bearing assembly into the front of the pump body with the longer end of the spindle leading. Locate it with the set bolt and spring washer.

4. The fan pulley hub must be pressed on to the spindle to a set dimension between the front face of the pulley hub and the mounting face of the water pump casing. This dimension must be: 3.453 in. (86,5 mm). Care must be taken to set the hub to the correct dimensions. When pressing on the hub, the spindle must be supported, to prevent pressure falling on the location set bolt.

Operation L/6

1. Examine the spindle and bearing assembly; it need not be renewed if the bearing is satisfactory and the spindle is free from excessive corrosion.

2. Insert a few drops of thick oil in the location hole in the bearing.

3. Press the spindle and bearing assembly into the front of the pump body with the longer end of the spindle leading. Locate it with the set bolt and spring washer.

4. The fan pulley hub must be pressed on to the spindle to a set dimension between the front face of the pulley hub and the mounting face of the water pump casing. This dimension must be: 4.140 in. (105 mm).

5. Fit the carbon ring and seal into the bore of the pump body with the carbon ring to the rear, and fit the rubber water deflector washer.

6. Press the impeller on to the spindle until there is .020 in. (0,5 mm) clearance between the vanes and the pump body face (check with a feeler gauge). The impeller must be a *press fit* on the spindle. If the impeller is loose on the spindle, replace either part as necessary.

7. Refit the inlet pipe to the water pump.

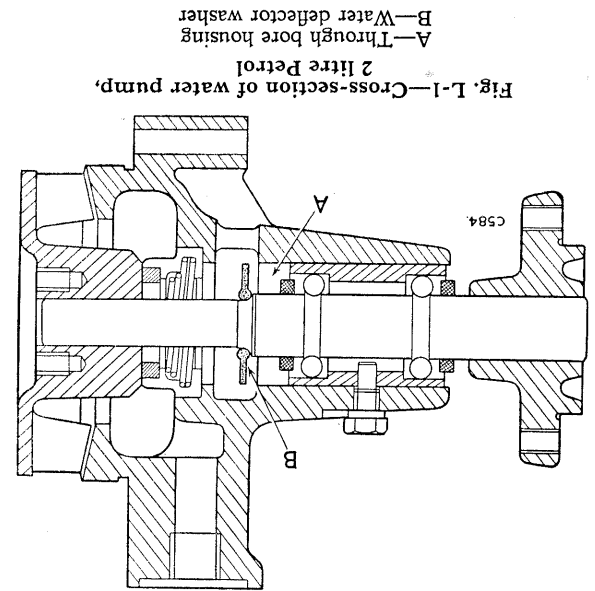
8. Examine the spindle and bearing assembly; it need not be renewed if the bearing is satisfactory and the spindle is free from excessive corrosion. Clean any corroded portion of the spindle and paint with chlorinated rubber primer to prevent further action. (Part No. 261483 for half-pint tin.) As an alternative, good quality aluminium paint or other anti-corrosive paint can be used in place of a rubber primer. A stainless steel deflector washer is fitted on later models.

1. Examine the spindle and bearing assembly; it need not be renewed if the bearing is satisfactory and the spindle is free from excessive corrosion. Clean any corroded portion of the spindle and paint with chlorinated rubber primer to prevent further action. (Part No. 261483 for half-pint tin.) As an alternative, good quality aluminium paint or other anti-corrosive paint can be used in place of a rubber primer. A stainless steel deflector washer is fitted on later models.
2. Insert a few drops of thick oil in the location hole in the bearing.
3. Press the spindle and bearing assembly into the front of the pump body with the longer end of the spindle leading. Locate it with the set bolt and spring washer.
4. The fan pulley hub must be pressed on to the spindle to a set dimension between the front face of the pulley hub and the mounting face of the water pump casing. This dimension must be: 3.453 in. (86,5 mm). Care must be taken to set the hub to the correct dimensions. When pressing on the hub, the spindle must be supported, to prevent pressure falling on the location set bolt.

To refit**Operation L/8**

To refit the water pump to the engine, reverse the removal procedure, noting the following points:—

Fig. L-1—Cross-section of water pump,
2 litre Petrol



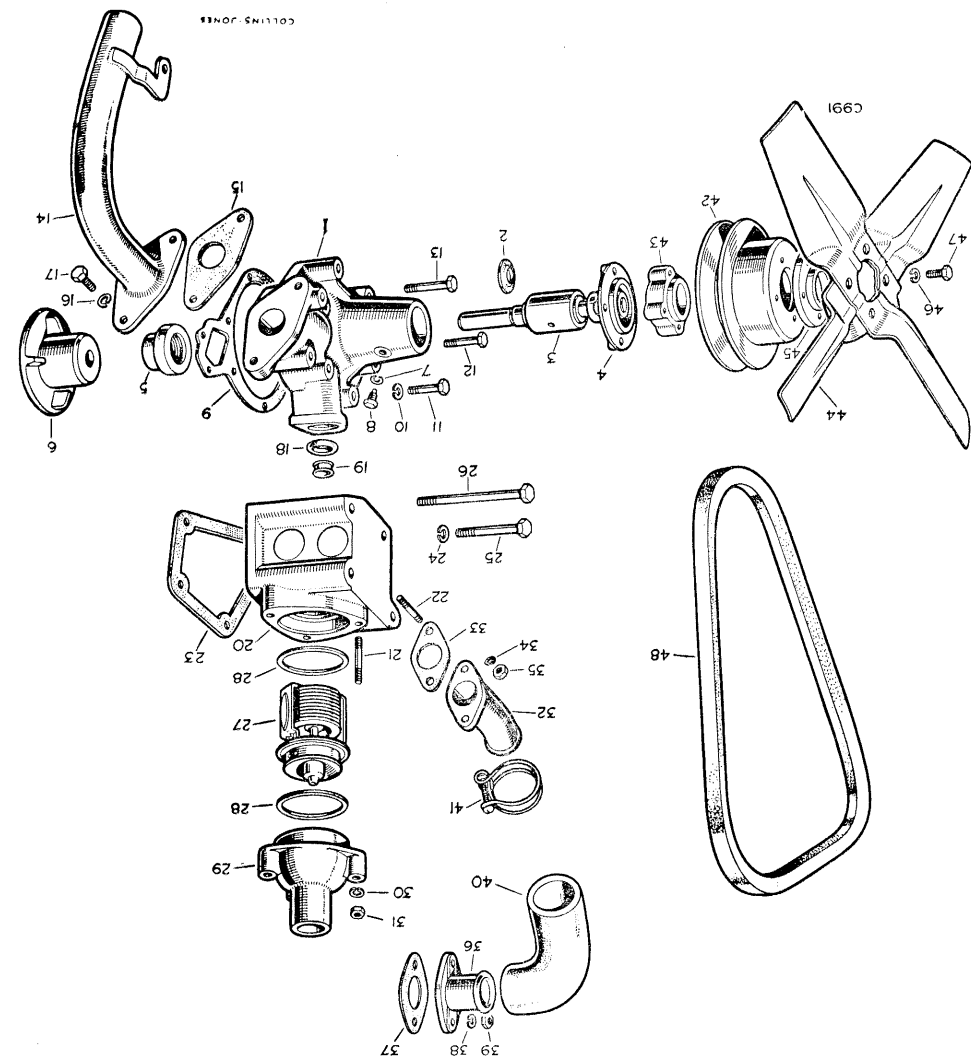


Fig. L-2—Layout of water pump, thermostat and fan, 2 litre Petrol

- | | |
|-------|---|
| 1 | Water pump casing |
| 2 | Water deflector washer |
| 3 | Pump spindle and bearing |
| 4 | Hub for fan |
| 5 | Carbon ring and seal unit |
| 6 | Impeller for pump |
| 7 | Spring washer |
| 8 | Set bolt |
| 9 | Joint washer for water pump |
| 10-13 | Fixings for water pump |
| 14 | Inlet pipe for water pump |
| 15 | Joint washer for inlet pipe |
| 16-17 | Fixings for pipe |
| 18 | Rubber joint ring |
| 19 | Copper tube |
| 20 | Thermostat housing assembly |
| 21 | Stud for outlet pipe |
| 22 | Stud for inlet pipe |
| 23 | Joint washer for thermostat housing |
| 24-26 | Fixings for thermostat housing |
| 27 | Thermostat |
| 28 | Fibre washer for thermostat |
| 29 | Water outlet pipe, thermostat to radiator |
| 30-31 | Fixings for outlet pipe |
| 32 | Water inlet elbow to thermostat |
| 33 | Joint washer for inlet elbow |
| 34-35 | Fixings for elbow |
| 36 | Water outlet pipe from manifold |
| 37 | Joint washer for outlet pipe |
| 38-39 | Fixings for water outlet pipe |
| 40 | Rubber hose |
| 41 | Clip for hose |
| 42 | Fan pulley |
| 43 | Distance piece for fan pulley |
| 44 | Fan blade |
| 45 | Reinforcing plate for fan blade |
| 46-47 | Fixings for fan blade and pulley |
| 48 | Fan and dynamo belt |

expansion of the bellows should commence between 162°F. and 171°F. and be completed at 191°F.

To renew Operation I/18

1. Partially drain off the coolant and remove the top hose.
2. Remove the water outlet pipe from the top of the thermostat housing.
3. Lift out the thermostat from the housing, together with a fibre joint washer, above and below its flange.
4. Fit the new thermostat, together with two new joint washers.
5. Replace the water outlet pipe and top hose.
6. Refill the coolant system to the bottom of the radiator filler neck and check for leaks.

Thermostat, 2½ litre Petrol, 2 litre Diesel

If the thermostat becomes faulty in operation, overcooling or overheating of the engine will usually result. To check the thermostat, remove it from its housing and run the engine; if the coolant temperature remains unchanged, the unit is faulty and should be renewed.

Further tests may be made by immersing the thermostat in hot water, whereon expansion of the bellows should commence between 164°F. and 173°F. and be complete at 193°F.

To renew Operation I/20

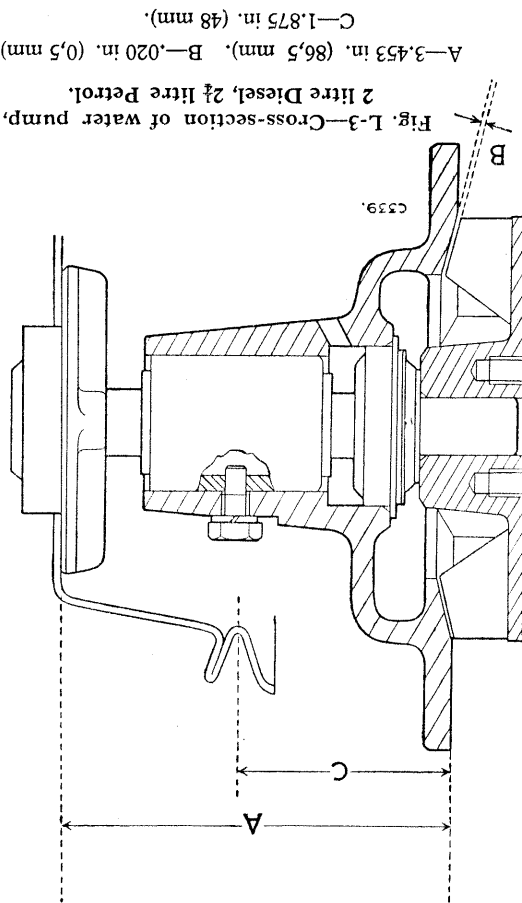
1. Partially drain off the coolant, disconnect the top and by-pass hoses from the thermostat cover—also the heater hose if fitted—and remove the cover.
2. Lift out the thermostat from its housing and fit the new one.
3. Replace the top cover and re-connect the hoses.
4. Refill the coolant system to the bottom of filler neck and check for leaks.

Visual inspection, cooling system

It is a good plan to inspect the cooling system at the same time as the engine oil level is checked; such care would largely prevent the possibility of a sudden and costly delay due to coolant loss and consequent engine damage. Attention should be paid to the following points:—

1. Water level in radiator— $\frac{3}{8}$ to 1 in. (19 to 25 mm) below the bottom of the filler neck.
2. Condition of all hoses—freedom from cracks and hose clips tight.
3. Any water leaks.
4. Check that the drain taps are fully closed.

5. Fit the carbon ring and seal into the bore of the pump body with the carbon ring to the rear.
6. Press the impeller on to the spindle until there is .020 in. (0,5 mm) clearance between the vanes and the pump body face (check with a feeler gauge). The impeller must be a *press fit* on the spindle. If the impeller is loose on the spindle, replace either part as necessary.
7. Refit the inlet pipe to the water pump.



To refit Operation I/16

To refit the water pump to the engine, reverse the removal procedure, noting the following points:—

1. Renew joint washer.
2. When fitting the fan pulley, first engage the fan belt in the pulley groove.
3. On completion, run the engine and check and rectify any leaks.

Thermostat, 2 litre Petrol

If the thermostat becomes faulty in operation, overcooling or overheating of the engine will usually result. To check the thermostat, remove it from its housing and run the engine; if the overheating or overcooling is eliminated, the unit is faulty and must be renewed. Further tests may be made by immersing the thermostat in hot water, whereon

Tests and adjustments

Fan belt

The fan belt is of the "V" type, drive is on the sides of the belt and it is not therefore necessary to adjust it tightly and so put an excessive load on the water pump and dynamo bearings; the tension is correct when the belt can be depressed $\frac{1}{8}$ to $\frac{1}{16}$ in. (8 to 11 mm)— $2\frac{1}{4}$ litre Petrol, 2 litre Diesel, and $\frac{3}{4}$ to $\frac{1}{2}$ in. (12 to 19 mm)—2 litre Petrol, by thumb

Thermostat

See page L-4 of this section.

The procedure for adjustment is as follows:—
Slacken the dynamo pivot bolts and the bolt securing the dynamo to the adjusting link. Move the dynamo outwards until the tension is correct and re-tighten the bolts.

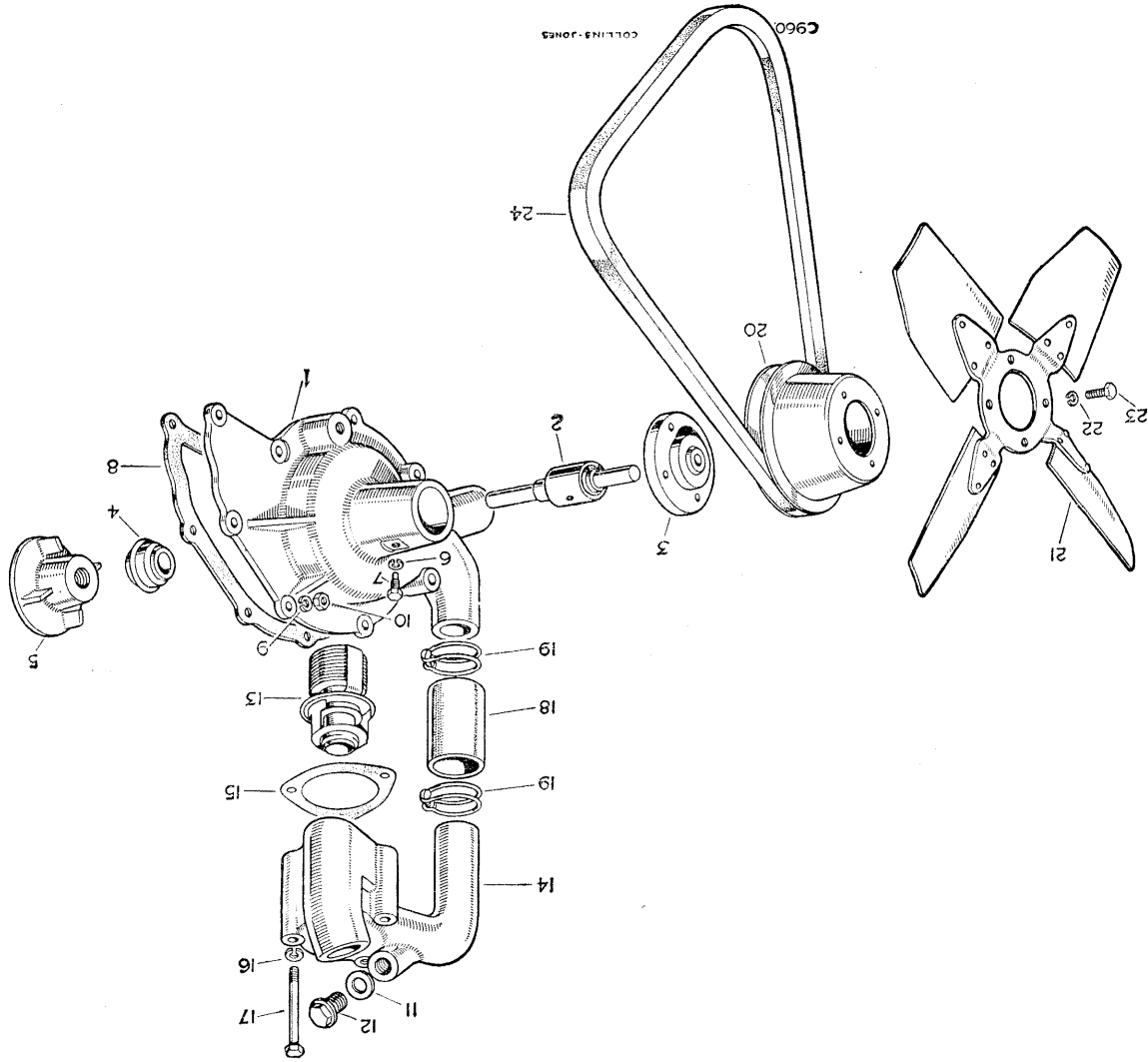


Fig. L-4—Layout of pump, thermostat and fan, $2\frac{1}{4}$ litre Petrol and 2 litre Diesel

- | | | | |
|----|------------------------------|----|-----------------------|
| 1 | Water pump casing | 12 | Plug |
| 2 | Spindle and bearing assembly | 11 | Joint washer for plug |
| 3 | Pulley hub | 10 | Nut |
| 4 | Seal | 9 | Spring washer |
| 5 | Impeller | 8 | Joint washer |
| 6 | Spring washer | 7 | Set bolt |
| 7 | Set bolt | 6 | Locating spindle |
| 8 | Joint washer | 5 | For casing |
| 9 | Spring washer | 4 | For heater return in |
| 10 | Nut | 3 | water outlet pipe |
| 11 | Joint washer for plug | 24 | Driving belt |
| 12 | Plug | 23 | Set bolt |
| 13 | Thermostat | 22 | Spring washer |
| 14 | Outlet pipes and cover | 21 | Fan blades |
| 15 | Joint washer for cover | 20 | Pulley |
| 16 | Spring washer | 19 | Clip |
| 17 | Set bolt | 18 | By-pass hose |
| 18 | By-pass hose | 17 | Set bolt |
| 19 | Clip | 16 | For casing |
| 20 | Pulley | 15 | For fan |
| 21 | Fan blades | 14 | blades |
| 22 | Spring washer | | |
| 23 | Set bolt | | |
| 24 | Driving belt | | |

Draining the cooling system

The cooling system should be drained and flushed out at least twice each year in the following manner:-

1. Remove the radiator filler cap.

2. Open the water drain taps at the bottom of the radiator and on the left-hand side of the cylinder block.

3. When the water flow has ceased, insert a piece of wire in each tap to make sure that a blockage has not been caused by rust or scale.

4. Place a hose in the radiator filler neck and fill the system; adjust the flow of water to equal that draining from the taps.

5. Run the engine for a short time to ensure thorough cleaning of the whole system.

6. Stop the engine, remove the hose and close the taps. Refill the system with clean water to the bottom of the filler neck and replace the filler cap.

The total capacity of the cooling system is: 2 litre Petrol, 2 litre Diesel—17 Imperial pints (9.5 litres) and 2½ litre Petrol—17½ Imperial pints (10.0 litres).

Use soft water wherever possible; if the local water supply is hard, clean rain or distilled water should be used.

7. Run the engine until working temperature is reached and top the water level as necessary.

Cleaning radiator, externally

In the event of the cooling gills of the radiator becoming blocked with dirt, straw, etc., they should be cleaned by means of compressed air or water pressure applied from the rear, so forcing the foreign matter out through the front of the radiator. Never use a metal implement for this purpose or serious damage may result to the radiator core.

Frost precautions

In cold weather, when the temperature may drop to or below freezing point, precautions must be taken to prevent freezing of the water in the cooling system.

A thermostat is fitted in the system and it is therefore possible for the radiator block to freeze in cold weather even though the engine is running.

temperature is quite high; for this reason the use of an anti-freeze mixture is essential.

Only high quality inhibited glycol-based solutions should be used.

When the temperature is between 32°F and 0°F (0°C and minus 17°C) use one part of anti-freeze to four parts of water.

Proceed as follows:—

1. Ensure that the cooling system is leak-proof; anti-freeze solutions are far more "searching" at joints than water.

2. Drain and flush the system. See "Draining the cooling system".

3. Mix the solution to the required strength in a separate container and refill the system.

4. Run the engine to ensure good circulation of the mixture.

If the vehicle is to be stored in cold weather, unless it is kept in a well-heated garage or anti-freeze solution has been used, the cooling system must be completely drained.

TURN DOWN TIGHT

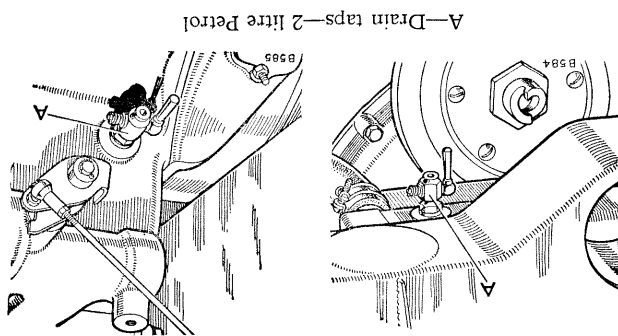
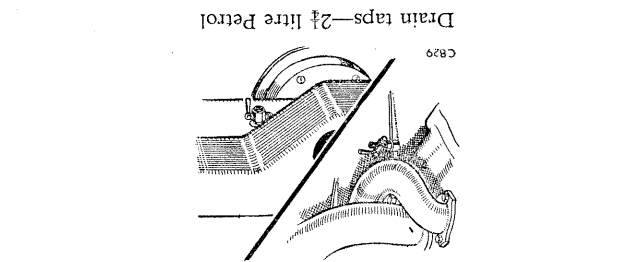
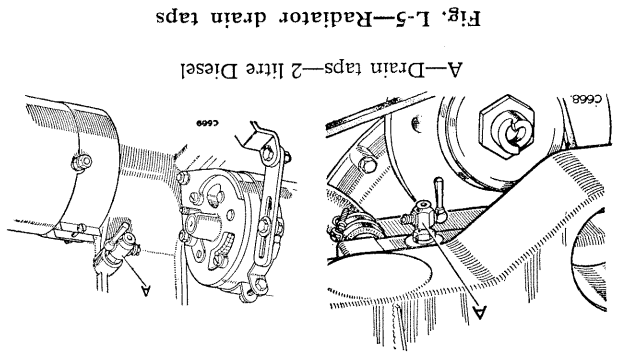
REMOVE SLOWLY

Fig. L-6—Radiator filler cap

A—Pressure relief valve (steam escape)

B—Depression relief valve

Fig. L-5—Radiator drain taps



Radiator

To remove

1. Drain off the coolant. Diesel only : Disconnect the lead coupling the two batteries.

2. Disconnect the top and bottom hoses from the radiator.

3. Disconnect the side lamp leads at snap connectors at each side of the grille panel assembly and the front lamp harness from the junction box at R.H. side of scuttle, then pull the wiring clear to front of engine.

4. Remove the radiator grille and chaff guard (if fitted) from the grille panel complete with the name plate.

5. Remove the fan blades.

6. Remove the bolts securing the front apron and remove panel. Remove the bolts securing the

grille panel to the front cross member and front wings.

7. Lift the radiator, grille panel and headlamps assembly upward, then forward to clear the vehicle.

8. Remove the rubber buffers from beneath the grille panel.

9. Remove the radiator block from the grille panel.

10. Remove the drain tap and joint washer from the bottom of the radiator block.

11. Remove the filler cap, complete with the joint washer, retainer and chain.

To refit

1. Reverse the removal procedure, replacing the rubber buffers, if necessary, and connecting the wiring in accordance with the appropriate wiring diagram—Section P.

Operation L/24

- 1 Radiator block assembly
- 2 Cowl for fan
- 3 Drive screw for cowl
- 4 Filler cap for radiator
- 5 Chain for filler cap
- 6 Retainer for chain
- 7 Joint washer for filler cap
- 8 Radiator grille panel assembly
- 9 Bonnet rest strip
- 10-12 Fixings for radiator block
- 13-17 Fixings for grille panel and front apron
- 18 Front apron panel

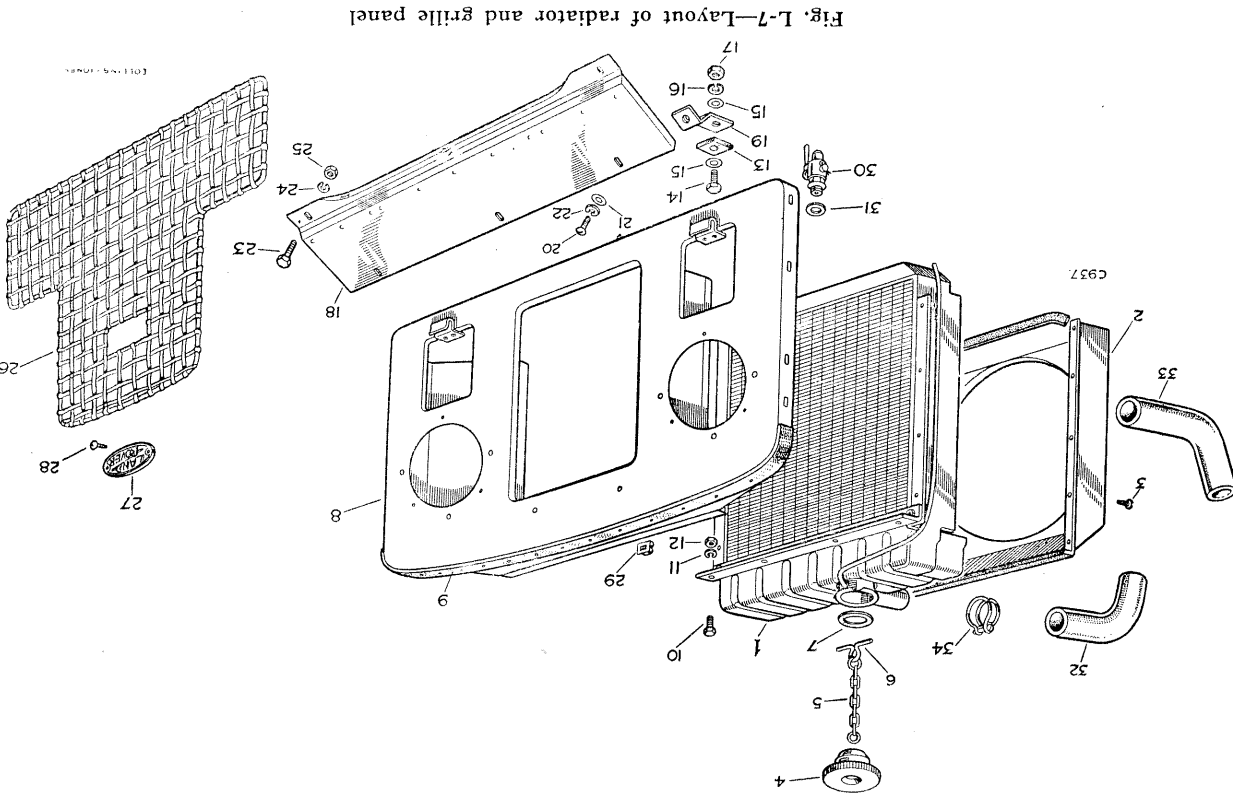


Fig. L-7—Layout of radiator and grille panel

- 19 Securing bracket
- 20-22 Fixings for apron panel—securing brackets
- 23-25 Fixings for apron panel—chassis frame
- 26 Grille for radiator
- 27 "Land-Rover" name plate
- 28-29 Fixings for grille and name plate
- 30 Drain tap for radiator
- 31 Joint washer for drain tap
- 32 Hose for radiator, top
- 33 Hose for radiator, bottom
- 34 Clip for radiator hoses

DEFECT LOCATION

(Symptom, Cause and Remedy)

<p>E—CORROSION</p> <ol style="list-style-type: none"> 1. Excessive impurity in the water—Use only soft, clean water (rainwater is satisfactory). 2. Infrequent flushing and draining of system—The cooling system should be drained and flushed thoroughly at least twice a year. 3. Incorrect anti-freeze mixtures—Certain anti-freeze solutions have a corrosive effect on parts of the cooling system. Only good glycol-base solutions should be used. 	<p>F—OVERHEATING</p> <ol style="list-style-type: none"> 1. Poor circulation—See item D. 2. Dirty oil and sludge in engine—Flush and refill. 3. Radiator fins choked with chaff, mud, etc.—Use air pressure from the engine side of the radiator and clean out passages thoroughly. 4. Incorrect injection pump or ignition timing—Section A. 5. Incorrect valve timing—Section A. 6. Low oil level—Replenish. 7. Tight engine—New engines are very tight during the "running-in" period and moderate speeds should be maintained for the first 1,000 miles (1,500 km). 8. Choked or damaged exhaust pipe or silencer—Rectify or renew. 9. Dragging brakes—Check cause. Section H. 10. Overloading vehicle—In the hands of the operator. 11. Driving in heavy sand or mud—In the hands of the operator. 12. Engine labouring on grades—In the hands of the operator. 13. Low gear work—In the hands of the operator. 14. Excessive engine idling—In the hands of the operator. 	<p>G—OVERCOOLING</p> <ol style="list-style-type: none"> 1. Defective thermostat—Renew. 	<p>A—EXTERNAL LEAKAGE</p> <ol style="list-style-type: none"> 1. Loose hose clips—Tighten. 2. Defective rubber hose—Renew. 3. Damaged radiator seams—Rectify. 4. Excessive wear in the water pump—Renew. 5. Loose core plugs—Renew. 6. Damaged gaskets—Renew. 7. Leak at the heater connections or plugs—Rectify. 8. Leak at the water temperature gauge plug—Tighten. 9. Diesel only—leak from either of the four small holes in L.H. side of cylinder block—Fit new sealing rings to liner Section 4. 	<p>B—INTERNAL LEAKAGE</p> <ol style="list-style-type: none"> 1. Defective cylinder head gasket—Renew, check engine oil for contamination and refill as necessary. 2. Cracked cylinder bore or liner—Renew cylinder block (or Diesel) liner. 3. Loose cylinder head bolts—Tighten. Check engine oil for contamination and refill as necessary. 	<p>C—WATER LOSS</p> <ol style="list-style-type: none"> 1. Overfilling—See Instruction Manual for filling instructions. 2. Boiling—Ascertain the cause of engine overheating and correct as necessary. 3. Internal or external leakage—See items A and B. 4. Restricted radiator or inoperative thermostat—Flush radiator and renew the thermostat as necessary. 	<p>D—POOR CIRCULATION</p> <ol style="list-style-type: none"> 1. Restriction in system—Check hoses for crimps, and flush the radiator. 2. Insufficient coolant—Replenish. 3. Inoperative water pump—Renew. 4. Loose fan belt—Adjust. 5. Inoperative thermostat—Renew. 	<p>Capacity of cooling system—</p> <p>2 litre Petrol, 2 litre Diesel ... 17 Imperial pints (9,5 litres)</p> <p>Capacity of cooling system—</p> <p>2½ litre Petrol ... 17½ Imperial pints (10,0 litres)</p>	<p>Radiator</p> <p>Filler cap pressure valve opens at:</p> <p>2 litre Petrol models 4 lb/sq.in. (3 Kg/cm²)</p> <p>2½ litre Petrol (early models) and Diesel models 10 lb/sq.in. (0,7 Kg/cm²)</p> <p>2½ litre Petrol (late models) 9 lb/sq.in. (0,6 kg/cm²) identified by figure '9'</p> <p>Not interchangeable with 10 lb/sq.in. (0,7 kg/cm²) type</p> <p>Filler cap vacuum valve opens at ... 1 lb/sq.in. (0,07 Kg/cm²)</p>	<p>Water pump</p> <p>Type ...</p> <p>Centrifugal impeller</p> <p>Dimensions between front face of pulley and mounting face of pump body</p> <p>2 litre Petrol ... 4.140 in. (105 mm)</p> <p>2½ litre Petrol and 2 litre Diesel ... 3.453 in. (86,5 mm)</p> <p>Clearance between impeller vanes and pump body ... 0.20 in. (0,5 mm)</p>	<p>Thermostat</p> <p>Type ... Bellows</p> <p>Opening temperature—2 litre Petrol</p> <p>Commences at ... 162° to 171°F (72-77°C)</p> <p>Fully open at ... 191°F (88°C)</p> <p>Opening temperature—2½ litre Petrol, 2 litre Diesel</p> <p>Commences at ... 164° to 173°F (73-78°C)</p> <p>Fully open at ... 193°F (89,4°C)</p>
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