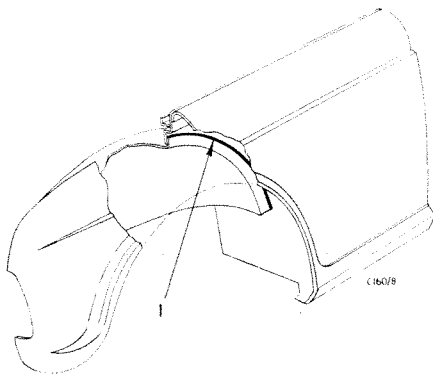
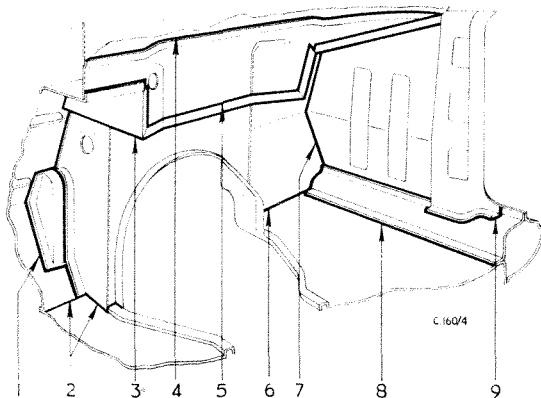


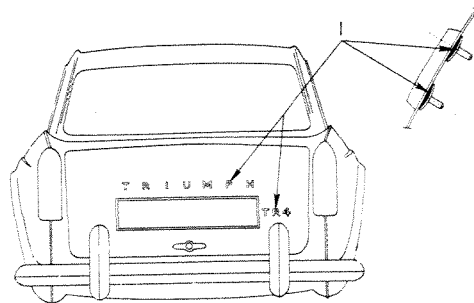
- 1 Under washers and dash panel.
(Seelastik)
- 2 Scuttle and 'A' post.
(Seelastik)



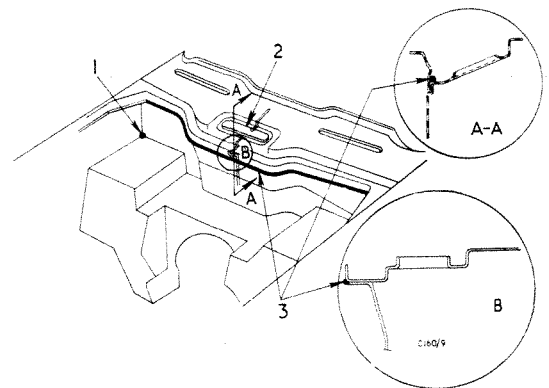
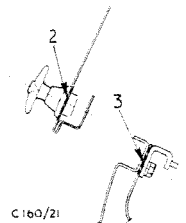
- 1 Wheelarch panel and closing panel.
(Plastisol 53)



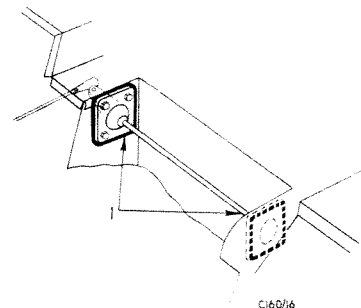
- 1 Pocket to lower bulkhead.
(Seelastik)
- 2 Bulkhead and floor panel.
(Seelastik)
- 3 Dash shelf and centre bulkhead.
(Seelastik)
- 4 Dash shelf and upper bulkhead
(Seelastik)
- 5 Dash shelf and bulkhead.
(Seelastik)
- 6 Bulkhead and floor.
- 7 Bulkhead and panel and front bulkhead.
(Seelastik)
- 8 Floor and inner sill.
(Seelastik)
- 9 Sill and 'A' post.
(Seelastik)



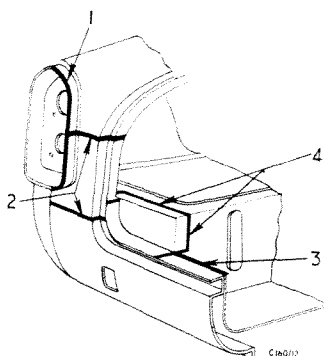
- 1 Name plate fixings and luggage locker lid.
(Glasticon 303)
- 2 Locker lid handle escutcheon and lid.
(Prestik)
- 3 Locker lid striker and spare wheel pan.
(Seelastik)



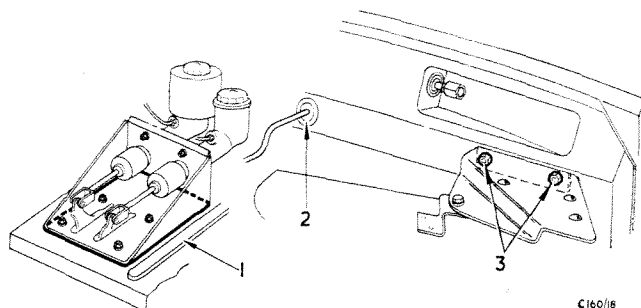
- 1 Plug corner hole.
(Plastisol Putty)
- 2 Upper bulkhead and plenum.
(Seelastik)
- 3 Scuttle and bulkhead.
(Plastisol Putty)



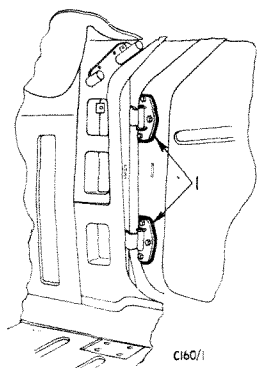
- 1 Accelerator relay and bulkhead.
(Seelastik)



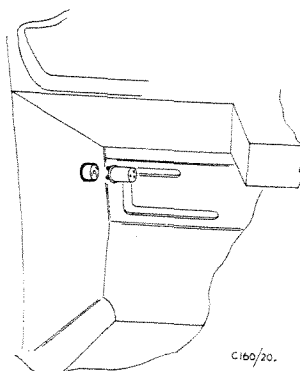
- 1 Tail lamp housing and tonneau panel.
(Plastisol)
- 2 Upper and lower tonneau panel and rear valance.
(Plastisol)
- 3 Spare wheel panel and rear valance.
(Plastisol)
- 4 All round closing panel.
(Plastisol)



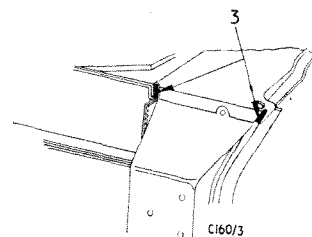
- 1 Master cylinder mounting bracket and dash shelf.
(Seelastik)
- 2 Grommet and bulkhead.
(Seelastik)
- 3 Wiper motor mounting bracket. Seelastik under washers from inside the car.



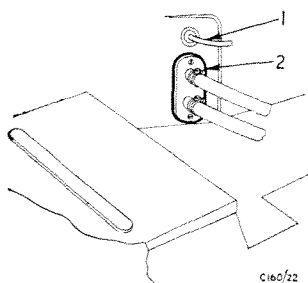
- 1 Door hinges and 'A' post.
(Seelastik)



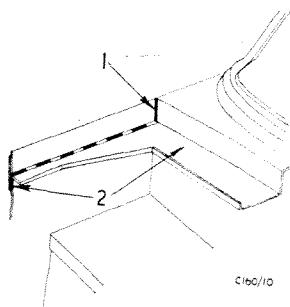
- 1 Flasher socket and bulkhead.
(Seelastik)



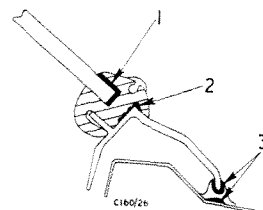
- 3 Plug holes in corners of 'A' post from inside body.
(Plastisol)



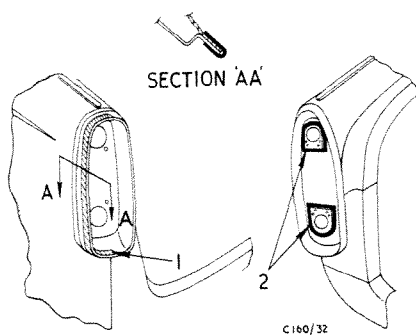
- 1 Choke control grommet and bulkhead.
(Seelastik)
- 2 Adaptor plate and bulkhead.
(Seelastik)



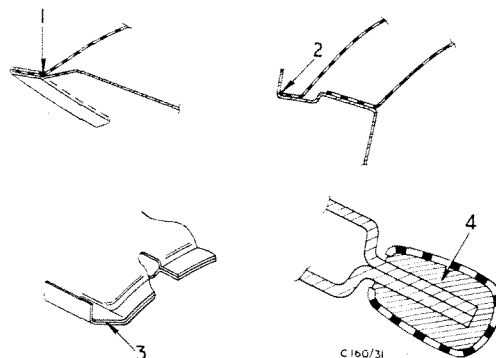
- 1 Wheelarch closing panel and scuttle and drip channel.
(Plastisol 53)
- 2 Wheelarch closing panel and underside of drip channel for not less than 12".
(Plastisol 53)



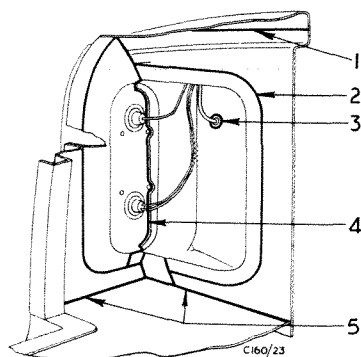
- 1 Glass and rubber weatherstrip.
(Seelastik M1)
- 2 Rubber weatherstrip and frame.
(Seelastik M1)
- 3 Backlight frame and sealing rubber and rear deck.
(Seelastik M1)



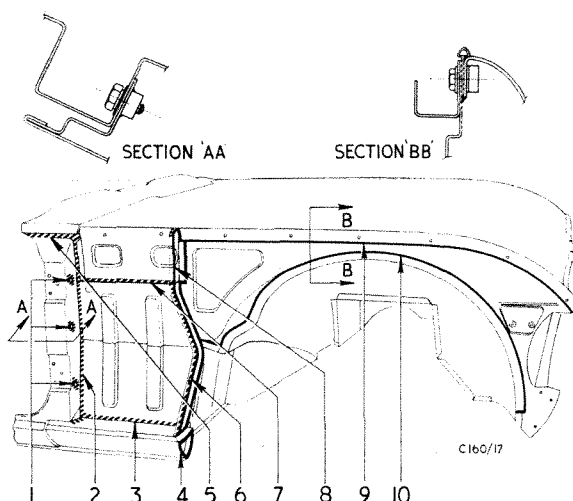
- 1 Tape round outer edges of tail lamp socket.
- 2 Tail lamp rubber and filler panel. (Seelastik)



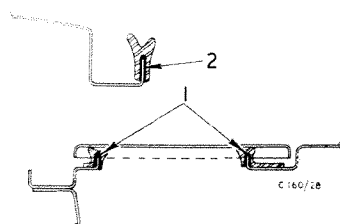
- 1 Front of roof. (Plastisol)
- 2 Roof and drip channel. (Plastisol)
- 3 Tear end of drip channel. (Plastisol)
- 4 Roof rear finisher. (Seelastik)



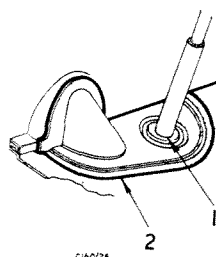
- 1 Tonneau side and wheelarch closing panel. (Seelastik)
- 2 Pocket and wheelarch closing panel. (Seelastik)
- 3 Grommet and tonneau side. (Seelastik)
- 4 All round lamp housing. (Seelastik)
- 5 Floor to lower tonneau and closing panels. (Seelastik)



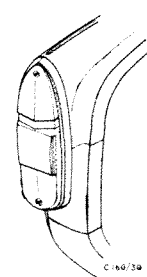
- 1 Wing fixing bolts. (Seelastik under washers)
- 2 'A' post and side panel. (Supra Dedseal)
- 3 Sill and side panel. (Supra Dedseal)
- 4 Sill end filler panel and sill. (Supra Dedseal)
- 5 Scuttle and 'A' post. (Supra Dedseal)
- 6 Stoneguard baffle, front wing and closing panel. (Supra Dedseal)
- 7 Upper and lower side panel. (Supra Dedseal)
- 8 Wing fixing bolts. (Seelastik under washers)
- 9 Wing and closing panel. (Boscoseal)
- 10 Closing panel to wheelarch. (Supra Dedseal)



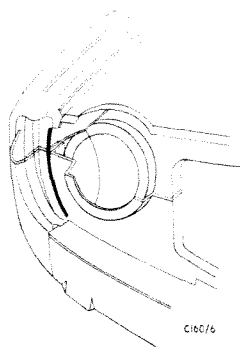
- 1 Ventilator sealing rubber. (Plus product 6/63)
- 2 Luggage locker sealing rubber. (Plus product 6/63)



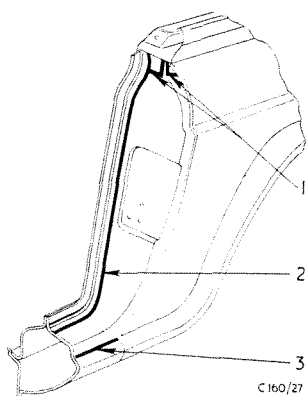
- 1 Handbrake lever and rubber seal. (Seelastik M1)
- 2 Rubber seal and floor. (Seelastik)



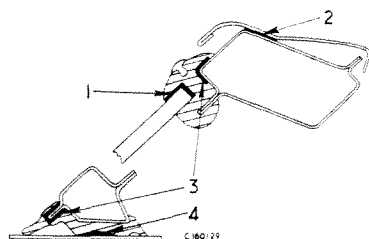
- 1 Tail lamp rubber and body. (Seelastik)



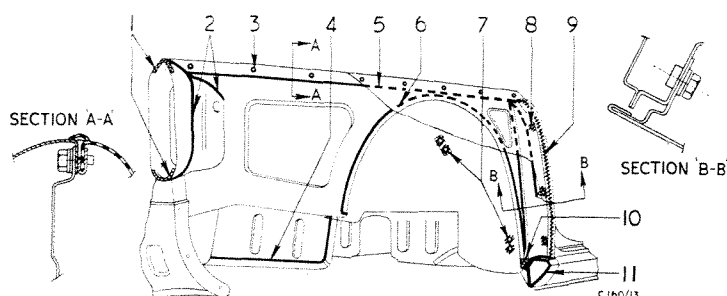
1 Upper valance and filler piece.
(Seelastik)



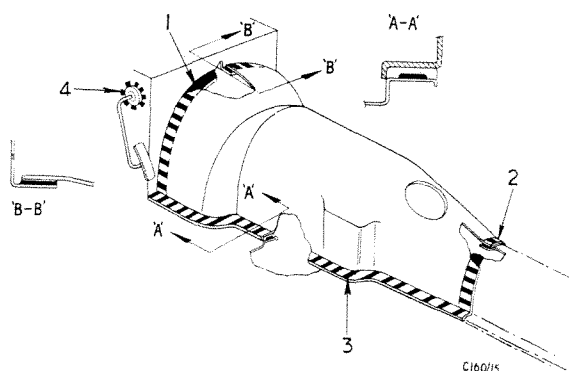
1 Rear deck filler and outer 'B' post panels.
(Plastisol 53)
2 Outer edge of door seal retainer channel.
(Plastisol 53)
3 'B' post and sill.
(Plastisol 53)



1 Glass and rubber weatherstrip.
(Seelastik M1)
2 Header capping and windscreen frame.
3 Rubber weatherstrip and windscreen frame.
(Seelastik M1)
4 Rubber and scuttle panel. Seel-A-Strip $\frac{1}{8}$ " diameter.



1 Edge of rear lamp housing.
(Seelastik)
2 Rear lamp housing and closing panel.
(Supra Dedseal)
3 Wing fixing bolts. (Seelastik under washers)
4 Spare wheel pan and tonneau side.
(Supra Dedseal)
5 Outer wing and side panel.
(Boscoseal)
6 Inner wheelarch and closing panel.
7 Safety harness holes.
(Seelastik)
8 Wing fixing bolts. (Seelastik under washers)
9 'B' post filter panel, rear wing and closing panel.
10 Plug corner hole.
(Plastisol Putty)
11 Sill end filler panel and sill.
(Supra Dedseal)



1 Rubber and bulkhead.
(Seelastik)
2 Rubber and transmission tunnel.
(Seelastik)
3 Rubber and floor.
(Seelastik)
4 Accelerator relay bracket, gaskets and bulkhead.
(Seelastik)

TR4 WORKSHOP MANUAL

GROUP 6

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Fuses	6·121
Windscreen wiper	6·122
Flasher unit and direction indicator	6·124
Cable connectors	6·125
Wiring harness loom	6·125

SPECIFICATIONS

Battery

Type BT.9A. (Home).

Supplied dry and uncharged, or filled and charged

Lead acid.

Type BTZ.9A. (Export).

Supplied dry but with plates charged ..

Lead acid.

Voltage

12.

Terminal earthed

Positive.

Capacity—at 10 hour rate

51 ampere hours.

—at 20 hour rate

58 ampere hours.

Plates per cell

9.

Electrolyte capacity (per cell)

1 pint imperial; 1.2 pints U.S.A.; 570 c.c.

Specific gravity charged—Climates below 32°C. ..

1.270—1.290.

—Climates above 32°C. ..

1.130—1.150.

Initial charging current for BT.9A

3.5 amperes.

Recharging current (both types)

5.0 amperes.

Generator

Model

C40—1.

Type

Two brush, two pole, compensated voltage control.

Rotation

Clockwise.

Field resistance

6 ohms. approximately.

Maximum output at 13.5 volts

22 amperes at 2,050—2,250 r.p.m. (connected to a load of 0.61 ohms).

Brush tension

22—25 ozs. (0.62—0.71 Kgs.).

Minimum brush length

 $\frac{1}{16}$ " (9 mm.).

Control Box

Type

RB.106/2.

Cut-in voltage

12.7—13.3.

Drop-off voltage

11—8.5.

Open circuit settings—Ambient temperatures ..

Open circuit voltages.

10°C. (50°F.)

16.1—16.7

20°C. (68°F.)

16.0—16.6

30°C. (86°F.)

15.9—16.5

40°C. (104°F.)

15.8—16.4

Starter Motor

Model

M.418.G.

Type

Four pole, four brush, series wound.

Brush tension

32—40 ozs. (0.9—1.1 Kgs.).

Minimum brush length

 $\frac{3}{16}$ " (8 mm.).

Number of teeth on ring gear

90.

Number of teeth on pinion

10.

Ratio

9 : 1.

Performance data

ARMATURE SPEED	TORQUE		CURRENT CONSUMPTION	
	lbs.ft.	Kgms.	Amperes	Volts
Locked	17	2.35	440—460	7.4—7
1,000 r.p.m.	8	1.11	250—270	9.4—9
7,400—8,500 r.p.m. ..	No load		45	12

TRIUMPH TR4

WORKSHOP MANUAL

GROUP 6

Comprising:
Electrical Section

SPECIFICATIONS

Distributor ..
 Model 25.D4.

Part Numbers

Compression Ratio	Lucas Service No.	Standard-Triumph Part No.
9	40795	208972
7	40842	209092

Design Data

Firing angles 0°, 90°, 180°, 270°, ±1°.
 Closed period 60° ± 3°.
 Open period 30° ± 3°.
 Contact breaker gap 0.015".
 Rotation (viewed on rotor arm) Anti-clockwise.

Centrifugal Timing Advance Tests

9 : 1 Compression Ratio

1. Set at 0° at a speed of less than 100 r.p.m.
2. Run distributor up to 1,200 r.p.m.—advance to be 9°—11°.
3. Check at following decelerating speeds:—

7 : 1 Compression Ratio

1. Set at 0°.
2. Run distributor up to 2,500 r.p.m.—advance to be 9° maximum.
3. Check at following decelerating speeds:—

Speed R.P.M.	Advance Degrees	Speed R.P.M.	Advance Degrees
800	9—11	1900	7—9
600	5—7	1350	4—6
350	0—2	700	½—2½
		400	0—1
No advance below 225 r.p.m.		No advance below 250 r.p.m.	

VACUUM ADVANCE TESTS CHECK ON RISING

Inches H.G.	Advance Degrees	Inches H.G.	Advance Degrees
2	0	2	0
3	1	3	1½
4	1¾	5	4½
5	2½	7	7½
Maximum 6	2¾	Maximum 8	10

Windscreen Wiper Motor

Lucas Model DR.3A Shunt wound single speed.
 Light running speed 44 to 48 cycles per minute of wiper blades.
 Stall current 13—15 amps.
 Light running currents 2.7—3.4 amps. (Measured less cable and rack).
 Resistance of field winding at 20°C. (68°F.) 8.0—9.5 ohms.
 Resistance of armature winding at 20°C. (68°F.) 0.29—0.352 ohms. (Measured between adjacent commutation segments).
 Brush tension 125—140 grammes.
 Maximum permissible force to move rack in protective tubing with wiper motor disconnected and wiper arms removed 6 lbs. (2.7 kgs.).

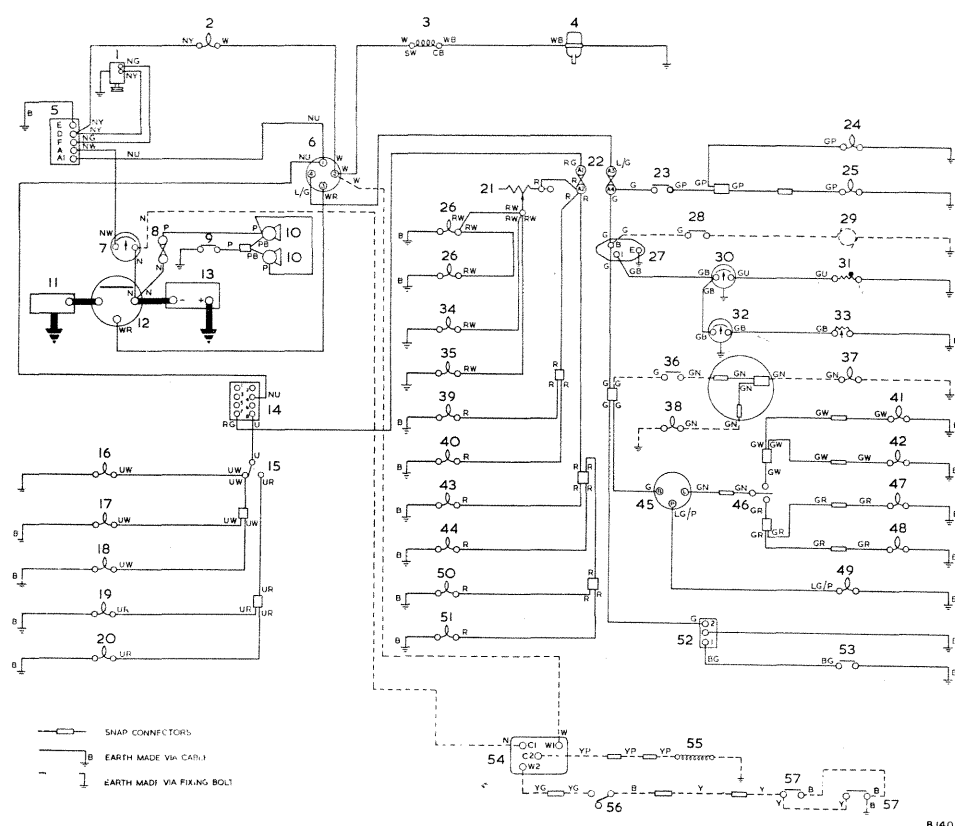


Fig. 1: Electrical circuit

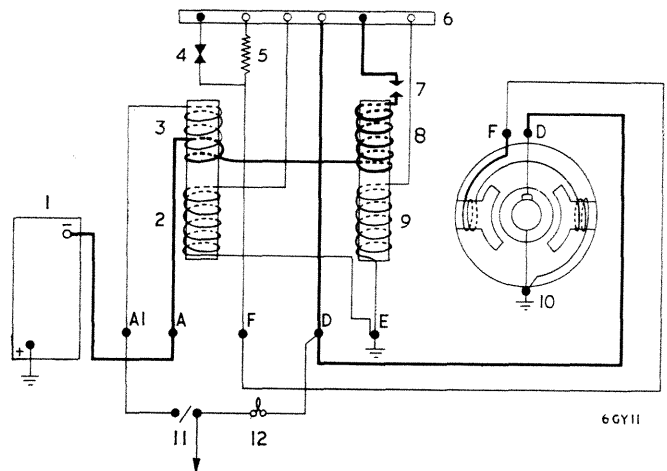
B 140

KEY TO FIG. 1

- | | | |
|-------------------------------------|------------------------------------|-------------------------------------|
| 1 Generator | 25 Stop lamp, L.H. | 48 Direction indicator, L.H. Rear |
| 2 Ignition warning lamp | 26 Ammeter and gauges illumination | 49 Direction indicator monitor lamp |
| 3 Ignition coil | 27 Voltage stabilizer | 50 Tail lamp, L.H. |
| 4 Distributor | 28 Heater blower motor | 51 Plate illumination lamp, L.H. |
| 5 Control box | switch | 52 Windscreen wiper motor |
| 6 Ignition switch | 29 Heater blower motor | 53 Windscreen wiper motor switch |
| 7 Ammeter | 30 Temperature indicator gauge | 54 Relay |
| 8 Horns fuse | 31 Temperature transmitter | 55 Solenoid |
| 9 Horn push | 32 Fuel gauge | 56 Column control |
| 10 Horns | 33 Tank unit | 57 Transmission switches |
| 11 Starter motor | 34 Speedometer illumination | |
| 12 Starter solenoid | 35 Tachometer illumination | |
| 13 Battery | 36 Reversing lamp switch | |
| 14 Lighting switch | 37 Reversing lamp | |
| 15 Dipper switch | 38 Reversing lamp | |
| 16 High beam indicator lamp | 39 Parking lamp, R.H. | |
| 17 Headlamp high beam, R.H. | 40 Parking lamp, L.H. | |
| 18 Headlamp high beam, L.H. | 41 Direction indicator, R.H. Front | |
| 19 Headlamp dip beam, R.H. | 42 Direction indicator, L.H. Front | |
| 20 Headlamp dip beam, L.H. | 43 Tail lamp, R.H. | |
| 21 Instrument illumination rheostat | 44 Plate illumination lamp, R.H. | |
| 22 Fuse unit | 45 Flasher unit | |
| 23 Stop lamp switch | 46 Direction indicator switch | |
| 24 Stop lamp, R.H. | 47 Direction indicator, R.H. Rear | |
- Optional Extra
- Overdrive Optional Extras

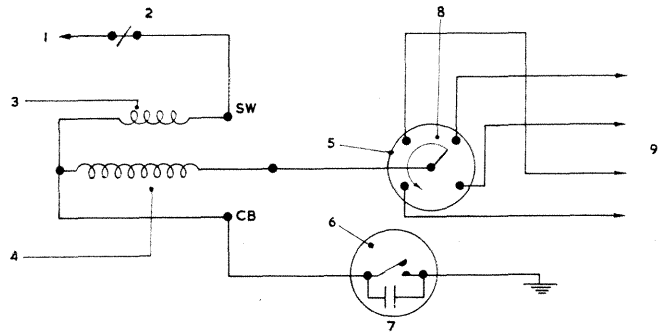
- Nos. 2-9 are incorporated in the control box

Fig. 2. Circuit diagram of generating system



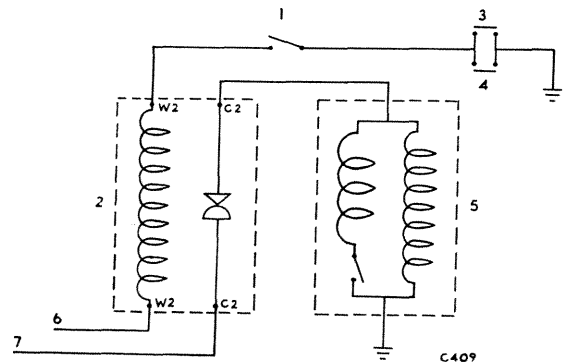
- 1 To battery via terminal 'A' on control box
- 2 Ignition switch
- 3 Ignition coil primary winding
- 4 Ignition coil secondary winding
- 5 Distribution cap
- 6 Contact breaker
- 7 Capacitor
- 8 Rotor arm
- 9 To sparking plug

Fig. 3. Circuit diagram ignition system



- 1 Control switch
- 2 Relay
- 3 Isolator switch
- 4 Isolator switch
- 5 Solenoid
- 6 To ignition switch
- 7 To ammeter

Fig. 4. Overdrive circuit



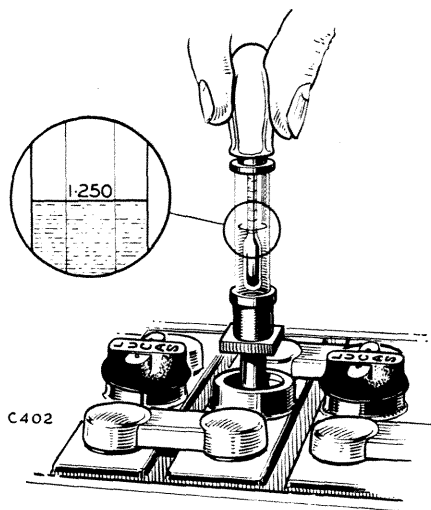


Fig. 5. Using a hydrometer to measure the specific gravity

TABLE 1. SPECIFIC GRAVITY OF ELECTROLYTE

Battery Condition	Climates below 90°F. (32°C.)	Climates over 90°F. (32°C.)
Fully charged . .	1.270—1.290	1.210—1.230
Half discharged . .	1.190—1.210	1.130—1.150
Completely discharged	1.110—1.130	1.050—1.070

TABLE 2
SPECIFIC GRAVITY OF ACID REQUIRED FOR FILLING

Quantity to half-fill each 2-volt cell	Specific gravity of electrolyte corrected to 60°F. (15.5°C.)	
	Climates below 90°F. (32°C.)	Climates over 90°F. (32°C.)
$\frac{1}{2}$ Pint	1.270 (30.83° Baume)	1.210 (25.16° Baume)

TABLE 3. PROPORTIONS OF ACID AND WATER

To obtain specific gravity when cooled to 60°F. (15.5°C.)	Add one part by volume of Acid (1.835 S.G.) to distilled water by volume as below.
1.210	4.0 parts
1.215	3.9 "
1.260	3.1 "
1.270	2.9 "
1.275	2.8 "
1.290	2.7 "
1.320	2.3 "
1.340	2.0 "

BATTERY

If the battery is subjected to long periods of discharge without suitable opportunities for recharging, a low state of charge can be expected. A defect in the charging system can also result in a discharged battery.

There are two reliable methods of assessing battery conditions. (1) Checking the specific gravity of the electrolyte, and (2) high rate discharge test.

1. Hydrometer Test

The specific gravity of the electrolyte varies with battery conditions (see table 1), and also with temperature, which should be corrected to the standard of 60°F. (15.5°C.) as outlined in table 4.

If it is necessary to top up the electrolyte, do not attempt to take a reading until the battery has been on charge for at least one hour. There should be little variation in the specific gravity readings between one cell and another of a battery in reasonably good condition.

A large variation, which is not the result of electrolyte loss, is probably an indication of an internal short circuit. If the electrolyte is very dirty, or contains small particles in suspension, it is possible that the plates are in bad condition.

2. Discharge Test

The high rate discharge test gives an indication of the condition and capacity of the battery. On test, the battery should maintain 100 amp. flow for 10 seconds with no appreciable fall in voltage.

Where a hand instrument (incorporating a low resistance device) is used for checking the individual cells of a battery, the actual reading obtained will depend upon the exact type of instrument used, but the cell voltage on a 5 to 6 seconds test should remain steady between 1.2 and 1.7 volts.

Variations in individual cell readings can indicate faults, but if all cells in any one battery fall below standard, recharge and again test before rejecting the battery.

Never make a high rate discharge test on a battery known to be low in charge.

Re-Charging from an external supply

If the above tests indicate that the battery is merely discharged and is otherwise in a good condition, it should be re-charged until the specific gravity and voltage show no increase over three successive hourly readings.

Preparing New, Unfilled, Uncharged Batteries

Batteries should not be filled with electrolyte until required for initial charging. Approximately one pint (570 c.c.) of electrolyte is needed for each cell.

Electrolyte of the specific gravity is prepared by mixing distilled water and concentrated sulphuric acid, usually of 1.835 S.G. either in a lead-lined tank or in suitable glass or earthenware vessel. Slowly add the acid to the water, stirring with a glass rod. Never add the water to the acid, as the resulting chemical reaction causes violent and dangerous spurting of the concentrated acid.

The approximate proportions of acid and water are indicated in table 3.

Heat is produced by the mixture of acid and water. Allow the electrolyte to cool before taking hydrometer readings, or pouring it into the battery.

Filling the cells

The temperature of the electrolyte, battery and filling in room must not be below 32°F. (0°C.) freezing.

Break the seals in the filling holes or remove the moulded pegs from the vent plugs and half-fill each cell with electrolyte of the appropriate specific gravity. Allow the battery to stand for six hours and fill to the top of the separators. Allow to stand for a further two hours and then proceed with the initial charge.

Initial Charge

Charge at a constant 3.5 amperes for 40 to 80 hours until the voltage and specific gravity readings show no increase over five successive hourly readings.

If the temperature of any cell rises 20°F. (11.1°C.) above the ambient temperature, interrupt the charge until the temperature has fallen at least 10°F. (5.6°C.) below that figure. Keep the electrolyte level with the top of the separator guard by adding electrolyte of the same specific gravity as the original filling. Continue the charge until specific gravity and voltage readings remain constant for five successive hourly readings.

At the end of the charge, check and if necessary, adjust the specific gravity in each cell when corrected to 60°F. (15.6°C.). To adjust, siphon off some of the electrolyte and replace it either by distilled water or by electrolyte of the strength originally used for filling. Continue the charge for an hour or so to ensure adequate mixing of the electrolyte.

Preparing New, Dry-Charged Batteries

Break the seals in the filling holes and fill each cell with electrolyte of correct specific gravity to the top of the separators. The temperature of the filling room, battery and acid should be maintained at between 60°F. (15.6°C.) and 120°F. (48.8°C.). If the battery has been stored in a cool place, allow it to warm up to room temperature before filling.

Batteries filled in this way are up to 90% charged. When time permits, a freshening charge may be given at normal charging rate of 5 amps. for not more than 4 hours. Check the specific gravity of the electrolyte at the end of the charge; if 1.270 electrolyte was used, the specific gravity should now be between 1.270 and 1.290; if 1.210 electrolyte between 1.210 and 1.230.

TABLE 4
SPECIFIC GRAVITY TEMPERATURE CORRECTION

Electrolyte Temperature		Correction required to obtain true specific gravity at 60°F. (15.5°C.).
Degrees F.	Degrees C.	
50	10.0	Deduct .004 from observed reading
55	12.7	" .002 " " "
60	15.5	Normal
65	18.3	Add .002 to " " "
70	21.1	" .004 " " "
75	23.8	" .006 " " "
80	26.6	" .008 " " "
85	29.4	" .010 " " "
90	32.2	" .012 " " "
95	35.0	" .014 " " "
100	37.7	" .016 " " "
110	43.3	" .020 " " "
120	48.8	" .024 " " "

TABLE 5. MAXIMUM PERMISSIBLE ELECTROLYTE TEMPERATURE DURING CHARGING

Climates below 80°F. (26.6°C.)	Climates between 80–100°F. (26.6–37.7° C.)	Climates above 100°F. (37.7°C.)
100°F. (37.7°C.)	110°F. (43.3°C.)	120°F. (48.8°C.)

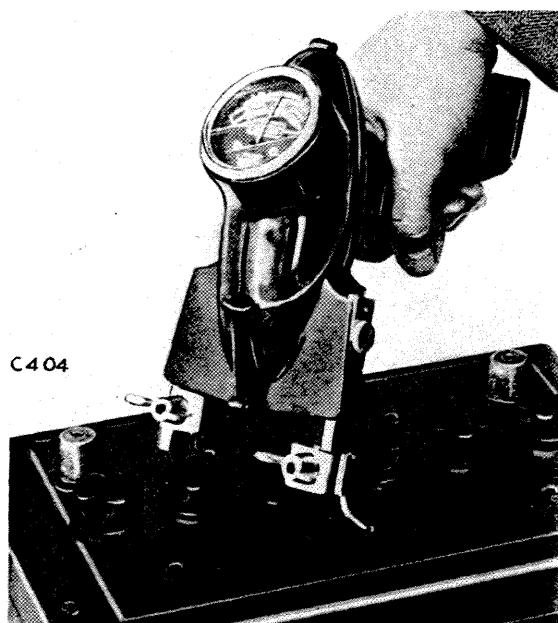
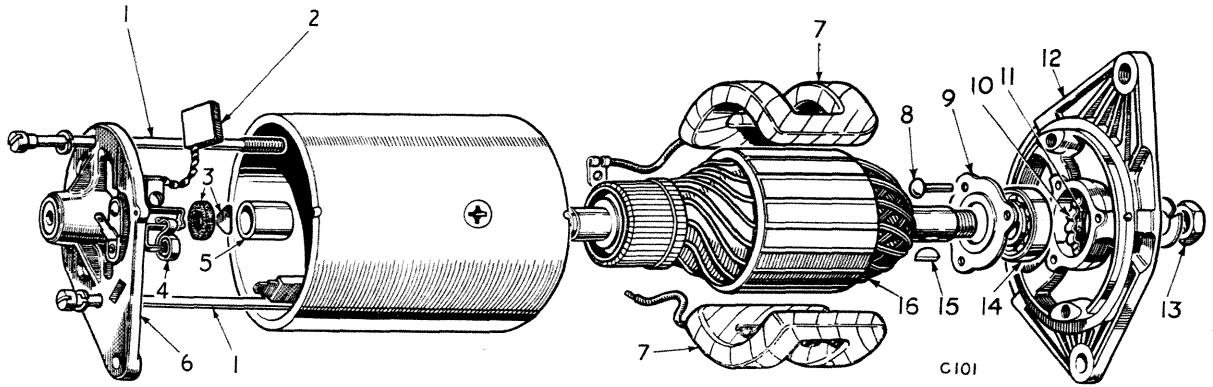


Fig. 6. Using a heavy discharge tester



- 1 Bolts
- 2 Brush
- 3 Felt ring and aluminium sealing disc
- 4 Brush spring
- 5 Bearing bush
- 6 Commutator end bracket
- 7 Field coils
- 8 Rivet
- 9 Bearing retainer plate
- 10 Corrugated washer
- 11 Felt washer
- 12 Driving end bracket
- 13 Pulley retainer nut
- 14 Bearing
- 15 Woodruff key
- 16 Armature

Fig. 7. Dismantled generator

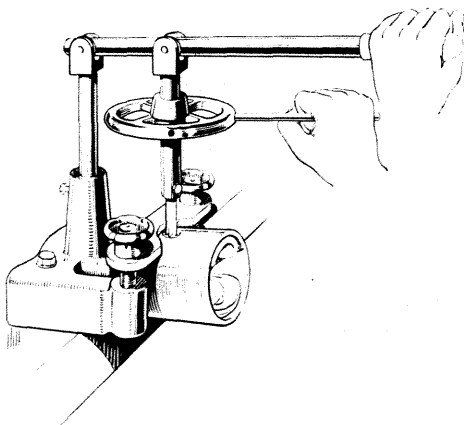


Fig. 8. Removing the pole pieces from the yoke

GENERATOR

To Dismantle

Remove the generator from the engine, extract the driving pulley and take out the woodruff key (15). Remove two bolts and withdraw the commutator end bracket (6) from the yoke. Note the fibre thrust washer adjacent to the commutator.

Withdraw the armature (16) and drive end bracket (12) complete with bearing. Support the bearing retaining plate (9) and press the shaft from the drive end bracket.

Field Coils

Renew as follows:

1. Drill out the rivet securing the field terminal assembly to the yoke and unsolder the field coil connections.
2. Remove the insulation piece which prevents the junction of field coils from contacting the yoke.
3. Mark the yoke and pole shoes so that they can be refitted to their original positions.
4. Unscrew the pole shoe retaining screws, remove the pole shoes and lift off the coils.
5. Fit the new field coils over the pole shoes and re-position them inside the yoke.
6. Locate the pole shoes and field coils by lightly tightening the retaining screws; fully tighten them by using a wheel operated screwdriver. Lock the screws by caulking.
7. Replace the insulation piece between the field coil connections and the yoke.
8. Re-solder the field coil connections to the field coil terminal tags and rivet the assembly to the yoke.

Commutator

Burned commutator segments may be caused by an open-circuit in the armature windings. If armature testing facilities are not available, test the armature by substitution.

The commutator should be smooth and free from pits or burned spots. Slight burning may be rectified by careful polishing with a strip of fine glass paper while rotating the armature. To remedy a badly worn commutator, mount the

armature, with or without the drive end bracket, in a lathe. Rotate the armature at high speed and take a light cut with a very sharp tool, removing as little metal as is necessary to clean up the commutator. Polish the commutator with very fine glasspaper and undercut the insulators between segments to a depth of $\frac{3}{32}$ " (0.8 mm.), using a hacksaw blade ground to the thickness of the insulator (Fig. 9).

Brushes

Check that the brushes move freely in their holders, by holding back the tension springs and pulling gently on the flexible connectors. If a brush is inclined to stick, remove it from its holder and clean its sides with a petrol-moistened cloth.

Replace the brushes in their original position or renew those which are less than $\frac{11}{16}$ " (8.7 mm.) in length.

Test the brush spring tension using a spring scale. Fit new springs if the tension is below 15 ozs.

Bearings

Replace the bearing bush in a commutator end bracket as follows:

Remove the old bearing bush from the end bracket by screwing a $\frac{1}{4}$ " tap squarely into the bush for a few turns and pulling out the bush with the tap.

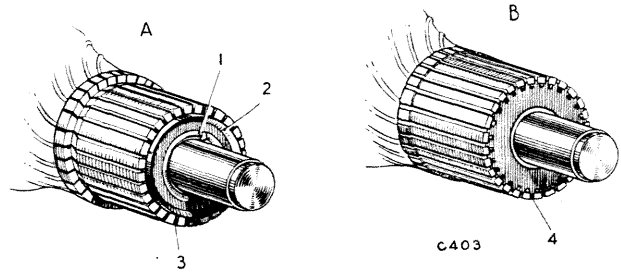
Insert the felt ring and aluminium disc (3) in the bearing housing and using a shouldered mandrel press the new bearing bush into the end bracket until the bearing is flush with the inner face of the bracket.

Replace the ball bearing at the driving end as follows:

1. Drill out the rivets (8) and remove the plate (9).
2. Press the bearing (14) from the end bracket (12) and remove the corrugated washer (10), felt washer (11) and oil retaining washer.
3. Clean and pack the replacement bearing with high melting point grease, such as Energrease RBB.3 or equivalent.
4. Place the oil retaining washer, felt washer and corrugated washer in the bearing housing and press in the bearing housing and press in the bearing.
5. Fit and rivet the retaining plate to the end bracket.

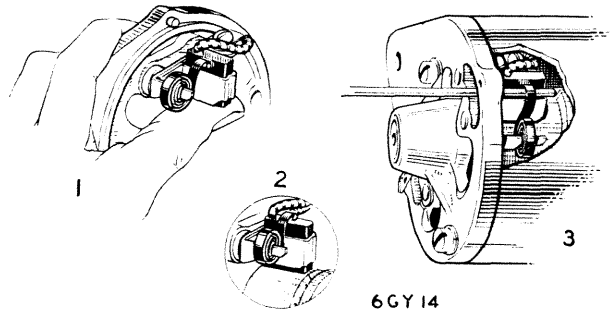
Re-assembly

1. Supporting the inner journal of the bearing to prevent damage, press the armature through the bearing assembled in the drive end bracket.
2. Assemble the armature and end bracket to the yoke.
3. Hold the brushes up by positioning each brush spring at the side of its brush.
4. Fit the commutator end bracket on the armature shaft until the brush boxes are partly over the commutator. Press each brush down on the commutator and move its spring to the operating position.
5. Fit the commutator end bracket to the yoke and refit the bolts (1).



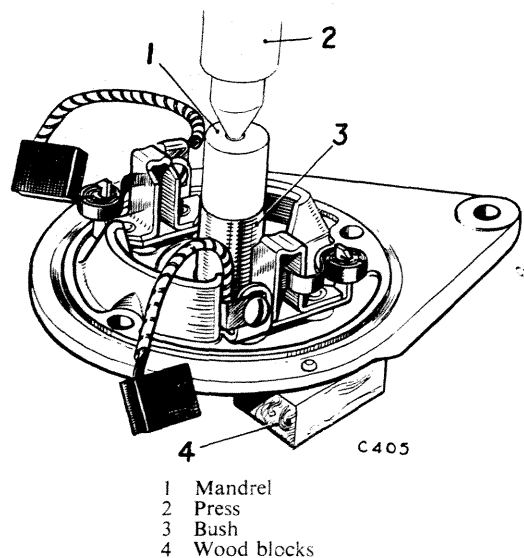
- A. Fabricated commutator
B. Moulded commutator
1 Metal roll-over
2 Insulating cone
3 Slot depth - 0.032" (0.81 mm.) maximum
4 Slot depth - 0.02" - 0.035" (0.508-0.89 mm.)

Fig. 9. Commutator details



- 1 Method of trapping brush in raised position with spring
2 Normal working position
3 Method of releasing brush on to commutator

Fig. 10. Fitting commutator end bracket to "windowless" yoke generator



- 1 Mandrel
2 Press
3 Bush
4 Wood blocks

Fig. 11. Fitting a new bearing to the commutator end bracket

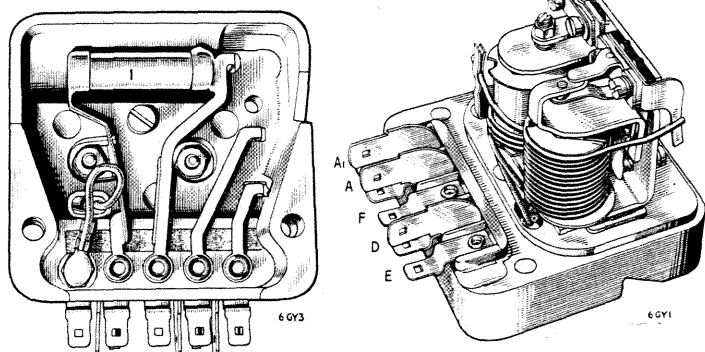


Fig. 12. The voltage regulator and cut-out

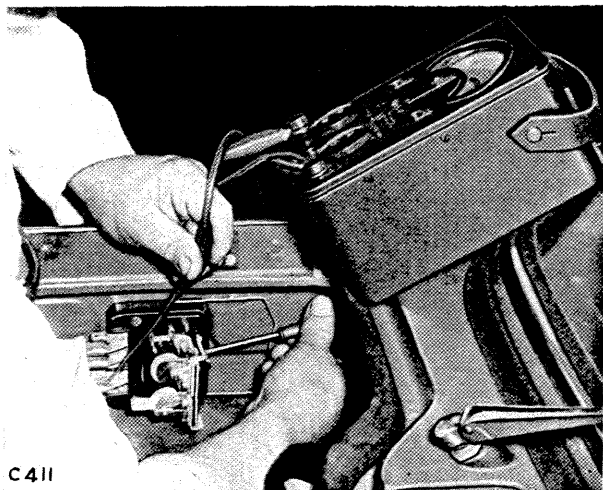


Fig. 13. Using a moving coil voltmeter to adjust the voltage regulator

CONTROL BOX

The control box shown in Fig. 12 contains two units — a voltage regulator and a cut-out. Although combined structurally, the regulator and cut-out are electrically separate.

The regulator is set to maintain the generator terminal voltage between close limits at all speeds above the regulating point, the field strength being controlled by the automatic insertion and withdrawal of a resistor in the generator field circuit.

Cleaning Contacts

- (i) Regulator Contacts — use fine carborundum stone or silicon carbide paper.
- (ii) Cut-out Relay Contacts — use a strip of fine glasspaper — never carborundum stone or emery cloth.

Voltage Regulator—Electrical Setting

It is important that only a good quality MOVING COIL VOLTMETER (0.20 volts) is used when checking the regulator.

Remove the cover and insert a thin piece of cardboard between the armature and the core face of the cut-out to prevent the contacts from closing.

Start the engine and slowly increase its speed until the generator reaches 3,000 r.p.m., when the open circuit voltage reading should be between the appropriate limits given on page 6-102, according to the ambient temperature.

If the voltage, at which the reading becomes steady, occurs outside these limits, adjust the regulator by turning the adjusting screw clockwise to raise the voltage or counter clockwise to lower.

Adjustment of regulator open-circuit voltage should be completed within 30 seconds otherwise heating of the shunt windings will cause false settings to be made.

Remove the cardboard.

Voltage Regulator — Mechanical Setting

A copper separator, in the form of a disc or square, is welded to the core face of the voltage regulator, and affects the gap setting between the core-face and the underside of the armature as follows:—

Where a round separator is used, the air gap should be 0.015" (0.38 mm.).

Where a square separator is used, the air gap should be 0.021" (0.53 mm.).

To adjust the air gap:—

Slacken the fixed contact locking nut and unscrew the contact screw until it is well clear of the armature moving contact.

Slacken the voltage adjustment spring-loaded screw until it is well clear of the armature tension spring.

Slacken the two armature assembly securing screws.

Insert a gauge of sufficient width to cover the core face, and of the appropriate thickness, between the armature and copper separator.

Press the armature squarely down against the gauge and re-tighten the two armature assembly securing screws. Without removing the gauge, screw in the fixed contact adjustment screw until it just touches the armature contact. Re-tighten the locking nut.

Re-check the electrical setting of the regulator.

CUT-OUT

Electrical Setting

If the regulator is correctly set but the battery is still not being charged, the cut-out may be out of adjustment. To check the voltage at which the cut-out operates, remove the control box cover and connect the voltmeter between the terminals D and E. Start the engine and slowly increase its speed until the cut-out contacts are seen to close, noting the voltage at which this occurs. This should be 12.7-13.3 volts.

If operation of the cut-out takes place outside these limits, it will be necessary to adjust. To do this, turn the adjusting screw in a clockwise direction to raise the voltage setting or in a counter clockwise direction to reduce the setting. Turn the screw only a fraction of a turn at a time and test after each adjustment by increasing the engine speed and noting the voltmeter readings at the instant of contact closure. Electrical settings of the cut-out, like the regulator, must be made as quickly as possible, because of temperature rise effects. Tighten the locknut after making the adjustment. If the cut-out does not operate, there may be an open circuit in the wiring of the cut-out and regulator unit, in which case the unit should be removed for examination or replacement.

Cut-out Relay

Slacken the adjustment screw until it is well clear of the armature tension spring.

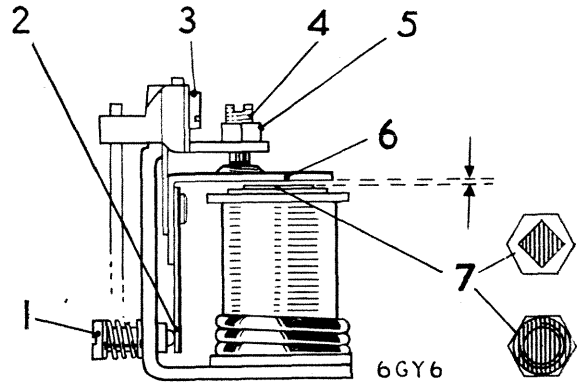
Slacken the two armature securing screws.

Press the armature squarely down against the core face (copper sprayed in some units, fit with a square of copper in others) and re-tighten the armature securing screws. No gauge is necessary.

With the armature still pressed against the core face, adjust the gap between the armature stop arm and the armature tongue to 0.032" (0.81 mm.) by bending the stop arm.

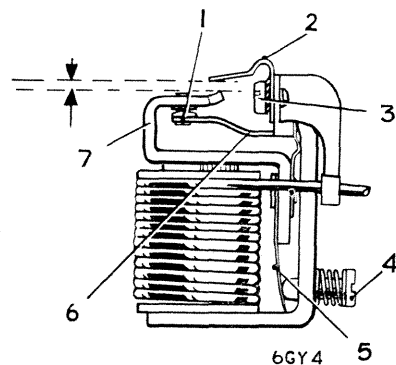
Adjust the fixed contact blade so that it is deflected 0.015" (0.38 mm.) by the armature moving contact when the armature is pressed against the core face.

Re-check the electrical setting of the cut-out.



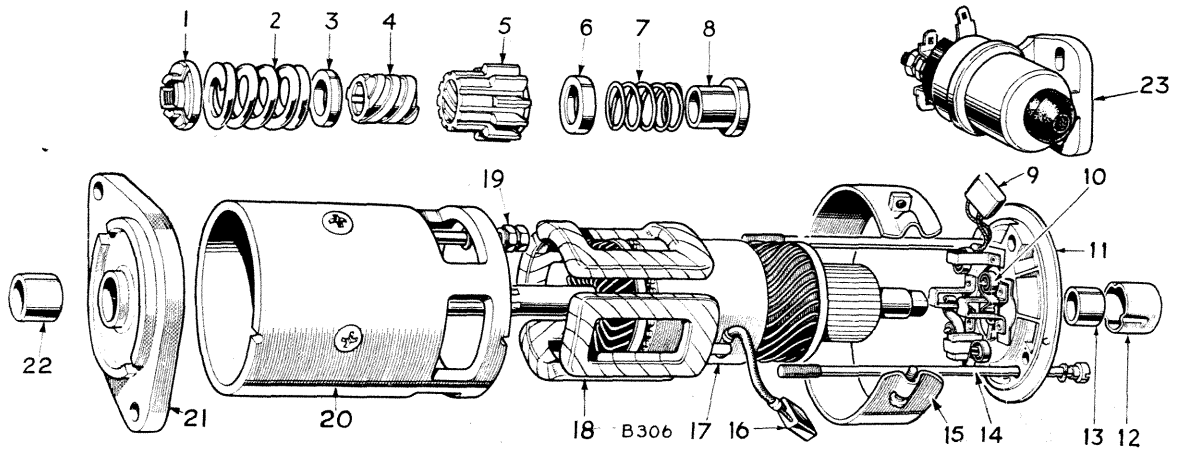
- 1 Voltage adjusting screw
- 2 Armature tension spring
- 3 Armature securing screws
- 4 Fixed contact adjustment screw
- 5 Lock nut
- 6 Armature
- 7 Core face and shim

Fig. 14. Regulator air-gap settings



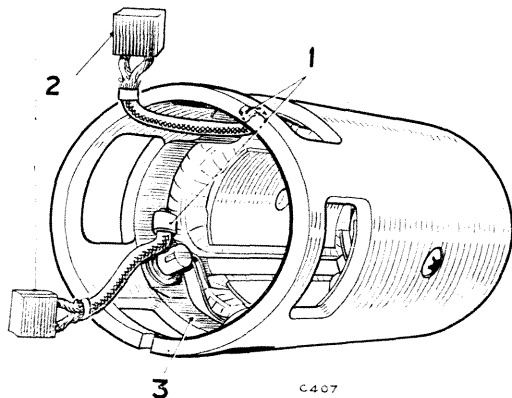
1. Follow through 0.010" - 0.020" (0.254 - 0.508 mm.)
- 2 Stop arm
- 3 Armature securing screws
- 4 Cut-out adjusting screw
- 5 Armature tension spring
- 6 Fixed contact blade
- 7 Armature tongue and moving contact

Fig. 15. Cut-out air gap settings



- | | |
|---------------------------|--------------------------|
| 1 Starter drive nut | 13 Bush |
| 2 Starter drive spring | 14 Bolt |
| 3 Thrust washer | 15 Brush cover |
| 4 Screwed sleeve | 16 Brush |
| 5 Pinion | 17 Field coil connection |
| 6 Thrust washer | 18 Field coil |
| 7 Spring | 19 Terminal |
| 8 Collar | 20 Yoke |
| 9 Brush | 21 Drive end cover |
| 10 Brush spring | 22 Bush |
| 11 Commutator end bracket | 23 Starter solenoid |
| 12 Cover | |

Fig. 16. Dismantled starter motor



- | |
|--------------------------|
| 1 Field coil connections |
| 2 Brushes |
| 3 Yoke |

Fig. 17. Brush connections

STARTER MOTOR MODEL M.418G

To Remove

1. Disconnect the negative cables from the battery and the starter motor terminals.
2. Remove two bolts, nuts and spring washers securing the starter motor to the cylinder block and clutch housing flanges.
3. Withdraw the starter motor from the clutch housing and manoeuvre it upwards between the carburettors and wing valance.

To Refit

Reverse the removal procedure, ensuring that the shoulder on the starter motor bolting face registers correctly with the cylinder block flange face.

Re-connect the cables to the battery and starter motor terminals.

Dismantling

Loosen the brush cover screw and slide the cover (15) from the unit. Lift the brush springs (10) and withdraw the brushes (9) from their holders.

Unscrew the terminal nuts (19), the two bolts (14) and remove the end bracket (11). Withdraw the drive end bracket (21) and armature from the yoke (20).

Extract the split pin, unscrew the nut (1), remove items 2—8 and slide the drive end bracket (21) from the shaft.

Reassembly — reverse the dismantling procedure.

Field Coils

To renew:

Unscrew the four-pole-shoe retaining screws, using a wheel operated screwdriver and pole expander tool for obstinate cases.

Mark the yoke and pole-shoes so that they can be refitted to their original positions.

Take out the pole-shoes, lift off the coils and unsolder the field coil tappings from the terminal post.

Fit new field coils by reversing the procedure, and replace the insulating pieces used to prevent the inter coil connectors from contacting the yoke.

To Reassemble

Assemble the components 1 to 8 in order shown on Fig. 16 and secure the retaining nut (1) with a split pin.

Bearings

To renew:

Using a shouldered mandrel of the same diameter as the shaft, drive out the old bush and press the new bearing bush into the end bracket.

The bronze bushes are porous and must not be opened out after fitting, otherwise the porosity of the bush may be impaired.

Commutator

A commutator in good condition is clean, smooth and free from pits or burned spots. If cleaning with a petrol-moistened cloth is ineffective, carefully polish the commutator with very fine glasspaper while the armature is rotating. Do not use emery cloth.

To rectify a badly worn commutator, mount the armature in a lathe, rotate at high speed and take a light cut with a sharp tool, removing the minimum of metal to obtain a clean finish. Finally, polish with very fine glasspaper.

Note:—Do not undercut the mica insulators between segments.

Brushes

Check that the brushes move freely on their holders by holding back the brush springs and pulling gently on the flexible connectors. If a brush is inclined to stick, remove it from its holder and release its sides with a smooth file.

Replace the brushes in their original positions or renew excessively worn brushes as follows:

Cut off the original brush flex $\frac{1}{4}$ " (3 mm.) approximately from the aluminium and tin the brazed joint. Open out the loop, taking care not to allow solder to run towards the brush.

Place the original joint within the loop, squeeze up and solder. The brushes are pre-formed so that bedding to the commutator is unnecessary.

Starter Drive

When the starter motor is removed from the engine, check the pinion for cleanliness and freedom of action. If necessary wash the drive assembly in paraffin to remove dirt and grease, which is the usual cause of a sticking pinion. Do not lubricate the components.

To Dismantle

Extract the split pin, unscrew the retaining nut (1), and slide the components 2—8 from the starter armature shaft.

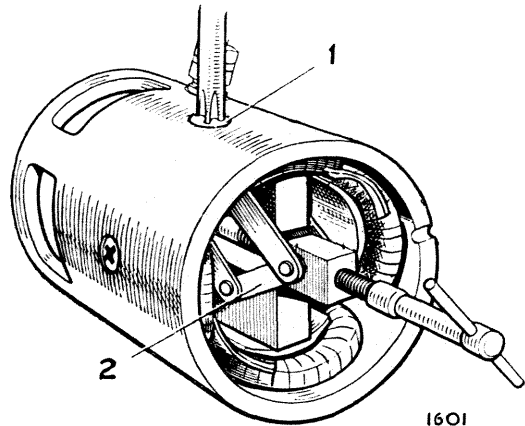
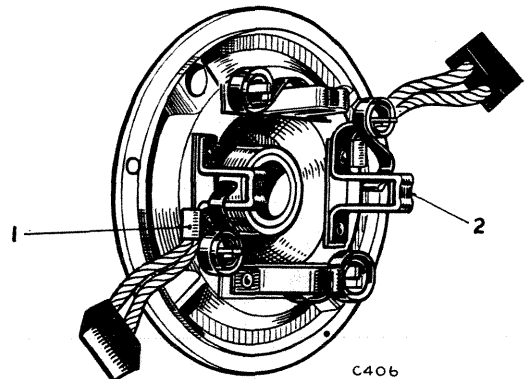


Fig. 18. Using a pole shoe expander to refit the field coils and retainer screws



- 1 Brush connections
- 2 Brush boxes

Fig. 19. Commutator end bracket

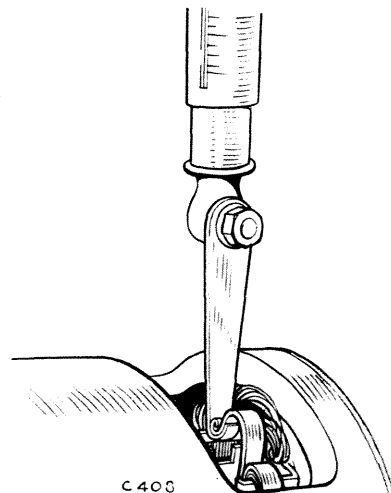


Fig. 20. Using a spring scale to test the brush spring tension

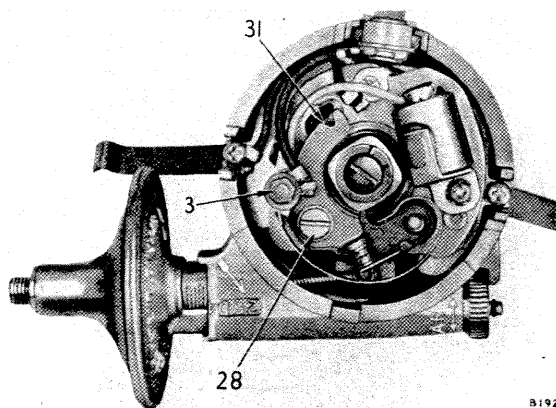


Fig. 21. Distributor contacts

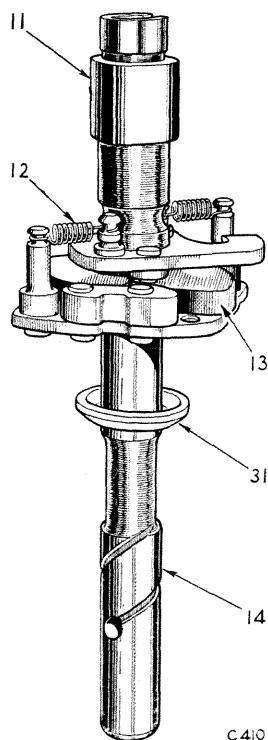


Fig. 22. Assembly of centrifugal weights and springs to the action plate

IGNITION DISTRIBUTOR

The distributor is mounted on a pedestal at the L.H. side of the engine and driven by the camshaft, via a helical gear, which also drives the oil pump and tachometer. The degree of ignition advancement is controlled mechanically, according to engine speed, by two centrifugal weights mounted between a driving and driven plate within the body. Additional vacuum control, according to the effect of load on manifold depression, is provided by a diaphragm acting directly on the contact breaker plate.

Contact Breaker Adjustment (Fig. 21)

Take off the distributor cap, remove the rotor arm and turn the engine until the contact breaker heel is on the highest point of the cam.

Slacken the screw (28), insert the blade of a screwdriver into the slots (31), and twist the screwdriver to adjust the gap between the contact breaker points, which should be 0.014"—0.016" (0.356—0.406 mm.) measured with a feeler gauge.

Tighten the locking screw (28), re-check the gap and, if satisfactory, refit the rotor arm and cap.

Contact Breaker Renewal

Slight pitting or discolouration of the points may be rectified by use of a fine carborundum stone. Do not use emery cloth unless the points are removed first and thoroughly cleaned before re-assembly. Renew burned or deeply pitted contacts as follows:—

1. Remove the nut (3), insulating sleeve (2) and lift the black and green cables from the terminal pillar.
2. Lift the spring contact (1) from the pivot post and remove the fibre washers (29) and (30).
3. Take out the lock screw (28) and lift off the fixed contact (27).

To Refit

Reverse the above instructions and adjust the gap between the contact breaker points.

Distributor Capacitor

A short circuit, resulting from the breakdown of the dielectric between the electrodes of the capacitor, which is parallel connected across the contact breaker points, will prevent the interruption of the low tension circuit and cause ignition failure.

An open circuit in the capacitor is more difficult to diagnose without the aid of special equipment, but may be suspect when the points are excessively burnt and difficult starting is experienced.

Renew the capacitor, or in case of doubt, substitute the existing one as follows:—

1. Remove the distributor cap and rotor arm, unscrew the nut (3) from the spring contact terminal post, and lift off the capacitor lead.
2. Take out the capacitor retainer screw and remove the capacitor.
3. Secure the new capacitor in place, reconnect the lead to the terminal post and refit the nut (3). Refit the rotor arm and distributor cap.

Overhauling the Distributor

To Remove

Disconnect the low tension cable from the side of the distributor, disconnect the high tension cable from the coil and release the high tension cables from the spark plugs.

Uncouple the vacuum pipe from the distributor, unscrew two nuts at the base of the distributor and lift it from the engine.

To Dismantle

Remove the distributor cover and rotor arm. Disconnect the vacuum control (26) from the contact plate (7), take out two screws (8) and remove the contact breaker assembly.

Release the circlip (19) and remove the adjusting nut (18) and spring (17), taking care not to lose the ratchet spring (16). Withdraw the vacuum control unit (25) from the distributor body.

Release both springs (12) from the base of the cam (11) and the action plate (14). Take out the screw (10) and lift the cam (11) from the shaft (14).

At this stage, check the shaft (14) for end float which should not exceed $\frac{3}{32}$ " (0.8 mm.). Drive out the pin (21), take off the collar (22) and the washer (23), and withdraw the shaft (14) from the distributor body.

Substituting a new shaft, or a test bar of 0.490" (12.45 mm.) diameter check the bearing sleeve (24) for wear, and renew the sleeve if required.

To reduce excessive end float, renew the nylon spacer beneath the action plate (14), and the washer (23) between the driving dog and distributor body.

To Reassemble

Refit the nylon spacer under the action plate (14), reassemble the weights (13), spring (12) and cam (11) to the action plate (14) and secure the cam with the screw (10). Lubricate the shaft and insert the assembly into the distributor body.

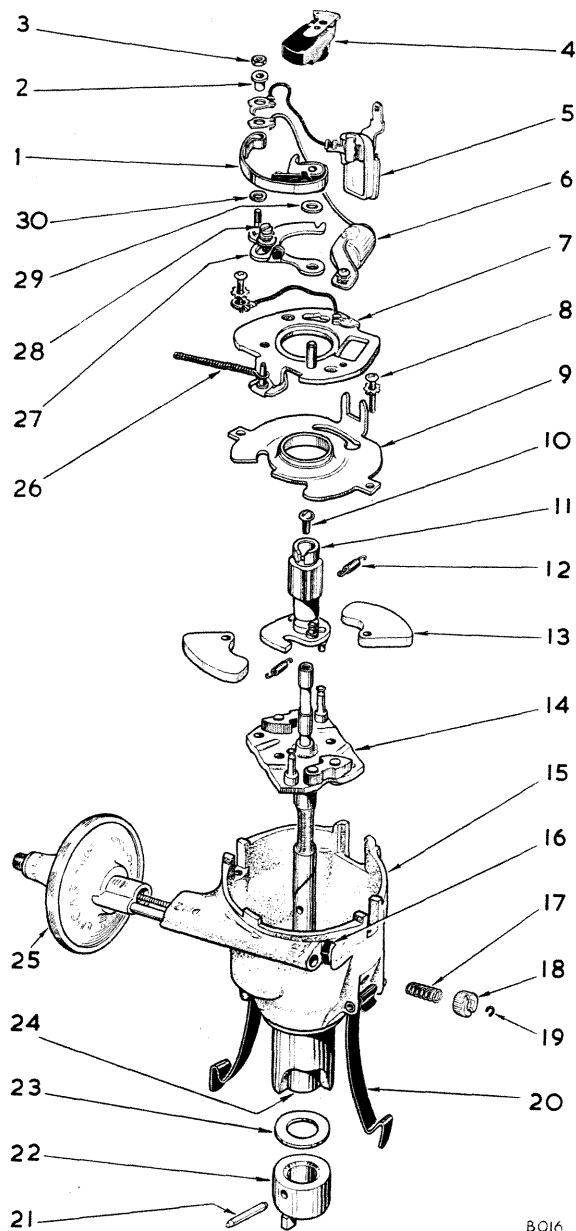
Refit the washer (23) and, placing the offset driving collar (22) as shown on Fig. 23, secure the collar by inserting and swelling the ends of the pin (21).

Assemble the contact plate (7) to the fixed base plate (9) by springing the spring clip over the base plate slot edge, inserting the peg of the contact plate into a slot in the base plate and moving it slightly clockwise. Secure the assembly to the distributor body, using two screws (8).

Insert the vacuum unit (25) into the distributor body and assemble the ratchet spring (16), the coiled spring (17), adjusting nut (18) and the circlip (19). Hook the vacuum connecting spring (26) on to the pin attached to a cranked lug on the contact plate.

Assemble the capacitor and the contact breaker to the contact plate (7) and adjust the contact breaker points as described previously.

Refit the complete distributor to the engine, re-connect the vacuum pipe, the high and low tension cables, and adjust the ignition timing as instructed on page 1-131.



B016

- | | |
|------------------------------------|-----------------------------|
| 1 Spring contact | 16 Ratchet spring |
| 2 Insulating sleeve | 17 Coiled spring |
| 3 Nut | 18 Adjusting nut |
| 4 Rotor arm | 19 Circlip |
| 5 L.T. terminal | 20 Cap retainer |
| 6 Capacitor | 21 Pin |
| 7 Contact plate | 22 Driving dog |
| 8 Screw | 23 Washer |
| 9 Base plate | 24 Bearing sleeve |
| 10 Screw | 25 Vacuum unit |
| 11 Cam | 26 Vacuum connecting spring |
| 12 Centrifugal spring | 27 Fixed contact |
| 13 Centrifugal weights | 28 Screw |
| 14 Action plate and shaft assembly | 29 Insulating washer |
| 15 Distributor body | 30 Insulating washer |

Fig. 23. Dismantled ignition distributor

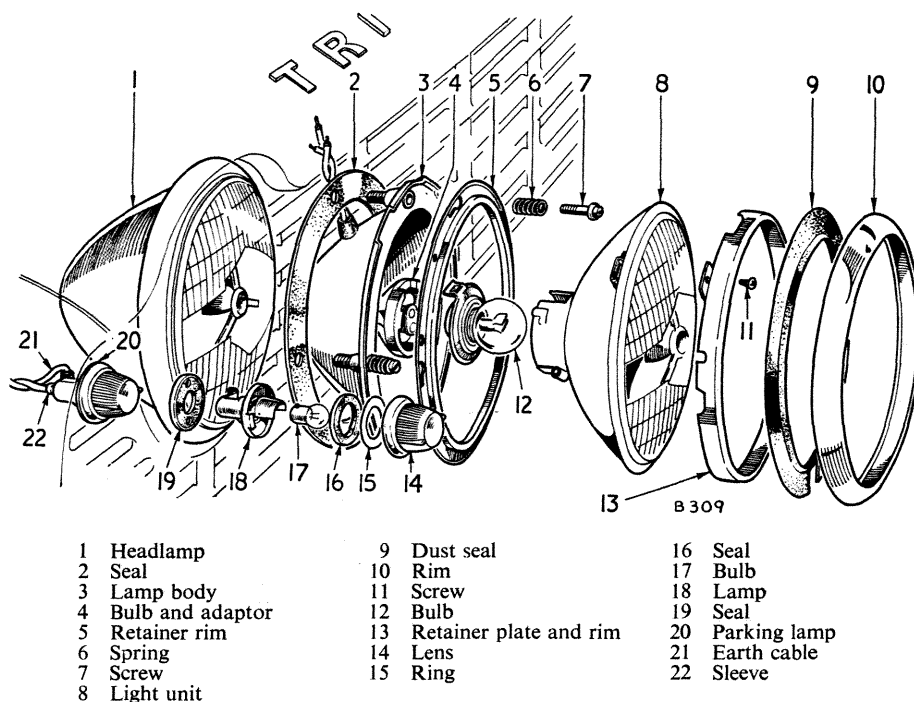


Fig. 24. Dismantled headlamp and parking lamp

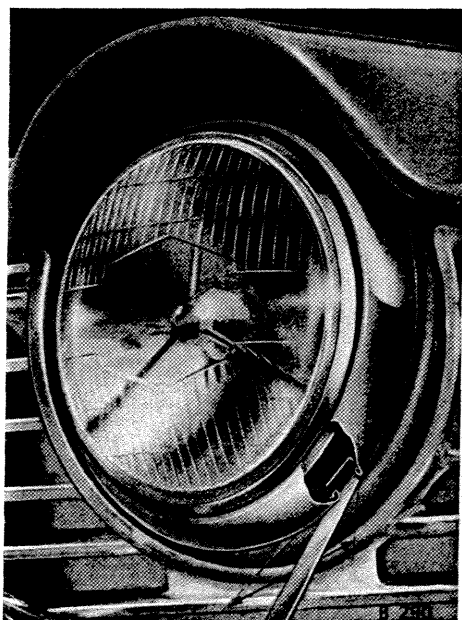


Fig. 25. Removing the headlamp rim

LAMPS

Headlamp Bulb Replacement

Remove the Snap-on rim by inserting the end of the special tool (provided in the kit) behind the lower edge of the rim and levering sideways as shown on Fig. 25. Press in the lamp unit against the tension of the adjusting screw springs and turn in an anti-clockwise direction until the key-slot holes in the rim line up with the screw heads. The lamp unit can then be drawn off. Do not rotate any of the screws, as this will affect the alignment of the reflector when assembled.

Rotate the adaptor anti-clockwise and pull off, then the headlamp bulb can be removed. Care should be taken to see that the bulb does not drop out.

Note:—Headlamp bulbs cannot be removed from the sealed beam units fitted to cars which are exported to the U.S.A. Bulb failure will necessitate unit replacement.

Headlamp Unit Replacement

Remove the lamp unit and bulb as described above. Unscrew three screws (11) and separate the inner and outer rims (5) and (13) from the light unit (8).

Fit a new unit by reversing the procedure and ensure that the locating clips at the edge of the light unit fit into corresponding slots in the rim.

Headlamp Alignment

The main beam is aligned in the vertical plane by turning the screw at the top of the lamp and in the horizontal plane by turning the screw on the side. Alignment of the beam on one lamp is best carried out with the other lamp covered.

Maximum illumination is obtained, and discomfort to other road users is prevented, by ensuring that the lamp beams do not project above the horizontal when the vehicle is fully laden.

Where adjustment is required, one of the following methods may be employed, subject to minor variations which may be necessary to meet varying conditions in different countries.

Method 1.

Lucas Beamsetter.

Remove the front rim and dust excluding rubber to gain access to the adjusting screws.

Roll the alignment bar into contact with the front wheels.

Wheel the beamsetter forward so that the two projecting arms butt against the alignment bar.

Adjust the height of the beamsetter unit to the level of the headlamp.

If the vehicle is not carrying its normal complement of passengers the height of the screen at the forward end of the setter may be adjusted to compensate for beam depression. The adjustment is calibrated in degrees and in inches per hundred feet and is effected by moving the lever to the appropriate angle of dip. This angle is dependent on the normal loading of the car. $0.5^\circ = 2 \text{ ft. } 7 \text{ ins. in } 100 \text{ yards (0.787 metres in } 91.44 \text{ metres)}$.

Switch on the lamp under test and adjust the screws to bring the beam image between the marker lines on the screen with the highest meter reading.

Method 2.

Wall Chart.

Position the car on level ground with the front facing squarely the screen or wall at a distance of $12\frac{1}{2} \text{ ft. (3.8 metres)}$ from the screen.

Adjust the spheres (B) $\frac{7}{8}'' (22.2 \text{ mm.})$ below the centre line of the lamps and to an equal distance either side of the centre line of the car.

Where the screen is not available, a wall may be marked to correspond with the adjustments given with the screen.

With one lamp covered adjust the screws on the other lamp to provide the pattern shown in Fig. 27.

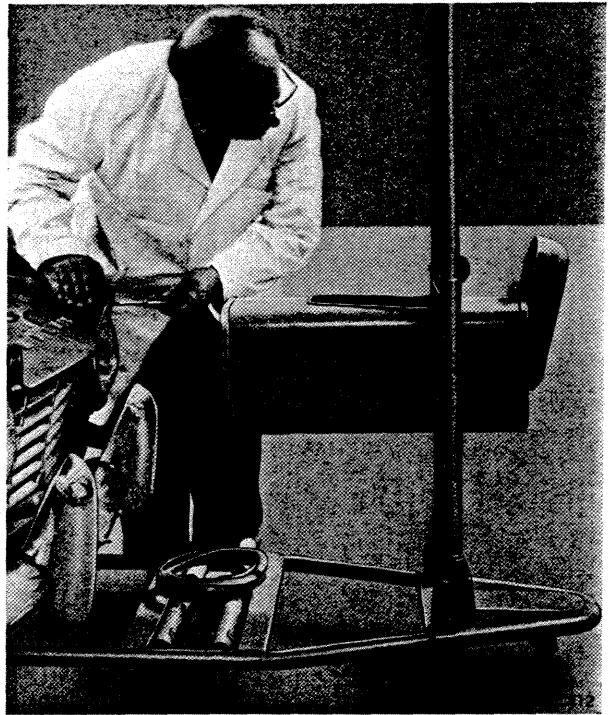


Fig. 26. Using Lucas Beamsetter

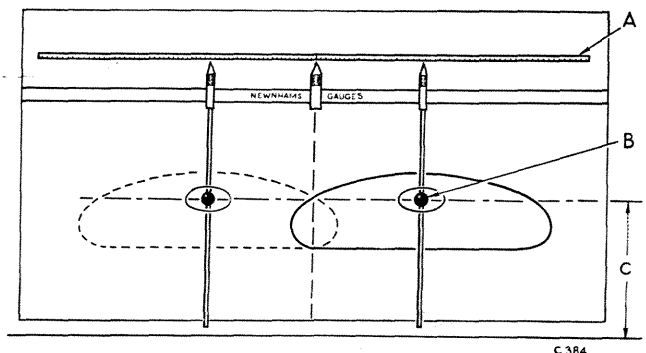


Fig. 27. Showing the light pattern projected on to a Newnham's Gauge

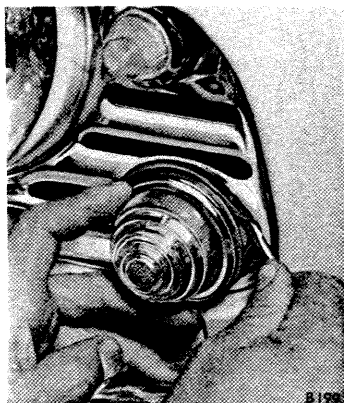


Fig. 28. Removing the lens from the direction indicator flashing lamp

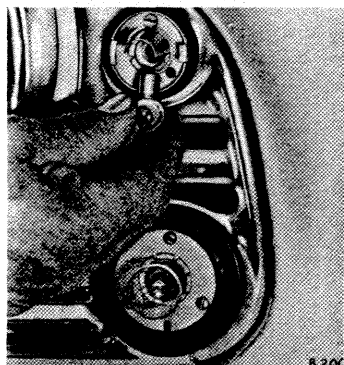


Fig. 29. Removing a bulb from the parking lamp

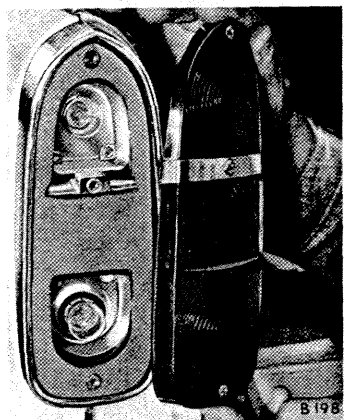


Fig. 30. Removing the lens from the tail, brake stop and direction indicator flashing lamp



Fig. 31. Removing a bulb from plate illumination lamp

Direction Indicator Flashing Lamps (Fig. 28)

With the aid of a thin screwdriver turn back the rubber and remove the rim. This then permits the glass lens to be similarly removed. When re-assembling the components fit the glass lens first.

Parking Lamps (Fig. 29)

Twist the lens counter-clockwise and withdraw the lamp front to gain access to the bulb.

Tail/Brake Stop and Direction Indicator Flashing Lamps (Fig. 30)

Remove three screws and lift off the lens, which is in two sections, to gain access to the bulbs. The pins on the tail/brake stop lamp bulb are offset and cannot be fitted incorrectly.

Plate Illumination Lamps (Fig. 31)

Remove the two screws securing the rim and cowl to the over-rider, withdraw the lamp approximately 2" (5 cm.) and renew the bulb.

TEMPERATURE INDICATOR

The temperature indicator, comprising a temperature transmitter and a gauge unit, operates on a 10 volts system which is controlled by a voltage stabilizer.

Temperature Transmitter

The temperature transmitter which is mounted in the right-hand side of the thermostat housing, consists of a temperature sensitive resistance element contained within a brass sleeve. The resistance element is a semi-conductor which has a high negative temperature co-efficient of resistance and its electrical resistance therefore decreases rapidly with an increase in temperature. As the temperature of the engine coolant increases, the resistance of the semi-conductor increases the flow of current through the indicator, similarly a decrease in coolant temperature will reverse the procedure.

Gauge Unit

The gauge unit comprises a heater winding round a bimetal strip which is linked to the pointer of the gauge unit. The flow of current through the heater winding is controlled by the temperature transmitter which reacts to any change in engine coolant temperature by varying the current drawn through the heater windings. This effects the bimetal strip which in turn causes the pointer to indicate the temperature of the coolant. The slow movement of the pointer is caused by the time taken to heat or cool off the bimetal strip.

Voltage Stabilizer

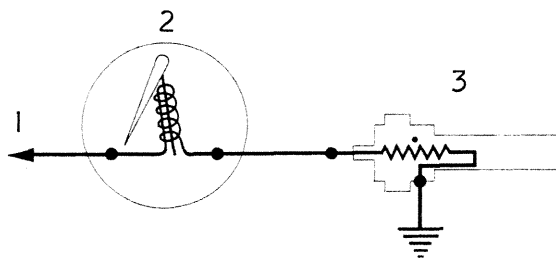
The voltage stabilizer is a small sealed unit, located under the facia on the right-hand side of the car, and is used to provide a constant current of 10 volts for the operation of the fuel contents gauge and the Temperature Indicator.

Since it is not possible to repair any of the units described above, a defective unit must, therefore, be renewed.

Testing

To establish which unit is defective, test for circuit continuity using an Ohmmeter or by substituting a known unit.

Do not connect any unit direct to the battery.



B 009

- 1 To "B" terminal on voltage stabilizer
- 2 Gauge unit
- 3 Transmitter

Fig. 32. Circuit diagram of temperature indicator

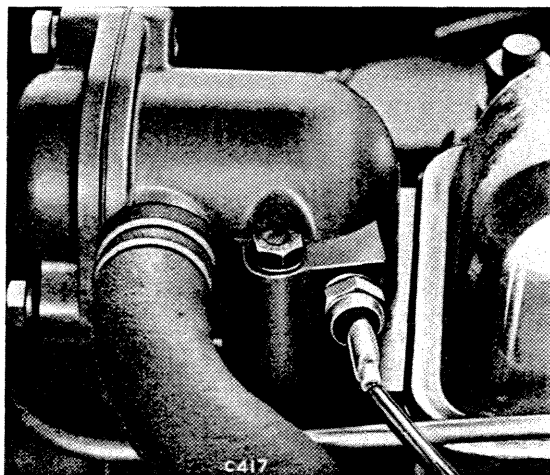


Fig. 33. Location of temperature transmitter

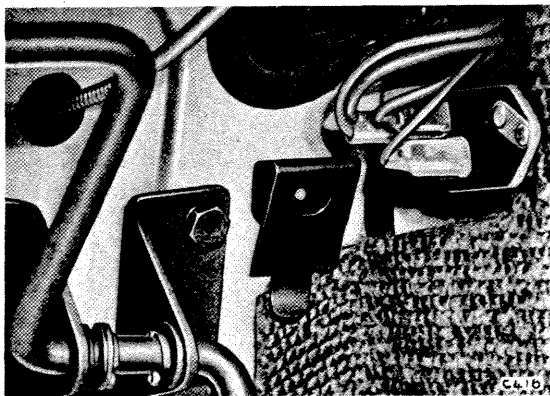
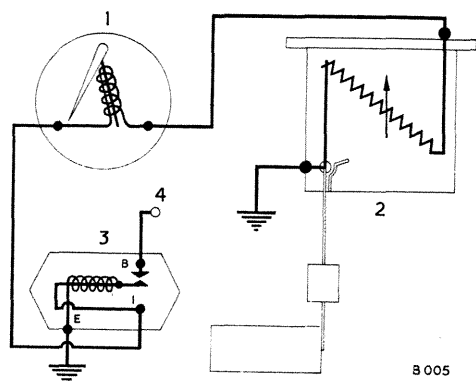


Fig. 34. Location of voltage stabilizer



- 1 Fuel indicator gauge
- 2 Tank unit
- 3 Voltage stabilizer
- 4 To "A4" on fuse unit

Fig. 35. Circuit diagram of fuels contents gauge

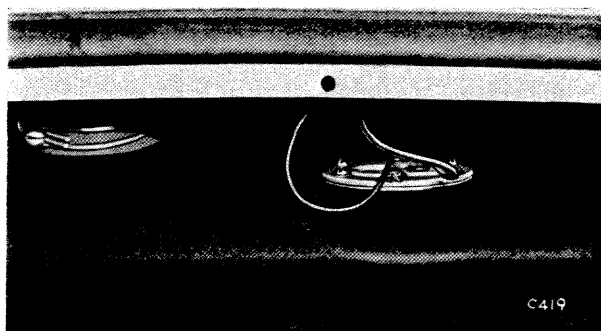


Fig. 36. Location of fuel tank unit

FUEL CONTENTS GAUGE

The fuel contents gauge operates on a stabilized 10 volts and comprises:

1. Indicator Gauge.
2. Tank Unit.

The units may be renewed independently of each other.

1. Indicator Gauge

The construction and operation of the contents indicator is identical to the temperature indicator gauge unit.

2. Tank Unit

The tank unit is virtually a variable resistor, with the sliding member controlled by the arm to which the float is attached.

The flow of current through the indicator will vary as the float rises or falls with the level of fuel in the tank.

Fault Finding

1. No reading on fuel indicator.
 - (a) Check the fuse between A3 and A4.
 - (b) Check the input and output voltages at the stabilizer. These should be set at battery voltage and 10 volts respectively.
If the input voltage is correct then the coil between the fuse unit and stabilizer is in order.
If an incorrect or no-volts reading is obtained at the output terminal "T" on the stabilizer then the stabilizer is faulty and must be renewed.
- (c) Remove the tank unit and test by substituting it with a "known" unit.
2. High or Low Reading on Fuel Indicator.
 - (a) Check the voltage stabilizer as described in 1 (b) above.
 - (b) Check the instrument by substituting "known" components.
 - (c) Check condition of insulation of inter-connecting cables between the units for lead to earth.
3. Intermittent Reading
 - (a) Check for loose connections.
 - (b) Substitute voltage stabilizer.
 - (c) Substitute indicator and tank unit in turn with similar type.

WIND TONE HORNS MODEL 9H

Lucas miniature wind tone horns, model 9H, operate on the principle of a resonating air column vibrated by a diaphragm, actuated electro-magnetically by a self-interrupting circuit. The horns are intended to be sounded in matched pairs, each pair consisting of a high note and a low note horn — the notes differing by a definite musical interval.

Maintenance

If a horn fails to sound or its performance is unsatisfactory, check the following and rectify as necessary:

1. Battery condition.
2. Loose or broken connection in the horn circuit.
3. Loose fixing bolts.

If the above points are in order, adjust the horn as follows:

Adjustment

Adjustment does not alter the pitch of the note but merely takes up the wear of moving parts.

Disconnect one horn whilst adjusting the other, and take care to avoid earthing disconnected live wires. Connect a first grade moving-coil 0-10A ammeter in series with the horn and adjust the small serrated adjustment screw on the side of the horn at which the cables terminate.

Turn the adjusting screw clockwise to increase the current, or anti-clockwise to decrease it, until the best performance is obtained with the least current.

If adjustment is being made without an ammeter, turn the adjusting screws anti-clockwise until the horn just fails to sound; then turn it back one quarter of a turn.

WARNING

Do not disturb the central slotted stem and locking nut.

FUSES

The fuse carrier is located at the side of the control box and houses two operating and two spare fuses. The left-hand fuse (25 amp.) protects the side and number plate illumination lamps, while the right-hand fuse (25 amp.) protects those items which can only operate when the ignition is switched on, i.e. direction indicators, windscreen wipers, brake lamp, fuel gauge, reverse lamp, screen washer and heater.

When replacing a fuse, it is important to use the correct replacement; the fusing value is marked on a coloured paper slip inside the tube.

The horns are protected by an in-line fuse (35 amp.) located below the fuse unit, adjacent to the main harness.

A blown fuse will be indicated by the failure of all units protected by it and is confirmed by examination of the fuse. If the new fuse blows immediately, locate the cause of the trouble.

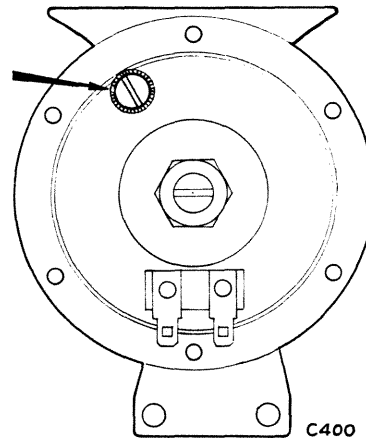


Fig. 37. Horn adjusting screw
(indicated by arrow)

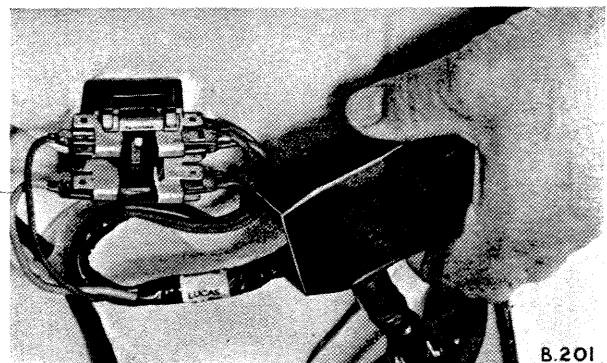
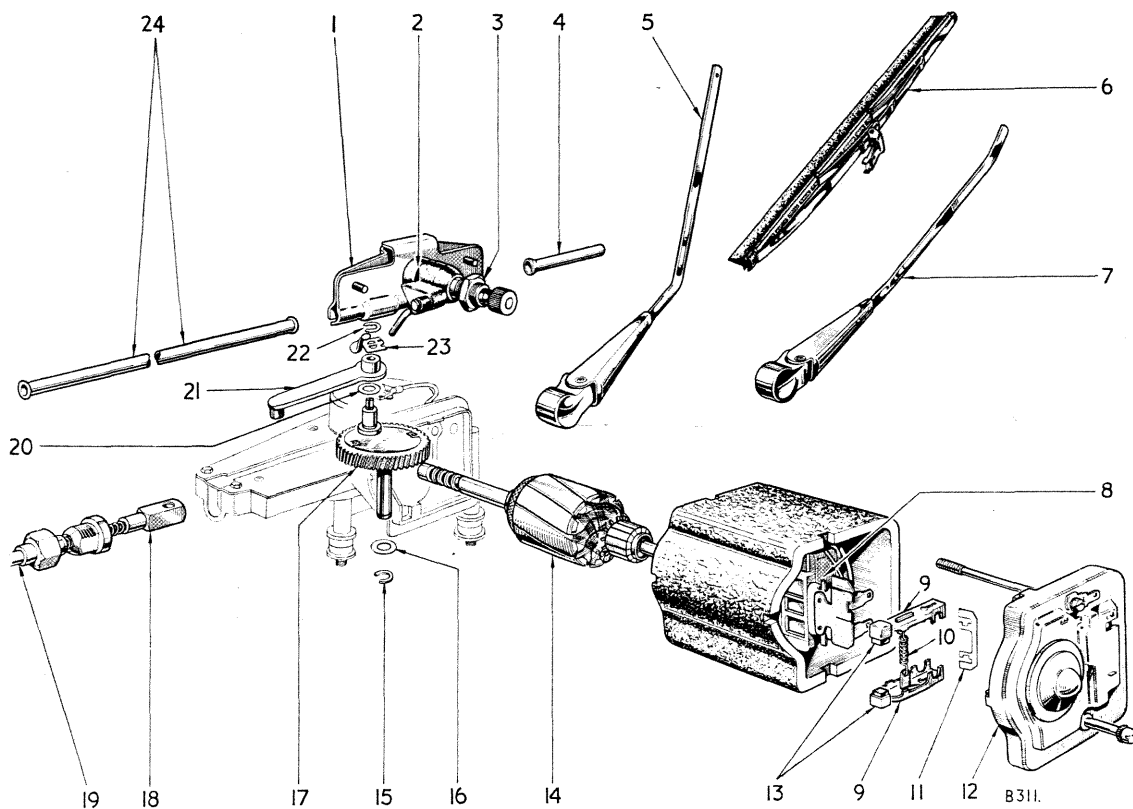


Fig. 38. Fuse unit



- 1 Wheel box
- 2 Jet and bush assembly
- 3 Nut
- 4 Rigid tubing—right-hand side
- 5 Wiper arm
- 6 Blade
- 7 Wiper arm
- 8 Field coil assembly
- 9 Brushgear
- 10 Tension spring and retainers
- 11 Brushgear retainer
- 12 End cover
- 13 Brushes
- 14 Armature
- 15 Circlip
- 16 Washer
- 17 Final drive wheel
- 18 Cable rack
- 19 Rigid tubing—left-hand side
- 20 Spacer
- 21 Connecting rod
- 22 Circlip
- 23 Parking switch contact
- 24 Rigid tubing—centre section

Fig. 39. Exploded arrangement of windscreen wiper mechanism

WINDSCREEN WIPER

General

The motor and gearbox unit is mounted on three pillars cast integral with the unit body and is located on the right-hand side of the dash panel in the engine compartment. Rotary motion of the motor armature is converted to a reciprocating movement by a single stage worm and nylon gear to which a connecting rod is attached. This actuates the cable rack which consists of a flexible core of steel wire wound with a wire helix to engage with a gear in each wheelbox for transmitting the reciprocating motion to the wiper arm spindles.

A parking switch is incorporated in the domed cover of the gearbox. On switching off at the wiper control switch, the motor continues to run until the moving contact of the parking switch reaches the insulated sector portion and so interrupts the earth return circuit and stops the motor. The domed cover is adjustable to give the correct park position of the wiper blades.

Dismantling

Remove the wiper arms and blades.

Unscrew the large nut securing the outer tubing (19) to the gearbox.

Remove three bolts securing the motor mounting bracket to the dash panel and withdraw the motor complete with inner cable rack.

Note:—The force required to withdraw the rack from the inner tubing should not exceed 6 lbs.

Mark the dome limit switch cover in relation to the gearbox lid, and remove the lid (four screws).

Release the circlip (22) and lift off the limit switch wiper (23).

Lift off the connecting rod (21) from the final drive wheel (17) and cable rack (18). Note the spacer (20) between the connecting rod (21) and final drive wheel (17).

The cable is now free to be removed.

Push the rack back into the tubing and wheelboxes and withdraw the rack from the tubing using a spring balance. The force required should not exceed 6 lbs.

Remove two bolts and lift off the end cover (12).

Check brush tension. This should be between 125 and 140 grammes.

Lift out the brush gear retainers (11).

Release the spring (10) and remove the brush gear (9) complete with brushes and spring retainers (12).

Remove the body complete with field coil; the red earth cable is long enough to permit the body to be lifted clear of the armature.

Remove the armature.

If further dismantling is required, remove the circlip (15) with washers (16). Use a fine file and remove any burrs from around the circlip groove.

Remove the final drive wheel (17).

Clean the wheel and associated parts and examine for wear or damage.

Mark the yoke and field coil in relation to each other.

Remove two screws and withdraw the field coil pole piece and field coil.

Re-assembly

Re-assembly is a reversal of the dismantling procedure.

The adjusting screw in the side of the gearbox should be set and firmly locked to permit 0.008" to 0.012" (0.203 — 0.305 mm.) end play of the armature.

Lubrication

The commutator and brush gear must be free of oil or grease. Apply Oilene, B.B.B. or engine oil to the bearings and bushes of the shafts of the final drive wheel and armature.

If the gearbox has been washed clean, use 25 to 35 cubic centimetres of Ragosine Listate grease to refill.

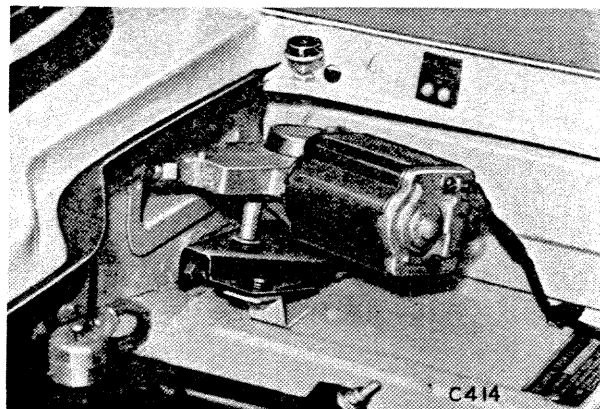


Fig. 40. Location of wiper motor

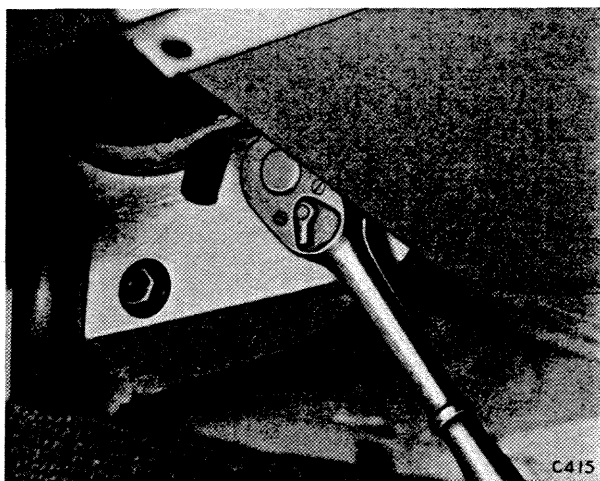


Fig. 41. Tightening the wiper motor bracket attachment bolts

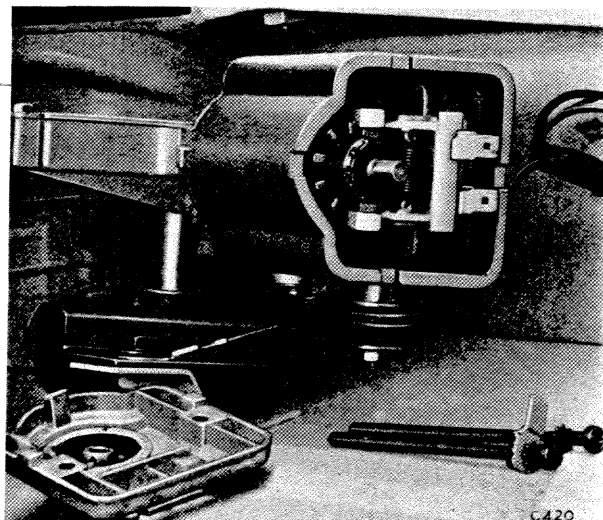


Fig. 42. Wiper motor brushgear

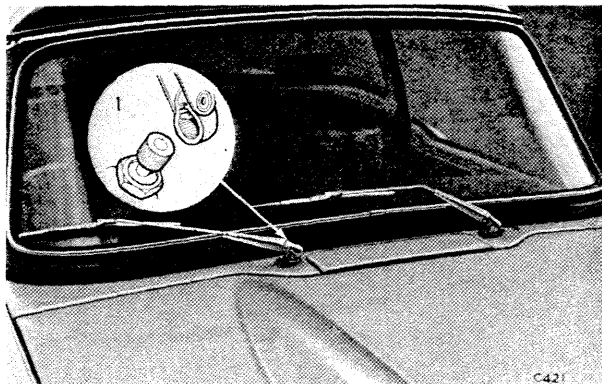
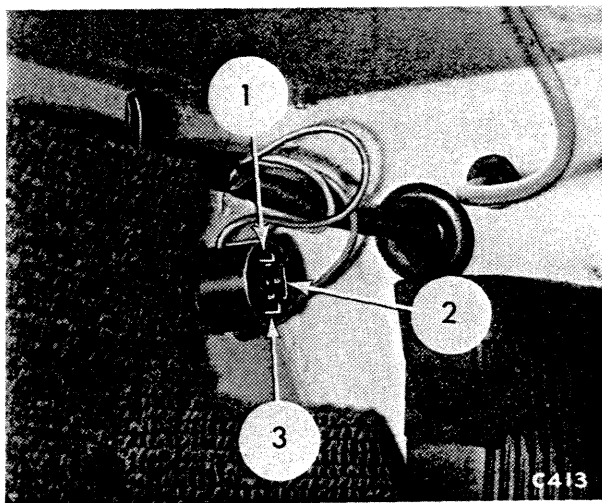


Fig. 43. Wiper arms in the "Parked" condition (RHD cars)



- 1 Lamps
- 2 Pilot lamp
- 3 Battery

Fig. 44. Location of flasher unit socket

Wiper Wheel Boxes

To Remove (Fig. 39)

Remove wiper motor and working under the facia, remove:

- demister nozzles
- cover plate, located beneath each wheel box (two screws in each).

Remove the nut (3) from each wheel box.

Withdraw the jet and bush assembly (2) for approximately 2" (5.1 cm.) and disconnect the water pipes.

Pass a piece of thin wire around the right-hand rigid tubing (4) to retain it in position.

Remove the back plate of the wheel box (two screws) and move the rigid tubing outward.

Grip the back of the wheel box with long nose pliers and withdraw it through the aperture.

To Refit

Clean all trace of old sealing compound from the body jet and bush assembly using petrol or white spirit.

Push the wheel box back into position and re-connect the assembly with Seelastik.

Re-connect the water pipes and the securing nut (3).

Clean the contacting surfaces of the cover plate and the underside of the facia. Apply fresh sealing compound to the surfaces and refit the cover plates.

Refit the wiper motor.

FLASHER UNIT DIRECTION-INDICATOR MODEL FL. 5

Housed in a small cylindrical container, the FL 5 Flasher Unit incorporates an actuating wire which heats and cools alternately to operate the main armature and associated pair of contacts in the flasher lamp supply circuit. Simultaneously a secondary armature operates the pilot contacts which cause a warning light to flash when the system is functioning correctly.

Defective Flasher Units cannot be dismantled for subsequent reassembly and must therefore be renewed. Handle the Flasher Unit with care, otherwise the delicate setting may be disturbed and the unit rendered unserviceable.

Trace the cause of faulty operation as follows:

- (i) Check the bulbs for broken filaments.
- (ii) Check all flasher circuit connections.
- (iii) Switch on the ignition and check the voltage at terminal "B" (12 volts).
- (iv) Connect terminals "B" and "L" together and operate the direction-indicator switch. If the flasher lamps light, the Flasher Unit is defective. If the flasher lamps do not light, check the direction-indicator switch.

CABLE CONNECTORS

Servicing

Connectors which are similar in design to those fitted in production are available as service replacements. The new connectors may be fitted as shown in Fig. 45.

1. Push the rubber sleeve clear of the end of the cable and strip the insulation from the conductor for approximately $\frac{5}{16}$ " (8 mm.) for 12 ampere connector or $\frac{7}{16}$ " (11 mm.) for 35 ampere connector.
2. Pass the conductor through the aperture and secure the cables with the tags.
3. Bend the conductors back over the connector and spread flat.
4. Solder the conductors neatly to the connector. Do not allow the solder to run freely through the aperture. Re-tighten the rubber insulating sleeve.

Wiring Harness Loom

The electrical components are connected as shown on Fig. 1 by a single loom, extending from the front end of the car and terminating in the luggage locker. The loom is secured by small clips welded to the body.

Commencing at a group of snap connectors located at the top side of the air intake duct, the loom passes along the right-hand side valance to the fuse unit and control box and into the body to the instrument panel. At this point, a section branches out and re-enters the engine compartment with connections for the windscreen wiper motor; and on earlier models, this branch of the loom connects the generator and the left-hand side horn. On later models, connections to the left-hand side horn, ignition and generator are provided for in the loom at the side of the right-hand valance.

From the instrument panel the loom passes along the floor to the top of the fuel tank and terminates at the upper forward corner of the locker with connectors for the tail and plate illumination lamps.

INSTRUMENTS

See Group 5.

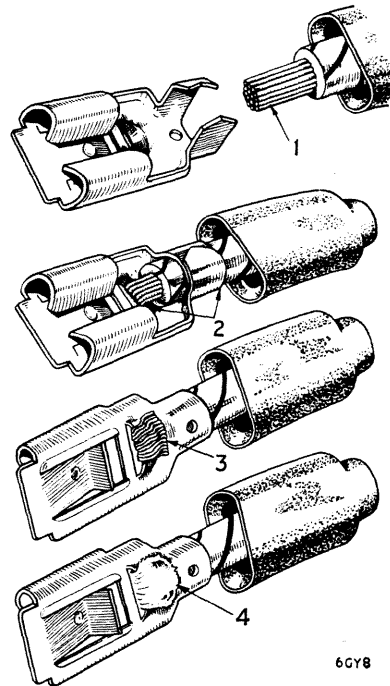


Figure 45. Cable connectors