INDEX

INTRODUCTION

The lighting and ignition systems of the Wipac alternator equipped model Bantam consists of a simple six-pole alternator generating set which supplies current through a metal plate rectifier to a battery, which then feeds the ignition system, lights, horn etc. The alternator ring carries six coils which are connected in three sets of two in series, as illustrated in the schematic diagram Fig. G2.

By using one set of two coils in series, a certain output is obtained for daylight running and when the pilot or parking lights are switched on. When the headlight is brought into circuit, all six coils are connected as three pairs in series parallel as shown in Fig. G2, giving maximum output, most of which is absorbed by the headlamp bulb but still leaving sufficient current for maintaining the state of charge of the battery.

Alternating current supplied by the generator is converted to direct current by means of the rectifier which is of the very efficient full wave bridge connected type.

The main connections in the wiring system are made by rubber socket connectors to the lighting and ignition switches and by individual rubber covered bullet-type push-in connectors. The latter are found most useful when making wiring checks or re-installing new cables. These connectors are not intended as plugs and sockets for frequent manipulation and should only be used when testing or fault-finding. It is important that they are making perfect contact as should all other connection points throughout the system.

BATTERY

The battery used on Bantam machines (with the exception of the Bushman Pastoral), is a Lucas six volt unit type PUZ5E/11.

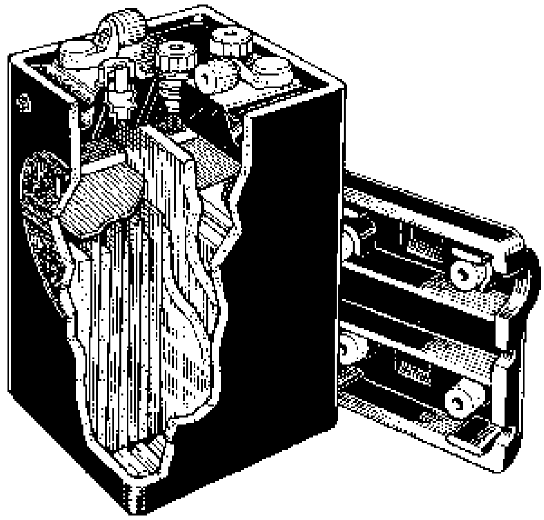

FIG. G1. *Cut-away view of battery.*

Charging the Battery

The battery leaves the factory in a fully "dry-charged" condition, but during storage some of the charge may be lost. In view of this, the following filling instructions must be carefully observed.

With the acid, battery and room temperature between 60°F., and 100°F. (15·5—37·7°C.), remove the vent plugs and fill each cell to the top of the separator guard.

Measure the temperature and specific gravity of the electrolyte in each of the cells.

Allow to stand for twenty minutes and then re-check the temperature and specific gravity of the electrolyte in each cell.

The battery is then ready for service unless the above checks show the electrolyte temperature to have risen by more than 10°F. (5·5°C.) or the specific gravity to have fallen by more than ten 'points', *i.e.,* by more than 0·010 specific gravity. In this event, it will be necessary to re-charge the battery at the appropriate charge rate (0·8 amperes) until the specific gravity values remain constant for three successive hourly readings and all cells are gassing freely.

During charging, keep the electrolyte in each cell level with the top of the separator guard by adding distilled water — **not acid.**

Routine Maintenance
Every 1,000 miles (1,600 km.) or monthly, or more regularly in hot climates, the battery should be cleaned as follows.

To gain access to the battery first take off the dualseat as detailed on page D8.

Remove the battery cover and clean the battery top. Examine the terminals: if they are corroded scrape them clean and smear them with a film of petroleum jelly, or with a silicone grease. Remove the vent plugs and check that the vent holes are clear and that the rubber washer fitted under each plug is in good condition.

The level of the electrolyte in each cell should be checked weekly or every 250 miles. Add distilled water until the electrolyte level reaches the top of the separator guard.

Great care should be taken when carrying out these operations not to spill any acid or allow a naked flame near the electrolyte. The mixture of oxygen and hydrogen given off by a battery on charge, and to a lesser extent when standing idle, can be dangerously explosive.

The readings obtained from the battery electrolyte should be compared with those given in table "A" opposite. If a battery is suspected to be faulty it is advisable to have it checked by a Lucas depot or agent.

A lead-acid battery slowly loses its charge whilst standing — the rate of loss being greater in hot climates. If a battery is not being used, it is important to give it freshening charges at the appropriate re-charge rate. These should be given fortnightly in temperate climates and weekly in the tropics.

Remember that a positive earth wiring system is employed on the bantam series and ensure that the battery is connected correctly, *i.e.,* with the positive (+) side of the battery connected to earth.

The coloured lead must be connected to the battery **negative** (—) terminal and the translucent (earth) lead to the battery **positive** (+) terminal.

Table "A"

Specific Gravity of Electrolyte for Filling the Battery

U.K. and Climates normally below 80°F. (26·6°C.)	Tropical Climates over 80°F. (26·6°C.)
Filling Fully charged	Filling Fully charged
1·260 1·270—1·290	1·210 1·210—1·230

To obtain a specific gravity strength of 1·260 at 60°F. (15·5°C.), add one part by volume of 1·840 specific acid to 3·2 parts of distilled water.

To obtain a specific gravity strength of 1·210 at 60°F. (15·5°C.), add one part by volume of 1·840 specific acid to 4·3 parts of distilled water.

Table "B"

Maximum Permissible Electrolyte Temperature During Charge

Climates normally below 80°F. (26·6°C.)	Climates normally above 80°F. (26·6°C.)
100°F. (38°C.)	120°F. (49°C.)

Notes:—The specific gravity of the electrolyte varies with the temperature. For convenience in comparing specific gravities, they are always corrected to 60°F., which is adopted as a reference temperature. This method of correction is as follows.

For every 5°F. below 60°F. deduct ·002 from the observed reading to obtain the true specific gravity at 60°F. For every 5°F. above 60°F. add ·002 to the observed reading to obtain the true specific gravity at 60°F.

The temperature must be indicated by a thermometer having its bulb actually immersed in the electrolyte and not the ambient temperature. To take a temperature reading tilt the battery sideways and then insert the thermometer.

EMERGENCY STARTING

The alternator equipment provides an emergency starting system which, when the ignition switch is put into the emergency position, connects all the six coils together and, providing the lighting switch is in the "off" position, gives full output in order to raise the voltage of a discharged battery and is effective in obtaining an immediate start under these conditions. The maximum charging current in the emergency position is very high as there is no drain against it by the lighting system. Therefore, the engine should not be run with the ignition switch in this position for more than 10—15 minutes. This type of emergency starting being entirely D.C. enables the machine to be run through the complete operational range of the engine.

FAULT FINDING

Before commencing the fault finding tests, it should be noted that the following equipment will be required.

(1) Wilkson test set.

(2) 6 volt, 3 watt bulb with holder and test leads, about 24" long.

(3) A well charged 6 volt battery.

If a Wilkson test set is not readily available, then the additional equipment listed below can be used as an alternative.

(1) A good quality moving coil A.C. voltmeter to be used in conjunction with a 1 ohm load resistor.

(2) 10—0—10 D.C. ammeter.

(3) 0—12 volts D.C. voltmeter.

Details of constructing a suitable 1 ohm load resistor will be found on page G8, but it is most essential that the resistor is accurate in order to obtain correct readings.

Charging Circuit

(1) Before commencing any tests, check the voltage of the battery and if completely exhausted, substitute one which is known to be capable of accepting a charge.

(2) Connect in series with the battery (easily done by disconnecting the brown negative lead from the double connector), the D.C. ammeter and check that the charge rates are as detailed below.

Ignition Switch	Lights Switch	Min. Charge Rates	R.p.m.
Ignition	Off	2·5 a.	3,000
Ignition	Low	·5 a.	3,000
Ignition	High	1·0 a.	3,000
Emergency	Off	4·5 a.	3,000

These figures should be checked when the engine is running at approximately 3,000 r.p.m. Charge rates will, of course, vary with engine speed and the state of battery charge, but the above figures will help to give a fair indication as to the correct functioning of the system.

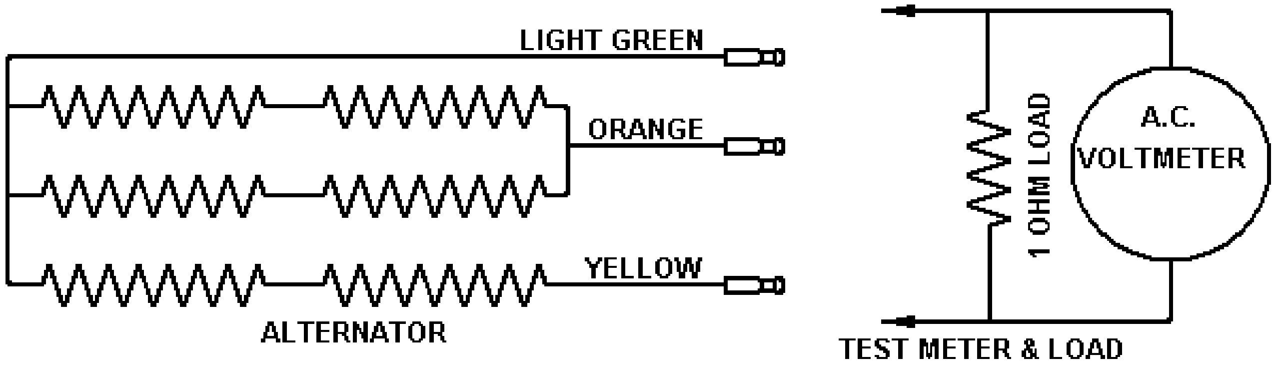

FIG. G2. *Generator testing.*

NOTE:—It is essential that bulbs of the correct wattage be used throughout the system, as any deviation will seriously upset the charge rates. See page GD6 for correct specification of each bulb.

If the meter readings are unsatisfactory, proceed as follows.

(3) Check the alternator output by disconnecting the yellow, orange and light green leads from the five-way connection, into which the alternator harness is plugged. It will be seen from the appropriate wiring diagram, on page G14 and from Fig. G2, that the light green lead from the alternator is common to all coils, whilst the yellow connects two coils only and the orange the remaining four. Connect one side of the Wilkson test meter (A.C. volts with 1 ohm load) or the A.C. voltmeter with 1 ohm load paralleled across it, to the green lead and the other side of the meter to the yellow and orange leads in turn.

Check with the table below:—

Check between	Revolutions per minute	Volts output
Yellow/ green	2,000—3,000	4—4·75
Orange/ green	2,000—3,000	7·5—8·5

A low reading on one group of coils would indicate coil failure and low readings on both groups of coils will, in all probability, be due to a low flux density in the magnetic rotor. No readings from both groups of coils indicates an open circuit in the green supply lead.

Winding resistance between:—

Yellow/green	0·25 ohms
Orange/green	0·4 ohms

NOTE:—During these series of tests, the importance of correct battery connections cannot be over-emphasised. The translucent lead should always be connected to the battery positive terminal, and the brown lead to the negative terminal. Reversal of these connections will invariably burn out the rectifier and, if the engine is run under these conditions, the generator rotor will become demagnetised.

(4) A further cause of low or no charge may be due to the alternator short-circuiting to earth. To check this, it is necessary to construct a simple continuity check circuit, *viz.,* a six-volt battery introduced in series with the D.C. voltmeter will amply suffice. Connect one end of the circuit to the green lead and the other end to the machine frame earth. If a reading is obtained on the voltmeter then the alternator is short-circuit to earth. It is desirable to carry out this check with both the generator stator rotor in position on the machine, the reason being that in isolated cases, careless handling of the stator may have caused one or more of the soldered coil link connections to have become displaced, thus making contact with the circumference of the rotor and short-circuiting all coils. Before condemning the alternator, therefore, it is wise to check that all connections are well clear of the rotor, gently easing back any which look a possible cause of future trouble.

Rectifier
A rapidly flattening battery necessitates an immediate check on both the rectifier and alternator.

Rectifier Test Procedure

Procedure	Battery Connections	Bulb Connections	Conclusions
Rectifier Check. Connect a 6 volt battery in series with a 6v., 3w. bulb across the rectifier terminals.	**Positive—** Light green White Brown Brown	Earthed Earthed Green White	Bulb lights rectifier o.k. Bulb does not light. Rectifier faulty, replace.
Reverse battery connections.	**Negative—** Light green White Brown Brown	Earthed Earthed Green White	Bulb does not light. Rectifier o.k. Bulbs light, rectifier faulty, replace.

(Refer to FIG. G3.)

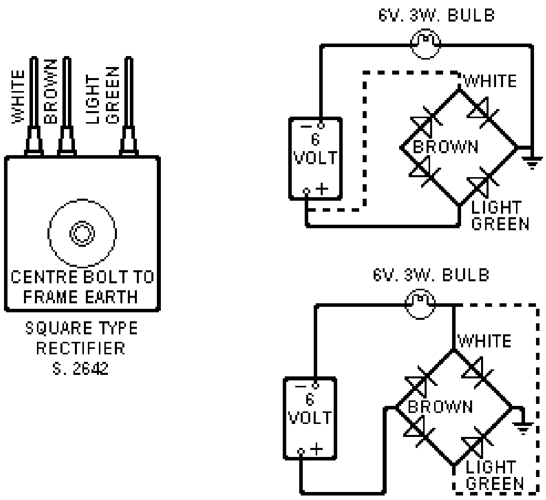

FIG. G3. *Rectifier test procedure.*

However, before attempting to carry out tests on the rectifier it is essential that the white, green and brown cables are disconnected from the unit at the plug sockets.

Check the rectifier as detailed in Fig. G3. Should it be found necessary to replace this component or to refit a proven good rectifier, ensure that it is rebolted securely to its mounting bracket, remembering that the case of the of the rectifier is D.C. positive. Take care when tightening the fixing nut and hold the bolt head firmly with a second spanner to prevent it from turning. If this precaution is not taken, the rectifier plates may twist and break the internal connections.

The cable snap connectors should be clean and tight, as poor connections can give rise to rectifier failure, owing to over-load or arc burning.

Switches
On all models except the Bushman Pastoral, both the ignition and lighting switches are mechanically identical. A faulty switch will invariably be detected if the procedure outlined below is adopted.

Remove the headlamp front and substitute the cable plugs from the ignition switch to the light switch and vice versa. If the switch is defective then the fault will be transferred from one circuit to the other. Replace the faulty switch.

Lighting Switch Continuity Test
Figure G4 illustrates a test for switch continuity.
Note that terminal No. 10 is the short pin.

Before testing, separate the switch completely from the harness and remove from headlamp. When the switch knob is is in the "off" position, there will be continuity between pin Nos. 1, 2 and 10, between 5 and 6 and between 8 and 9. Next rotate the switch knob clockwise to "H" position and continuity will occur between pin Nos. 1, 2 and 10, between 4 and 5 and between 7 and 8. Now rotate the switch knob anti-clockwise to "L" position and continuity will occur between pin Nos. 2, 3, 9 and 10 and between 6 and 7.

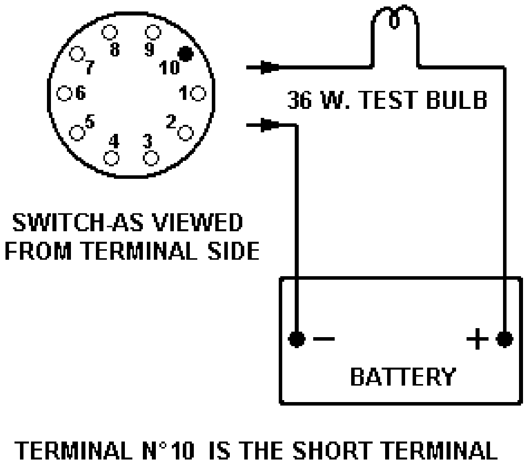

FIG. G4. *Lighting switch continuity test.*

Finally there should be no circuit between any switch pin and earth (earth body) in any switch position selected.

Premature Bulb Failure
Premature bulb failure involving all or many of the light bulbs at one time on a full D.C. battery system is caused by a defective connection in the battery "line."

The following should be checked:—

(1) Battery positive terminal.

(2) Battery negative terminal.

(3) All connections in the four-hole connector into which the battery negative lead is fitted.

(4) Rectifier earth lead (translucent).

(5) Harness frame earth.

(6) Both ends of the short link wire in ignition switch joining brown lead from lighting switch to brown lead from main body of harness.

(7) Check battery acid level and top-up if necessary.

Contact Breaker
Check the contact breaker points gap and adjust to the recommended setting of ·012", as detailed on page B17. Check cleanliness of contact faces, these, if in good order, should have a light grey frosted appearance. Where fine matter, *e.g.,* oil and grease have been present, the contacts may have a blackened, burnt appearance. Should the condition not appear serious, then a light application of fine grade emery will restore them. If in doubt replace the whole breaker unit. Check the action of the breaker arm on the pivot, as any sticking of this arm can cause intermittent difficulty.

On no account should the star-shaped retaining washer on the breaker arm be removed from the pivot as the amount of end float is strictly controlled, and is essential to the correct functioning of the contact breaker.

Condenser
Should the capacity be suspect, first check for good contact to earth and security to the contact breaker plate. Secondly, a quick check can be made for short-circuit to earth; the battery and bulb is a simple and quick test, but first remember to disconnect from the contact breaker plate. Visual recognition of a defective condenser or its connections is vivid blue arcing at the contacts when an attempt is made to start the engine or when the engine is actually running.

Where an Avometer is available, a more conclusive check can be made. This is done by firstly, disconnecting the condenser lead from the contact breaker. Select the Avometer to the ohms by 100 range and, using the test prods from the meter, connect one to the condenser lead and the other to the condenser case. The needle on the Avometer will move rapidly and return to infinity immediately. Remove the test meter prods and wait fifteen seconds. Re-apply the prods and the needle should not again move. If it does the condenser requires replacement. It should be noted that a very small white spark across the contact breaker points when running is normal.

Ignition Coil
Firstly, completely disconnect the ignition coil from the motor-cycle circuit, and connect the D.C. voltmeter across the six-volt battery to produce a continuity check. The meter should register the battery voltage. Now break this circuit at any point and across this break connect the two small screw terminals of the ignition coil. This test will indicate continuity to prove that the primary winding is intact. Likewise, one lead of the test circuit connected to either one of the primary terminals and the other to the high-tension pick-up will again show continuity. A lower reading can be expected due to the higher resistance of the secondary windings.

The third and last check is to ensure that the coil is not earthing out. Leave one lead attached to one of the primary terminals and connect the other to the coil case, when no reading should show. Similar results should be noted at the high-tension pick-up point.

Where an ohm meter is available, check the resistance as below:—

Primary resistance	1·3 ohms
Secondary resistance	4,500 ohms

A defective primary winding may continue to produce a weak spark whereas intermittent performances will invariably be caused by a faulty secondary. Should there be any possible doubt about the ignition coil, however, a final check can be made by substitution.

Constructing a 1 ohm Load Resistor
The resistor used in the above tests must be accurate and constructed so that it will not over-heat otherwise the correct values of current or voltage will not be obtained.

A suitable resistor can be made from 4 yards (3¾ metres) of 18 s.w.g. (·048", *i.e.,* 1·2 mm. diameter) Nichrome wire by bending it into two equal parts and calibrating it as follows.

(1) Fix a heavy gauge flexible lead to the folded end of the wire and connect this lead to the positive terminal of a six-volt battery.

(2) Connect a D.C. voltmeter (0-10 volts) across the battery terminals and an ammeter (0-10 amp.) between the battery negative terminal and the free ends of the wire resistance, using a crocodile clip to make the connection.

(3) Move the clip along the wires, making contact with both wires until the ammeter reading is numerically equal to the number of volts shown in the voltmeter. The resistance is then 1 ohm. Cut the wire at this point, twist the two ends together and wind the wire on an asbestos former approximately 2" (5 cm.) diameter so that each turn does not contact the one next to it.

BUSHMAN PASTORAL MODELS

The Pastoral models are not fitted with a battery and the electrical equipment will only function when the engine is running.

The electrical system is fed by a Wipac series 114 six-pole alternator comprising a six-pole magnetic rotor and a laminated stator plate fitted with six feed coils. Issuing from the alternator is a group of five wires, translucent, brown/black, maroon, brown and dark red. The translucent lead is common to all coils.

A schematic diagram of the alternator is shown in Fig. G5.

(1) The headlight, tail light and speedometer light take their supply between the translucent and dark red leads utilising two of the six alternator coils.

(2) The stop light is fed between the brown and translucent lead utilising one alternator coil.

(3) The ignition system which operates on an energy transfer basis is fed between the maroon and translucent leads and uses one alternator coil.

(4) Provision is made for the operation of an A.C. horn which is operated by two alternator coils between the brown/black and translucent leads. No provision is made for parking lights.

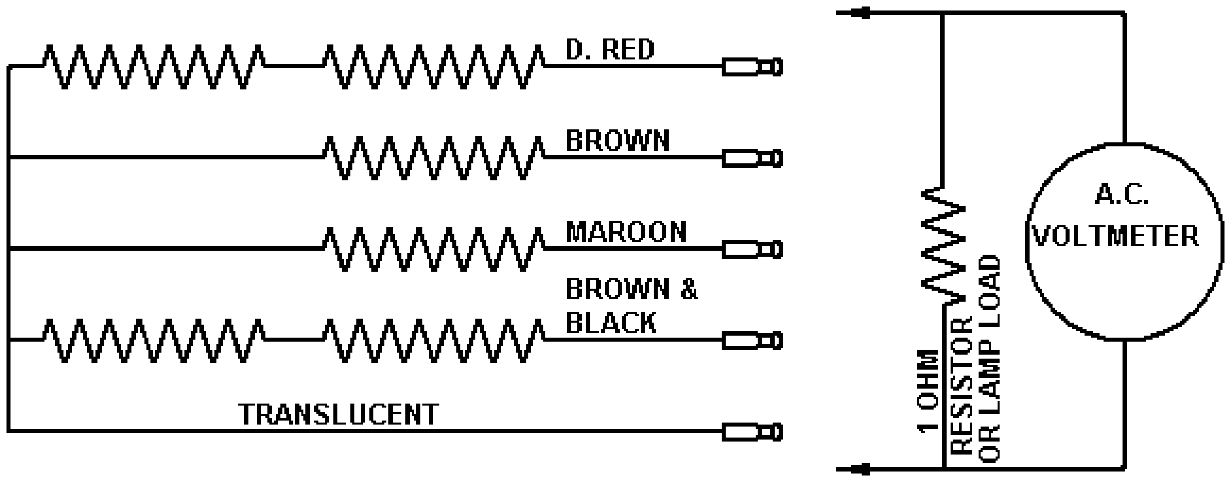

FIG. G5. *Generator testing (Bushman Pastoral models only).*

Generator Testing
The following table will apply in checking the alternator outputs and the readings should be taken only under loaded conditions as detailed in column 3 and column 4. The table embraces values associated with the lights, horn and stop light circuits. The ignition feed coil is dealt with separately. The voltmeter used in these tests should be a good quality moving coil instrument and the 1 ohm resistance must be accurate otherwise correct results cannot be obtained. With respect to column 3, the light should, of course, be switched on before checking these output figures and care should be taken to see that the correct bulbs are fitted with in the lamps at the time of testing. When testing in accordance with column 4, be sure the lighting witch is in the "off" position.

Ignition Feed Coil
The ignition feed coil operates between the maroon and translucent (earth) lead. A useful check in the case of misfiring is to start the machine and check between the maroon lead at the four-hole connector and earth. At 3,000 r.p.m., nine volts should be attained. Where a machine will not start, a test can be made by unplugging the maroon lead from the four-hole connector and checking with the voltmeter between the maroon lead and earth. At kick-over, *i.e.,* approximately 1,000 r.p.m., the meter will read 4·5—5·0 volts. The resistance of the feed coil is 1·85 ohms.

Column 1. Readings taken across wire colours	**Column 2.** Value of lamp load or open circuit (see Column 3)
Dark red/trans.	30·6 w., 2,000/4,000 rpm
Brown/trans.	10·0 w., 2,000/4,000 rpm
Brown and black trans.	30·6 w., 2,000/4,000 rpm

Column 3. A.C. volts across lamp or open circuit	**Column 4.** A.C. volts across 1 ohm resistance
From — To	From — To
5·5 — 7·0	5·0 — 5·75
5·0 — 6·25	3·0 — 3·5
5·0 — 6·5	4·5 — 5·0

Premature Bulb Failure
The current feeding the bulbs when the headlights are in use is alternating current, provided direct from the generator. The correct bulb loading under these conditions is of the utmost importance. To ensure that the rear lamps do not blow and consequently overload the headlamp and speedometer units, a "carry-over" type of dip switch is used. This means that during the change over from head to dip and vice versa both headlamp filaments are alight thus ensuring that the heavy bulb loading is not transferred to the small tail light bulb and speedometer bulb which would result in failure. Firstly, then, check that the dipper switch is functioning correctly and, secondly, check that all bulb holder contact spring tensions are satisfactory as intermittent open-circuiting of the bulbs could again lead to circuit overload. Where premature bulb failure does take place, on no account should twelve-volt bulbs be substituted as this would only aggravate the complaint.

Dipper Switch
The dipper switch fitted to the Pastoral is a Wipac Tricon switch. This switch embodies headlight dipper switch, engine cut-out (red button) and horn push (black button). The alternator, wiring harness and switching incorporates leads for a horn where fitted. The horn should be of the A.C. buzzer type.

SPARKING PLUG

It is recommended that the sparking plug be inspected, cleaned and tested every 5,000 miles (8,000 km.) and a new one fitted every 10,000 miles (16,000 km.).

To remove the sparking plug a box-spanner 13/16" (19·5 mm.) across flats should be used and if any difficulty is encountered a small amount of penetrating oil should be placed at the base of the sparking plug and time allowed for penetration.

Examine the plug for signs of petrol (gasoline) fouling. This is indicated by a dry, sooty, black deposit which is usually caused by over-rich carburation, although ignition system defects such as a discharged battery, faulty contact breaker, coil or condenser defects, or a broken or worn out cable may be additional causes.

Examine the plug for signs of oil fouling. This will be indicated by a wet shiny, black deposit on the central insulator. This is caused by excessive oil in the combustion chamber during combustion and indicates that the petroil mixture is incorrect.

To rectify this type of fault the above mentioned items should be checked with special attention given to carburation system.

Over-heating of the sparking plug electrodes is indicated by severely eroded electrodes and a white, burned or blistered insulator. This type of fault can be caused by weak carburation although a plug which has been operating whilst not being screwed down sufficiently can easily become over-heated due to heat that is normally dissipated through to the cylinder head not having an adequate conducting path. Over-heating is normally symptomised by pre-ignition, short plug life, and "pinking" which can ultimately result in piston crown failure. Unnecessary damage can result from over-tightening the plug. To achieve a good seal between the plug and cylinder head, screw the plug in by hand on to its gasket, then lightly tighten with a box-spanner.

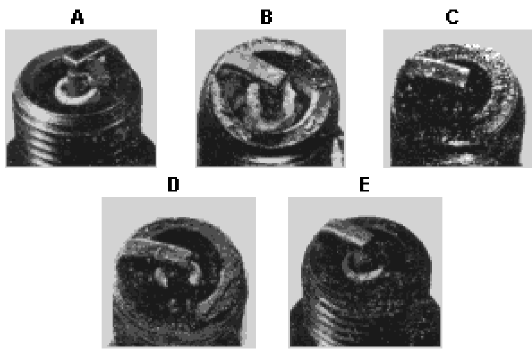

FIG. G6. *Sparking plug diagnosis.*

A plug of the correct grade will bear a light flaky deposit on the outer rim and earth electrode, and these and the base of the insulator will be light chocolate brown in colour. A correct choice of plug is marked (*A*). (*B*) shows a plug which appears bleached, with a deposit like cigarette ash ; this too is "hot-running" for the performance of the engine and a cooler-running type should be substituted.

A plug which has been running too "cold" and has not reached the self-cleaning temperature is shown at (*C*). This has oil on the base of the insulator and electrodes, and should be replaced by a plug that will burn off deposits and remove the possibility of a short-circuit. The plug marked (*D*) is heavily sooted, indicating that the mixture has been too rich, and a further carburation check should be made. At illustration (*E*) is seen a plug which is completely worn out and in need of replacement.

To clean the plug it is preferable to make use of a properly designed proprietary plug cleaner. The makers instructions for using the cleaner should be followed carefully.

When the plug has been carefully cleaned, examine the central insulator for cracking and the centre electrode for excessive wear. In such cases the plug has completed its useful life and a new one should be fitted.

Finally, before refitting the sparking plug the electrode should be adjusted to the correct gap setting of ·025" (·635 mm.). To prevent the possibility of thread seizure occurring, it is advisable to clean the threads of the plug with a wire brush then smear a minute amount of graphite grease on to the threads.

If the ignition and carburation settings are correct and the plug has been correctly fitted, but over-heating still occurs, then it is possible that carburation is being adversely affected by an air leak between the carburetter and the cylinder. This possibility must be checked thoroughly before taking any further action. When it is certain that none of the above mentioned faults are the cause of over-heating then the plug type and grade should be considered.

Normally the type of plug quoted in General Data is satisfactory for general use of the machine, but in special isolated cases, conditions may demand a plug of a different heat range. Advice is readily available to solve these problems from the plug manufacturer who should be consulted.

NOTE:—If the machine is of the type fitted with an air filter or cleaner and this has been removed it will affect the carburation of the machine.

HEADLAMP

Description

The headlamp glass, together with the reflector and bulb assembly is secured to the main casing by means of a slotted screw either above or below the lamp rim. To gain access to the bulb therefore, it is only necessary to loosen the screw until the rim can be withdrawn.

To replace the double-filament bulb, press the bulb retainer inwards and turn slightly anti-clockwise, to release, enabling the bulb to be removed.

Replacement bulbs automatically provide correct relationship of the filaments and focusing, therefore, is unnecessary. Check the replacement bulb voltage and wattage specification and type before fitting.

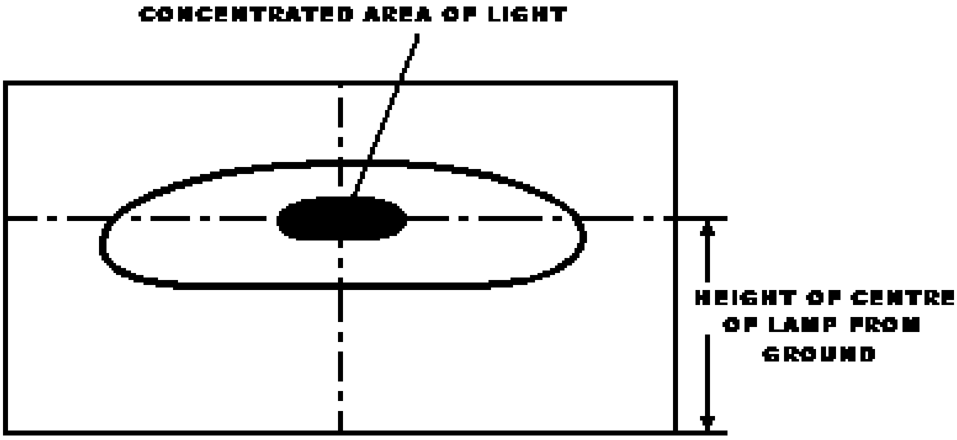

FIG. G7. *Beam adjustment.*

The headlamp has a reflector with an extremely efficient reflecting surface provided by the now widely adopted aluminisation process in which a thin film of aluminium is deposited on the reflector under vacuum. This reflecting surface should not be touched or cleaned in any way and it will retain its brilliance indefinitely. The bulb is a pre-focus twin-filament type giving correct beam length and spread in main and dip positions.

Beam Adjustment
The headlamp beam must at all times be set as specified by local lighting regulations. For the United Kingdom, The Transport Lighting Regulations read as follows:—

"A lighting system must be arranged so that it can give a light which is incapable of dazzling any person standing on the same horizontal plane as the vehicle at a greater distance than 25 feet from the lamp, whose eye level is not less than 3 feet 6 inches above that plane."

Of course these instructions may vary with overseas lighting regulations.

The headlamp must therefore be set so that the main beam is directed straight ahead and parallel with the road when the motor-cycle is fully loaded. To achieve this place the machine on a level road, facing a wall at a distance of 25 feet away. With a rider and passenger seated on the machine, slacken the two screws on the nacelle rim (Supreme models), or the lamp fixing screws (Sports, and Bushman models), and move the lamp until the correct setting is obtained, *i.e.,* the height of the beam centre on the wall should be the same height of the centre of the headlamp from the ground. Tighten the fixing screws and re-check the setting. Do not forget that the headlamp should be on "full-beam" lighting when carrying out the above adjustment.

TAIL AND STOP LAMP

Access to the double-filament, tail and stop lamp bulb, is achieved by removing the red plastic lens, secured by two countersunk screws.

The bulb is of the offset pin type, thus ensuring that the replacement is fitted correctly into its housing.

Ensure that both the black (tail lamp) and brown (stop lamp) supply leads are properly connected and see that the earth lead to the bulb holder is in satisfactory condition. When refitting the lens, avoid over-tightening the fixing screws or the lens may fracture.

The stop lamp switch is operated by the brake rod through a spring. Periodically clean any mud or grease from the switch and lubricate the operating mechanism with a few drops of thin oil.

HORN

Description
The horn (not fitted on Bushman Pastoral models) is of a high-frequency single-note type and is operated by direct current from the battery. The method of operation is that of a magnetically operated armature, which impacts on the cone face, and causes the tone disc of the horn to vibrate. The magnetic circuit is made self-interrupting contacts which can be adjusted externally.

If the horn fails to work, check the mounting bolts etc., and horn connection wiring. Check the battery for state of charge. A low supply voltage at the horn will adversely affect horn performance. If above checks are made and the fault is not remedied, then adjust the horn as follows.

Horn Adjustment
When adjusting and testing the horn, do not depress the horn push for more than a fraction of a second or the circuit wiring may be over-loaded.

A small serrated adjustment screw situated near the terminals is provided to take up wear in the internal moving parts of the horn. To adjust, turn this screw anti-clockwise until the horn just fails to sound, and then turn it back (clockwise) about one-quarter to half a turn.

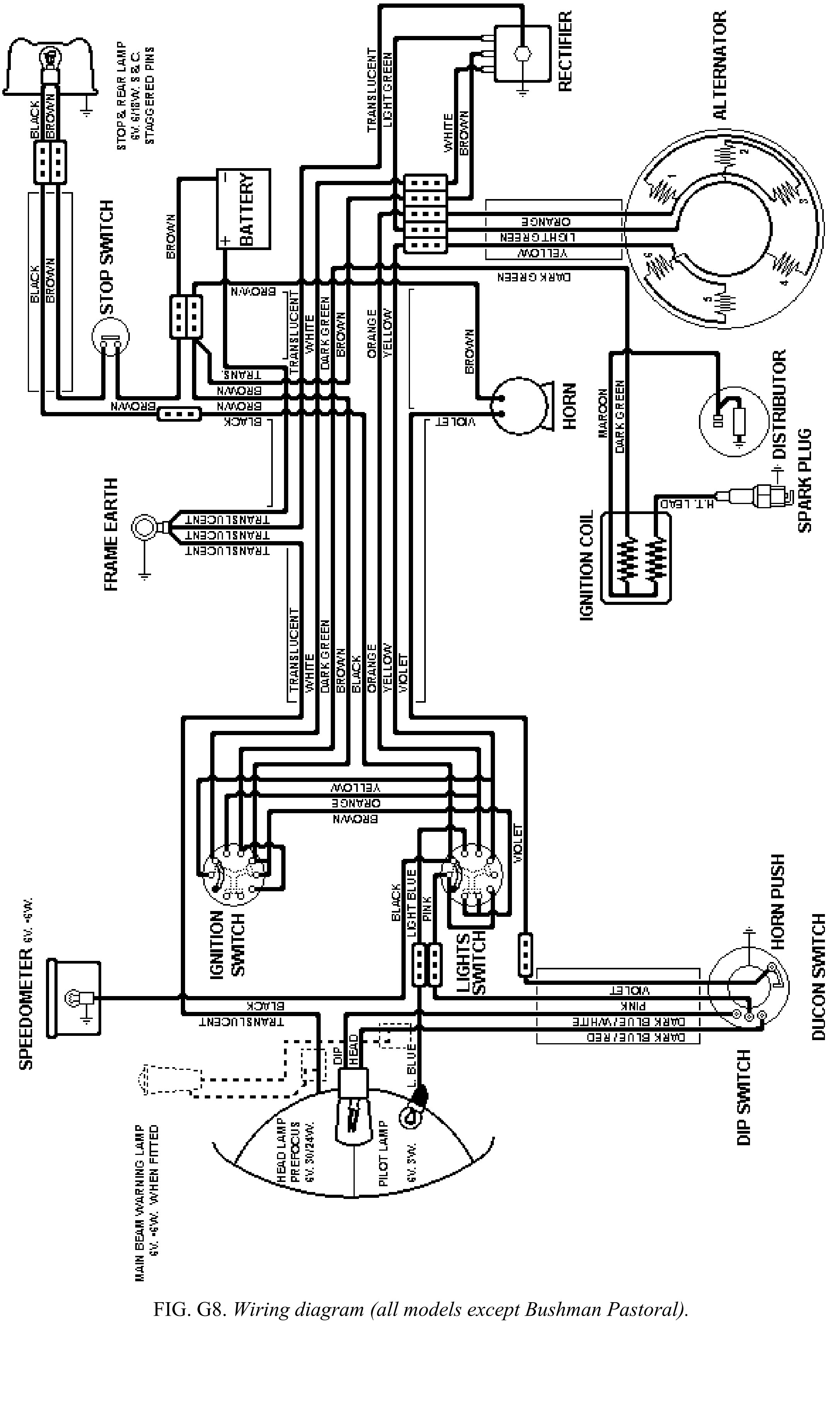

FIG. G8. *Wiring diagram (all models except Bushman Pastoral).*

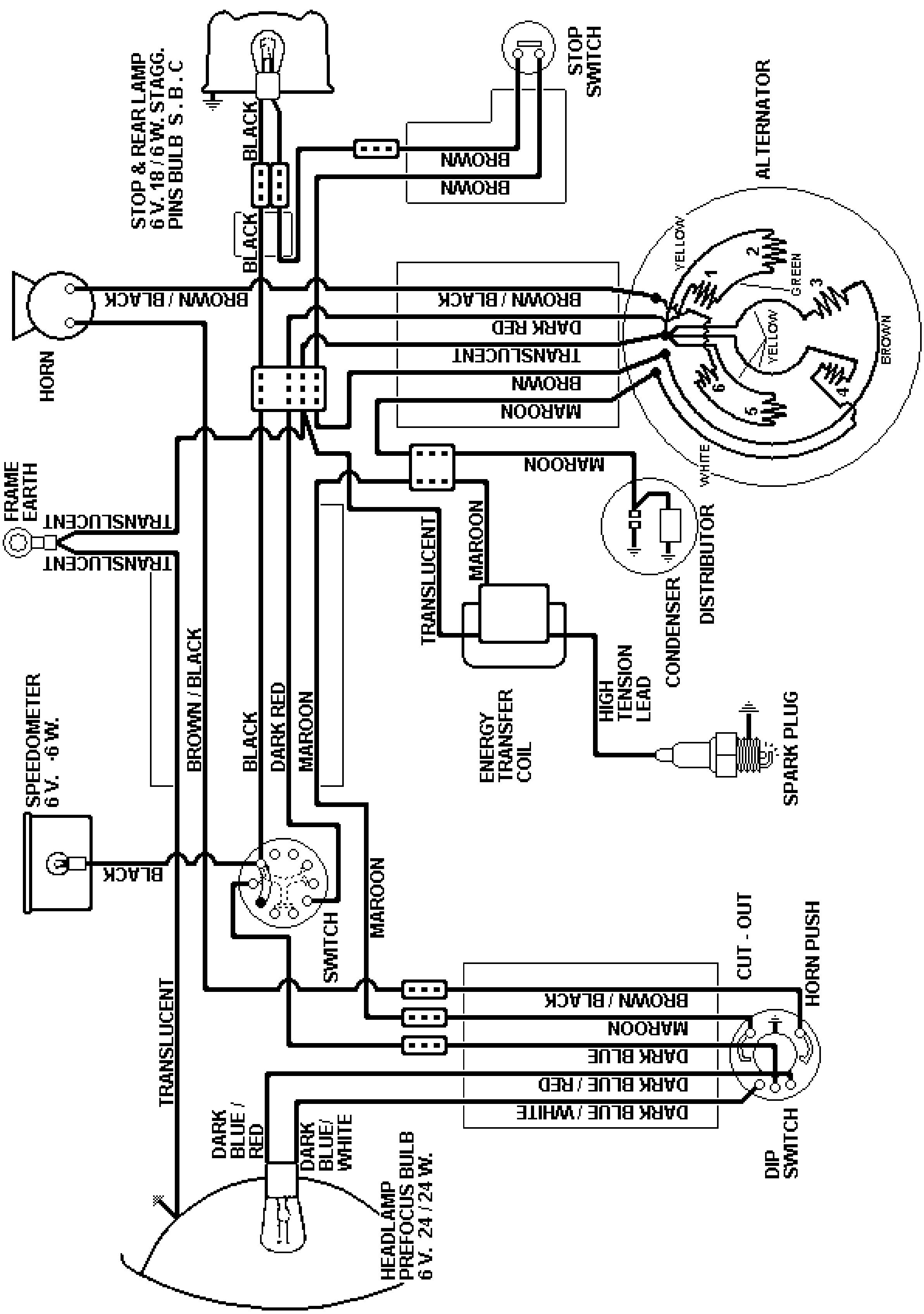

FIG. G9. *Wiring diagram (Bushman Pastoral models).*