

Sect. 6. Delete "(to be issued later)" after the title of Chap. 7 in the List of Chapters, write "A.L.114" in the outer margin of the list, insert this Chapter, and make an entry in the Amendment Record Sheet at the beginning of the Volume.

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AIR MINISTRY

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A.P.1095C, Vol. I, Sect. 6

Chapter 7

VOLTAGE REGULATOR AND CUT-OUT COMBINED, TYPE B

LIST OF CONTENTS

	Para.		Para.
Introduction	1	Paralleling decompounding test	13
Description	3	Adjustment of regulators installed in aircraft	17
Voltage regulator, Type 42	4	Setting-up instructions for regulators out of adjustment	19
Cut-out, Type G2	5	Preliminary mechanical setting	20
Fuse box, Type J2	6	Voltage adjustments	21
Installation	7	Stability tests (after long service)	24
Servicing		Cut-out, Type G2	
Voltage regulator		Adjustment	29
Test prior to installation	8	Method of adjustment	30
Stability tests (new regulators)	10	Closing test	31
Accumulator decompounding test	12	Opening test	34

LIST OF ILLUSTRATIONS

	Fig.		Fig.
Voltage regulator and cut-out combined, Type B	1	Underside of combined unit	4
Combined unit, with covers removed	2	Circuit diagram of combined unit	5
Combined unit, showing regulator trimmer and terminals	3	Test circuit diagram	6

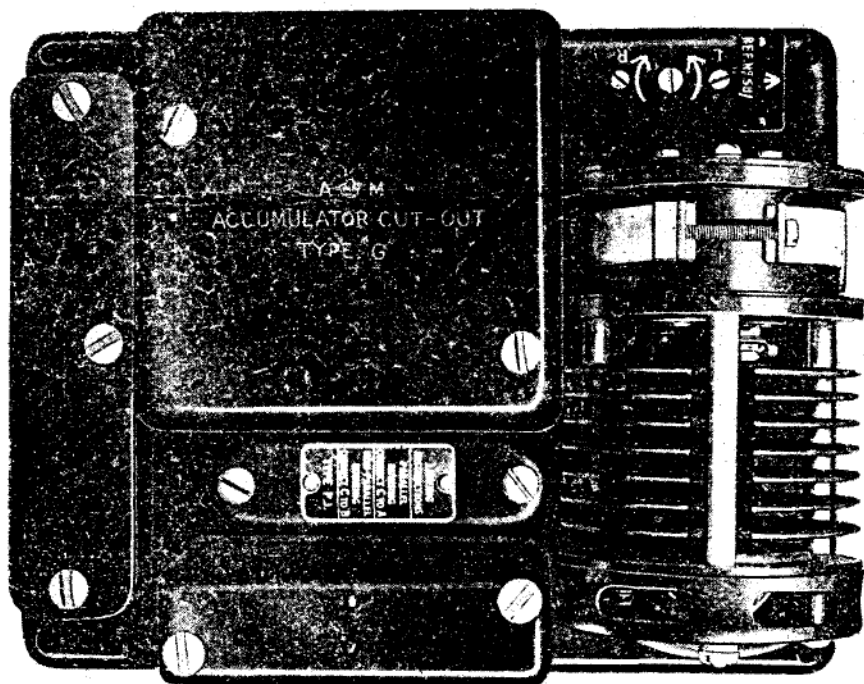


Fig. 1. Voltage regulator and cut-out combined, Type B

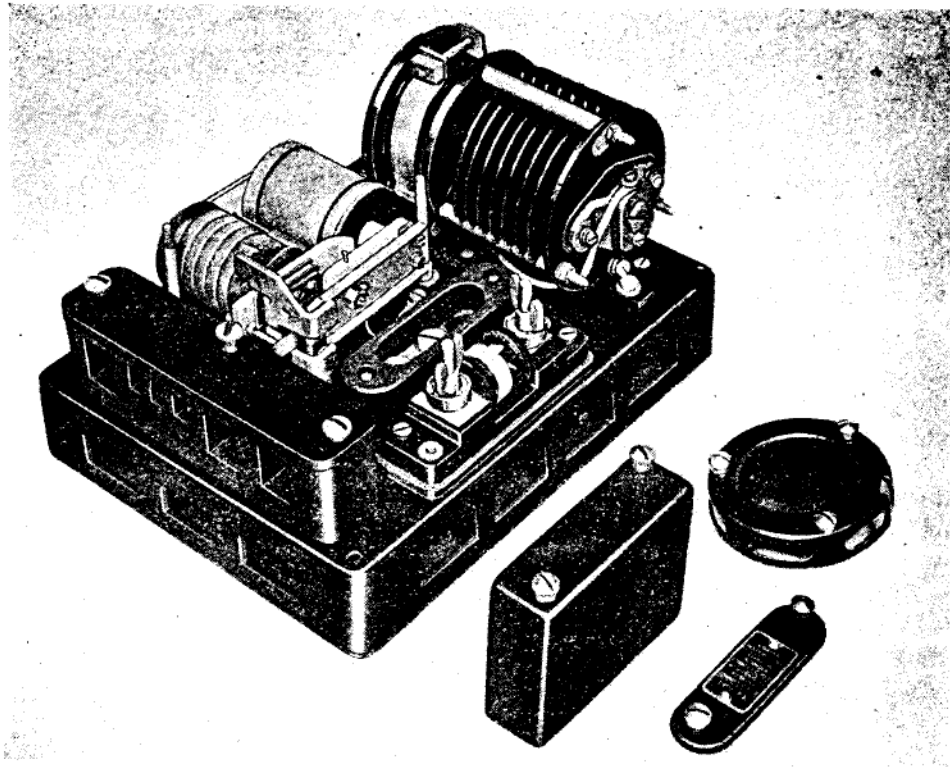
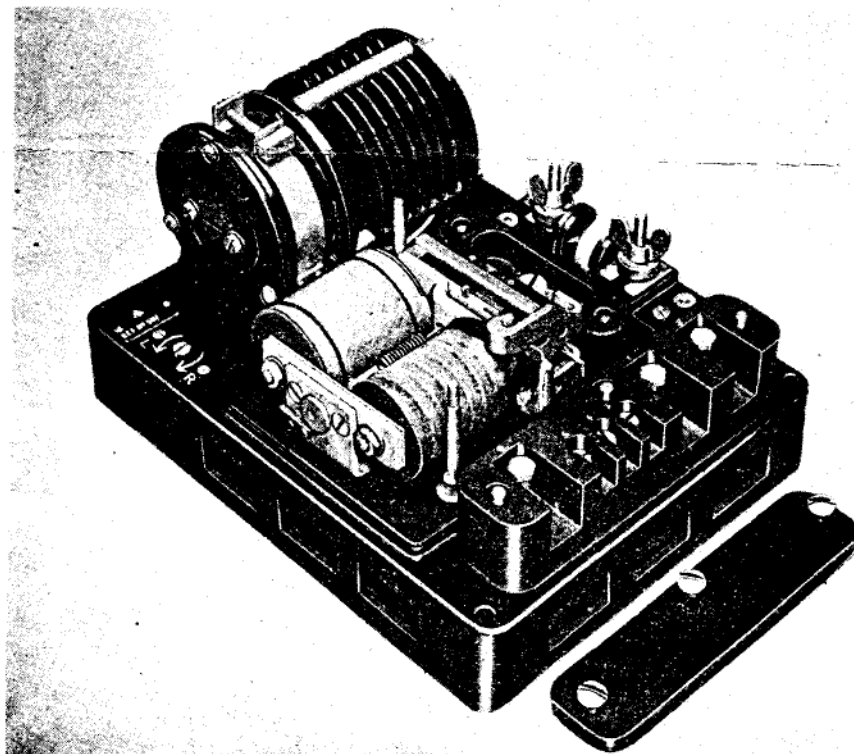


Fig. 2. Combined unit, with covers removed



Introduction

1. The voltage regulator and cut-out combined, Type B (Stores Ref. 5U/3880) has been introduced for use in aircraft fitted with generators, Type 02 and U0. It is slightly larger than the regulator units, Type A and A2, and embodies a regulator unit, cut-out, and fuse, which, together with an enclosed "linkage" device, are mounted on a common base.

2. Two decompounding coils are incorporated. One of these is permanently connected in the accumulator charging circuit for the purpose of controlling the accumulator charging rate. The other coil, designed to regulate the falling volts/load characteristic from no load to full load when the regulator is used with two generators operating in parallel, may be switched in circuit when used with paralleled generators or out of circuit when only one generator is used. The change-over is achieved by means of the "linkage" device, hereafter referred to as the "link".

DESCRIPTION

3. The regulator and cut-out is illustrated in

fig. 1 to 4, and fig. 5 shows the circuit diagram. It will be seen that the regulator, cut-out and fuse are mounted on a base similar to that used for Type A and A2 units. The Type B differs physically from the Type A and A2 in that an enclosed "link" is interposed between the cut-out and fuse box, the latter being of a narrower type than the fuse box used on the Type A and A2 units. Ballast resistances for both the regulator and cut-out are housed in the base, as also is the trimmer resistance. The latter is provided with a spindle, slotted for screwdriver adjustment, which protrudes through a hole in the upper face of the base and is positioned near the coil housing end of the regulator. The spindle should be turned in a clockwise direction to increase voltage and anti-clockwise to decrease.

Voltage regulator, Type 42

4. The voltage regulator, Type 42, is similar to the Type 41 unit described in Chapter 4 of this Section, but an additional decompounding coil is superimposed on the main voltage coil. This coil, which is provided with a 35-amp. shunt may be brought into circuit,

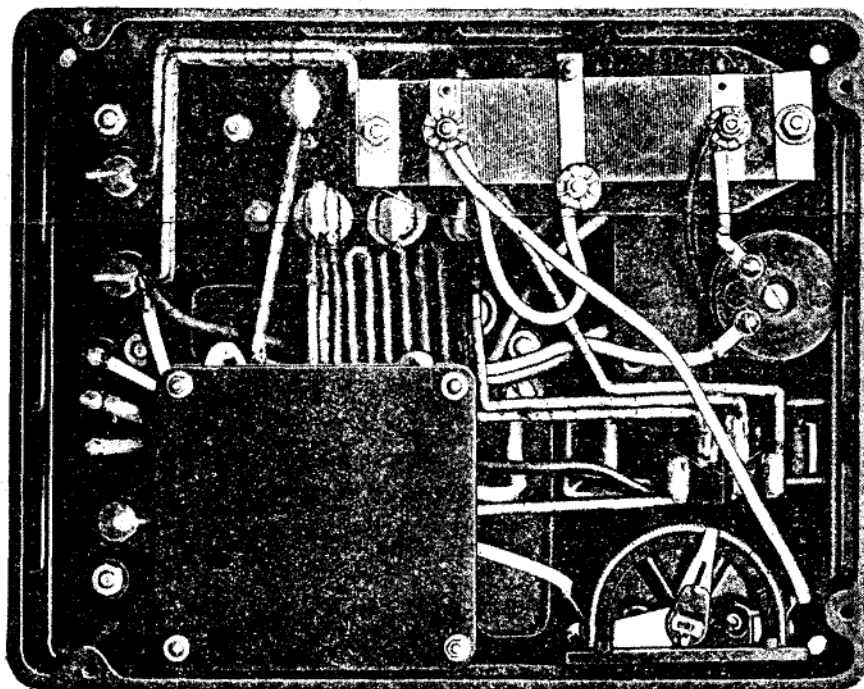


Fig. 4. Underside of combined unit

thereby giving the necessary falling volt/load characteristic when the regulator is used with two generators operating in parallel. Alternatively, when used with a single generator the coil is taken out of circuit, the change-over being effected by means of the link. This link, fig. 1, 2 and 3, which is in effect a single-pole, double-throw switch, consists principally of three terminals suitably mounted on an insulating base and has a moulded plastic cover. It is provided with a connecting strap which enables the central terminal, marked "C", to be linked with either of the outer terminals, marked "A" and "B" respectively. Reference to fig. 5 and 6 will show that when the linking strap is in position A-C, the paralleled decompounding coil is in circuit, whilst setting the link to position C-B will open-circuit the coil.

Cut-out, Type G2

5. This cut-out is similar mechanically and electrically to the Type G described in Chapter 3 of this Section. It differs from the Type G only in that it is mounted on a smaller base and the wiring connections are made from underneath, as shown in fig. 4.

Fuse box, Type J2

6. The fuse box, Type J2, fig. 1, 2 and 3, comprises a moulded plastic base complete with wing nut terminals for securing a Type N fuse (Stores Ref. 5C/1963) and a moulded plastic cover complete with two captive securing screws. The base is provided with two screw holes for securing purposes and two tapped bushes to receive the cover securing screws.

INSTALLATION

7. The regulator and cut-out unit should be mounted in an upright position, with the terminals at the bottom. A typical circuit, giving the general sense of the cable connections, is shown at fig. 5, but, if required, the detailed sequence of connections will be found in Sect. 6 of the appropriate aircraft handbook. Care should be taken to ensure that free circulation of air round the regulator is possible to minimise the possibility of overheating.

SERVICING

Voltage regulator

Test prior to installation

8. When first installed, very little adjustment should be necessary, but certain irregularities may have accrued due to the presence of moisture, especially in the carbon pile, absorbed during a period of storage. The presence of moisture would affect the resistance of the carbon pile and

impair the efficiency of the unit. Therefore, before testing, the regulator must be dried out. The method of achieving this object is outlined at para. 9 (1).

9. The circuit for testing is shown in fig. 6 and testing, using only meters of known accuracy, should be carried out in the sequence outlined in the following paragraphs:—

- (1) Fix a generator, Type 02, to a bench testing set, as described in A.P.1095H, Vol. I, Section 4, Chapters 1 and 4. Connect generator terminals to regulator unit and run the generator, on no load, at the lowest speed given by the bench testing set, for a period of 20 minutes. This operation will ensure that the regulator unit is thoroughly dried out.
- (2) Short-circuit the rheostat in series with the generator field winding, set the arm of the regulator trimmer in the mid position and ensure that switches SW1 and SW3 are closed. This condition applies for all tests except where otherwise stated.
- (3) After checking that the link is in the C-B or non-parallel position and that SW4 is open, check the line voltage indicated on meter V1. This should be between the limits of 27.0 to 28.5 volts when the generator speed is increased from 3,250 to 6,000 r.p.m. and then decreased to 3,250 r.p.m. This applies (a) on no load, and (b) on full load. Should the regulator fail to satisfy this test it should be sent to a Maintenance Unit for setting up and a new regulator substituted. In the event of a spare not being available the procedure outlined in paragraphs 19 to 28 should be adopted.
- (4) With no load applied, run up the generator, from rest, to 6,000 r.p.m. and by means of the slotted spindle, adjust the trimmer to give a controlled voltage of 28.0. The spindle should be turned in a clockwise direction to increase and anti-clockwise to decrease the voltage. This is important as it governs the accuracy of ensuing tests.

Stability tests (new regulators)

10. The conditions of para. 9 (4) having been satisfied, the regulator should be subjected to tests in the following sequence:—

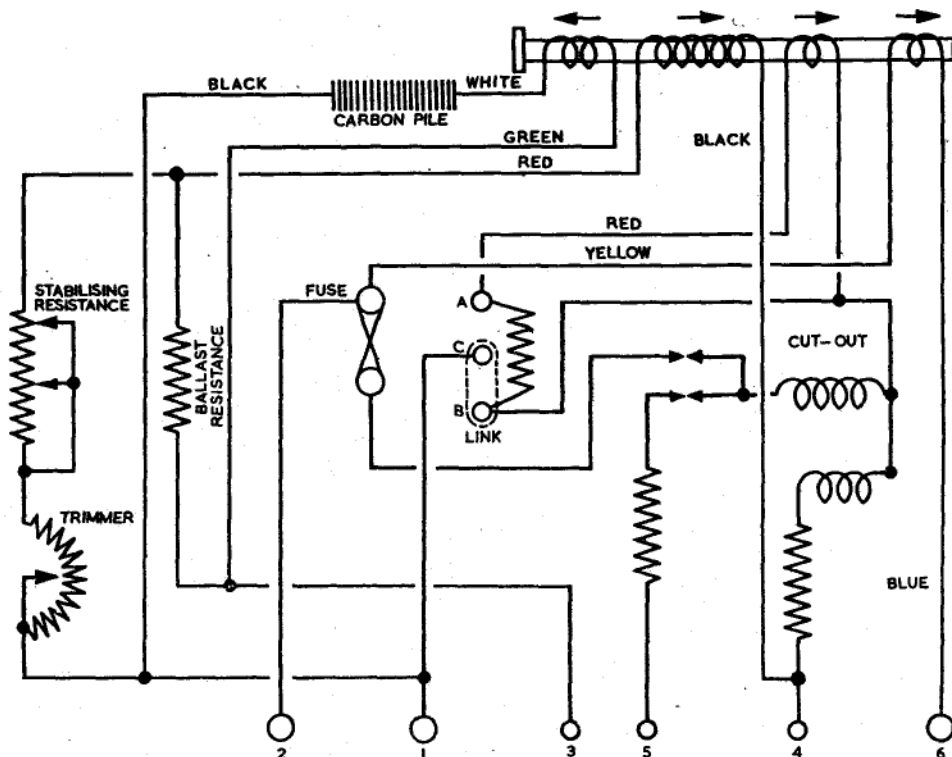


Fig. 5. Circuit diagram of combined unit

- (1) The accumulator is to be switched on and off three times at generator speeds of 4,000, 5,000, and 6,000 r.p.m.
- (2) With the generator on no load, the shunt field is to be switched on and off three times at speeds of 4,000, 5,000 and 6,000 r.p.m.
- (3) Set resistance R1 so that meter A4 registers 40 amp., and open and close SW4 at the speeds in (1) and (2).

11. In each of the tests specified at para. 10 the regulator should respond without any tendency to hunt (that is, without causing widely fluctuating voltages). Hunting may be detected by the presence of lamp "flicker" in a 24-volt lamp, temporarily connected across the load.

Accumulator decomposing test

12. Set the link in position C-B and close SW4. With the generator running at 5,000 r.p.m. adjust the resistance R1 to give a reading of 40 amp. on meter A4. Stop the generator and again run up to 5,000 r.p.m. with the resistance R1 switched in, when

the line volts must be within the limits of 26.2 and 26.6. This will ensure that the accumulator decomposing is functioning correctly.

Paralleling decomposing test

13. Set the link in position, open SW4 and set SW2 to position A-B. Run the generator at 5,000 r.p.m. and adjust the load resistance to give a reading of 100 amp. on meter A2. Stop the generator and again run up to a speed of 5,000 r.p.m. with the load on. The line volts must then be between the limits of 24.8 and 25.4. Failure to meet this requirement will indicate faulty paralleling decomposing (that is, the unit is not in a suitable condition to be used with two generators operating in parallel).

14. When the tests specified in para. 12 and 13 have been satisfactorily completed, slacken the screw which locks the pile compression screw and rotate the latter $\frac{1}{4}$ turn in an anti-clockwise direction. Then repeat the test outlined in para. 10. Under this condition the regulator must show no tendency to sustained hunting, and, if satisfactory, the pile

compression screw should be returned to, and locked in, its original setting. When this has been done the test outlined at para. 9 should be repeated.

15. These instructions having been carried out and the conditions satisfied, no further adjustments, with the exception of slight voltage adjustment, should be necessary. The latter adjustment is effected by turning the slotted spindle of the regulator trimmer clockwise to increase, and anti-clockwise to decrease the voltage.

16. Provided that the regulator is found to be stable in operation, it may now be installed in the aircraft. If, however, hunting develops, the regulator should be regarded as unserviceable and should be set up as described in para. 19 to 28.

Adjustment of regulators installed in aircraft

17. Regulators should not normally be adjusted in aircraft. Where, however, this is unavoidable, they should be set up to regulate at 28 volts by means of the trimmer. This should be done with the aircraft engine turning at normal cruising speed, with the fuses removed, or all electrical loads switched off and the accumulator disconnected. For this purpose a meter of known accuracy, not the aircraft voltmeter, should be used, connecting across terminals 1 and 4 of the regulator.

18. A rise of up to 1 volt may result in the event of moisture being present in the carbon pile. Such a condition often prevails under dispersal conditions. It is therefore recommended that the regulator should be checked when the aircraft returns after a flight. This will ensure that the regulator is in a dry condition and thereby enable correct voltage level readings to be obtained.

Setting-up instructions for regulators out of adjustment

19. These operations will normally be undertaken by Maintenance Units, but they may be undertaken at other units by skilled personnel under supervision of the Specialist Officer. If the regulator is known to be completely out of adjustment, or if it fails to pass the installation tests as outlined in para. 8 to 14 inclusive, the following procedure should be adopted:—

- (1) Slacken the screw which locks the pile compression screw and remove the latter.
- (2) Remove the carbon washers of the pile from the ceramic tube. This may be effected without undue handling by

passing a metal rod through the central holes of the washers, and then turning the regulator on end so that the washers slide out on the metal rod.

- (3) Examine the carbon washers visually for pitting, burning, or other defects. Renew where necessary, taking care to avoid handling unnecessarily. It is of importance that all dust and/or fragments are removed. This should be done by blowing.
- (4) Replace the pile, making sure that the washers enter the tube squarely (the use of the metal rod will facilitate this operation), and replace the compression screw.

Preliminary mechanical setting

20. Set the magnet core in the flush position as follows:—

- (1) Slacken the core locking screws and unscrew the core until two threads are protruding from the end plate of the magnet casing.
- (2) Turn the pile compression screw clockwise as far as it will go. It is important that undue force is not used as this will result in damage to the carbon pile.
- (3) Turn the core clockwise until resistance to further movement is felt. This will indicate that the core is touching the armature and is in the "flush" or "zero gap" position.
- (4) Loosen the pile compression screw $\frac{1}{2}$ turn by turning it anti-clockwise. At this setting, both the core and pile compression screws should be temporarily secured by tightening their respective locking screws.

Voltage adjustments

21. Fit the regulator to a bench testing set on which a Type 02 generator has been set up, and connect a load circuit as shown in fig. 6. Only meters of known accuracy (preferably test meters) should be used. The trimmer resistance should be set at its mid position and the following procedure adopted:—

- (1) Close SW1 and set the regulator link to position C-B. Run the generator on no load, at approximately 6,000 r.p.m., and by means of the magnet core adjust the voltage output to give a reading of 28 on meter V1. Clockwise rotation of the core will reduce, and anti-clockwise rotation increase, the output voltage.
- (2) Slacken the locking screw just sufficiently to permit movement of the pile compression screw and turn the latter clockwise. During this operation watch

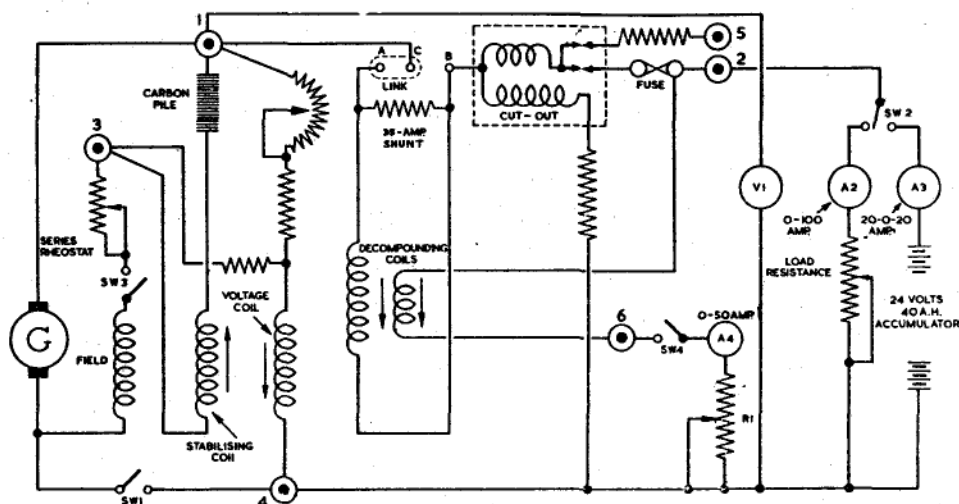


Fig. 6. Test circuit diagram

the meter V1 carefully, and when the output voltage drops to a minimum, and then tends to rise again, lock the compression screw at the lowest voltage setting. If, on clockwise rotation of the screw, the voltage rises, reverse the direction of rotation of the screw until the minimum is obtained.

- (3) Loosen the core locking screw, adjust the core until the output voltage again reads 28, and re-lock the core at this setting.
- (4) With the generator running on no load, the regulator should be so adjusted that, when the generator speed is varied between 3,300 r.p.m. and 6,000 r.p.m., the line voltage, indicated on meter V1, is maintained within the limits 27.0 and 28.5 volts.

22. The minimum voltage or "dip" position is very near that obtained by carrying out the setting outlined in para. 20 (4), and this preliminary adjustment obviates taking the compression screw through the violent hunting position in finding the "dip" position.

23. The preceding instructions having been carried out, it may be reasonably assumed that the regulator is adjusted for optimum regulation under varying conditions of speed and load.

Stability tests (after long service)

24. To ensure stable operation after long periods of service, when deterioration of the carbon washers in the pile may result in a variation in setting equivalent to slackening the pile compression screw, tests should be applied in the following sequence:—

- (1) The accumulator is to be switched in and out of circuit three times at generator speeds of 4,000, 5,000 and 6,000 r.p.m.
- (2) At the same generator speeds, and on no load, the shunt field is to be switched in and out of circuit three times.
- (3) A load of 40 amp. is to be applied and switched off and on three times at the same generator speeds.

Under these conditions the regulator response should show no tendency to sustained hunting.

25. When the test described at para. 24 has been satisfactorily completed it should be repeated with the compression screw turned back $\frac{1}{4}$ turn, and again there should be no tendency to hunt. Provided that this condition is satisfied, the compression screw should be restored to its original setting, locked, and the test outlined at para. 24 again applied.

26. If however, the regulator fails to satisfy the conditions of para. 25, the compression

screw should be slowly rotated in a clockwise direction until hunting ceases. When this has been done, the compression screw should be given a further $\frac{1}{4}$ turn clockwise, the regulator again tested as detailed in para. 24, and when satisfactory the compression screw should be locked in this position.

27. In order that satisfactory operation may be ensured when the regulator is used with (a) single, and (b) paralleled generators, the following tests should be applied:—

- (1) With the regulator link in position C-B and a load of 40 amp., run the generator 5,000 r.p.m. Under these conditions the line volts must be between the limits of 26.2 and 26.6.
- (2) With the link in position C-A run the generator at 5,000 r.p.m. and apply a load of 40 amp. The line volts must now be between the limits of 24.8 and 25.4.

28. If the foregoing instructions have been carried out, no further adjustments in service should be necessary, with the exception of correction of minor voltage variation by means of the trimmer. The setting given in the preceding paragraphs may not give optimum regulation and response but does provide a safe setting, giving sufficient tolerance to cover pile wear, without tendency to hunting.

Cut-out, Type G2

Adjustment

29. The cut-out should be checked, and, if necessary, adjusted to the following requirements:—

- (1) With the armature held fully closed by hand, the air gap between armature and pole face must be $0.025 \pm \frac{+0.002}{-0.000}$ inch.
- (2) With the armature in the open position, the air gap between armature and pole face must be $0.035 \pm \frac{+0.002}{-0.000}$ inch.
- (3) In the fully open position the distance between either fixed contact and the moving contact bar must not be less than 0.025 inch. No adjustment should be necessary, as this requirement should follow automatically from the adjustments given at (1) and (2).

Method of adjustment

30. The settings outlined in the previous paragraph should be effected as follows:—

- (1) Slacken locking nut of adjusting screw located in the middle of the adjusting bar. Then rotate the screw till the closed air gap setting is obtained and re-lock.
- (2) Slacken locking nut of screw stop in the end of the contact carrier plate till the open air gap setting is obtained, and re-lock in this position.

When these adjustments have been made, a spot of air drying varnish is to be applied to the lock-nuts.

Closing test

31. The unit is to be mounted with the base vertical and the series coil at the bottom. With connections made in accordance with fig. 5 the following tests will be carried out.

- (1) With switches SW1 and SW3 closed and SW2 open, run the generator at approximately 4,000 r.p.m.
- (2) Using the field rheostat, the generator voltage is to be gradually increased from zero to that at which the cut-out closes smartly. This "pull-in" voltage should be between the limits 26 and 27. Adjustment is effected by rotating the the adjusting nut on the control spring. To obviate hysteresis errors, the voltage for any individual check setting must be reduced to zero and gradually increased to the required voltage. To avoid stopping the generator between each test first reduce the voltage to as low a value as possible by means of the field rheostat and then open SW1.

32. The cut-out must close smartly between the limits 26 and 27 volts and must show no tendency to sluggish movement.

33. Lock the adjusting nut and re-check. Provided that the conditions of para. 31 and 32 are still satisfied, seal the adjusting nut with a spot of air drying varnish, but if not correct the adjustment must be repeated.

Opening test

34. To ensure that the cut-out opens at the correct value the following procedure is to be adopted:—

- (1) With the switches set as described in para. 31 (1), the cut-out must open smartly when the generator voltage is reduced gradually from the "pull-in" value. There must be no suggestion of sluggishness.
- (2) With SW1 and SW3 closed and SW2 in position A-C, run the generator at approximately 4,000 r.p.m.
- (3) Increase the voltage until the cut-out closes, and by means of the field rheostat and/or speed regulation adjust the charging current to approximately 10 amp.
- (4) Whilst still in the condition resulting from the application of (2) and (3) of this paragraph, open SW3. The cut-out should show no tendency to hold closed on reverse current. This test should be applied once.
- (5) Make sure that SW3 has been closed subsequent to the previous test. Then gradually decrease the voltage to the value at which the cut-out opens. This is to be repeated six times, and on each check the cut-out is to open, without excessive chattering, between discharge current limits 14 to 25 amp. at an accumulator voltage of 23 to 24. The cut-out must also close smartly within the limits 26 and 27 volts. If the discharge current is sufficient to motor the test set a braking force should be applied to the driving motor.

Sheet No. 1

TYPE B
VOLTAGE REGULATOR AND CUT-OUT COMBINED

A.P.4343B Vol.4 Pt.
BOOK 1 of 3 BOOK
SECTION 1 CHAPTER 1

REF. No.

EQUIPMENT AND TOOLS

QTY.

	Kits, tool, Electrician, to scale A.26, A.P.830, Vol.3, Pt. 'A'.	1
1A/291	Brushes, varnish 1 in.	1
5CW/543	Switches, tumbler, A.M. Type 'B'.	2
5CW/2498	Switches, tumbler, A.M. Type 'B'.	1
5CW/2828	Switches, tumbler, A.M. Type 'C'.	3
5G/152	Testers, insulation resistance, Type 'C'.	1
5G/197	Panels, loading,	1
5G/553	Testers, generator, Mk.5B.	1
5Q/234	Voltmeters, 0-40 volts.	1
5A/17977	Ammeters, 30-0-30 amps.	1
5Q/25091	Ammeters, 0-10 amps.	1
5Q/25152	Ammeters, 0-50 amps.	1
5UA/3620	Generators, E.D. Type '02'.	1
10S/10610	Testmeters, Type 'D'.	2
10W/1167	Resistors, variable, 0-46.25 ohms.	1
Loc. Man.	Go No/Go gauge. (See Fig.2.)	1

SPARES

5UC/5062
32B/242
33A/364
33A/512
33C/538
33C/89C

Piles, carbon.
Rags, cotton.
Enamel, air drying, scarlet.
Varnish, resin, synthetic.
Paper, crocus, grade '00'.
Paper, glass, grade '00'.

1 set
As required
"
"
"
"

BAY FACILITIES

1. Power supply 28 volts D.C.

(45664)198

Sheet No. 2

TYPE B
VOLTAGE REGULATOR AND CUT-OUT COMBINED

A.P.4343B Vol.4 Pt.6
BOOK 1 of 3 BOOKS
SECTION 1 CHAPTER 14

SERVICING NOTES

1. Before setting up regulator ascertain whether it is to be used on an alkaline or lead acid battery system.

TYPE B
VOLTAGE REGULATOR AND CUT-OUT COMBINEDA.P.4343B Vol.4 Pt.
BOOK 1 of 3 BOOKS
SECTION 1 CHAPTER 1

Item No.	ITEM	OPERATION	Prog Time
1.	Regulator. (External.)	(i) Clean, using cotton rag. (ii) Examine for damage.	
	(a) Terminal cover.		
	(b) Fuse cover.		
	(c) Cut-out cover.	(i) Remove.	
	(d) Pile compression screw cover.	(ii) Clean, using cotton rag. (iii) Examine for damage.	
	(e) Link box cover.		
	(f) Base.		
2.	Regulator.		
	(a) Regulator. (Internal.)	(i) Remove dust, using clean dry brush. (ii) Examine for damage.	
	(b) Electric cables.	Examine for chafing, deterioration of insulation, security of attachment and good electrical connection.	
	(c) Ballast resistor.	(i) Examine for signs of overheating and security of attachment. (ii) Check continuity, using Type 'D' testmeter.	

2. (Contd.)

(d) Trimmer resistor.

(i) Examine for signs of overheating and security of attachment.

(ii) Check contact arm makes good contact over complete range of movement, using Type 'D' testmeter.

(e) Cut-out ballast resistor.

Examine for signs of overheating and security of attachment.

(f) Securing nuts and screws.

(i) Check for tightness.

(ii) Lock if necessary, using scarlet air drying enamel or synthetic resin varnish as applicable.

3. Regulator.

(External.)

(a) Fuse holder.

Examine terminals for security of attachment.

(b) Fuse.

Examine for signs of overheating and damage. If found fit new fuse.

(c) Link box.

Examine terminals for security of attachment and damage.

4. Cut-out.

(a) Cut-out.

Examine for corrosion and damage.

(b) Coils.

Examine for signs of overheating and security of attachment

(c) Securing nuts and screws.

(i) Check for tightness.

(ii) Lock if necessary, using synthetic resin varnish.

TYPE B
VOLTAGE REGULATOR AND CUT-OUT COMBINED

Item No.	ITEM	OPERATION	Prog Time
4e (Contd.)			
	Cut-out.		
	(d) Contacts.	Examine for pitting and signs of burning. Clean if necessary, using grade '00' glass paper.	
	(e) Armature.	(i) Operate by hand and check for freedom of movement. (ii) Fully close by hand and check air gap between the armature and pole face, using feeler gauge. Gap is to be within 0.025 in. and 0.027 in. inclusive. Adjust gap if necessary, by means of the adjusting screw at the centre of the armature assembly. (iii) Allow armature to return to its normal open position. (iv) Check air gap between the armature and the pole face, using Go No/Go gauge. Gap is to be within 0.065 in. and 0.067 in. inclusive. Adjust if necessary, by means of the adjusting screw stop in the end of the contact carrier plate. Note:- No adjustment is required for the main contact clearance, which follows automatically from the air gap adjustment.	

5. Regulator.
- (a) Pile compression screw.
 - (i) Unlock and remove.
 - (ii) Examine carbon inset for pitting and signs of burning. Clean if necessary, using grade '00' crocus paper.
 - (b) Pile washers.
 - (i) Remove on a rod or small screwdriver.
 - (ii) Examine for pitting and signs of burning. Fit complete new pile stack if any washer is in bad condition.

Note:- Pile washers are to be handled as little as possible and are to be kept free from oil and grease.
 - (c) Pile compression screw. Refit and half lock.

6. This Item to be supervised by N.C.O.

Regulator.

Set to flush position as follows:-

- (i) Unlock magnet core screw.
- (ii) Turn magnet core screw out until two threads are protruding from the base of the magnet pot.
- (iii) Unlock pile compression screw.
- (iv) Turn pile compression screw in until opposition to further movement is felt.
- (v) Turn magnet core screw in until opposition to further movement is felt.

Sheet No. 5

TYPE B
VOLTAGE REGULATOR AND CUT-OUT COMBINED

A.P.4343B Vol.4 Pt.
BOOK 1 of 3 BOOKS
SECTION 1 CHAPTER 1

Item No.	ITEM	OPERATION	Prog Time
6. (Contd.) Regulator.	(vi)	Turn pile compression screw out three quarters of a turn and half lock.	
	(vii)	Turn magnet core screw out a quarter of a turn and half lock.	
7. This Item to be supervised by N.C.O. Regulator.	Check coil current as follows:-		
	(i)	Remove compensating link.	
	(ii)	Set trimmer to mid-position.	
	(iii)	Connect a 28 volt supply through a Type 'D' testmeter to terminals 1 and 4.	
	(iv)	Check current reading indicated by Type 'D' testmeter is within 0.85 and 0.95 amps. inclusive. Adjust if necessary, by means of the ballast resistor.	
	(v)	Disconnect 28 volt supply.	

8. This Item to be supervised by N.C.O.

Regulator.

Connect to test equipment as shown in Fig.1.

9. This Item to be supervised by N.C.O.

Regulator.

Set to dip position as follows:-

- (i) Run generator at 5000 R.P.M.
- (ii) Set SW.1, SW.3 and SW.5 to 'ON'.
- (iii) Run generator for 20 minutes off load to dry out pile.
- (iv) Carefully observing V.1 turn pile screw in until voltage decreases to a minimum and just begins to increase.

Note:- If the voltage increases as pile compression screw is turned in, reverse rotation of the pile screw until voltage decreases to a minimum and just begins to increase.

- (v) Lock pile compression screw.
- (vi) Check voltage as indicated at V.1 is within the stated limits, adjust, by means of magnet core screw and repeat Operations (iv), (v) and (vi).
- (vii) Adjust voltage at V.1 to 28 volts for an alkaline battery system or 27.5 volts for a lead acid battery system, by means of magnet core screw.
- (viii) Lock magnet core screw.

Sheet No. 6

TYPE B
VOLTAGE REGULATOR AND CUT-OUT COMBINED

A.P.4343B Vol.4 Pt.6
BOOK 1 of 3 BOOKS
SECTION 1 CHAPTER 14

Item No.	ITEM	OPERATION	Prog. Time
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9. (Contd.)

Regulator.

- (ix) Set SW.3 to 'OFF'.
- (x) Shut down generator.
- (xi) Run generator at 5000 R.P.M.
- (xii) Unlock magnet core screw.
- (xiii) Adjust voltage at V.1 to 28 volts for an alkaline battery system or 27.5 volts for lead acid battery system, by means of the magnet core screw.
- (xiv) Lock magnet core screw.

10. This Item to be supervised by N.C.O.
Regulator.

Test regulation as follows:-

- (i) Run generator at 3250 R.P.M.
- (ii) Set SW.3 to 'ON'.

10. (Contd.)

- (iii) Increase generator speed to 6000 R.P.M. and then decrease generator speed until pile is working at 5 ohms as calculated by the ratio $V.2/A.1$. During this speed cycle voltage at $V.1$ is to remain within 27 volts and 28.5 volts for an alkaline battery system or 26.5 volts to 28 volts for a lead acid battery system.
- (iv) Set SW.3 to 'OFF'.
- (v) Shut down generator.

11. This Item to be supervised by N.C.O.

Regulator.

Test stability as follows:-

- (1) Connect compensating link between terminals 'C' and 'B'.
- (2) Run generator at 4000 R.P.M.
- (3) Set SW.3 to 'ON'.
- (4) Set SW.2 to 'C'.
- (5) Set SW.2 'OFF' and 'ON' three times and check that regulator responds without any tendency to hunt.
- (6) Run generator at 5000 R.P.M.
- (7) Repeat Operation (5).
- (8) Run generator at 6000 R.P.M.
- (9) Repeat Operation (5).
- (10) Set SW.2 to 'OFF'.

TYPE B
VOLTAGE REGULATOR AND CUT-OUT COMBINEDA.P.4343B Vol.4 Pt.6
BOOK 1 of 3 BOOKS
SECTION 1 CHAPTER 11

Item No.	ITEM	OPERATION	Prog. Time
11. (Contd.) Regulator.		(11) Set SW.3 to 'OFF' and 'ON' three times and check that regulator responds without any tendency to hunt.	
		(12) Run generator at 5000 R.P.M.	
		(13) Repeat Operation (11).	
		(14) Run generator at 4000 R.P.M.	
		(15) Repeat Operation (11).	
		(16) Set SW.4 to 'ON'.	
		(17) Adjust R.1 until a current of 40 amps is indicated at A.4.	
		(18) Set SW.4 to 'OFF' and 'ON' three times, and check that regulator responds without any tendency to hunt.	
		(19) Run generator at 5000 R.P.M.	
		(20) Repeat Operation (18).	
		(21) Run generator at 6000 R.P.M.	
		(22) Repeat Operation (18).	

11. (Contd.)

- (23) Set SW.4 and SW.3 to 'OFF'.
- (24) Shut down generator.
- (25) Unlock pile compression screw.
- (26) Turn pile screw out one eighth of a turn and lock.
- (27) Repeat Operations (2) to (25) inclusive.
- (28) Restore pile compression screw to its original position and lock.

12. This Item to be supervised by N.C.O.

Regulator.

Test regulation as follows:-

- (i) Remove compensating link.
- (ii) Run generator at 3250 R.P.M.
- (iii) Set SW.3 to 'ON'.
- (iv) Increase generator speed to 6000 R.P.M. and then decrease generator speed until pile is working at 5 ohms as given by the ratio V.2/A.1. During this speed cycle voltage at V.1 is to remain within 27 volts and 28.5 volts for an alkaline battery system or 26.5 volts to 28 volts for a lead acid battery system.
- (v) Set SW.3 to 'OFF'.
- (vi) Shut down generator.

(45664)210

Sheet No. 8

TYPE B
VOLTAGE REGULATOR AND CUT-OUT COMBINED

A.P.4343B Vol.4 Pt.6
BOOK 1 of 3 BOOKS
SECTION 1 CHAPTER 14

Item No.	ITEM	OPERATION	Prog. Time
13.	This Item to be supervised by N.C.O. Regulator.	Carry out compounding test as follows:- (i) Run generator at 5000 R.P.M. (ii) Set SW.3 to 'ON' and check voltage as indicated at V.1 is 28 volts for an alkaline battery system or 27.5 volts for a lead acid battery system. Adjust if necessary, by means of trimmer resistor. (iii) Shut down generator. (iv) Connect compensating link between terminals 'C' and 'B'. (v) Run generator at 5000 R.P.M. (vi) Set SW.4 to 'ON'. (vii) Adjust R.1 until a current of 40 amps. is indicated at A.4. (viii) Shut down generator.	

13. (Contd.)

- (ix) Run generator at minimum speed, slowly increase to 5000 R.P.M. and check voltage at V.1 is within 26.3 volts and 26.7 volts inclusive for an alkaline battery system or 25.5 volts to 26.2 volts for a lead acid battery system.
- (x) Set SW.4 and SW.3 to 'OFF'.
- (xi) Shut down generator.

14. Regulator.

Test compound paralleling as follows:-

- (i) Remove compensating link.
- (ii) Run generator at 5000 R.P.M.
- (iii) Set SW.3 to 'ON' and check that voltage at V.1 is 28 volts for an alkaline battery system or 27.5 volts for a lead acid battery system. Adjust if necessary, by means of trimmer resistor.
- (iv) Shut down generator.
- (v) Connect compensating link between terminals A and C.
- (vi) Run generator at 5000 R.P.M.
- (vii) Set SW.2 to 'B'.
- (viii) Adjust R.2 until a current of 100 amps. is indicated at A.2.
- (ix) Shut down generator.
- (x) Run generator at 5000 R.P.M.

TYPE B
VOLTAGE REGULATOR AND CUT-OUT COMBINED

A.P.4343B Vol.4 Pt.
BOOK 1 of 3 BOOK
SECTION 1 CHAPTER 1

Item No.	ITEM	OPERATION	Prog Time
14. (Contd.)	Regulator.	(xi) Check that voltage at V.1 is within 24.9 volts and 25.5 volts for an alkaline battery system or 24.4 volts and 25 volts for a lead acid battery system. (xii) Set SW.2 and SW.3 to 'OFF'. (xiii) Shut down generator.	
15.	In this Item, the unit is to be mounted with the base in a vertical plane and the series coil at the bottom.		
	Cut-out.	Check pull-in voltage as follows:- (i) Run generator at 4000 R.P.M. (ii) Set SW.3 to 'ON' and SW.5 to 'OFF'. (iii) Adjust R.3 to the all in position.	

15. (Contd.)

- (iv) Observing V.1 decrease R.3 until contacts close. The contacts are to close when the voltage at V.1 is within 26 volts and 27 volts inclusive.
- Note:- 1. If the pull-in voltage is not within the stated limit it is to be adjusted by means of the adjusting nut on the control spring and Operations (iii) and (iv) repeated.
- Note:- 2. On any individual check setting, the voltage at V.1 is to be decreased to a minimum by means of R.3 and SW.1 set to 'OFF' and then 'ON' in order to eliminate hysteresis errors.

16. In this Item, the unit is to be mounted with the base in a vertical plane and the series coil at the bottom.

Cut-out.

Carry out opening test as follows:-

- (i) Set SW.2 to 'C'.
- (ii) Increase the generator voltage by means of R.3 until the contacts close and a charging current of 10 amps. is indicated at A.3.
- (iii) Observing A.3 slowly decrease the generator voltage by means of R.3 until the contacts open. Contacts are to open when the discharge current indicated at A.3 is within 12 amps. and 25 amps. inclusive.
- (iv) Repeat Operation (ii) six times.

(45664)214

(Continued)

Sheet No. 10

TYPE B
VOLTAGE REGULATOR AND CUT-OUT COMBINED

A.P.4343B Vol.4 Pt.6
BOOK 1 of 3 BOOKS
SECTION 1 CHAPTER 14

Item No.	ITEM	OPERATION	Prog. Time
16. (Contd.) Cut-out.	(v)	Observing A.3 adjust the generator voltage by means of R.3 until the contacts close and a charging current of 10 amps. is indicated at A.3.	
	(vi)	Set SW.3 to 'OFF' and check that the contacts show no tendency to remain closed on reversed current. Note:- This test is to be made once only.	
17—	In this Item, the unit is to be mounted with the base in a vertical plane and the series coil at the bottom.		
Cut-out.		Check millivolt drop, using Type 'D' testmeter across contacts as follows:- (i) Set SW.3 and SW.5 to 'ON' and SW.2 to 'B'. (ii) Adjust R.2 until a current of 100 amps. is indicated at A.2.	

17. (Contd.)

- (iii) Check, using Type 'D' testmeter, that millivolt drop across terminals B of change-over link at A Pos. does not exceed 250 millivolts.
Note:- If the voltage drop across fuse link is 70 millivolts, ensure the contact faces of the Type 'N' fuse are clean and make good contact.
- (iv) Check, using Type 'D' testmeter, that millivolt drop across the contacts does not exceed 30 millivolts.
- (v) Set SW.1, SW.2 and SW.3 to 'OFF'.
- (vi) Shut down generator.

18. Test equipment.

Disconnect.

19. Regulator.

- | | | |
|-----------------------------------|---|----------------------|
| (a) Compensating link. | } | Connect as required. |
| (b) Fuse cover. | | |
| (c) Pile compression screw cover. | } | Refit. |
| (d) Cut-out cover. | | |
| (e) Line box cover. | | |
| (f) Base. | | |

Sheet No. 11

TYPE B
VOLTAGE REGULATOR AND CUT-OUT COMBINED

A.P.4343B Vol.4 Pt.6
BOOK 1 of 3 BOOKS
SECTION 1 CHAPTER 14

Item No.	ITEM	OPERATION	Prog. Time
20.	Regulator.	Check insulation resistance using Type 'C' insulation tester between each terminal and frame. Minimum permissible reading 20 megohms.	
21.	Form 3592.	Sign for completing this Servicing.	2.30

TYPE B
VOLTAGE REGULATOR AND CUT-OUT COMBINED

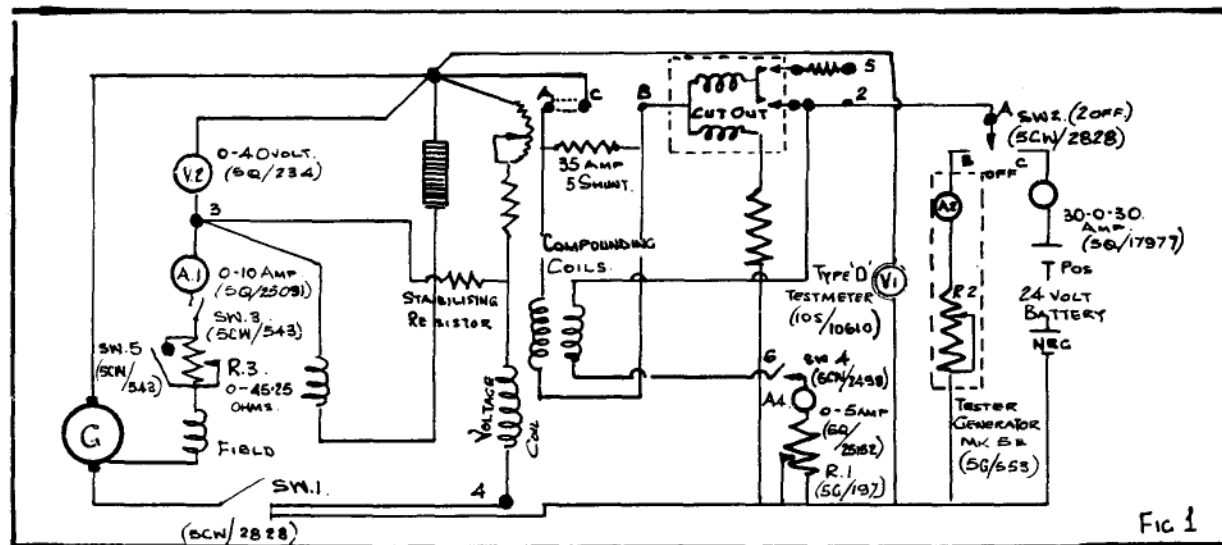
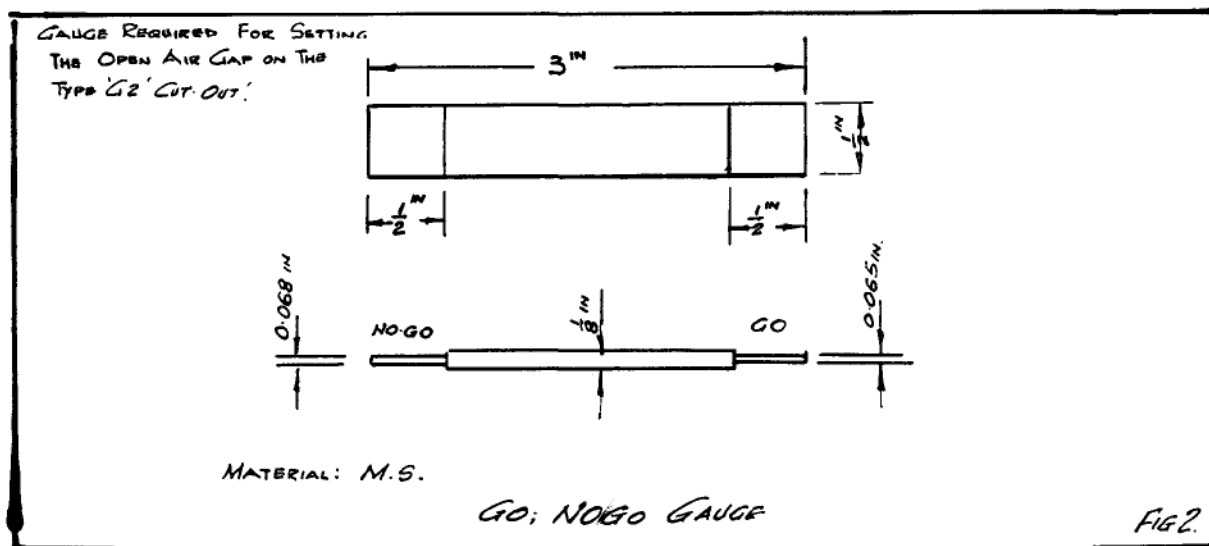


FIG 1

TYPE B
VOLTAGE REGULATOR AND CUT-OUT COMBINED



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