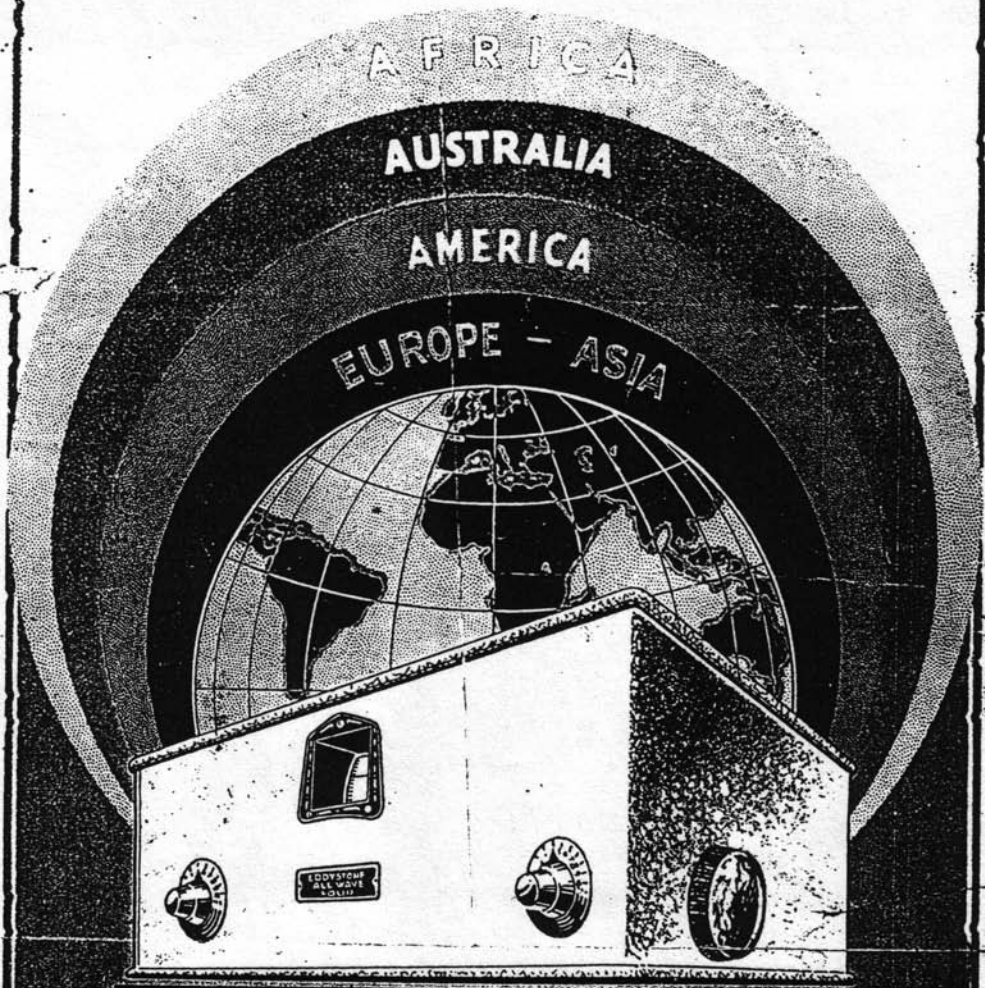
Continent Calls Continent



The EDDYSTONE ALL WAVE FOUR

'Built to Last'

EDDYSTONE

TWO YEARS AGO, we introduced the first 'EDDYSTONE' All Wave Four, a short and long wave receiver of original design, for overseas and tropical requirements. Since then, from the technical press and from users in all parts of the world, we have received articles and letters of appreciation, congratulating us upon the design, construction and performance of each model.

We therefore place before you our improved 1932/33 model All Wave Four with the complete confidence that it will give full satisfaction.

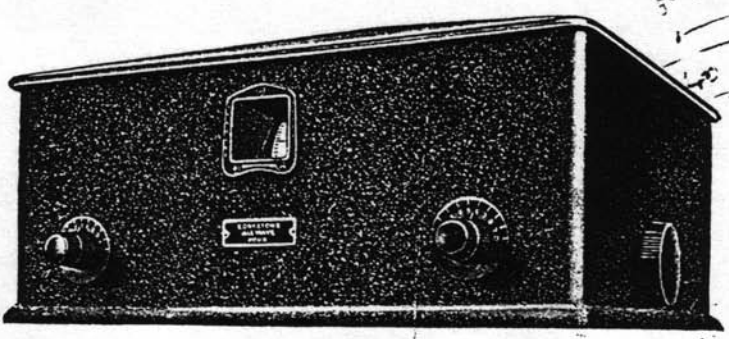
One of the most important features of the receiver is the patent one-piece aluminium alloy cabinet. This, although artistically arranged and finished, protects the instrument from all rigours of climate and is insect and damp proof. It cannot fall to pieces and will withstand the most severe handling. Technically it possesses great advantages affording the highest degree of electrical screening for each circuit section of the instrument, thus enabling each valve to be utilized to its maximum efficiency.

The receiver is therefore extremely powerful and although utilizing but four valves, competes easily with sets employing five and six valves. It is capable of giving loud speaker reception of short wave stations over thousands of miles, even under the adverse reception conditions which prevail in many parts of the world. Its performance on all other wavelengths is exceptionally good and loud speaker reception on the 200-500 metre waveband up to 2,000 miles is regularly reported. The set is in every way ideal for world wide reception of the new British Empire short wave station at present in course of construction. The receiver and its component parts are designed to withstand hot and humid or arctic cold climates and remain trouble free.

The circuit arrangement comprises a tuned screened grid amplifier valve coupled to a detector valve by means of a H.F. transformer with reaction winding. The set will therefore not re-radiate to the annoyance of other listeners. The detector valve is followed by two low frequency note magnifiers, one of the resistance capacity coupling type and the second a Ferranti L.F. transformer. The output valve is a high efficiency pentode. The screened grid valve is of the latest variable mu type. The reaction control is absolutely smooth and constant over all wavelengths and there is a complete absence of unpleasant hand capacity effects. Tuning is carried out by a one knob control, calibrations being shown on an illuminated large vision drum scale. Automatic grid bias is fitted, obviating the use of a separate dry battery for this purpose. Only two leads are necessary to the H.T. battery, the various voltages to the different valve stages being drop fed in the receiver itself. This simplifies the connections and drains the H.T. battery evenly. An automatic safety fuse in the form of a limiting resistance is incorporated to prevent accidental damage to the valve filaments from the H.T. supply. A volume and selectivity control is fitted to the reciever for use on radio. Terminals are provided so that a gramophone pick-up can be used for the amplification and reproduction of gramophone records on the loud speaker. The instrument is quite simple to instal and operate and no previous knowledge is necessary. Each set is supplied with clear and comprehensive instructions. The volume and quality from the set are all that can be required.

Instal your receiver accordingly, switch on and tune in to the fund of interest, amusement and news which the ether brings you. Music, opera, song, jazz, variety, drama, politics, stock exchange markets and sport are all included in the short wave programmes which the All Wave Four can receive.

ALL WAVE FOUR



The Cabinet of the 1933 All Wave Four is of Aluminium beautifully finished a rich Dark Brown colour

BATTERY MODEL SPECIFICATION.

All Wave Four	1933 type in patent monoblock metal cabinet, full tropical finish throughout.
Valves	1 Cossor VSG 220 2 Mazda HL210 or 2 Osram HL210 1 Mullard PM22
Wave-range	12.5 metres to 85 metres and 260 metres to 550 metres. Extra coils for all wavelengths up to 1,800 metres can be obtained if required.
Special Features	Drop fed H.T., vari-mu S.G. valve, automatic grid bias, one dial tuning, dial light, volume and selectivity control.
Battery Consumption	The receiver needs .55 amps at 2 volts for the valve filaments and 14/15 m.amps H.T. at 135/150 volts.

PRICE (*including Royalties*) . **£24 10 0**
Code : ALFO.

Spare Set of Valves (if required) . **£2 8 0**
Code : VALVA.

The following accessories are needed to form a complete installation :

1 'EDDYSTONE' Permanent Magnet Moving Coil Loud Speaker in cabinet, special tropical movement with tapped output . . . . . *Code : ALPEM* **£4 15 0**

1 'EDDYSTONE' All Wave Four 135-volts long life H. T. supply, comprising 3 super-capacity 45-volt special block units for overseas use, made to our specification by Hellesen's . . . . . *Code : ALBAS* ~~£2 2 0~~

1 Exide or Young Accumulator, type WZG4, 80 amp. hour. (This battery will give 3 hours daily use for 50 days before recharge is necessary . . . . *Code : ALPE* **£1 2 0**

Code for complete installation without spare valves : ALCOM.

3 Kolin Hellesen H T Batteries 9-9-6

Aerial & Earth Equipment 15-0

ALL-ELECTRIC MODEL SPECIFICATION.

All Wave Four . .	1933 type for A.C. mains operation. In patent monoblock metal cabinet, full tropical finish throughout. Complete with separate power supply unit.
Valves	1 Osram VMS4, 1 Osram MH4 or Mazda AC/HL. 1 Mullard 354V and 1 Mullard PM24M. 1 Mullard rectifier, DW2.
Wave-range . . .	12.5 metres to 85 metres and 260 metres to 550 metres. Extra coils for all wavelengths up to 1,800 metres can be obtained if required.
Special Features . .	Drop fed H.T., vari-mu S.G. valve, automatic grid bias, one dial tuning, dial light, volume and selectivity control.
Power Consumption .	40 watts.

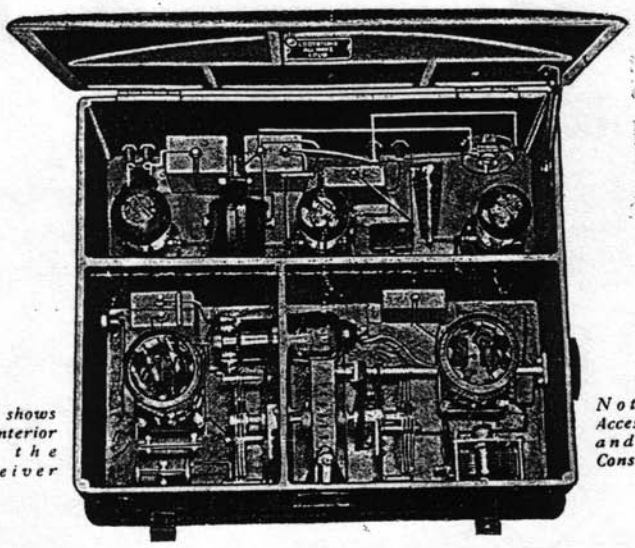
A.C. All Wave Four Receiver, complete with power supply unit:

95-115 volts, 40/100 cycles . *Code: ALFOL.* 200-240 volts, 40/100 cycles . *Code: ALFOM*

PRICE (*including Royalties*) . **£33 0 0**

Spare Set of 5 valves (if required) . **£3 18 6**
Code: VALEC

1 'EDDYSTONE' Permanent Magnet Moving Coil Loud Speaker in cabinet, special tropical movement with tapped output . . . . . *Code: ALPEM* **£4 15 0**

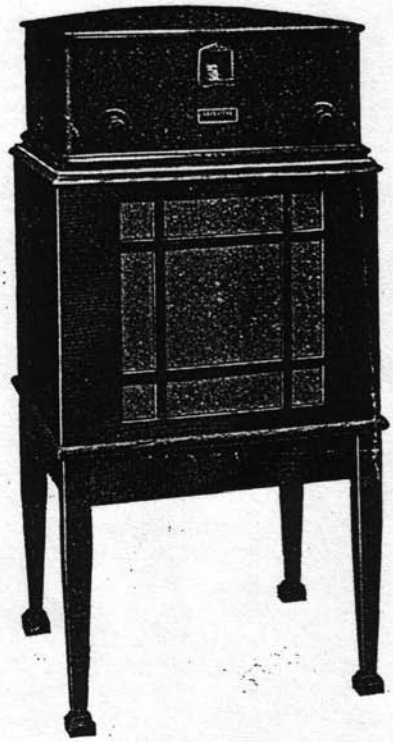


This shows the Interior of the Receiver

Note the Accessibility and solid Construction

'EDDYSTONE'
PEDESTAL LOUD SPEAKER CABINET

FOR ALL WAVE FOUR RECEIVER



This pedestal loud speaker cabinet is designed so that the All Wave Four can be placed on top, forming a complete and self-contained installation. It has an attractive appearance, and in addition to containing the 'Eddystone' permanent magnet moving coil loud speaker unit, the back is easily removable and batteries or power supply unit can be accomodated. The legs have patent fittings so that they can be detached and packed separately for easy shipment. The cabinet with receiver, stands just under 3 ft. high.

PRICE : In Oak . **£7 0 0**
Code : *PEDOK.*
In Teak . **£8 0 0**
Code : *PEDET.*

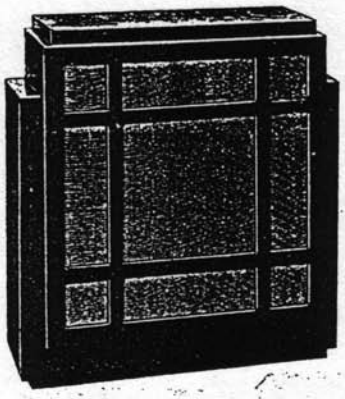
SUPPLEMENTARY ACCESSORIES :

'EDDYSTONE' D.C. Eliminator for supplying H.T. to the receiver when D.C. mains are available, type D.C.5, 200-250 volt only . . . . *Code* : *ALDIM* **£3 0 0**

Extra coils for in-between wavelengths if required :

1 pair Coils, type 2W & 4W	80/170 metres	*Code* : *AWEX*	9/-	pair.
1 ,, ,, ,, 2P & 4P	160/270 ,,	*Code* : *APAX*	9/-	,,
1 ,, ,, ,, 2BR & 4BR	490/1000 ,,	*Code* : *ABAX*	11/-	,,
1 ,, ,, ,, 2GY & 4GY	900/1800 ,,	*Code* : *AGAX*	11/-	,,
1 Marconiphone Pick-up with tone-arm		*Code* : *APIC*	**£2 5 0**	
or :—				
1 B.T.H. Pick-up head only to fit to tone-arm of gramophone			**£1 7 6**	
1 Volume Control for use with pick-up		*Code* : *VOLEX*	**4 0**	
1 Pair B.T.H. Headphones . .		*Code* : *FONOS*	**12 6**	
1 Set Aerial and Earth Equipment .		*Code* : *ALEA*	**15 0**	

'EDDYSTONE'
PERMANENT MAGNET M.C. LOUD SPEAKER



This is the latest type of moving coil loud speaker, employing a powerful permanent magnet of high flux density in place of the usual mains energised field winding. It is remarkably sensitive to weak signals and has a very even musical frequency response. Fitted with a special tapped output transformer, giving five different ratios from 15 : 1 to 70 : 1, it can be matched to suit any output valve. The cabinet is of modern design and is strongly made to withstand adverse climates, the movement is of full tropical construction. The instrument will handle 3.75 watts output without overload, has a speech coil resistance of 2 ohms and its impedance is 2.3 ohms at 800 cycles.

PRICE £4 15 0

Code PERMA.

'EDDYSTONE' RADIO RECEIVERS

are manufactured by STRATTON & CO., LTD., Bromsgrove Street, Birmingham, England, and are guaranteed to be of the highest quality and workmanship. The firm specialises in receivers for use in overseas countries where reception and climatic conditions are most difficult and render special apparatus highly necessary if lasting satisfaction is to be obtained. Seven years' experience in catering for these markets lies behind the receiver described herein, which can be relied upon to give long service with an absolute minimum of trouble.

Obtain your Eddystone Receiver from—

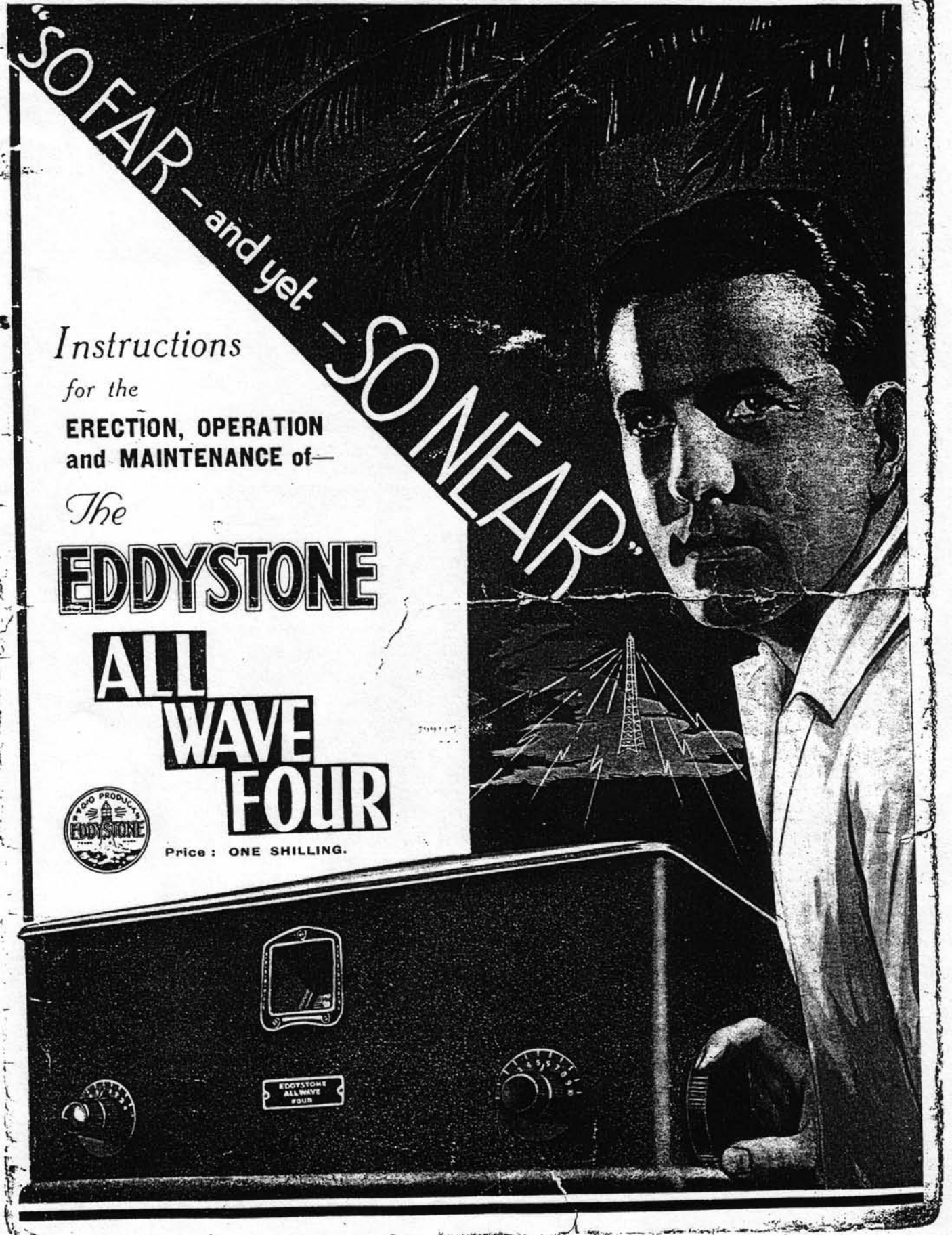
C. WEBB LIMITED
THE RADIO ELECTRIC STORES,
164, CHARING CROSS ROAD,
LONDON, W.C.2.

GRIFFITHS, MCALISTER LTD.
COMPLETE OUTFITTERS,
LIVERPOOL. STREET, LONDON, W.1.

GRIFFITHS, MCALISTER LTD.
COMPLETE OUTFITTERS,
LONDON STREET,

MADE IN ENGLAND

PRINTED IN ENGLAND

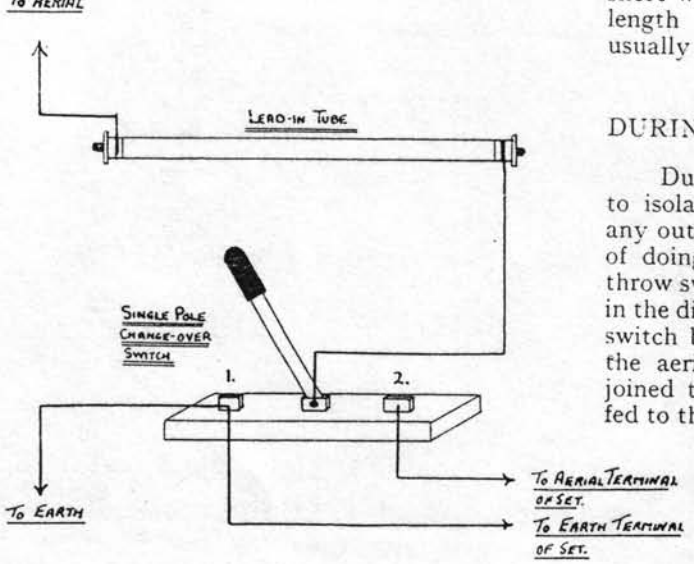

"SO FAR – and yet – SO NEAR"
Instructions
for the
ERECTION, OPERATION
and MAINTENANCE of—
The
EDDYSTONE
ALL WAVE FOUR
RADIO PRODUCTS
EDDYSTONE
Price : ONE SHILLING.
EDDYSTONE ALL WAVE FOUR

THE AERIAL AND EARTH.

Results can be obtained from the All Wave Four receiver on any form of aerial and earth arrangement, nevertheless it is always well worth while to erect this in as efficient a manner as possible to suit local circumstances. It can be readily appreciated that quite a small increase of signal voltage obtained from the aerial can result in a large increase in final output volume, due to the very great amplification factor of the valve stages in the receiver. The qualifications of a good aerial are firstly, that it shall be in as open a position as possible, that is, not badly screened by nearby objects, such as trees or buildings. Secondly, that it shall be as high as convenient, at least 30 ft.; and thirdly, it should be well insulated and in one piece without any frayed strands, right to the lead-in. The down wire from the horizontal position should always be well away from buildings and never carried down a wall. Inside the house, the lead to the set should be direct and short.

For the outside wire, a single strand of 14g. enamelled copper is highly satisfactory, while the lead inside the house to the set should be insulated flex.

The most usual type of aerial is the inverted L type shown in sketch A. Another equally good alternative for some installations is also the T aerial shown in sketch B. In this case, the lead in top should be taken from the centre and soldered. For short wave reception, a vertical type of aerial consisting of a single wire suspended in as vertical a position as possible gives very good results; this, however, is only recommended when it can be suspended from a good height and is not very closely screened.



DIRECTION OF AERIAL.

In theory, best results are obtained from a given station when the aerial is pointing in the direction of that station. In practice, it is seldom that a very pronounced difference is found.

LENGTH OF AERIAL.

An all round standard to work to for good medium wave and short wave reception is about 60 ft. of wire from the free end of the aerial to the set.

On the medium waves, 100 ft. of wire will give rather more sensitivity and volume from very distant stations, but the selectivity of the set will be reduced. To obtain maximum selectivity, a length of wire down to as low as 20 ft. can be employed. If atmospherics cause considerable interference, a shorter aerial is to be preferred to a longer one. For short wave reception, the aerial can be of any length between 20 ft. and 60 ft., there is usually a loss of volume below 40 ft.

DURING STORMS.

During electrical storms, it is advisable to isolate the receiver and connect to earth any outside aerial. A simple and safe method of doing this is to use a single pole double throw switch connected in the system as shown in the diagram on the opposite page. When the switch blade is thrown over to contact No. 1, the aerial is disconnected from the set and joined to earth, while in position No. 2, it is fed to the receiver in the usual way. The earth terminal on the set can be earthed through the switch contact or direct, whichever is the most convenient. It is advisable that the switch be fitted outside the

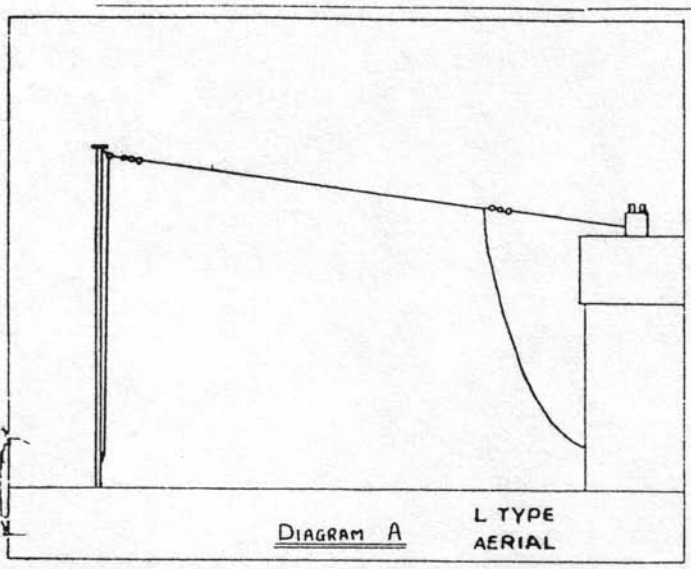


DIAGRAM A L TYPE AERIAL

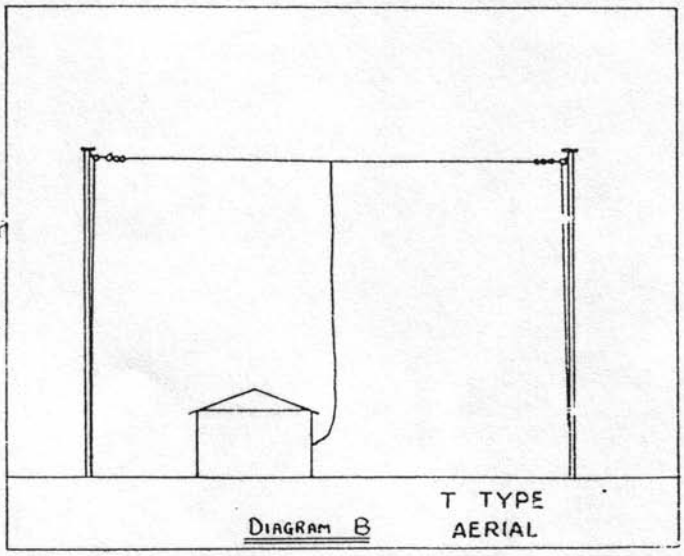


DIAGRAM B T TYPE AERIAL

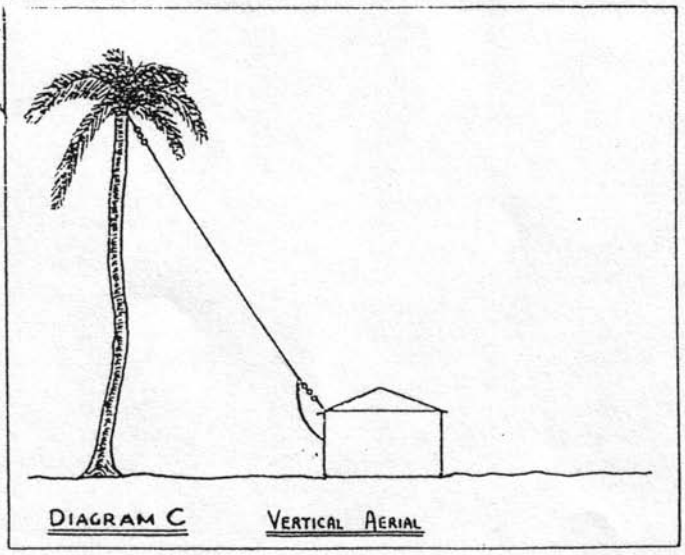


DIAGRAM C VERTICAL AERIAL

AERIAL & EARTH—contd.

house at the position where the lead to the set comes in. A properly earthed aerial and earth system is actually a safeguard during a storm.

GENERAL REMARKS.

If the aerial is sloping, the highest end should be the one which is away from the receiver. The down lead should be taken from the horizontal position immediately in front of the insulator and not from a short distance along the wire. The best method of obtaining a down lead is to continue the main aerial by securely twisting it at the insulator and so avoiding the necessity of making a soldered joint.

THE EARTH.

The earth lead should consist of insulated wire from the set to the point where the connection to earth is made. Do not use bare wire, as it may result in partial earthing to walls or pipes and so cause noises in the receiver or unstable reception and control. The earth connection should be well made to a copper earth tube or similar object buried in damp ground. It is important that the length of the earth connection is kept as short as possible. The earth lead may sometimes be omitted for short wave reception without loss of signal strength, but on the medium wavebands, if this is done, a distinct loss of volume will be found with increased selectivity and much sharper tuning. A good earth is always desirable.

NOTES ON AERIAL ERECTION.

See that the aerial does not sway unduly, on the other hand, it is not necessary to have it ultra taut.

Arrange so that it can be let down at least from one end for an occasional inspection.

When pulleys are used for hoisting and letting down, see that they are of the type in which the rope or wire cannot slip out of the pulley groove and jam.

Stranded steel wire covered, such as Electron aerial wire or Superaerial, makes good hoisting and supporting wire for the aerial proper.

Well galvanized stranded iron wire is good for guying poles and masts.

Do not fasten the aerial direct to a tree which can sway in a wind—the aerial will break unless left very loose, which is inadvisable. In this case a pulley and balance weight should be used.

BATTERY MODEL.

PUTTING THE RECEIVER INTO COMMISSION.

The first consideration is to insert the valves in the respective holders, the types used being as follows :—

1ST VALVE—		
S.G. H.F.	..	Osram VS2.
2ND VALVE—		
DETECTOR	..	Mazda HL210 or Osram HL210.
3RD VALVE—		
1ST L.F. AMPLIFIER		Mazda HL210 or Osram HL210.
4TH VALVE—		
PENTODE OUTPUT		Mullard PM22.

These valves have been specially chosen for use in the receiver and it is strongly urged that they should not be substituted. The Mullard PM22 pentode output valve should always be employed, because if this is substituted for another type, the automatic grid bias adjustment which is made to this valve may be incorrect.

The valves should be inserted in their holders BEFORE THE BATTERIES ARE CONNECTED TO THE RECEIVER. AT ANY TIME WHEN CHANGING VALVES, ALWAYS DISCONNECT THE BATTERIES FIRST. The screened grid valve is the one with the additional terminal at the top of the bulb and it is inserted horizontally through the hole in the centre metal division. A lead for connecting to the top terminal will be found suitably placed in the set. It will be found easier to connect this lead by joining to the valve terminal before actually inserting the valve in its holder. The detector valve is placed in the right hand valveholder, the first L.F. amplifier valve in the centre valveholder, and the pentode valve is fitted in the 5-pin valveholder on the extreme left. The valve pins are eccentrically placed so that each valve can only be properly inserted in the one position. Care should be taken to see that all the valve pins have actually been pushed into the sockets.

FILAMENT SUPPLY.

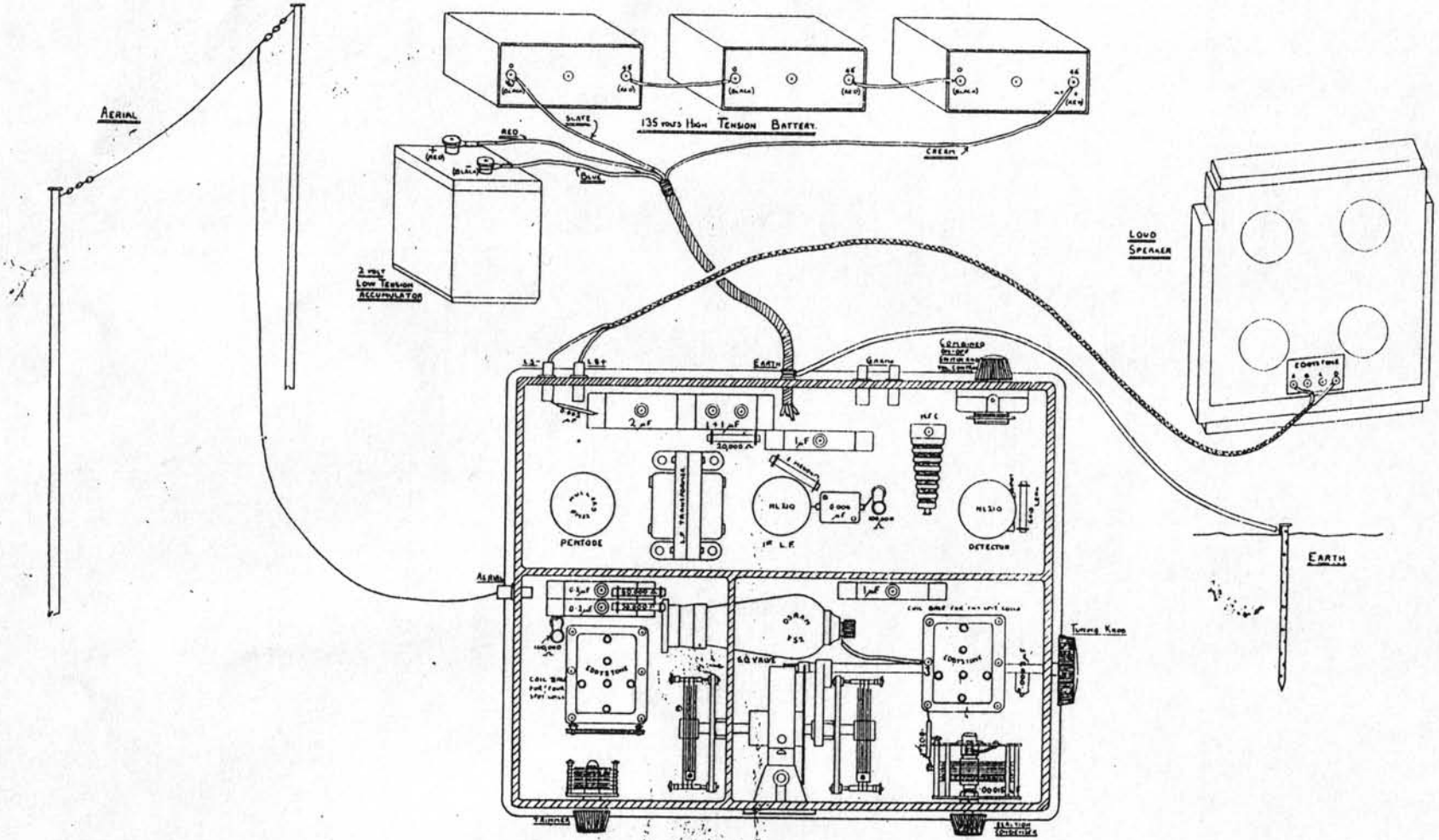
A 2 volt low tension accumulator is necessary, and since the valves are of 2 volt filament construction, no higher voltage should ever be used, otherwise their efficiency will be destroyed. The total L.T. current consumed by the four valves is .55 amps. By dividing the actual ampere hour capacity of the accumulator by this figure, the approximate number of hours use which can be obtained from the battery before recharging is necessary, can be calculated. Thus an 80 ampere hour battery will give about 145 hours' use before a recharge is needed.

If any other form of L.T. supply except a 2 volt accumulator be used and the initial voltage is more than 2 volts, a voltmeter should always be connected across the L.T. leads to the receiver so that by means of the regulator resistance, the voltage can be accurately adjusted and maintained at 2 volts exactly.

HIGH TENSION SUPPLY.

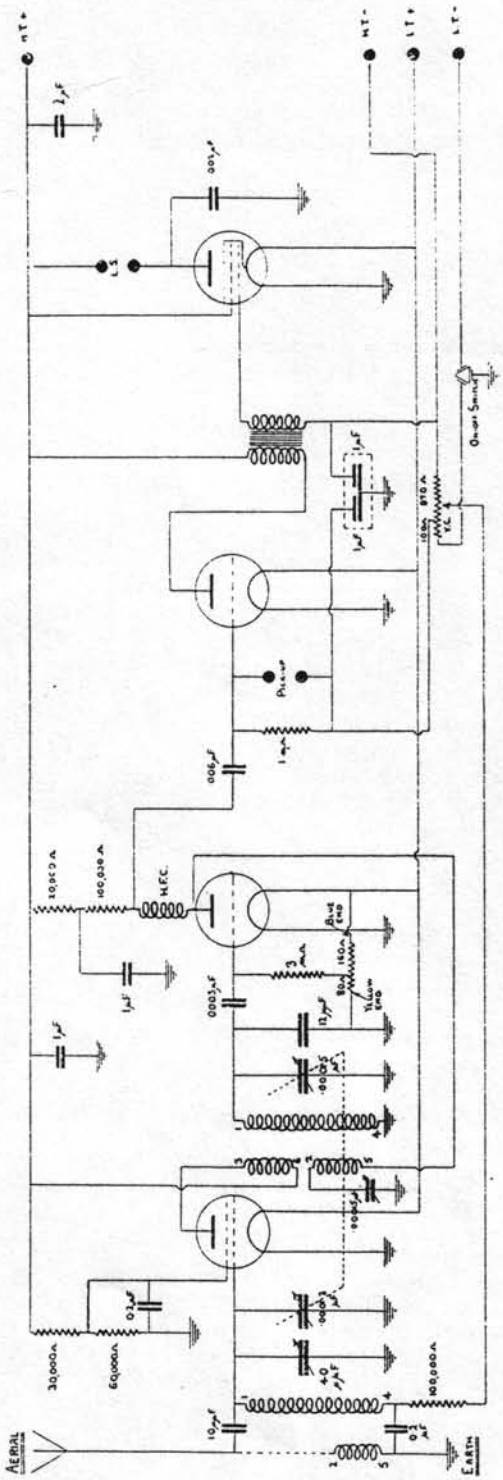
The set requires at least 135 volts high tension, but no harm can be done to the receiver if this is increased to 150 volts or to a maximum of 165 volts. The grid bias and different voltages applied to the various valves in the set are automatically adjusted whatever voltage is used. A dry battery high tension supply is necessary if no charging facilities are easily available, or if portability should have to be considered. Only dry batteries of a large capacity, designed for overseas use, should be considered and a special 135 volt " EDDYSTONE " H.T. supply unit is available. This consists of three 45 volt blocks which are joined in series as per the accompanying sketch and which are capable

EDDYSTONE ALL WAVE FOUR. BATTERY MODEL.

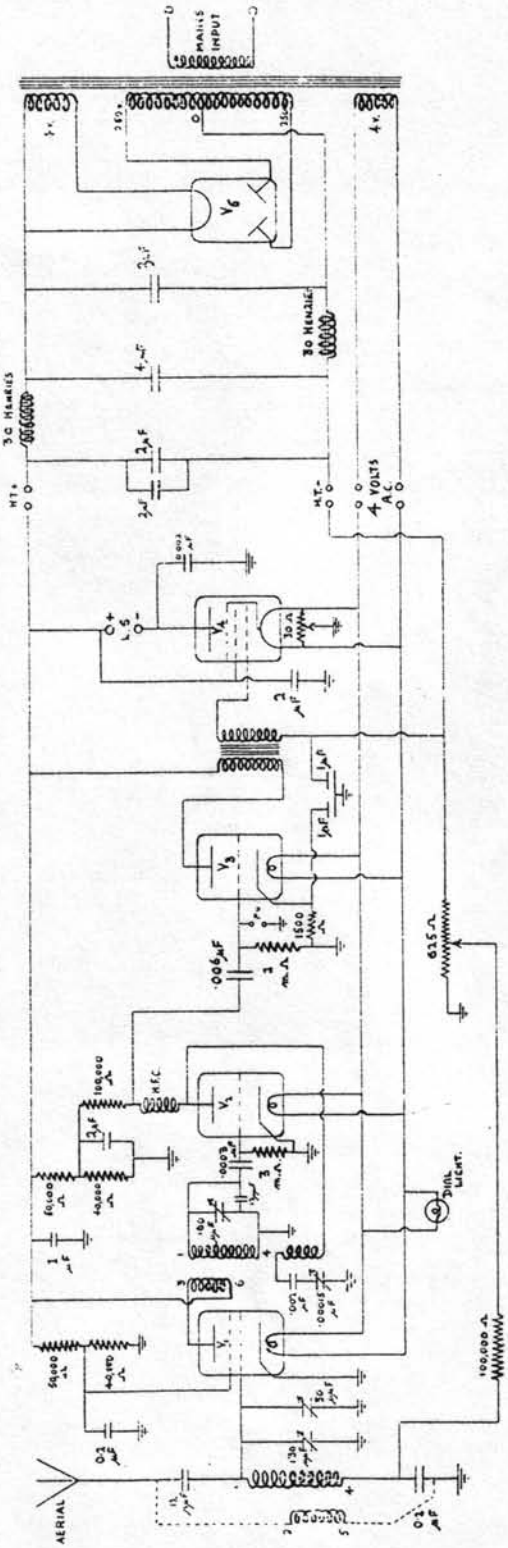


Showing general layout of Set and complete connections to aerial, earth, Eddystone dry battery H.T. supply, accumulator and Eddystone M.C. loud speaker.

THEORETICAL CIRCUIT DIAGRAMS.



BATTERY MODEL.



ALL ELECTRIC MODEL FOR A.C. MAINS.

A.C. ALL ELECTRIC MODEL.

PUTTING RECEIVER INTO COMMISSION.

The All Wave Four all electric model for A.C. mains consists of two separate units, the receiver proper and a power supply pack. Before connecting the two units together, the valves should be inserted, and these are as follows :—

1ST VALVE—		
S.G. H.F.	..	Osram VMS4.
2ND VALVE—		
DETECTOR	..	Mazda AC/HL Metallised.
Alternative		Osram MH4 Metallised.
3RD VALVE—		
L.F. AMPLIFIER		Mazda AC/HL Clear.
Alternative		Osram MH4 Clear.
4TH VALVE—		
PENTODE OUTPUT		Mullard PM24M.

Other types of valves should not be substituted unless first hand technical knowledge is available and the Mullard PM24M Output Valve should always be used, otherwise the grid bias arrangements in the receiver may be upset.

RECTIFIER VALVE.

The valve in the power supply unit is a double wave rectifier with an emission of 60 milliamps and the correct type to use is a Mullard DW2, or alternatively an Osram type U10, or Mazda type UU60/250. This valve is inserted in the valveholder in the power unit itself.

The screened grid valve is inserted in the receiver in the horizontal position through the hole in the centre metal division of the cabinet. There are five prongs on the base of this valve and it is only possible to insert it one way. The valve should be pushed well home and when this is done the additional connection to the terminal at the top of the valve should be connected, a suitable lead for this purpose will be found in the receiver. The detector valve is inserted in the valveholder on the extreme right, the first L.F. valve in the centre valveholder and the PM24M output valve in the valveholder on the extreme left.

CONNECTING UP.

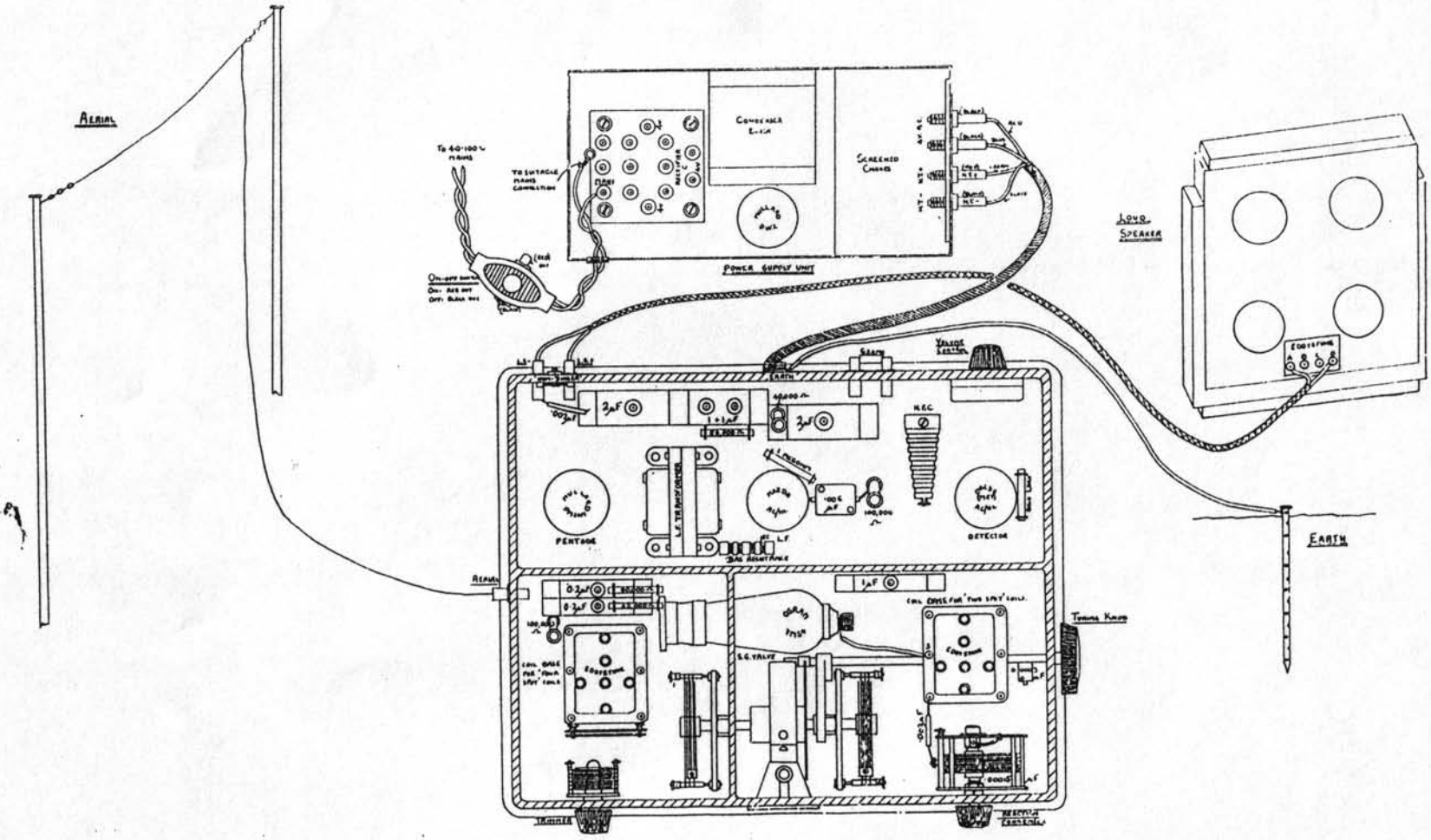
The four leads from the back of the receiver are now joined to the power supply unit. The two leads with plain black plugs are plugged in to the two sockets on the eliminator marked 4v. A.C. and it is immaterial which way these are connected. The leads with the two plugs marked H.T.— and H.T.+ are plugged into the two sockets on the power unit similarly marked. Before connecting the power supply unit to the mains, see that the unit is set to the same voltage as the supply. The voltage to which the power supply unit is set can be ascertained by removing the top of the unit, undoing the fibre cover to the mains transformer and inspecting the terminals at the top of this. A number of the terminals are marked with different voltages and if one of the mains leads is not already connected to the one for the voltage already in use, it should be transferred to the correct tapping. An on and off switch is fitted in the supply lead for operating the supply.

The aerial connection is made by means of a plug and socket which will be found on the left hand side of the receiver. The earth connection is taken direct to the earth terminal at the back of the set, and in addition an extension of the earth lead can be taken to the earth terminal on the power supply unit so that the metal case of this unit is then at earth potential. It is desirable that this connection should be made if the supply is very close in the vicinity of the receiver, otherwise an increased hum may result. On the back of the receiver also, will be found terminals marked for loud speaker and pick-up.

HUM ADJUSTMENT.

There is a small screw adjustment between the two loud speaker sockets on the back of the receiver and this should be turned slightly either way until hum is reduced to a minimum. When this is once set, no further adjustment should be necessary.

EDDYSTONE ALL WAVE FOUR. ALL ELECTRIC MODEL.



Showing general layout of Receiver and complete connections to aerial, earth, power supply unit and Eddystone M.C. loud speaker.

BATTERY AND ALL ELECTRIC MODELS.

OPERATING THE RECEIVERS.

With the exception of the arrangement for switching on the receivers, the control and operation of both the battery model and the all electric model are identical. On the battery model, the set is switched on by turning the volume control knob at the back in a clockwise direction, and the all electric model by pressing the black knob on the bakelite switch incorporated in the power unit cable. When the red knob is projecting, the set is alive. On the electric receiver, however, it requires a short space of time before the set will work properly, due to the fact that the heaters of the valves must warm up.

COILS AND WAVE-RANGE.

The correct pair of coils, which include in their wavelength range the station to be received, should be plugged into the coil bases in the receiver. The coils marked with 4 spots fit in the left hand coil base and those with 2 spots in the one on the right. No harm is done to the receiver if the coils are reversed but no signals will be received.

Interchangeable coils are used in the All Wave 4 Receiver, giving complete flexibility of wave-range and also freedom from trouble due to poor coil switch contacts, often a source of much trouble in receivers used in tropical climates.

The standard equipment with the receiver includes four pairs of coils, as follows :—

1 Pair Blue Spot Coils Nos. 4LB and 2LB. Wave-range 12.5/27 metres.

1 Pair Yellow Spot Coils Nos. 4Y and 2Y. Wave-range 26/49 metres.

1 Pair Red Spot Coils Nos. 4R and 2R. Wave-range 45/86 metres.

1 Pair Green Spot Coils Nos. 4G and 2G. Wave-range 250/520 metres.

The approximate condenser settings for any given wavelength for the various coils can be obtained by reference to the graphs at the end of the book.

These coils cover all wavelengths normally in use overseas. Extra coils as listed below are obtainable for additional wavelengths, but it should be remembered that they are only really useful with the receiver when stations using these in-between wavelengths are near at hand.

Nos. 2W and 4W ..	80/170 metres
Nos. 2P and 4P ..	160/270 metres
Nos. 2BR and 4BR	490/1000 metres
Nos. 2GY and 4GY	900/1900 metres

TUNING IN STATIONS.

The volume control knob at the back of the receiver should first be turned fully on in a clockwise direction for maximum volume. The tuning of the receiver is effected by the main tuning knob on the right hand side of the set and this should be turned slowly, since tuning on the short wavelengths is much more delicate than on an ordinary broadcast receiver. In conjunction with this main tuning dial, there is also a small balancing condenser which is placed on the left hand side of the front panel. This control, which is used to bring the two ganged condensers exactly into step, will require adjustment as the tuning range of the set is altered. The correct adjustment for maximum efficiency will be found more easily by working this knob in conjunction with the reaction control. Actually, when this balancing condenser is adjusted correctly, a minimum amount of reaction will be found necessary to make the receiver oscillate.

The right hand control, which is the reaction regulator, is of vital importance in the operation of a short wave receiver. When searching for a station, it should be slowly increased until the set *just begins* to oscillate. This will be observed by a rushing sound in the loud speaker. The balancing condenser should then be adjusted so that the set is still maintained in an oscillating condition as above mentioned with a minimum of reaction.

BATTERY AND ALL ELECTRIC MODELS.

OPERATING THE RECEIVERS—continued.

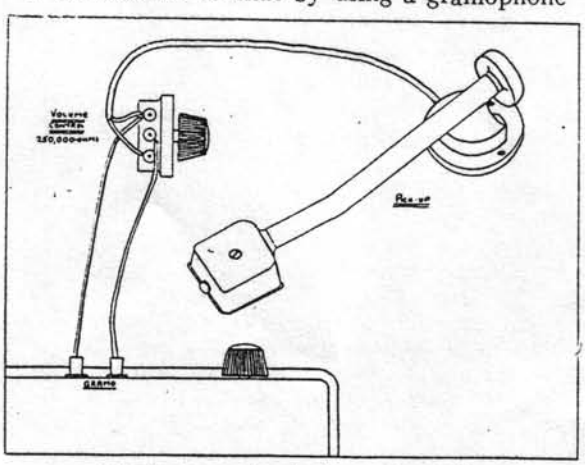
The set should always be kept *just* oscillating by means of the reaction control until signals are heard. All telephony signals will at first appear only as high pitched whistling notes very similar to C.W. morse signals except that when tuning slowly, it will be found to be double peaked with a silent point in the centre instead of a constant note as with morse transmission. To receive the telephony signals clearly, the reaction control should be decreased so that the receiver is just off the oscillating point and then the final tuning is adjusted and the signal should be heard clearly.

VOLUME CONTROL ADJUSTMENT.

The adjustment of volume when using the set for radio reception, is obtained by means of a variable potentiometer which gives a variation of 0-15 volts negative bias to the grid of the vari-mu screened grid valve. Maximum volume will be obtained with only a small amount of applied bias, say about 1 volt negative. The application of more negative bias to this valve has, however, another effect apart from volume control, which is that as the bias is increased, so is the selectivity improved. Therefore, when selectivity is required, the volume should be reduced to about a quarter strength by means of this control and the lack of volume then made up by increase of the reaction adjustment. When receiving weak or distant signals, only slight adjustment is possible to the volume control but on powerful signals, the complete variation is possible.

GRAMOPHONE PICKUP.

Two terminals are provided on the back of the receiver so that by using a gramophone pickup, records can be amplified in the set and reproduced on the loud speaker. Only the two final amplifying valves are used for this purpose. The leads from the pickup are connected to these terminals and unless the pickup already incorporates a volume control in its design, an additional variable volume control of 0-250,000 ohms resistance should be connected across the pickup or the pickup terminals. This arrangement is shown in the accompanying sketch. When using the receiver with the pickup, the reaction condenser should be set at zero. The pickup leads and the loud speaker leads should be kept apart from each other, otherwise distortion may occur.



Showing connections for Gramophone Pickup.

DIAL LIGHT.

On the battery receiver, a special low consumption fusebulb type lamp is used, taking 60 m/amps at 2 volts, to prevent excessive drain from the accumulator. On the A.C. all electric set, an Osram 6 volt .3 amp. 15 m/m clear flashlamp bulb is used.

LOUD SPEAKER.

The loud speaker should be as sensitive as possible so that weak signals are reproduced. The permanent magnet moving coil type is quite suitable providing that it is designed with a high flux density and powerful magnet system. If for use in the tropics, it should, of course, be constructed from suitable materials. Since the output valves in both the battery and electric models are pentodes with a comparatively high impedance, a step-down transformer of considerable ratio should be incorporated in the speaker. For best results, a ratio of from 50-1 to 70-1 should be used. The Eddystone P.M. Speaker has the qualifications set out above and is designed to work with the All Wave Four. Alternatively, a sensitive cone type of speaker about 1,500 ohms resistance may be employed with usually a slight gain in volume and loss of quality, but speakers of special construction such as the electrostatic type are not recommended. For obvious reasons, no output transformer or output choke is fitted in either receiver, a point which should be borne in mind, if headphones or long loud speaker extensions are used, and in this case it is advisable that one of these arrangements should be fitted externally. Any speaker with an output transformer can be connected either way round to the output terminals of the set without injury.

SERVICING RECEIVER.

NOISES, CRACKLING, ETC.

First disconnect the aerial and earth leads from the receiver, *turning reaction control to minimum*, and if the trouble disappears, the fault can be looked for outside the set. It may be that the noise is electrical interference coming from some external source such as a motor, electric fan, electric sign, or it may be bad atmospherical static. In the former case, it is sometimes possible to effect a remedy by tracing the source of the trouble and then getting permission to add apparatus to reduce it.

Severe noises can be caused by the aerial and earth system itself. Check this over for loose joints, frayed or broken strands of wire, shake all wires to make sure that there is no intermittent break in the conductor. All contacts should be clean and well made and no intermittent contacts with buildings or trees should occur. It is worth remembering that when listening on the short waves, the ignition system of passing cars can often be picked up strongly. Check the earth lead and see that this is not responsible for noise. It is advisable to use insulated wire for this and see that a really good short earth return is obtained.

If the noises persist when the aerial and earth are removed, the trouble lies in the instrument, batteries, or associated wiring. See that the terminals on the accumulators and the connectors are clean and free from corrosion—dirt here is a prevalent cause of trouble. Similarly, the H.T. connections. The H.T. battery or unit may be noisy, this can be checked by putting a pair of 'phones across sections of 20v. of it when, if in good silent working order, after the initial click at contact, nothing more will be heard. Do not hold the telephone tags when making this test and test the battery in sections.

Shake every flexible lead to ensure no intermittent connection exists. Examine points where spade terminals, plugs, etc., join leads. Check 'phone or loud speaker cords. All the external causes of noise having been eliminated, we come to the receiver itself. Occasionally a valve may be noisy in operation, this can best be checked by substitution. Clean all coil and valve pins and with the aid of a knife blade, open out all pin leaves so that they make more positive contact with their sockets. Care should be taken not to damage any wire in the pins when opening these out.

Make sure that no loose connections or broken joints exist in the receiver wiring. Loose metal parts, such as screws, nuts or terminals even if not connected will cause noise. Any components which have their earth returns made by being bolted or fastened to the metal cabinet should always be well tightened up and care taken to see that the two bearing surfaces are clean.

The component parts of the set now come under examination, and in order to locate which part of the receiver is causing the noise, remove the valves one at a time, commencing at the H.F. or detector end. If the noise ceases when the H.F. valve is pulled out, the trouble obviously lies in the parts associated with it ; if the noise persists, obviously the trouble is in the detector or L.F. stages. Having located the portion of the circuit which is noisy, it remains to test the components likely to be at fault. A simple method is to use a pair of headphones in series with a small dry battery—a flashlamp battery is suitable, one tag of the 'phones and one lead from the battery forming the two testing ends.

All components which have continuity to a direct current, such as transformers, H.F. chokes, coils, resistances, grid leaks, should show that continuity is intact by a distinct click when test connections are made. If no click is heard, they have broken down completely ; if crackling is heard, the part is faulty and should be replaced. This click at contact will, of course, vary according to the resistance of the circuit and will be very much smaller in the case of a grid leak than a transformer winding. Fixed condensers can be tested with the same arrangement. In the case of small value condensers, no noise will be noticed at contact but if they have short circuited or broken down in insulation, a definite click or crackling noise will be heard. By-pass condensers of larger capacity will

SERVICING RECEIVER—contd.

show the same symptoms if faulty and though a click will appear at first contact, once they are charged to the same potential as the battery, no further click should be heard, if the testing ends are taken off and then applied again. If the 'phone tags only are applied to the condenser some time after, and the insulation of the condenser is perfect, the noise of the condenser discharging itself should be heard.

Test variable condensers to make sure vanes are not touching at any one point, this may account for the set not oscillating with a certain condenser setting. Clean out dust from between condenser vanes with a pipe cleaner.

NO SIGNALS.

Check over all leads and connections, making sure that there are no breaks or loose joints and in the case of the battery model, make sure that the batteries are in order. In the case of the all electric set, ascertain that the mains supply plug is alive and also that the flex lead is intact. The cause of the trouble may be due to a faulty valve or valves and, of course, any broken down component would be responsible for the set not working. The most likely cause of the trouble as far as components are concerned, would be the high frequency choke or the transformer, and these should be tested first. The volume control potentiometer, which is also responsible for the grid bias adjustments to the two last valves as well as the variable bias on the screened grid valve, should also be tested for continuity. Check over the loud speaker leads and the loud speaker itself.

INDIFFERENT RESULTS.

The trimming condenser on the left of the set is adjusted correctly for use with all normal aerials. It is possible, however, that if a very long aerial or very badly damped aerial is used, correct trimming may not be possible and the aerial should be adjusted and arranged more efficiently.

If the emission of any one of the valves falls below normal, the performance of the whole set will be affected and this should be checked by substitution or having the valves tested. If the wrong valves are substituted, the results may be seriously affected. All connections on the valve pins, coil pins, valve-holder and coil base sockets, should be cleaned and if necessary the pins opened out. Dirt or corrosion on these contacts will cause indifferent results. In the case of the battery receiver, check the L.T. and H.T. batteries, or source of H.T. supply, as these may be down in voltage, or in the case of the all electric set, the rectifying valve may be losing its emission and the incoming line voltage should be checked.

DIAL DRIVE ADJUSTMENT.

The dial drive should cause very little trouble, but if slip takes place, the large driving disc should be carefully wiped to remove any grease and a small spot of oil fed on to the two fibre bearings of the driving rod. More tension can be put on the two small driving wheels which grip the sides of the large disc, and to do this, the grub screw in the round collar should be loosened, the collar screwed up further to put more tension on the spring and the screw re-tightened.

GENERAL NOTES.

Do not disconnect loud speaker with set switched on.

Do not forget to switch set completely off when not in use. If left on, H.T. batteries will be seriously drained.

It is preferable to switch set off when changing coils.

Never leave L.T. accumulator standing for long periods when fully discharged.

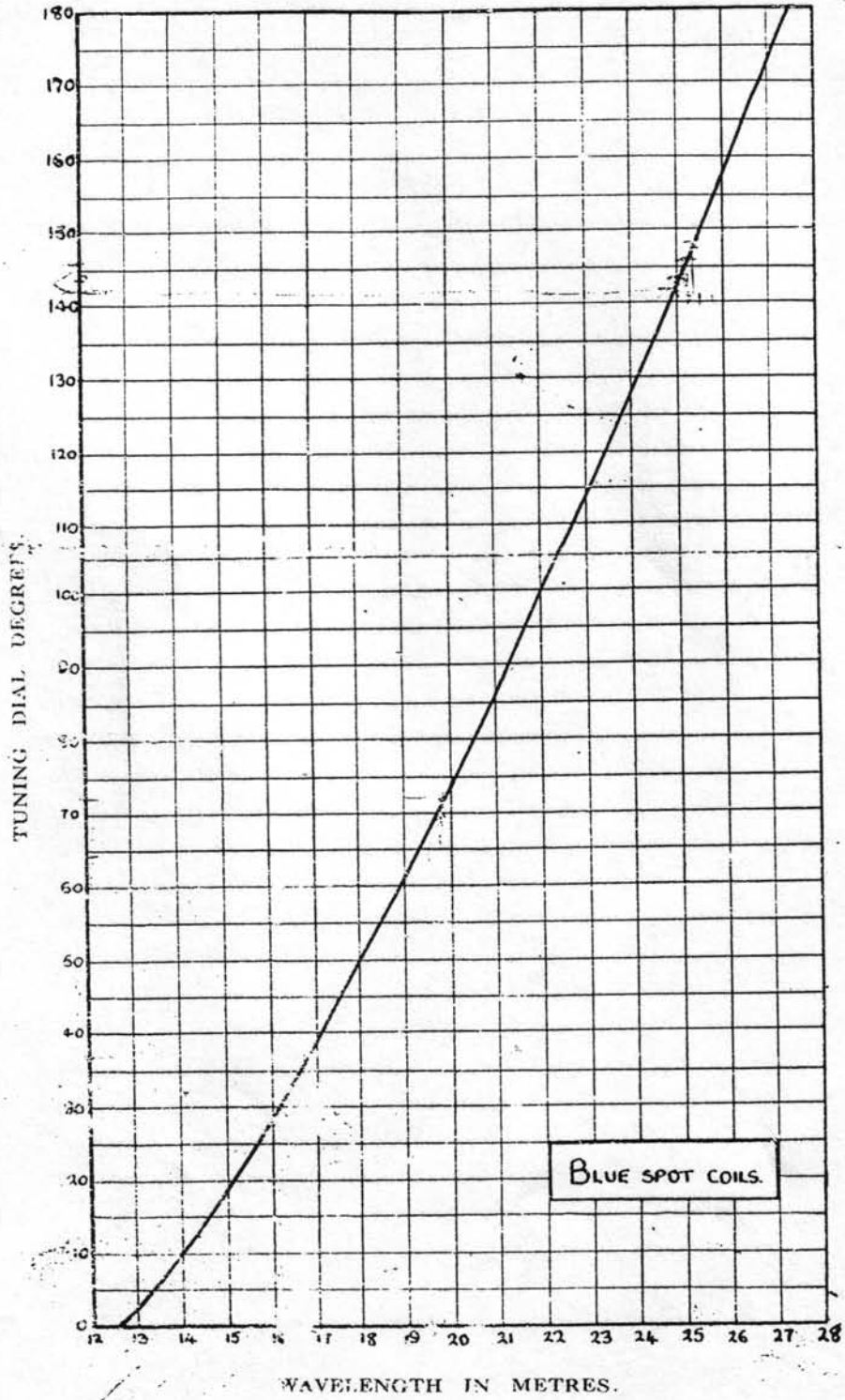
If set is out of use for long periods, keep in dry place and disconnect batteries.

Keep aerial lead-in, pickup and loud speaker leads well apart.

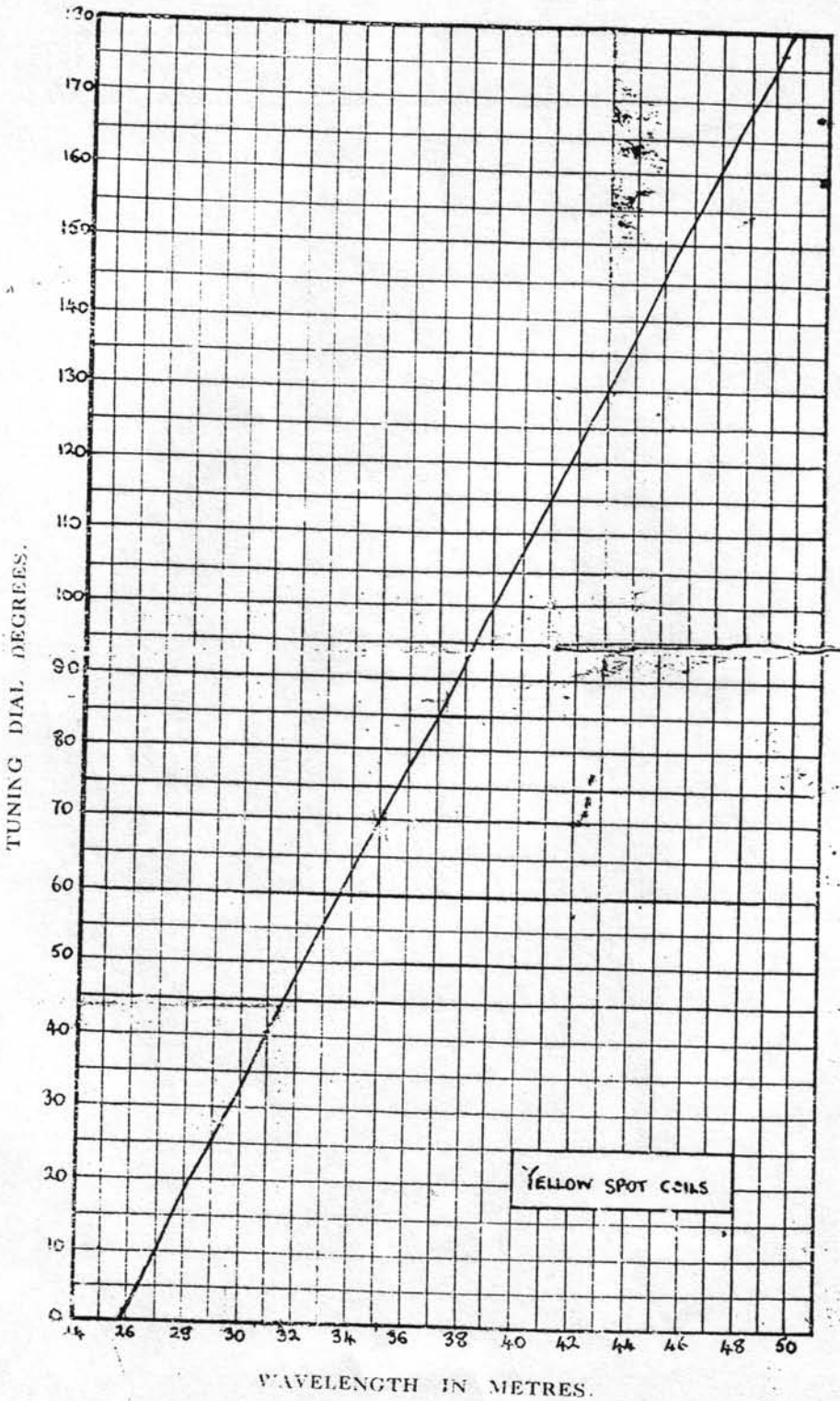
The loud speaker should not be placed so that the sound waves are directed on the receiver.

COIL CHART No. 1.

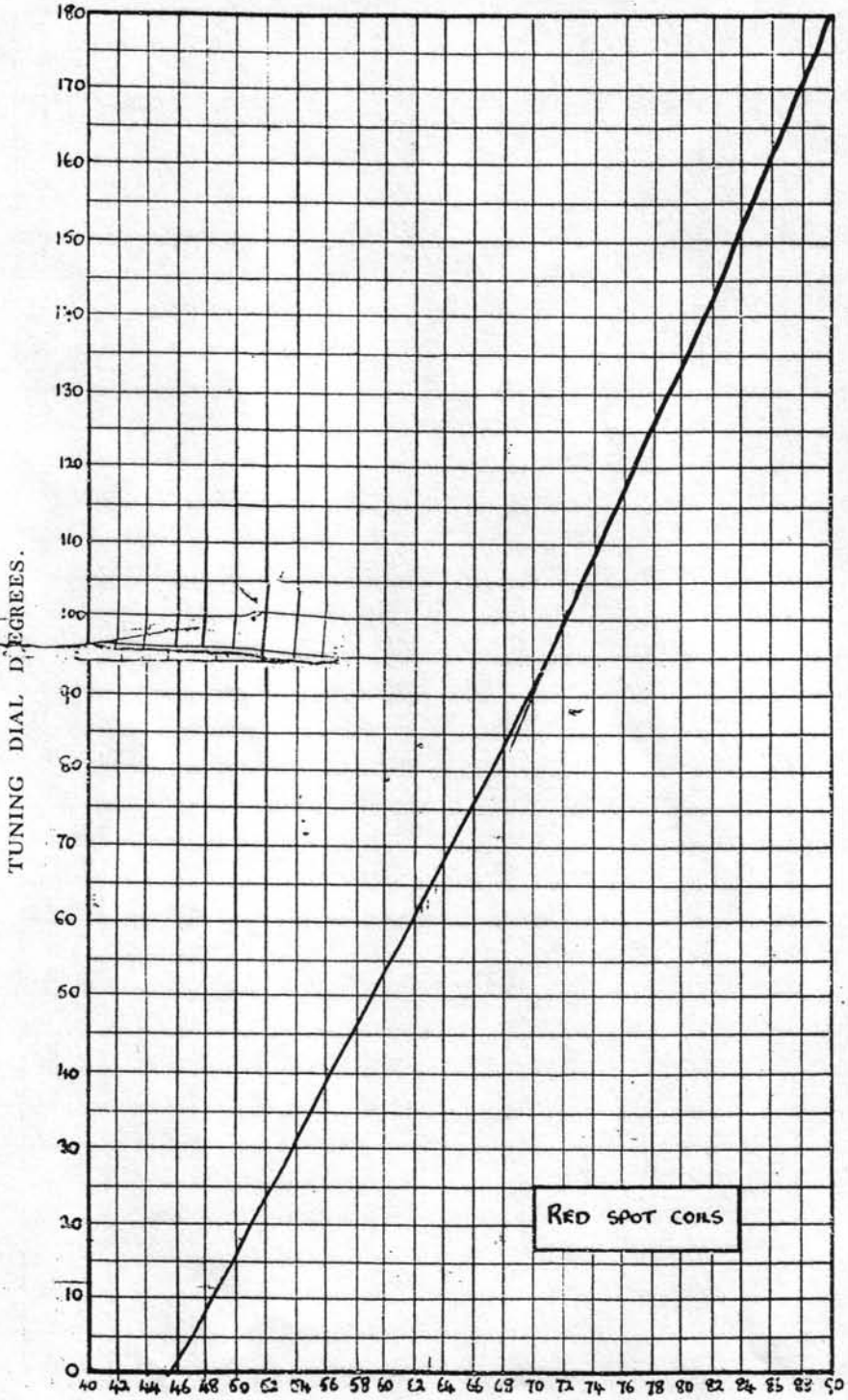
These graphs have been carefully hand calibrated for this receiver and set of coils. Since, however, slight alterations due to valves, H.T. voltage or the aerial in use, may affect their accuracy, they are given for the purpose of useful approximate settings to assist in tuning and station finding.



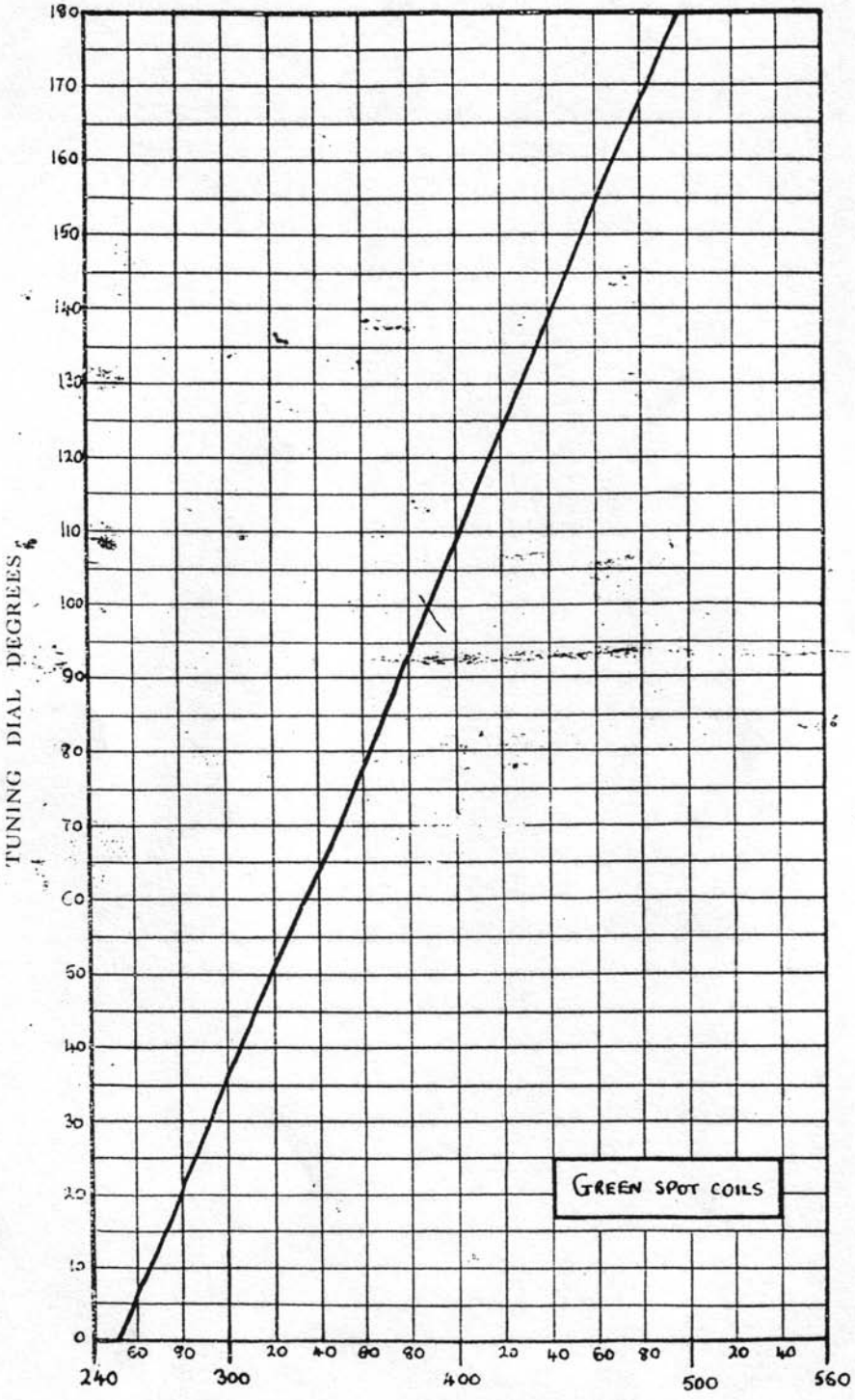
COIL CHART No. 2.



COIL CHART No. 3.



COIL CHART No. 4.



LOG CHART.

Station	Call Letters	Wavelength	Dial Reading	Remarks

INSTRUMENT TEST REPORT.

TYPE 1933 BATTERY MODEL.

SET NO. B158833

LICENSE PLATE NO. SE 9308

POWER UNIT NO.

AERIAL TEST BY

MECHANICAL INSPECTION BY

COMPLETE FINAL CHECK BY

SPARE SET OF VALVES TESTED BY

TOTAL VALVE EMISSION 15·5 M.AMPS. AT 150 VOLTS.

IMPORTANT.

In all communications relative to this receiver, please quote the set number given above.

The enclosed postcard, if filled in by the purchaser and returned to us, will be filed in our records so that any later publication or information relative to the set issued at a later date can be sent on.

Criticisms, suggestions or reports on the performance of the ALL WAVE FOUR RECEIVER are always welcomed by the manufacturers.

Sole Manufacturers :

STRATTON & CO., LTD.,

Eddystone Works,
Bromsgrove Street,
BIRMINGHAM.

Telegrams :

"STRATNOID, BIRMINGHAM."