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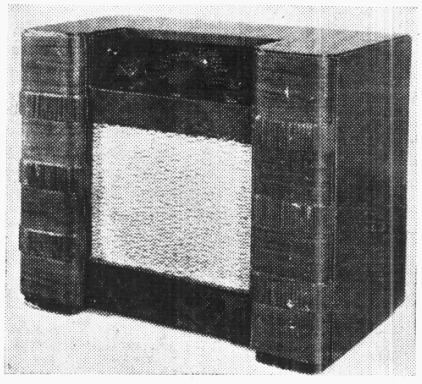
"TRADER" SERVICE SHEET

525

PYE 825

AC/DC TRANSPORTABLE



The appearance of the Pye model 825 AC/DC transportable receiver.

PROVISION is made for connection of an external aerial and an earth lead in the Pye model 825, which is a 3-valve (plus rectifier) 2-band TRF AC/DC mains portable receiver, designed to operate from mains of 200-250 V, 25-100 C/S in the case of AC.

A special sensitivity device, used in conjunction with the reaction control and the directional properties of the frame aerials, enables a distant transmission to be received in the service area of a local station. External speaker sockets are provided, with internal speaker muting, and safety fuses are included in the mains lead.

Release date: June, 1938.

CIRCUIT DESCRIPTION

Tuned frame aerial input **L1, C20** (MW) or **L2, C20** (LW) to variable-mu RF pentode valve **(V1, Mullard metallised SP13C),** which operates as signal frequency amplifier. Gain control by **R11,** which varies the bias potential applied to **V1** CG via **R10.**

Provision is made for the connection of an external aerial, if required, via the small series condenser **C4.** An earth socket is also provided, and it is isolated from the mains by the series condenser **C1.**

Tuned-anode coupling by **L5** (MW) plus **L6** (LW), tuned by **C23,** between **V1** and a second RF pentode valve **(V2, Mullard metallised SP13C),** which operates as detector on the grid leak system with **C8** and **R4.** Reaction from anode by coils **L3, L4,** controlled by the variable condenser **C22.**

C22 and **R11** are ganged, and as the volume control spindle is advanced from minimum, the negative potential applied to **V1** control grid is gradually reduced until the control has travelled half of its course, when GB is at minimum, and further travel produces no change in the grid bias applied to **V1,** although the reaction condenser capacity continues to increase.

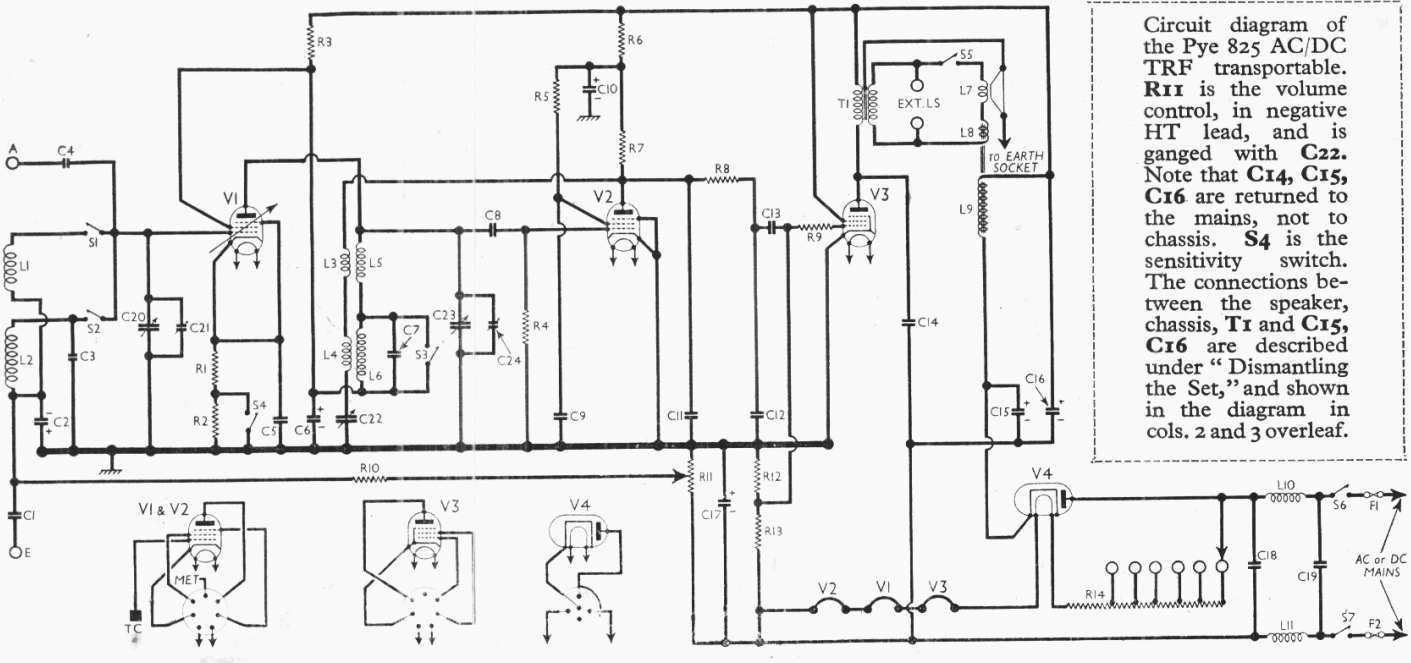
Advantage is taken of the natural increase in selectivity, which accompanies an increased application of reaction, to overcome the difficulty of interference by a local transmission when it is desired to receive a distant one. The normal fixed GB potential for **V1** is obtained from the drop along **R1** in **V1** cathode circuit, the second resistance **R2** being short-circuited by the sensitivity switch **S4,** which is closed in the "Sens." position.

When **S4** is opened, the fixed GB applied to **V1** is increased, and the receiver becomes comparatively insensitive. If the reaction control is then advanced to increase the sensitivity, the characteristic selectivity accompanying the increased application of reaction will in most cases effect the required separation.

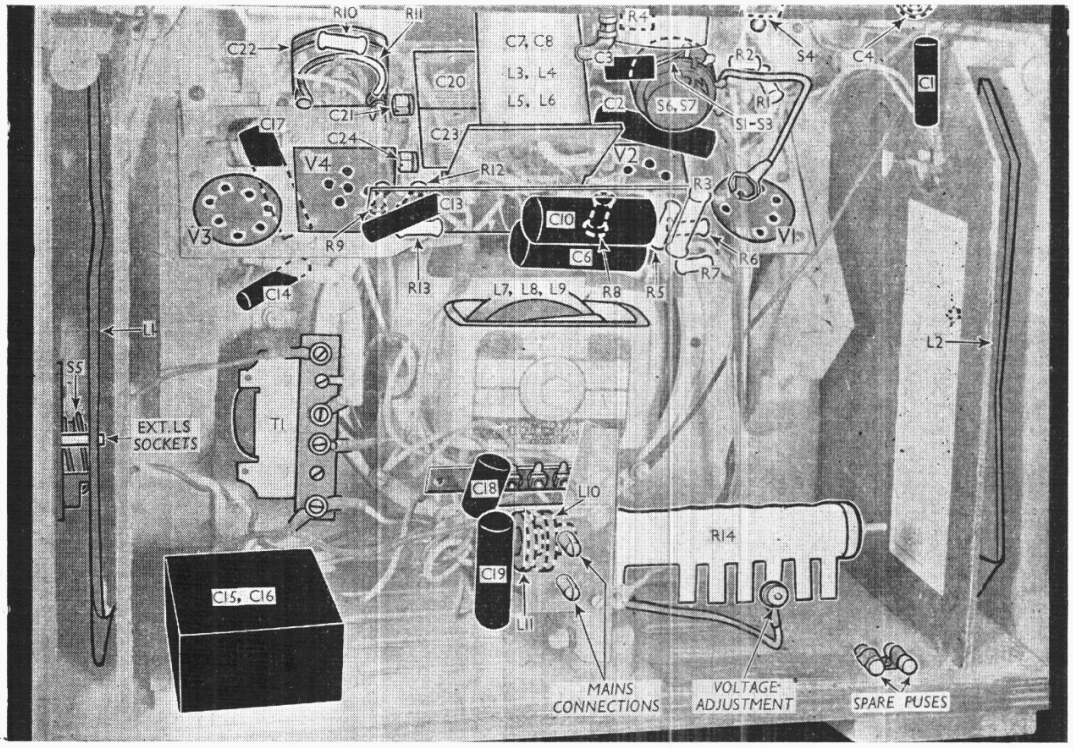
Resistance-capacity coupling by **R7, C13** and **R12, R13,** via the RF filter circuit **C11, R8, C12** and grid stopper **R9,** between **V2** and pentode output valve **(V3, Mullard Pen36C).** Fixed tone correction by **C14** in anode circuit. Provision is made for the connection of a low impedance external speaker, or low impedance headphones, across the secondary winding of the output transformer **T1,** while the switch **S5,** which is associated with the external speaker sockets, permits the internal speaker to be muted if desired. If the external speaker plugs are pushed in about half-way, both speakers operate; if the plugs are pushed fully home, **S5** opens automatically and breaks the internal speaker speech coil circuit.

The metal frames of the speaker and output transformer are connected directly to the earth socket, on the earthy side of **C1,** and are, therefore, isolated from the mains.

When the receiver is used with AC mains, HT current is supplied by a half-wave rectifying valve **(V4, Mullard UR1C),** which, with DC mains, behaves as a low resistance. Smoothing is effected



Circuit diagram of the Pye 825 AC/DC TRF transportable. **R11** is the volume control, in negative HT lead, and is ganged with **C22.** Note that **C14, C15, C16** are returned to the mains, not to chassis. **S4** is the sensitivity switch. The connections between the speaker, chassis, **T1** and **C15, C16** are described under "Dismantling the Set," and shown in the diagram in cols. 2 and 3 overleaf.



Rear view of the complete receiver, assembled in the cabinet. The main chassis can be seen above, the speaker in the centre, **T1** left-centre with **C15, C16** beneath it, and the mains input unit in the foreground. The external speaker sockets and **S5** are indicated on the left. **S4** is dotted through the top of the cabinet, as is also **C4**. The **A** and **E** sockets are near **C4**. The connections to **T1** and the speaker are shown in the diagram in cols. 2 and 3 overleaf.

by the speaker field **L9** and dry electrolytic condensers **C15, C16.**

The volume control **R11** is interposed between chassis and HT negative so that the flow of HT current produces a potential drop across it for bias purposes. **V3** CG resistances **R12, R13** are connected in series across **R11,** so that half of the potential appearing across **R11** is applied as GB to **V3** control grid.

It should be noted that the common negative of **C15, C16** and the earthy side of **C14** are returned to the "HT negative" side of the mains, and not to chassis.

Valve heaters, together with ballast resistance **R14,** are connected in series across the mains input. A filter circuit comprising air-cored chokes **L10, L11** and condensers **C18, C19** suppresses mains-borne interference, while fuses **F1, F2** (which are located in the mains lead) afford protection to the mains circuit against accidental short-circuit.

COMPONENTS AND VALUES

	RESISTANCES	Values (ohms)
R1	V1 fixed GB resistances...	1,000
R2	V1 fixed GB resistances...	50,000
R3	V1 SG and anode HT feed resistance	5,000
R4	V2 grid leak	510,000
R5	V2 SG HT feed	260,000
R6	V2 SG and anode decoupling	20,000
R7	V2 anode load resistance	110,000
R8	RF stopper	110,000
R9	V3 grid stopper	50,000
R10	V1 CG decoupling ...	10,000
R11	Volume control, ganged C22	250
R12	V3 CG resistances ...	1,100,000
R13	V3 CG resistances ...	1,100,000
R14	Heater circuit ballast ...	840*

* Tapped at 590 O + 50 O + 50 O + 50 O + 50 O + 50 O from V4 heater.

	CONDENSERS	Values (μF)
C1	Earth isolating condenser	0·005
C2*	V1 CG decoupling ...	10·0
C3	LW frame aerial trimmer	0·000035
C4	External aerial series ...	0·000005
C5	V1 cathode by-pass ...	0·1
C6*	V1 SG and anode decoupling	2·0
C7	V1 anode LW trimmer ...	0·000025
C8	V2 CG condenser ...	0·0001
C9	V2 SG decoupling ...	0·1
C10*	V2 anode decoupling ...	2·0
C11	RF by-pass condensers ...	0·0002
C12	RF by-pass condensers ...	0·001
C13	V2 to V3 AF coupling ...	0·01
C14	Fixed tone corrector ...	0·003
C15*	HT smoothing condensers	8·0
C16*	HT smoothing condensers	16·0
C17*	Auto GB by-pass ...	10·0
C18	Mains RF filter condensers	0·1
C19	Mains RF filter condensers	0·1
C20†	Frame aerial tuning ...	—
C21‡	Frame aerial MW trimmer	—
C22†	Reaction control	—
C23†	V1 anode circuit tuning ...	—
C24‡	V1 anode MW trimmer ...	—

* Electrolytic. † Variable. ‡ Pre-set.

	OTHER COMPONENTS	Approx. Values (ohms)
L1	Frame aerial windings ...	0·8
L2	Frame aerial windings ...	21·0
L3	Reaction coils, total ...	4·0
L4	Reaction coils, total ...	
L5	V1 anode MW tuning coil	3·0
L6	V1 anode LW tuning coil	12·0
L7	Speaker speech coil ...	2·0
L8	Hum neutralising coil ...	0·15
L9	Speaker field coil... ...	1,000·0
L10	Mains RF filter coils ...	2·0
L11	Mains RF filter coils ...	2·0
T1	Output trans. Pri. ...	450·0
	Output trans. Sec. ...	0·3
F1, F2	Mains circuit fuses ...	—
S1-S3	Waveband switches ...	—
S4	Sensitivity switch ...	—
S5	Speaker muting switch ...	—
S6, S7	Mains switches	—

VALVE ANALYSIS

Valve voltages and currents given in the table below are those to be expected in an average receiver when operating on AC mains of 250 V, using the 250 V tapping on the mains resistance.

The receiver should be switched to MW, and the volume control should be midway between the minimum and maximum settings, but the MW frame should be short-circuited, so that there is no signal input.

Voltages were measured with a meter having a resistance of 1,000 ohms per volt, chassis being negative.

Since voltage measurements will usually be made with the chassis in the cabinet, and the underside of the chassis is then inaccessible, it should be borne in mind if the valve base diagrams beneath the circuit diagram are used, that the bases are drawn as seen when viewed from the free ends of the pins.

Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 SP13C	186	1·7	186	0·6
V2 SP13C	39	1·0	48	0·4
V3 Pen36C	177	48·5	200	8·3
V4 UR1C	270†	—	—	—

† Cathode to chassis, DC.

DISMANTLING THE SET

Removing Chassis.—Remove the three control knobs (pull-off), and withdraw the valves from their sockets;
disconnect from the mains input unit the black lead from the electrolytic condenser block which lies on the floor of the cabinet;
remove the mains input unit (two nuts and bolts, with lock-washers), from the wooden block on which it is mounted on the floor of the cabinet;

disconnect from the connecting panel on the speaker the seven leads held by screw terminals;

disconnect from the connecting panel on the output transformer the thick yellow sleeved lead coming from beneath the chassis;

free the bunched leads from the mains input unit from the two cleats holding them to the floor of the cabinet beneath the speaker;

free the yellow electrolytic lead from the bunched leads by removing the adhesive tape holding it;

remove the small round-head wood screw holding the tag of **R2** to the top right-hand corner of the cabinet;

remove the round-head wood screw holding the sensitivity switch clip to the top right-hand corner of the cabinet;

remove the two long round-head wood screws holding the clamps at the upper edge of the chassis to the front of the cabinet;

remove the two round-head wood screws (with metal washers, rubber grommets and brass bushes) holding the lower edge of the chassis to the wooden blocks supporting it;

disconnect from the two frame aerial connecting panels the two leads to each;

disconnect from the screw terminal on the **A** and **E** socket panel on the right-hand side of the cabinet the green lead from chassis.

The chassis can now be removed by drawing it to the right, so that the metal screen above **V4** holder slides from behind the asbestos shield.

When replacing, reference may be made to the diagram in cols. 2 and 3, but the connections to each of the affected components are described below. Do not forget to slip the frame aerial leads under the small cleats provided for them in the top corners at the front of the cabinet.

Connect the speaker leads before replacing the mains input unit.

Frame Aerial Connections.—Connect the yellow frame lead to the front terminal on the right-hand frame connecting panel, and the mauve one from the same end of the chassis, together with the tag of **C1**, to the rear one;

connect the white frame lead to the rear terminal on the left-hand frame panel, and the mauve one to the front terminal.

Output Transformer Connections.—Numbering the terminals on the connecting panel from top to bottom, the lead colours are as follows:

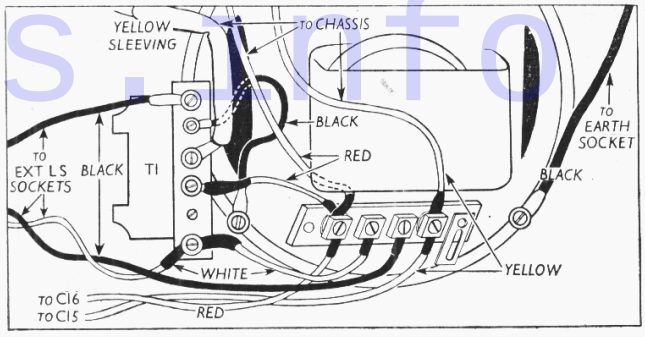


Diagram showing the connections to the speaker and **T1**. The connections are described under "Dismantling the Set." The diagram is drawn exactly as seen in the rear view of the receiver overleaf.

1, black to upper end of Ext. LS switch, on left of the cabinet;
2, black to fixing screw on speaker frame;
3, thick yellow sleeved lead from beneath chassis;
4, red from left-hand terminal on speaker connecting panel;
5, no connection;
6, two white leads; one from the plain Ext. LS socket, and one from the second terminal from the left on the speaker connecting panel.

Speaker Connections.—Numbering the terminals on the connecting panel from left to right, the leads are as follows:

1, three red leads; one from the output transformer, one from chassis, and one from the electrolytic block;
2, white lead from the output transformer;
3, black lead from the lower end of the Ext. LS switch;
4, two yellow leads; one from chassis, and one from the electrolytic condenser block.

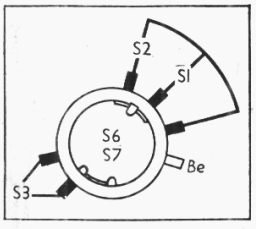


Diagram of the waveband and mains switches, drawn as seen from the rear.

Electrolytic Block Connections.—Black to metal bracket supporting the mains input unit;

red to left-hand terminal on the speaker connecting panel;

yellow to right-hand terminal on the speaker connecting panel.

Removing Speaker.—First remove the chassis as previously described; then remove the three fixing screws (with lock-washers) holding the speaker to the sub-baffle.

When replacing, slip the top of the speaker frame under the fibre insulating strip, with the connecting panel at the bottom;

fit the tags of the two black leads, one from the output transformer and one from the earth socket, under the two lower fixing screws.

The rest of the procedure is as described for replacing the chassis.

GENERAL NOTES

Switches.—**S1-S3** are the waveband switches, in a single rotary unit on the chassis deck. The unit is indicated in our rear view of the receiver, and its connecting tag positions are shown in the diagram in col. 2, where it is drawn as seen when viewed from the rear of the chassis. **S1** and **S3** close on MW, while **S2** is open; on LW, **S2** closes, and **S1** and **S3** are open.

S6, S7 are the QMB mains switches. They are contained in a circular moulded case which is fitted concentrically over the rear of the **S1-S3** unit, and are ganged with its control spindle. Their position is indicated in our rear view and the **S1-S3** diagram in col. 2.

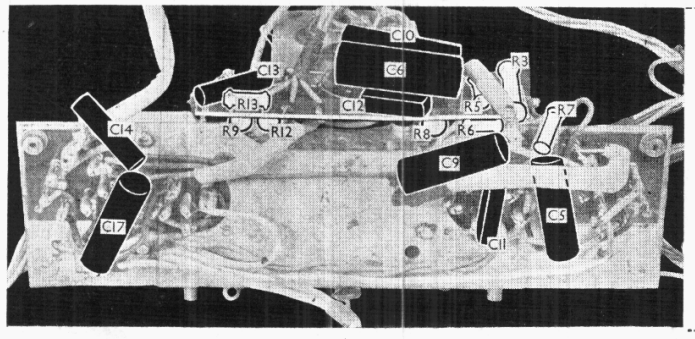
S4 is the sensitivity switch, mounted in a metal clip screwed to the front of the cabinet, so that its control toggle projects from one of the side faces of the recessed control panel opening in the cabinet, near the wavechange control. The position of the switch is indicated at the top of our rear view of the receiver. The two associated resistances **R1** and **R2** are mounted on their leads between its tags and a tag screwed to the front of the cabinet.

S5 is the internal speaker muting switch. It forms part of the external speaker socket assembly, mounted on the left side of the cabinet, and opens automatically when the external speaker plugs are inserted and pressed fully home.

Coils.—**L1** and **L2** are the frame aerial windings. Each is a separate assembly, **L1** being mounted near one side of the cabinet and **L2** near the opposite side. Their connecting leads are coloured, and the coding is given under "Dismantling the Set."

The RF and reaction coils **L5, L6** and **L3, L4** are in a screened unit mounted on a bracket over the chassis deck. **C7** and **C8** are in the same container.

Condensers C15, C16.—These are two dry electrolytics in a cardboard container screwed to the bottom of the cabinet. The three connecting leads are terminated with tags, and their connections are described under "Dismantling the Set." The red lead is the positive of **C16** (16 μF) and the yellow the positive of **C15** (8 μF).



Under-chassis view. Some of the components shown here are indicated also in the rear view of the receiver overleaf.

The black lead is the common negative. The unit is rated at 300 V peak working and 350 V surge.

External Speaker.—Two sockets are provided on the left-hand side of the cabinet (viewed from the rear) for a low impedance (3-5 O) external speaker. A muting switch associated with them is described under "Switches."

C22, R11.—These are ganged together on the volume control spindle. **R11** consists of a stout wire frame, which forms the support, shaped to form the greater part of a circle. One half of its length is coated with insulating material, and over this is wound the wire composing the resistance element.

At the mid-point of the track, the resistance element ends and is connected to the supporting wire, so that the slider contacts the resistance element for only half of its travel, and then the bare supporting wire for the remainder. The connections of both ends of the resistance element are at the bottom right-hand corner when viewed from the rear. The condenser **C22** is of the conventional two-element reaction type.

Chassis Construction.—A small metal chassis containing the controls, valve holders and most of the small components forms the nucleus of the assembly, but the remaining components are distributed about the cabinet. For this reason our rear view illustration shows the rear aspect of the complete receiver.

In this view, the chassis can be seen at the top, and certain components such as **S4** and **C4**, which are hidden from view by the top of the cabinet, are shown dotted.

The frame aerial windings can be seen on opposite sides of the cabinet, the speaker in about the centre, the output transformer at left centre, with the electrolytic block just beneath it, and the mains input unit in the lower foreground. The external speaker sockets and **S5** can be seen on the left, but the **A** and **E** sockets, just outside the top right-hand corner of the picture, are not indicated.

This method of assembly results in a complicated system of interconnecting leads between the several separate units, and our dismantling instructions are consequently of greater length than usual. In addition, the diagram in cols. 2 and 3 opposite is given to enable quick reference to be made to the speaker and output transformer connections.

Fuses F1, F2.—These are incorporated in the mains connecting plug, and are not shown in our illustrations. They are two ¾-inch fuses, rated at 1 A. A clip screwed to the floor of the cabinet holds two spare fuses, which are indicated in our rear view.

Chassis Divergency.—**R10** in our diagram was not shown in the makers' diagram, and may not be present in some receivers.

CIRCUIT ALIGNMENT

With the gang at minimum, the pointer should coincide with the 200 m calibration mark on the scale. Connect the signal generator leads, via a suitable dummy aerial, to external aerial and earth sockets. The chassis should be fitted in the cabinet, and the volume control should be adjusted to a position midway between its minimum and maximum settings.

MW.—Switch set to MW, tune to 210 m on scale, feed in a 210 m (1,425 KC/S) signal and adjust **C21** and **C24** for maximum output. There is not room to use the usual trimming tool for this operation, so that an insulated spanner is required. One could be made up from a flat strip of wood. Calibration should be checked at 550 m (545 KC/S).

LW.—There are no adjustments for the LW band, but the calibration should be checked at 900 m (332 KC/S) and 1,900 m (157 KC/S) and, if necessary, a compromise made between the MW and LW requirements. If they became seriously out of adjustment, a small fixed condenser could be introduced across whichever coil required it to balance out the mis-match approximately.

EMI CORD DRIVE REPLACEMENT INSTRUCTIONS

For HMV 438, 440, 441, 444, 512, 540, 541, 542, 570, 570A ; Marconiphone 262, 264, 272, 274, 286, 287, 288, 289, 296, 297, 298.

Where the cord drives are to be replaced, the makers recommend superior flax fishing line having a breaking strain of approximately .42lb. For both cords, about 58 inches is required, and where both are being replaced the condenser drive should be fitted first. The cord must be rubbed with hard wax to ensure freedom from slip. The operation should be carried out facing the front of the chassis.

Condenser Drive.—Remove scale from its frame;

cut off about 24 inches of cord, and splice on to closed end of "S" hook;

fully engage vanes of gang, and turn tuning control spindle fully clockwise. The anchor plate should now be at the top of the drum. If it is not, adjust the drum after loosening the hexagon screw. See also that the cheese-head screw is in the centre of its radial slot.

Hook the cord to the rear left-hand anchor-point of drum, and bring the cord once round the wide rear channel of drum in an anti-clockwise direction, down through the aperture in chassis, and on to the right-hand side of the control spindle;

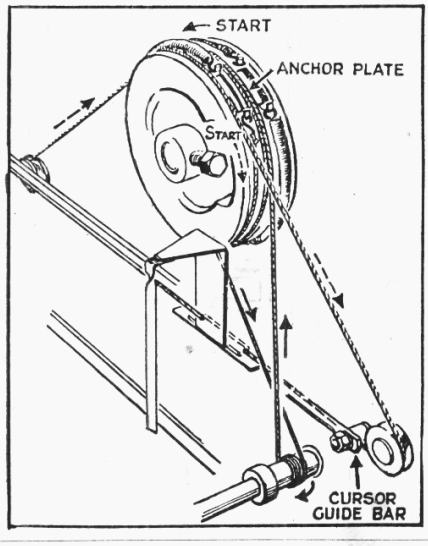
make four complete turns round the undercut portion of the spindle, in a clockwise direction, taking care that the spindle remains fully clockwise, and the vanes fully enmeshed;

come round again as for a fifth turn, and return cord through aperture in chassis;

pass cord along the centre (narrow) groove of condenser drum in an anti-clockwise direction (only one turn is necessary) and splice end of cord to the spiral spring so that coils open slightly when hooked to right-hand (rear) anchor point.

The cord will cross from centre to rear groove before completing one revolution of drum.

Pointer Drive.—Remove scale, cursor guide bar and pointer;



Take about 34 inches of cord, and splice to closed end of "S" hook on pointer drum;

pass cord through two small holes in cursor so that hook end is on the right and exactly 13⅛ inches from the nearer hole;

replace pointer on cursor guide bar, and replace guide bar;

slide cursor fully to the right, and fully enmesh condenser vanes;

slip hook end of cord over front right-hand anchor point and pass cord clockwise once round the front channel of the cord drum and over the right-hand pulley;

take free end of cord under left-hand pulley, and pass cord clockwise along the centre (narrow) channel of cord drum, for one turn only;

splice cord to spiral spring so that coils open slightly when hooked to the left-hand front anchor.

The cord will cross from centre to front groove before completing one revolution of drum.

Adjusting Pointer.—Tune accurately to a known station at the top of the MW band;

slacken off cheese-head screw on rear of drum;

without allowing condenser vanes to move, adjust tuning control until pointer registers accurately;

tighten up cheese-head screw and check calibration.

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