AUCKLAND

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SERVICE

CHRISTCHURCH

DUNEDIN

Turnbull & Jones, Limited

New Zealand

Ferguson & Osborn Ltd.,

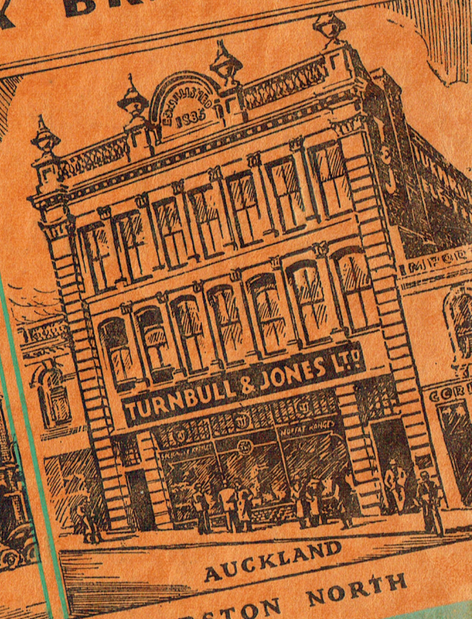
TURNBULL & JONES LTD

WELLINGTON

CHRISTCHURCH

STOCKS and SERVICE from SIX BRANCHES

DUNEDIN



AUCKLAND

ALSO AT HAMILTON AND PALMERSTON NORTH

TURNBULL & JONES LTD

NOTE!

This Catalogue contains Valuable Technical Information on EXELRAD Coils, enabling home constructors to choose any combination of types they may desire, for Broadcast Dual-Wave or All-Wave Models.

EXELRAD PARTS ARE FULLY GUARANTEED AND ARE INDIVIDUALLY MATCHED TO STANDARD.

Any Set is only as good as the Components will allow it to be. EXELRAD PRODUCTS are the best obtainable, always ask for them, do not accept substitutes.

TURNBULL & JONES, LTD. CATALOGUE 1936

INTRODUCTION.

IN introducing our 1936 Catalogue we wish to thank our customers for their esteemed patronage during 1935 and hope that our merchandise and service merited their support.

Our 1935 issue was primarily introduced to furnish in complete detail our Exelrad line of Kit Sets and other components, only a small portion being devoted to Electrical Appliances. However, this year our range of Radio Components has been considerably augmented, and therefore only a small space has been devoted to other merchandise. But we would inform you that our range of Electrical materials and labour-saving devices cannot be equalled, let alone surpassed, therefore we solicit your enquiries for anything Electrical. Write us for particulars.

New types of Coils are listed along with illustrations of circuit diagrams. New types of Transformers have also been introduced. It will also be noted that several new Agencies have been acquired —Belling-Lee, Plessey, Wright de Coster, etc.— every one a quality product.

Exelrad components are products of your own country; but not on this account alone do they desire consideration—Quality components are demanded. Exelrad make them. Take advantage of this—do not accept substitutes.

It has been a pleasure to compile the information contained in this Catalogue, and we trust that it will render an anticipated service to our customers.

INSTRUCTIONS.

Terms:
Cash with order unless you already have an accredited account on our books.

Sales Tax:
Extra when applicable.

Prices:
Subject to alteration without notice.

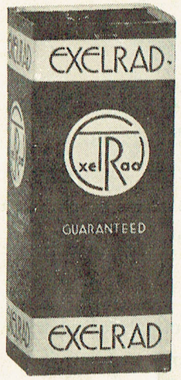
Delivery:
F.O.B. or F.O.R. Main Ports.

Telegrams:
"Turjon."

NOTE.—We always endeavour to maintain the same day despatch service. This is not always possible, as at times goods have to be procured from another branch, it is seldom, however, that we find it necessary to hold an order for more than one day after receipt of order. To avoid unnecessary delays please order from our nearest Branch.

Breakages and loss in transit are the entire responsibility of the purchaser, as every care is taken in packing. Any claim whatsoever must be submitted within 7 days.

EXELRAD KIT SETS, COMPONENTS, ETC.



Note the Attractive Cartons—
Dustproof—Easily arranged for Display.

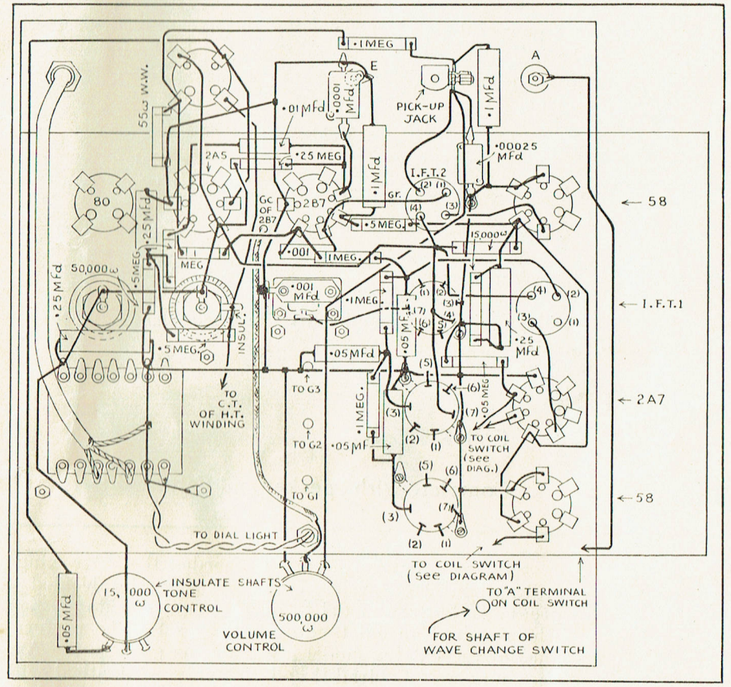
All Cartons Contain Diagrams of Connections.

:: All Coils are Guaranteed ::
Individually Matched to Standard.

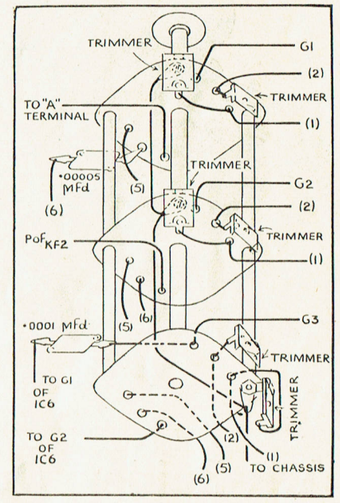
EXELRAD Components are Packed in Sealed Containers and reach you in the same condition as they leave the factory. Be sure yours arrive with the seals unbroken. Do not accept substitutes. We cannot guarantee the maximum efficiency of our circuits unless EXELRAD components are used.

Also Build the 7-valve "AIR KING" All-Wave Superhet, using Metal Valves, described in the Radio Guide, 1936. Write us for full particulars of How to Build this Kit.

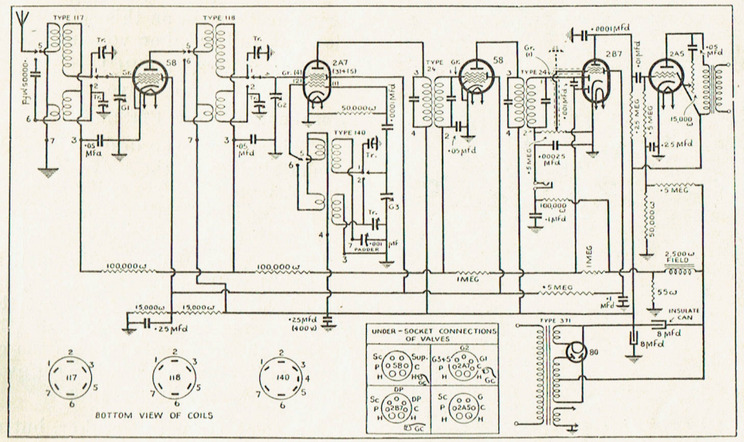
The EXELRAD "AIR-KING" DUAL-WAVE 6 VALVE SUPERHET USING GLASS TUBES.



Circuit and Under-Chassis Wiring Diagrams.



This sketch of the dual-wave switch was drawn looking at the assembly from the back of the chassis.



Distributors :—Turnbull & Jones, Ltd.

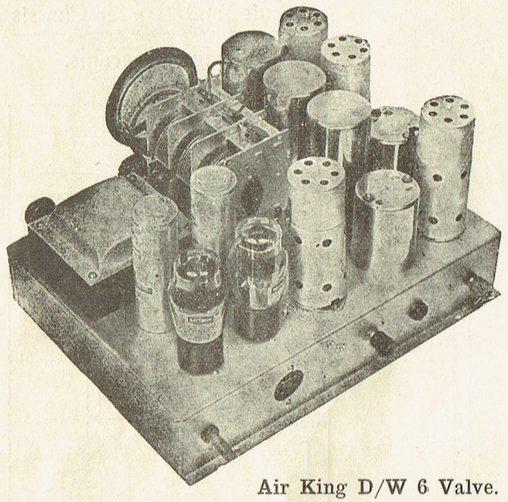
ALWAYS ASK FOR "EXELRAD" GUARANTEED PARTS.

T & J

EXELRAD KIT-SETS

Undoubtedly the Air King Dual Wave 6-Valve Superhet was the most outstanding and popular Kit for 1935. See circuit Diagram overleaf. Coverage is 19-50-220-550 Meters.

(Write us for full particulars on any Kit illustrated.)



Air King D/W 6 Valve.

A powerful Receiver, selective and exceptionally sensitive on both bands. Shore-wave stations can be brought in with almost the same volume as the local stations. Tone is excellent.

Features:

Full A.V.C. Aeroplane Dial.
256 K.C. Intermediate Frequency. Special High Gain Coils.

Valves ..... 1 2A7 2 58 1 2B7 1 2A5 1 80.

Speaker required ..... Plessey 2500 Ohm. Field.

This kit is recommended by the Technical Editor of the "Radio Times."

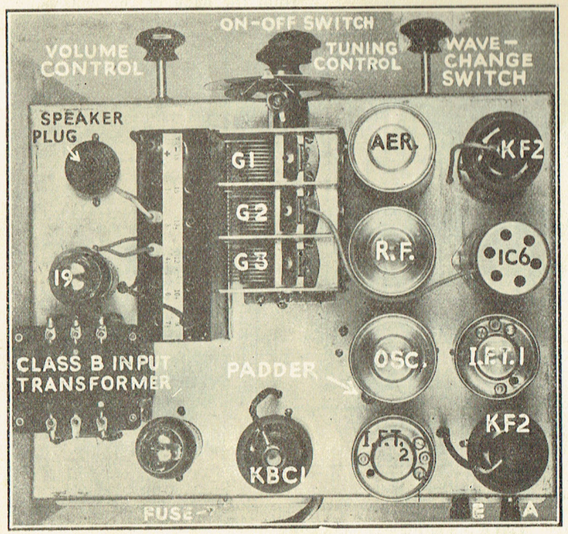
Price—

Coil Kit only - - - **£5**

Complete with Speaker and Valves **£15**

AIR-Raider Dual Wave.

(Battery Operated.)



So great was the reception accorded the "Air King" featured in the March "Times" that it was decided to produce a battery model to fill the requirements of those who required an outstanding battery set. The performance of the battery model is equally as good as the A.C. one and the "Exelrad" coil assembly is identical with that used in the "Air King." There is no doubt about bringing them in on this set, and, what's more, it can be done at full speaker volume.

Valves: 2 KF2, 1 KBC1, 1 1C6, 1 30, 1 19 Class "B" Output Valve.

Speaker: Plessey PM8in.

This set has been designed to fill the need of a battery model similar to the "Air King" Dual-Wave described in last month's "Times." It uses 2 KF2's, 1C6, KBC1, 30 and 19 class "B" output. The coil assembly is identical with that used in the "Air King."

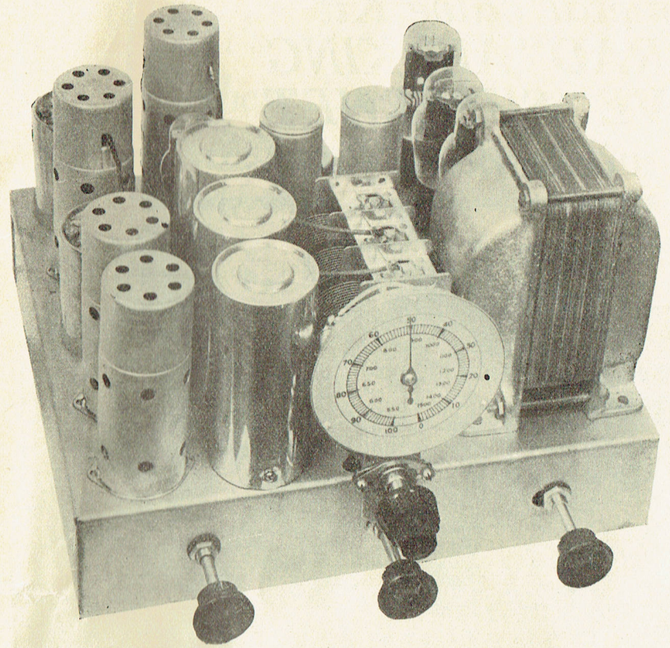
Those who want a really good battery dual-wave job that will pull in London, Paris, Berlin, with plenty of kick behind it, need not go past this set. It will fill all requirements, and the tests that "Exelrad" engineers put it through would satisfy even the most exact. Fading is practically eliminated in this set owing to the particularly sensitive A.V.C. incorporated.

Price, complete with Speaker, but no valves or batteries,

£11

T & J

EXELRAD KIT-SETS



AIR-KING DE LUXE EIGHT

(DUAL WAVE)

The de luxe eight-valve version of the "Air King" (shown on the left), retains all the excellent qualities of the six-valve model, but has a high-powered push-pull audio channel that gives tone and volume unequalled by far more expensive receivers. It is the ideal set for the radio connoiseur.

Complete Kit of parts

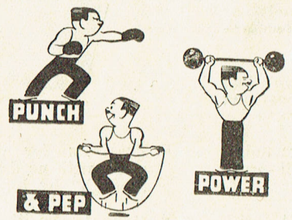
£17/5/-

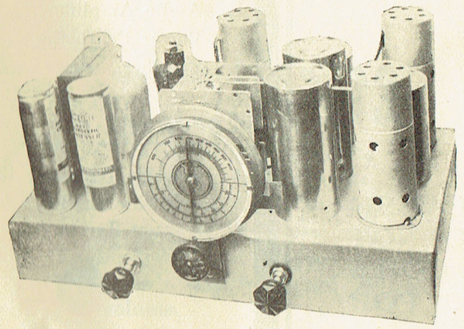
(including Valves; High Fidelity Speaker extra).

Valves: 1 2A7, 2 58, 1 2B7, 1 56, 2 45, 1 5Z3.

Speaker: Wright de Coster (1000 Ohm. Field).

Here's a simpler and cheaper Kit, but the "punch" is there just the same...





..because the Coils are..

"EXELRAD"

THE COMET DUAL-WAVE FIVE.

The Comet Dual-Wave Five Kit is a winner in its class. Simple to construct and much lower in price—yet it has the **punch**—**power** and **pep** of a much bigger set, because the coils are '**EXELRAD.**' Don't take chances—always use Individually Matched '**Exelrad**' Components and play safe. Their efficiency is absolutely dependable.

Price,

Complete with Speaker and Valves ..... **£12/10/-.**

Coil Kit only ..... **£2/19/6.**

Valves: 1 2A7, 1 58, 1 2B7, 1 2A5, 1 80.

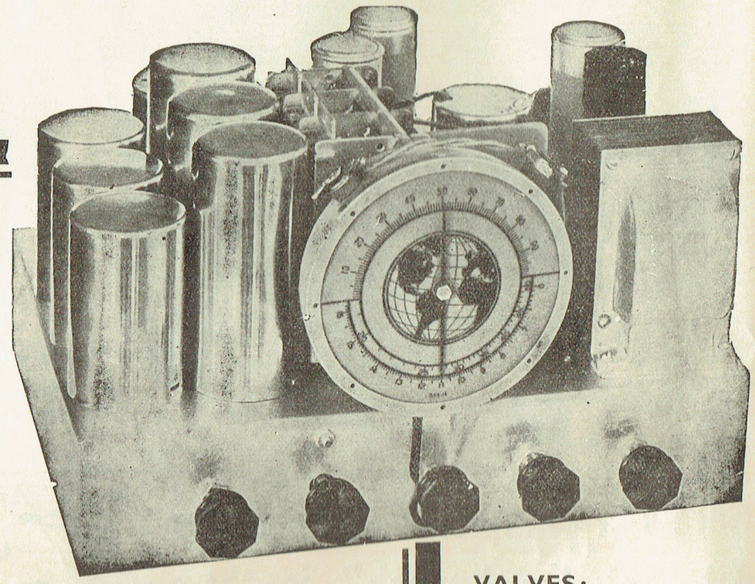
Speaker: Plessey 2500 Ohm. Field.

T & J

EXELRAD KIT-SETS

• *The new metal valve Kit—the EXELRAD "AIR KING ALL-WAVE SUPERHET SEVEN" will amaze you!*

Start to build this wonder kit now



HERE ARE A FEW OF THE FEATURES!

- All-wave coverage in three bands: 15-45m., 40-120m., and 200-550m.
- Special high-efficiency Exelrad coil kit, designed for easy assembly and wiring.
- New type wave-change switch, with pure silver contact bar and silver-plated phosphor-bronze wipers.
- Friction type aero-vision dial, with a ratio of 35 to 1, ensuring easy tuning on all bands.
- Provision for connecting a noise-reducing, high-gain all-wave aerial.
- Special Exelrad circuit, with latest stabilised oscillator and full automatic volume control.
- Provision for pick-up attachment, with no danger of "break-through" by locals.
- Manual sensitivity control to reduce background noise in poor localities.

COMPLETE KIT, LESS VALVES AND SPEAKER ....
Coil Kit, including all Coils, 3-gang Condenser, Aero-vision Dial, All-wave Switch Padders and Trimmers £6/15/-

£15

USE ONLY EXELRAD COILS IF YOU WISH TO GET MAXIMUM EFFICIENCY—DO NOT ACCEPT SUBSTITUTES — EXELRAD COILS ARE PACKED IN SEALED CARTONS FOR YOUR PROTECTION.

VALVES:

R.F. Amplifier	6K7
Frequency Changer	6A8
I.F. Amplifier	6K7
Diode Detector A.V.C.	6H6
Audio Amplifier	6J7
Power Penthode	6F6
Rectifier	5Z4

SPEAKER:

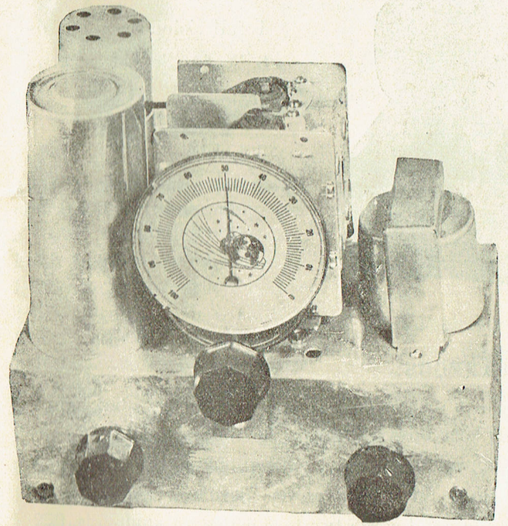
Plessey Celestion, 1500 Ohm. Field.

T & J

EXELRAD KIT-SETS

• *It's as easy as ABC to build either of these Exelrad Converters and it's the most economical way of modernising your set!*

EXELRAD
"A.C." SHORTWAVE CONVERTER



VALVES:

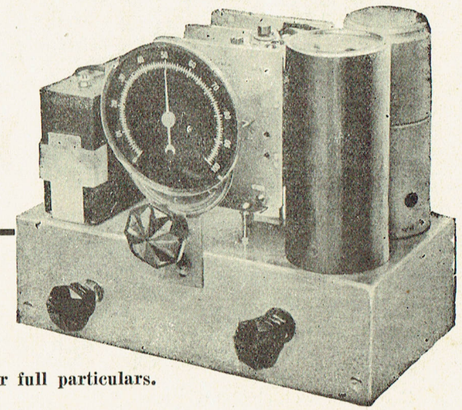
A.C. operated KF2 or 2A7
Battery „ 1C6
Coverage 19-50 Meters

YOU CAN convert your obsolete Broadcast Set in a few moments, and bring in Short Wave Stations from all parts of the globe—

England, France, Germany, New York, can be heard at full volume.

You can convert your present A.C. or Battery or Broadcast set to "All-Wave"—and be sure of perfect results if you build up either the "EXELRAD" A.C. or Battery Shortwave Converter. And remember—the complete A.C. Converter Kit costs only £4/5/-—and the complete Battery Converter Kit only £3/15/-. You'll be amazed, too, how simple they are to construct.

EXELRAD
"BATTERY" SHORTWAVE CONVERTER



Write to us for full particulars.

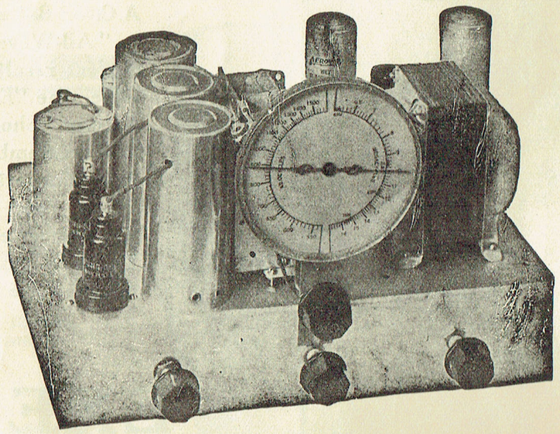
T & J

EXELRAD KIT-SETS

LIST OF PARTS REQUIRED TO BUILD THE METAL VALVE DUAL WAVE SEVEN.

Described in Radio Times, Feb., 1936, by the Technical Editor.

(THE METAL VERSION OF THE AIR KING 6)



1 Steel Chassis.

1 Exelrad Dual-wave Coil Kit, No. 335, comprising matched aerial, r.f., and Oscillator Coils, 3-gang Condenser, 2 256 k.c. I.F. Transformers, .001 mfd. Padder, 6 trimmer and 3 - deck dual-wave Switch, with shield partitions.

1 Power Transformer (371).

1 full-vision Tuning Dial.

8 Wafer Sockets; 7-8 pin and 1-4 pin.

1 Open circuit Jack.

3 Knobs.

2 Potentiometers, .5 Megohm and 15,000 Ohm (insulated).

FIXED RESISTORS:

2 15,000 ohm carbon.
2 50,000 ohm carbon.
3 100,000 ohm carbon.
1 .25 megohm carbon.
1 55 ohm wirewound.
4 .5 meg. carbon and 2 1 meg. carbon.

FIXED CONDENSERS:

1 .00005 mfd. mica.
2 .0001 mfd. mica.
1 .00025 mfd. mica.
1 .001 mfd. mica.
2 .01 mfd. mica.
4 .05 mfd. tubular.
1 .1 mfd. tubular.
4 .25 mfd. tubular.
2 8 mfd. wet electrolytics.

MISCELLANEOUS:

3 doz. $\frac{3}{8}$in. nuts and bolts; 2 doz. solder lugs; dial light; 10 yards hook-up wire; 1 yard flexible push-back; 1 foot flexible copper braiding; 1 yard 18 gauge tinned copper wire; length of 3-core power flex and plug; 4-pin speaker plug and cord; two terminals; 5 s.g. clips; large and small bushes (for power cable and aerial terminal).

EXTRAS REQUIRED (Not included in Kit):

VALVES:

1 5Z4, 1 6A8, 2 6K7, 1 6H6, 1 6J7, 1 6F6.

SPEAKER:

1 dynamic speaker, 2,500 ohm field, with input transformer to match single pentode. (Plessey).

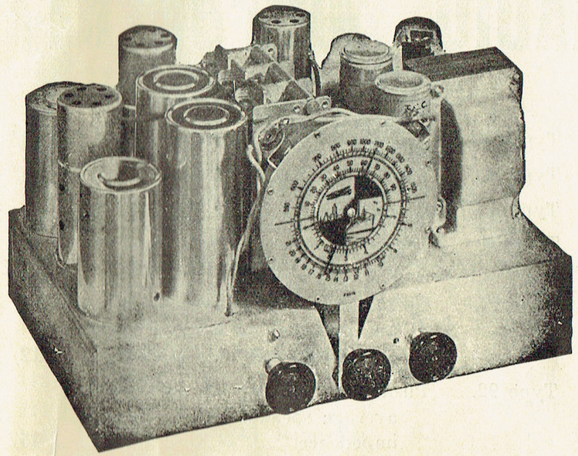
COMPLETE KIT OF PARTS **£19/10/–**

COIL KIT ONLY **£5/–/–**

T & J

EXELRAD KIT SETS

Band Pass Dual Wave Five



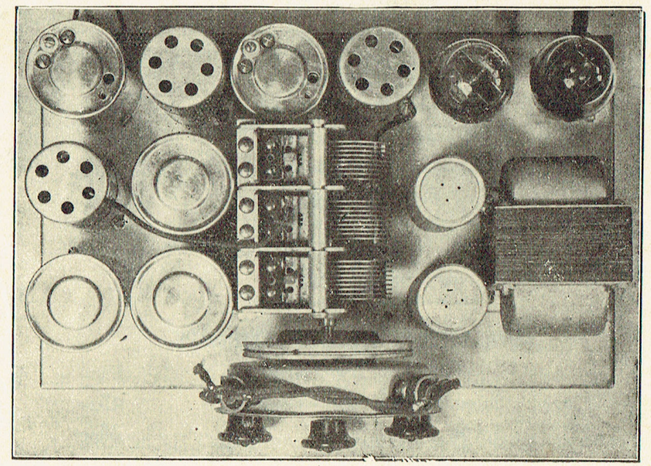
1 0.003 mfd. mica condenser.
1 0.00025 mfd. mica condenser.
2 0.0001 mfd. mica condenser.
1 0.5 megohm volume control
1 2.0 megohm carbon resistor
2 0.5 megohm carbon resistors.
1 0.25 megohm carbon resistor.
1 100,000 ohm carbon resistor.
1 50,000 ohm carbon resistor.
2 25,000 ohm carbon resistors, 1 Watt.
1 15,000 ohm carbon resistor, 1 Watt.
1 5,000 ohm bias resistor.
1 450 ohm bias resistor.
1 250 ohm bias resistor.
1 4-wire speaker cord and plug.
3 3-piece valve shields.
3 grid clips.
3 knobs.
1 8ft. 3-wire power cord.
2 6.3 volt pilot lamps.
2 G2751 Exelrad insulated wiring lugs, single.
3 G2752 Exelrad insulated wiring lugs, double.

Price Complete £14/0/0

Less Speaker and Valves £9/10/0

Complete with Speaker, less Valves £11/5/0

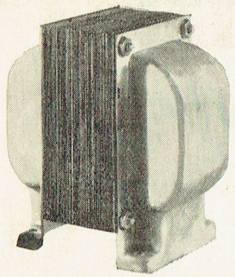
1 C2281 steel chassis with condenser bracket.
1 373 power transformer.
2 4-pin valve sockets.
2 6-pin valve sockets.
2 7-pin valve sockets.
1 Type G Stromberg-Carlson .00035 mfd. 3-gang condenser.
1 F3310 Exelrad dial with P3215 dual-wave scale.
5 Rubber grommets.
1 S5304 Exelrad 4P2T 2-deck wave-change switch.
6 T25 Exelrad trimmer condensers, 25 mmfd.
1 1,000 mmfd. padder condenser.
1 460 mmfd. padder condenser.
1 Type 121 Broadcast antenna coil.
1 Type 125 Shortwave antenna plus Broadcast sec'y coil.
1 Type 160 Dual-wave oscillator coil.
1 25A intermediate frequency transformer, 465 k.c./sec.
1 Type 25B intermediate frequency transformer, 465 k.c./sec.
2 8 mfd. electrolytic condensers, 500 volt.
2 10 mfd. electrolytic condensers, 50 volt.
1 0.25 mfd. tubular condensers.
3 0.1 mfd. tubular condensers.
1 0.05 mfd. tubular condensers.
1 0.02 mfd. tubular condensers.
3 0.01 mfd. tubular condensers.



EXTRAS (Not included in Kit):

Speaker: 1 8in. dynamic speaker, 1,500 ohm field, to match single penthode.

Valves: 1 6A7, 1 6D6, 1 6B7, 1 42, 1 80



Price List

. . . of . . .

EXELRAD RADIO COMPONENTS

POWER TRANSFORMERS.

Type 341.	50 m/a Vertical mounting .... H.T.—380 + 380v. A.C. Fil. —5v. 2 amps. 2.5v. 4 amps.	21/–
Type 343.	50 m/a Vertical mounting .... H.T.—380 + 380v. A.C. Fil. —5v. 2 amps. 6.3v. 1 amp.	21/–
Type 371.	80 m/a Vertical mounting .... H.T.—400 + 400v. A.C. Fil. —5v. 2 amps. 2.5v. 8 amps.	24/–
Type 373.	80 m/a Vertical mounting .... H.T.—400 + 400v. A.C. Fil. —5v. 2 amps. 6.3v. 2 amps.	24/–
Type 421.	120 m/a Vertical mounting..... ..... H.T.—400 + 400v. A.C. Fil. —5v. 2 amps. 2.5v. 3 amps. 2.5v. 8 amps.	36/–
Type 423.	120 m/a Vertical mounting..... ..... H.T.—400 + 400v. A.C. Fil. —5v. 2 amps. 6.3v. 3 amps. 6.3v. 3 amps.	36/–

FILAMENT TRANSFORMERS.
(For S.W. Converters.)

No. 225.	2.5 volt	15/–
240.	4 volt	15/–

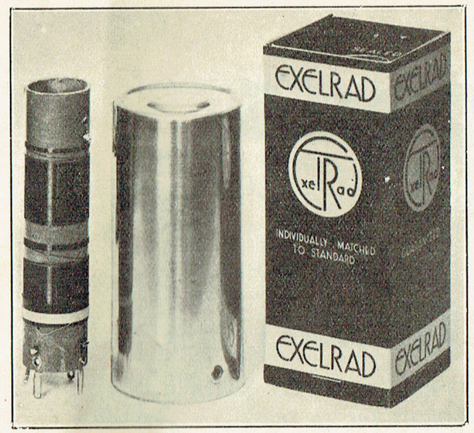
AUDIO TRANSFORMERS.

Type 81.	General purpose ratio 1 : 3	12/–
Type 82.	Push-pull input, ratio 1 : 3	15/–
Type 83.	Push-pull input for 19 Valve Class B	15/–
Type 84.	Coupling between 56 Valve and Push-pull 45's, Class A.B.	19/6
Type 91.	Output transformer from single output penthode to average speaker of 4 ohms. coil impedence	12/–
Type 92.	Push-pull from output penthodes to average speaker of 4 ohms. coil impedence	15/–
Type 93.	Push-pull output from 19 Valve to 4 ohms. speaker	15/–
Type 94.	Ditto from 45 Valves	15/–
Type 95.	Output from single 45 to 4 ohms. speaker	12/–
Type 96.	Universal output transformer from any modern output stage, single or Push-pull penthodes or Triodes into speakers from 1 to 10 ohms. voice coil impedence	15/–

CHOKES.

Type 61.	50 m/a 30 Henries for filtering H.T. on small receiver (size of Audio Transformers)	12/–
Type 62.	1 m/a 600 Henries Audio choke for coupling purposes	18/–
Type 71.	100 m/a 30 Henries Filter choke for general purpose (size of Power Transformer 341)	21/–
Type 72.	200 m/a 10 Henries General purpose filter choke, same size as Power Transformer 371	21/–

Note.—Only Genuine Stallory is used in EXELRAD TRANSFORMERS, CHOKES, Etc.



EXELRAD COILS

Price List

See pages 12, 13, 14, 15, 16, 17, 18, for Diagrams of Connections.

AERIAL AND R.F. COILS.

Type No.	Antenna Coils.	R.F. Coils.	Frequency Range.	Price.
111.	Low imp.		B.C.	4/–
112.	R.F. interstage Low imp.		B.C.	4/–
113.	High imp.		B.C.	4/6
114.		High imp. and Cap.	B.C.	4/6
115.	Induct'ly cpld. Band Pass		B.C.	7/–
116.	Short Wave Converter		.....	15/–
117.	Low imp.		D.W.	9/–
118.	R.F. interstage Low imp.		D.W.	9/–
119.	Low imp. with reaction		B.C.	5/–
121.	Litz wound, high imp.		B.C.	6/–
122.	Litz interstage,	high imp.	B.C.	6/–
123.	High imp.		D.S.W. ...	9/–
124.		Interstage	D.S.W. ...	9/–

No. 125.—Short-wave antenna with broadcast secondary only, for dual wave receivers having a capacity-coupled band-pass on broadcast band 9/–

INTERMEDIATE FREQUENCY TRANSFORMERS.

Type No.	I.F. Frequency.	Special Remarks.	Price. Price.
21.	175 KC	B.C. only	8/–
22.	175 KC	B.C. only. Must follow type 150 Osc. Coil	8/–
23.	175 KC	B.C. only. C.T. for fullwave detection	8/–
24.	256 KC	D.W.	8/–
26.	465 KC	D.W.	8/–
25a.	465 KC	Step-up ratio for plate to grid circuit	9/–
25b.	465 KC	Step-down ratio for plate to diode circuit	9/–

KC = 550–1500 KC.
DW = 550–1500 KC and 16–16 MC.

OSCILLATOR COILS.

Type No.	I.F. Frequency	Padder in MMF.	Frequency Range. Designed for Valves.	Price.
110.	175 KC	1000	B.C. 27, 56, 37, 76	5/–
120.	175 KC	1000	B.C. 30	5/–
130.	175 KC	1000	B.C. 2A7, 6A7	4/–
140.	256 KC	1000	D.W. 2A7, 6A7	9/–
150.	175 KC	1000	B.C. 57, 6C6 Autodyne	4/–
	Must be followed by type 22 I.F. Transformer.			
160.	465 KC	460	D.W. 2A7, 6A7	9/–
170.	465 KC	460mmF.	B.C. 2A7, 6A7, 6A8	6/–
180.	465 KC	1000mmF.	D.S.W. 2A7, 6A7, 6A8	9/–

No. 190.—New dual-wave oscillator coil for new series of coils with type G condenser and "Exelrad" full vision dial. For 2A7, 6A7 or 6A8 valve 9/–

Coverage of bands:
B.C. 550–1500 KC.
D.W. 550–1500 KC, 6–16 MC.
D.S.W. 2.8–8.4 MC, 7.5–21.6 MC.

CHASSIS.

Chassis 5E (5 valve)	9/–
,, 6E (6 valve)	9/–
,, 6F (6 valve)	9/–
No. C2280. For Model 7MXI–7 valve, Metal Valve, All-Wave 1936	12/–
C2281. For Model 5GX–5 valve, Dual Wave 1936	9/–

COIL CANS.

Aluminium 2" × 2½" with base	1/3
4" × 2½"	2/3

MICA TRIMMING CONDENSERS.

T25.	25 MMFD.	1/–

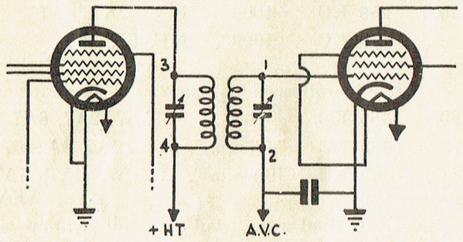
EXELRAD COILS are Guaranteed individually matched to Standard, and will improve the performance of any set

EXELRAD COILS

Diagrams of Connections.

I.F. TRANSFORMERS

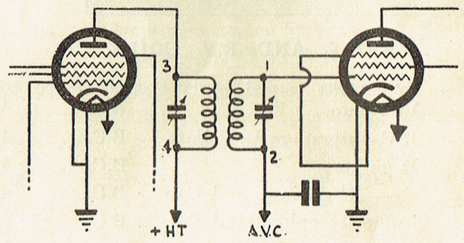
"EXELRAD" TYPE No. 21.



Intermediate Frequency ..... 175 k.c.

If grid wire from No. 1 terminal is required for diode, it may be pulled through can for bottom connection.

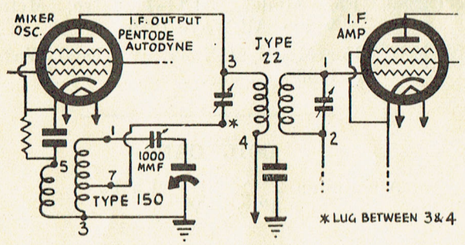
"EXELRAD" TYPE No. 23.



Intermediate Frequency ..... 175 k.c.

This is an IF transformer with centre-tapped secondary for full wave diode detection. The secondary centre tap (not shown in sketch) is between lugs 1 and 2.

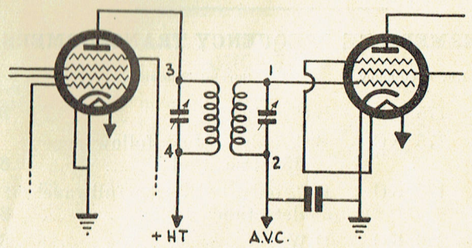
"EXELRAD" TYPE No. 22.



Intermediate Frequency ..... 175 k.c.

This is a special IF transformer. It can be used only after Type 150 oscillator coil. The extra lug as shown on above sketch completes the autodyne oscillator circuit.

"EXELRAD" TYPE No. 24.

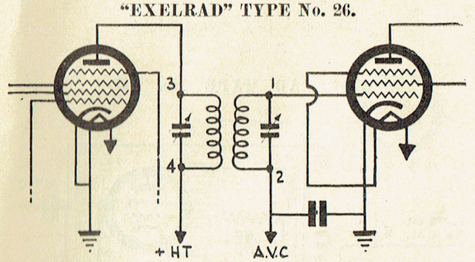


Intermediate Frequency ..... 256 k.c.

This is an IF transformer designed particularly for Dual Wave receivers. If grid wire is needed for diode connection it may be pulled through can and connected from bottom.

I.F. TRANSFORMERS—*continued.*

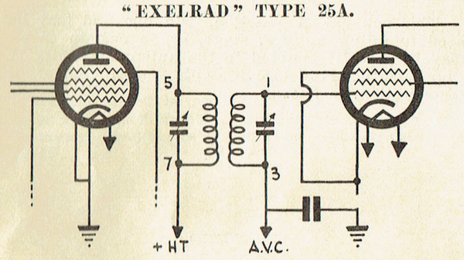
"EXELRAD" TYPE No. 26.



Intermediate Frequency ..... 465 k.c.

This is an IF transformer designed particularly for Dual Wave receivers. If grid wire is needed for diode connection it may be pulled through can and connected from bottom.

"EXELRAD" TYPE 25A.

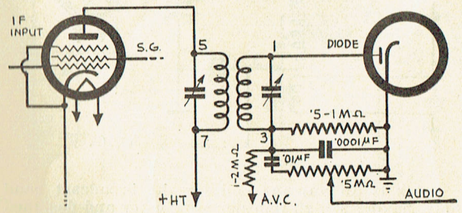


Intermediate Frequency ..... 465 kc/sec.

This is an intermediate frequency transformer designed especially for modern multi-wave receivers. It should only be used to couple the plate circuit of an IF amplifier to the grid circuit of a similar amplifier, and for this purpose the transformer has a suitable step-up ratio. An ideal application is between the frequency-changer and the IF amplifier valves.

The grid lead may be pulled through the can and connected from the bottom lug if required, but careful shielding of this lead will probably be necessary.

"EXELRAD" TYPE 25B.

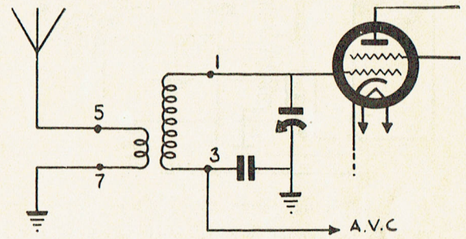


Intermediate Frequency .....465 kc/sec.

This intermediate frequency transformer, designed especially for modern multi-wave receivers, is a companion type to the 25A. It should only be used to couple the plate circuit of an intermediate frequency amplifying valve to a circuit of comparatively low dynamic resistance. For this purpose the transformer has a suitable step-down ratio. An ideal application is between the intermediate frequency amplifier and the diode rectifier circuit.

AERIAL COILS

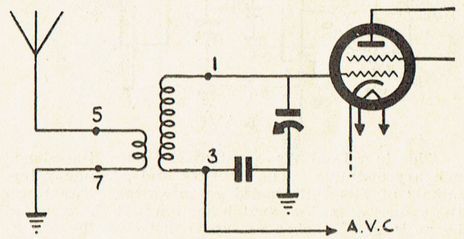
"EXELRAD" TYPE No. 111.



Tuning Range, 550-1500 k.c.

This is an antenna coil for broadcast only. It has a low impedence antenna primary designed to give lowest possible noise with maximum selectivity. It is specially designed for TRF receivers but can be used as an RF antenna coil in a superheterodyne. To track with other coils of this series its tuning condenser must be "Exelrad" type C5. If by-pass condenser is used for A.V.C. it should not be smaller than .05 MF.

"EXELRAD" TYPE No. 113.

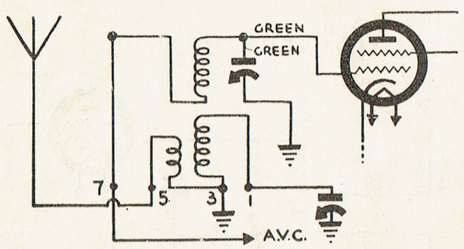


Tuning Range, 550-1500 k.c.

This is a high impedence primary antenna coil for broadcast only. It is designed to give maximum gain particularly at the low frequency end of the band. It can be used in either TRF or superheterodyne receiver. To track with other coils of this series its tuning condenser must be "Exelrad" type C5. If by-pass condenser is used for A.V.C. it should not be smaller than .05MF.

AERIAL COILS—*continued.*

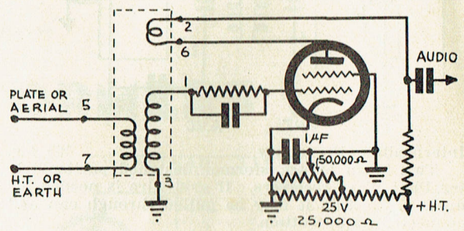
"EXELRAD" TYPE No. 115.



Tuning Range, 550-1500 k.c.

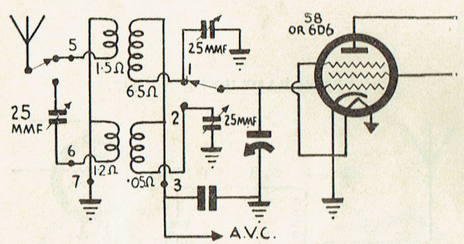
This is an inductively coupled band pass for broadcast only contained in one can. The primary on the first tuning circuit is the low impedence type. A.V.C. may be applied to the second tuning circuit in which case by-pass condenser should not be smaller than .05MF. This band pass coil is designed mainly for input to superheterodyne circuits but can be used on TRF sets as well. To track with other coils of this series the tuning condenser must be "Exelrad" type C5.

EXELRAD TYPE No. 119.



This coil has a reaction, winding and may be used to follow an R.F. stage, or, in certain cases, may be directly coupled to the antenna circuit. A suggested detector circuit, with screen control of regeneration, is shown.

"EXELRAD" TYPE No. 117.

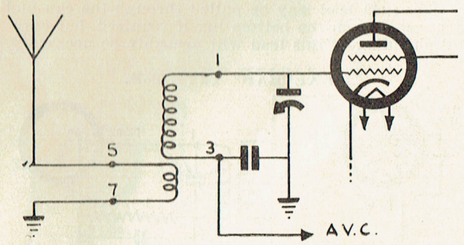


This is a Dual Wave antenna coil low impedence primary coupling. The primary and secondary terminals of this coil should go to switch contacts on the same "wafer" or switch section and there should be at least 1½ inches air space between these contacts and the section for the R.F. or oscillator stage. Leads connecting coil switch and tuning condenser should be flexible (to avoid microphonics), but as short as possible and clear of all other parts. Trimmers of tuning condenser must be removed or bent very wide open and additional trimmers added for all grid circuits below chassis to allow for individual trimming of broadcast and short-wave bands.

Frequency range—550-1500 k.c., 6.16 m.c.

Tuning condenser to track with this coil must be Type C5.

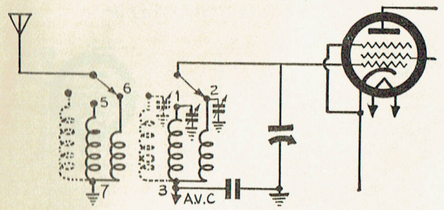
"EXELRAD" TYPE No. 121.



This is an antenna coil for the broadcast band only, having a high impedence primary and designed to give constant gain over the whole band. It may be used for either T.R.F. or superheterodyne receivers. To track with other coils of this series the condenser must be an S-C type G. The A.V.C. by-pass condenser should be not less than .05 MF.

AERIAL COILS—*continued.*

"EXELRAD" TYPE No. 123.

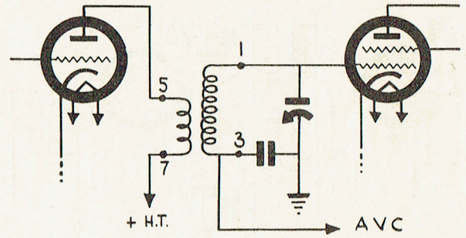


This dual short-wave antenna coil, with high impedence primaries, covers the ranges 2.8 to 8.4 megacycles, and 7.5 to 22 megacycles. Its associated coils are types 124 and 180. It is desirable that the wave-change switch be arranged to short-circuit the coil on the low-frequency side of the one in use, to avoid "dead spots" due to absorption in unused coils. Commercial switch arrangements vary somewhat, and only a skeleton circuit has been shown.

To track with other coils of this series the tuning condenser must be an S-C type G. The A.V.C. by-pass condenser should be not less than .05 MF. The trimmer condensers should be approximately 25 MMF.

R.F. COILS

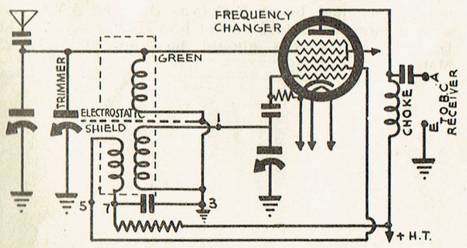
"EXELRAD" TYPE No. 112.



Tuning Range, 550-1500 k.c.

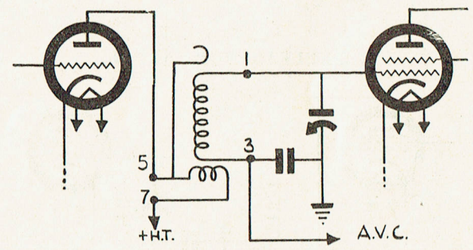
This is a radio frequency inter-stage coil for broadcast only. It has a low impedence plate primary designed to give lowest possible noise with maximum selectivity. It is designed for TRF circuits, but may be used as an RF inter-stage in a superhet. circuit. To track with other coils of this series its tuning condenser must be "Exelrad" type C5. If by-pass condenser is used for A.V.C. it should not be smaller than .05 MF.

EXELRAD TYPE No. 116.



This coil is designed for a short-wave converter to be used ahead of a suitable broadcast receiver, which is tuned to the low-frequency end of the dial (about 550 k.c.) but not directly to any station. Except for volume adjustments, the boradcast receiver is then left alone while the converter is tuned in the usual manner. This coil may be used with any type of frequency converter valve.

"EXELRAD" TYPE No. 114.

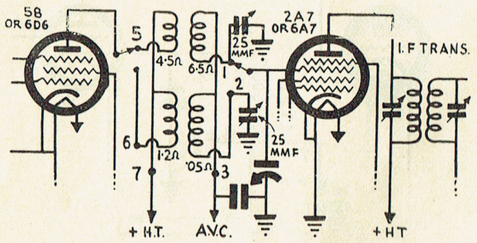


Tuning Range, 550-1500 k.c.

This is a high impedence inter-stage coil for broadcast only. Its primary consists of non-coupled choke with capacity coupling. It is designed for maximum sensitivity as an RF amplifier primarily for TRF sets, but can be used in a superheterodyne if two stages of RF are desired. To track with other coils of this series its tuning condenser must be "Exelrad" type C5. If A.V.C. is used, by-pass condenser should not be smaller than .05MF.

R.F. COILS—*continued.*

"EXELRAD" TYPE No. 118.

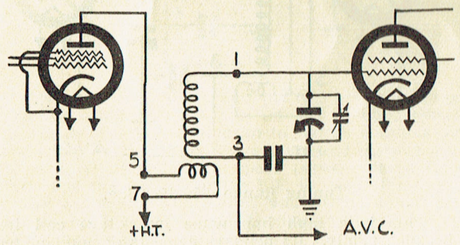


This is a Dual Wave R.F. interstage coil low impedence primary coupling. The primary and secondary terminals of this coil should go to switch contacts on the same "wafer" or switch section and there should be at least 1½ inches air space between these contacts and the section for the antenna or oscillator stage. Leads connecting coil switch and tuning condenser should be flexible (to avoid microphonics) but as short as possible and clear of all other parts. Trimmers of tuning condenser must be removed or bent very wide open and additional trimmers added for all grid circuits below chassis to allow for individual trimming of broadcast and short-wave bands.

Frequency range—550-1500 k.c., 6-16 m.c.

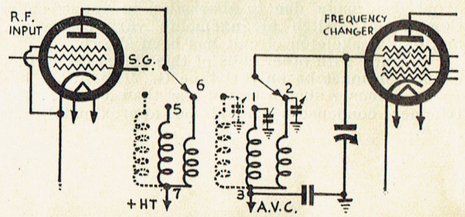
Tuning condenser to track with this coil must be Type C5.

"EXELRAD" TYPE No. 122.



This is a high-impedence interstage coil for broadcast only, having a non-coupled choke primary. It may be used for either T.R.F. or superheterodyne receivers. To track with other coils of this series the tuning condenser must be an S-C type G. The A.V.C. by-pass condenser should be not less than .05 MF.

"EXELRAD" TYPE No. 124.

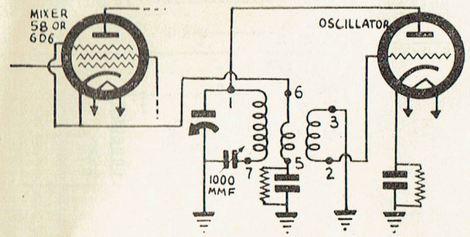


This is a dual short-wave interstage coil designed to couple an r.f. amplifier to a frequency charger, or to another r.f. amplifier. It is desirable that the wave-change switch be arranged to short-circuit the coils on each side of the one in use to avoid "dead spots" due to absorption in unused coils. If this is not practicable, the coils on the low-frequency side of the one in use should at least be shorted. Commercial switch arrangements vary somewhat, and only a skeleton circuit has been shown.

To track with other coils of this series the tuning condenser must be an S-C type G. The A.V.C. by-pass condenser should be not less than .05 MF. The trimmer condensers should be approximately 25 MMF.

OSCILLATOR COILS

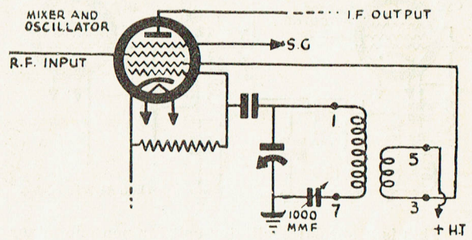
"EXELRAD" TYPE No. 110.



This is an oscillator coil for broadcast only. It is designed for separate triode oscillators in conjunction with pentode mixers.

Intermediate Frequency ..... 175 k.c.
Padder required ..... 1000 MMF.
Designed for Valves 27, 56, 37, 76
Tuning Condenser ..... "Exelrad" Type C5
Tuning Range ..... Standard Broadcast Band

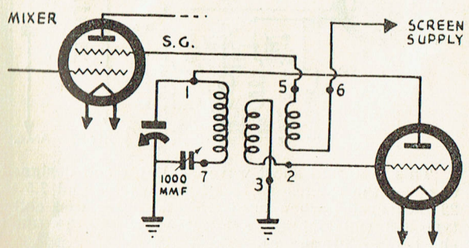
"EXELRAD" TYPE No. 130.



This is an oscillator coil for combined oscillator mixer 2A7 type.

Intermediate Frequency ..... 175 k.c.
Padder required ..... 1000 MMF.
Designed for Valves 2A7, 6A7, 1A6
Tuning Condenser ..... "Exelrad" Type C5
Tuning Range ..... Standard Broadcast Band

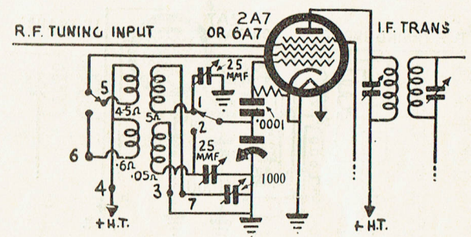
"EXELRAD" TYPE No. 120.



This is an oscillator coil for broadcast only. It is designed for a 2 volt battery type triodes in conjunction with pentode mixer valve.

Intermediate Frequency ..... 175 k.c.
Padder required ..... 1000 MMF.
Designed for Valve 30
Tuning Condenser ..... "Exelrad" Type C5
Tuning Range ..... Standard Broadcast Band

"EXELRAD" TYPE No. 140.



This is a Dual Wave oscillator coil. The primary and secondary terminals of this coil should go to switch section and there should be at least 1½ inches air space between these contacts and the section for the R.F. or antenna stage. Leads connecting coil switch and tuning condenser should be flexible (to avoid microphonics, but as short as possible and clear of all other parts. Trimmers of tuning condenser must be removed or bent very wide open and additional trimmers added for all grid circuits below chassis to allow for individual trimming of broadcast and short-wave bands.

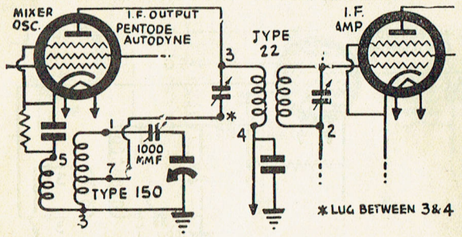
Tuning range—806-1756 k.c., 6.256-16.256 m.c.

Tuning condenser to track this coil with Types 117 and 118 must be Type C5.

Padder Condenser is 1000 MMF.

OSCILLATOR COILS—*continued.*

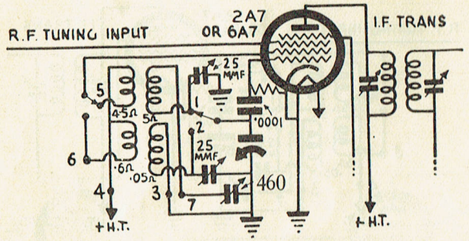
"EXELRAD" TYPE No. 150.



This is a special oscillator coil for pentode mixer valves working as autodyne oscillators. This oscillator coil must be followed by a "split" IF transformer Type 22, as shown in the above circuit. A.V.C. cannot be applied to this mixer valve.

Intermediate Frequency ..... 175 k.c.
Padder required ..... 1000 MMF.
Designed for Valves ..... 57 or 6C6
Tuning Condenser ..... "Exelrad" Type C5
Tuning Range ..... Standard Broadcast Band

"EXELRAD" TYPE No. 160.



This is a Dual Wave oscillator coil. The primary and secondary terminals of this coil should go to switch section and there should be at least 1½ inches air space between these contacts and the section for the R.F. or antenna stage. Leads connecting coil switch and tuning condenser should be flexible (to avoid microphonics), but as short as possible and clear of all other parts. Trimmers of tuning condenser must be removed or bent very wide open and additional trimmers added for all grid circuits below chassis to allow for individual trimming of broadcast and short-wave bands.

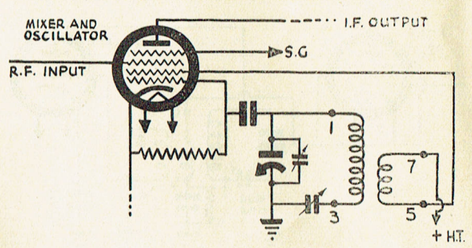
Tuning range—550-1500 k.c., 6-16 m.c.

Tuning condenser to track this coil with Types 117 and 118 must be Type C5.

Padder Condenser is 1000 MMF.

I.F. Frequency is 465 k.c.

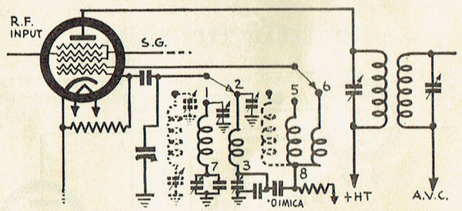
"EXELRAD" TYPE No. 170.



This is an oscillator coil for the broadcast band only. Its associated coils are type 121 (antenna) and type 122 (interstage).

Intermediate Frequency ..... 465 kc/sec.
Tuning Condenser ..... S-C type G
Padder ..... 460 MMF.
Suitable for Valves 2A7, 6A7, 6A8
Tuning Range (with above coils) 550-1500 kc/sec.
Trimmer capacity ..... 25MMF.

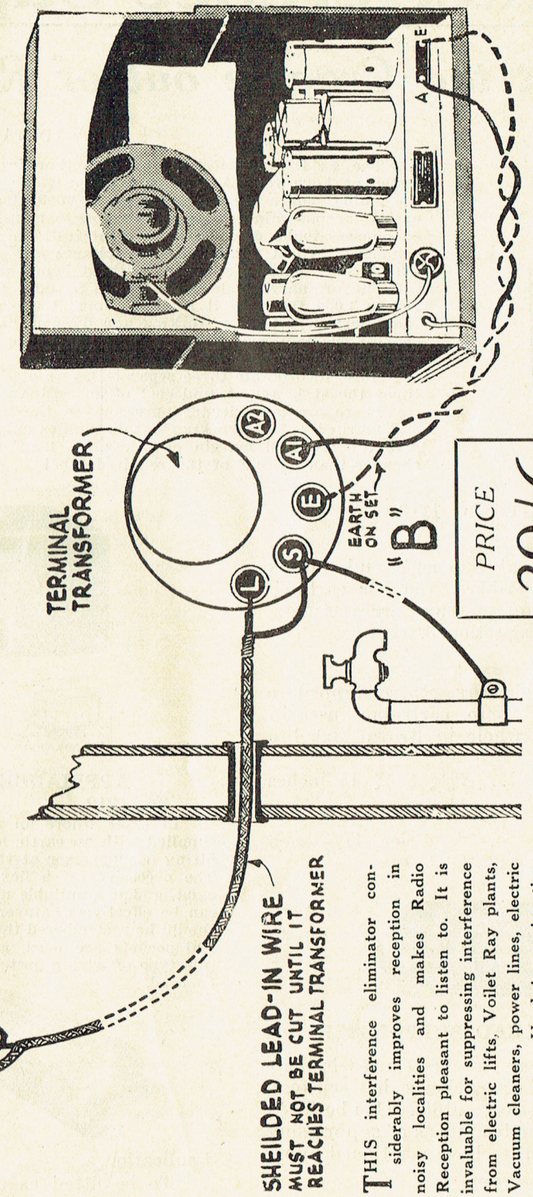
"EXELRAD" TYPE No. 180.



This is a dual short-wave oscillator coil designed to cover the ranges 2.8 to 8.4 megacycles and 7.5 to 22 megacycles when used with its associated coils, type 123 (dual short-wave antenna) and 124 (dual short-wave interstage).

Intermediate Frequency ..... 465 kc/sec.
Tuning Condenser ..... S-C type G
Padders:
Intermediate high frequency band—
1000 MMF. variable plus .00025 MF. mica
High frequency band—
1000 MMF. variable plus .001 MF. mica
Trimmers ..... 25 MMF.
Suitable for Valves 2A7, 6A7, 6A8

Cut the CRACKLE Out of RADIO with this "EXELRAD" Noiseless Aerial.



PRICE 3/6

Liberal Discounts to Dealers.

BELLING-LEE Set Lead Suppressor.

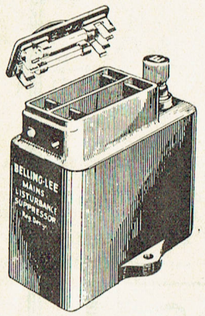
(See Next Page)

THIS interference eliminator considerably improves reception in noisy localities and makes Radio Reception pleasant to listen to. It is invaluable for suppressing interference from electric lifts, Voilet Ray plants, Vacuum cleaners, power lines, electric trams, etc., etc. Used in conjunction with Belling-Lee Noise Suppression Devices which attacks the trouble at its source. Every Listener should enjoy Clear Noise Free Entertainment.

Order and INSTAL NOW! a BELLING-LEE

BELLING-LEE RADIO
Interference Suppressors.

"Cut the Crackle out of Radio."



TEST VOLTAGES.

The I.E.E. and electric supply authorities require any electric appliance to be tested at 1.500 volts A.C. from poles to frame or earth before it can be connected to the mains. More precisely the test is 1,000 plus twice the working voltage, R.M.S., 50 cycles for one minute. It is therefore obviously necessary for suppressors and their condensers to be given an equivalent test. In practice it is harmful to the life of a condenser to test it at high A.C. voltages and we therefore substitute 2,250 volts D.C., which is at least as stringent without being harmful.

The ordinary condensers used in a radio set are tested at voltages varying from 500 to 1,000 D.C., but it is not serious if one condenser in a thousand fails inside a radio set; it just stops working and does no harm. It is serious and dangerous, however, if one condenser in one hundred thousand failed on the electric mains and caused the frame of an appliance to become "live." "Belling-Lee" suppressor condensers, therefore, incorporate three separate layers of thick dielectric and are necessarily three times the size, weight, and cost of an ordinary radio condenser.

There are low-priced suppressors on the market using ordinary radio condensers and marked "250 v. working"; this implies only 500 or 750 V.D.C. test, which does not give the required margin of safety. A 2 μF condenser of this type is smaller and cheaper than a 1 μF of the required type!

STANDARD UNIT No. 1118.

Application.

General, at meter board at listener's end, across brushes of commutator motor where frame is earthed, between Anode and Cathode of mercury arc rectifiers, etc. See pages 13 to 18, and Section 3.

Description.

Y 1.0 × Y 1.0 μF condensers centre tapped to earth terminal. Fitted with 2-amp. cartridge fuses in removable safety carrier, the whole in Brown Bakelite case.

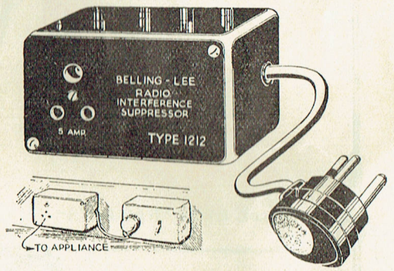
Dimensions .... 3 × 3 × 1½ inches
Nett weight .... 11 ozs.

List No. 1118. Price, 17/- each

No. 1174. FLEXIBLE LEAD SUPPRESSOR.

Suitable for suppressing interference caused by hair dryers, vacuum cleaners, sewing machines, hair cutters, cleaners, portable drills, Violet Ray outfits. Can be fitted in a few minutes. A most effective means of suppressing Radio interference caused by the above mentioned apparatus.

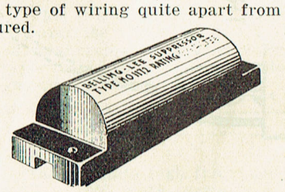
No. 1174. Price ..... 9/6 each.



APPLIANCE PLUG SUPPRESSOR.

No. 1212. Price, 25/-.

In cases where an appliance, portable or semi-portable, is supplied with an earth, adequate suppression can be obtained by fitting a suppressor at the point where its supply is picked up. The necessity for a flex supressor in such instances does not exist, and if a suitable unit is fitted close to the plug point this can be effective whatever appliance is plugged at that point. It should be remembered that this is only effective when 3-pin plugs and sockets are used, and this is an important advantage of this type of wiring quite apart from the greater safety which is ensured.



No. 1172. FLASHING SIGN SUPPRESSOR.

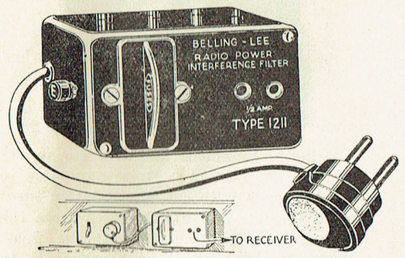
Price ..... 18/- each.

Application.

To be fitted as close as possible to flashing signs, thermostatic switches, switch contacts, etc.

Write Us for the greatest Treatise (70 pages) ever written on Radio Interference Suppression, its Cause and Cure.
Price .... 1/6 each.

Radio Set Input Suppressor for your Home.



The ideal suppressor for use with transportable receivers, particularly in terrace houses, flats, hotels, etc. Plug into existing supply and plug set into suppressor, which filters the mains.

No. 1211.
Price 25/-

In most cases of conducted H.F. interference a suppressor at the meter is satisfactory, but in a number of instances disturbance is picked up or produced in the same building as the receiver, and a condenser unit at the supply entry offers no relief; the noise may even increase as the H.F. currents are to some extent localized and so may cause more trouble.

A special suppressor has been produced for this form of interference, which consists of a small choke-condenser combination and is fitted in the supply mains at the point where the receiver is tapped on to the mains. An earth terminal is included and for most efficent results this should be connected to the cable covering or conduit, and *not* on to the radio earth, the object being that it is desired to by-pass the interference away from the receiver. The best earth must be found by trial in each case.

The chokes are rated to carry ½ amp. and as the unit is designed to operate from a 5 amp. plug suitably fused, it is necessary to provide adequate protection for the chokes and radio receiver. Further, in the unlikely event of a condenser breakdown or a fault developing in the receiver, the house section fuses would not blow.

VARIOUS FORMS OF INTERFERENCE.

(*a*) Mains radiated interference is present in about nine cases out of ten, and fortunately is not the most difficult to overcome. The disturbance is injected into the mains by the offending electrical plant, and may be conducted for long distances along the supply cable or any other electrical conductor and still be strong enough to radiate across to a receiving aerial placed anywhere near its path, *i.e.*, the wiring of your house. In this way disturbance enters the radio receiver via the aerial, but it is the house wiring which is responsible for it, and which should be fitted with some form of suppressor.

(*b*) Conducted interference is the least common form and is usually low frequency in nature, that is to say, it is due to ripple or unsteadiness generally in D.C. mains. Sometimes high frequency disturbance enters in this way, but it is always accompanied by mains radiated interference and the latter greatly predominates.

HOW DOES "INTERFERENCE" REACH THE RADIO SET?

When electrical disturbances are generated in a motor or other machine, they usually radiate away from the source into space, or travel back along the electrical conductors running to the offending machine; it is found in most cases that the disturbance is propagated in both these ways. The range of the direct radiation is limited to a few yards, but the conducted disturbance can travel considerable distances when once it has got on to an electrical conductor. Usually the electric mains act as the means of conveyance, but in some cases it may be tram or trolley wires, telephone wires, water mains, or even steel girders used in the structure of buildings. Powerful disturbances can be carried for distances up to two miles underground along the electric mains and so to your house.

Once the disturbance has entered your house it will be conveyed all over the electric wiring, which will in effect become a transmitting aerial radiating the high frequency disturbances, with the result that the aerial and earth wires connected to the radio receiver will pick them up and amplify them to produce the noises found in the loud-speaker. Some of the high frequency currents which enter the mains are conveyed to the receiver direct.

We thus have four different forms of electrical interference, which may be summarised as follows:—

(*a*) "Mains Radiated Interference"—mains carried, then re-radiated from the house wiring and picked up by the aerial-earth system of the set.

(*b*) "Conducted Interference"—mains carried, entering set by mains lead.

(*c*) "Direct Radiated Interference"—picked up by the aerial by direct radiation from the source.

(*d*) "Re-radiated Interference"—carried by other conductors and re-radiated.

Direct radiated interference is experienced if the rereiver is operated within a few yards of the disturbing source, and the worst cases are trams, trolley 'buses, etc., as these are rarely treated so as not to cause disturbance, and have been found to affect receiving aerials up to a distance of twenty yards without the assistance of any intermediate wiring, although normally direct radiation is not noticeable at distances greater than about five yards from the source.

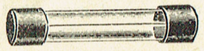
Re-radiated interference from electrical conductors such as telephone wires, steel girders in large buildings, drain-pipes, water supplies, overhead wires, neighbour's house wiring, neighbour's aerials, etc., as distinct from your own electric wiring.

Belling-Lee co-operate with the British Post Office authorities in the cure of Electrical Interference with Radio Reception.

BELLING-LEE TERMINALS, Etc.

FUSES.

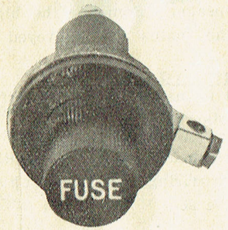
The long, straight fuse. Path totally enclosed, and the method of fitting the fuse are points in favour of the cartridge type.



No. 1055, Black, 60 M/A.
No. 1089, Grey, 100 M/A.
No. 1056, Red, 150 M/A.
No. 1057, Brown, 250 M/A.
No. 1058, Yellow, 500 M/A.
No. 1059, Green, 750 M/A.
No. 1061, Blue, 1 AMP.
No. 1062, Purple, 2 AMP.
No. 1063, White, 3 AMP.

All One Price .... 9d. each.

PANEL FUSE HOLDER.

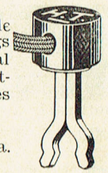


Single-hole fixing and insulated from panel. Very neat and compact but robust and reliable. Sensible Terminals for easy connecting with fuse of any desired rating up to 1 Amp. Ideal for replacing old Lamp Type of Fuse in modern Battery sets.

No. 1064. Complete ..... **2/-** each.

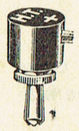
SPADE TERMINALS.

The BELLING-LEE spade Terminal has spring prongs which clip on to a terminal stem and stay put. Connecting up in awkward places becomes a one-hand job.



No. 1025. Price ..... **3d.** ea.

MIDGET WANDER PLUGS.



In the patented construction of these plugs three separate prongs of hard-drawn spring wire are riveted into the internal brass part, giving self-adjustment.

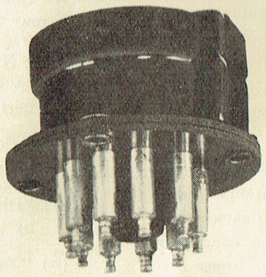
No. 1019. Price ..... **3d.** ea.

BANANA PLUGS & SOCKETS.

These are interchangeable with Continental Plugs and Sockets. Plugs of same 3-prong spring construction as Wander Plug but Banana shaped, to facilitate entry to 4 MM Sockets, will adjust itself to sockets 1/64in. over or under normal size. Socket self-bushing and eliminates soldering.

No. 1078. Price ..... **6d.** ea.

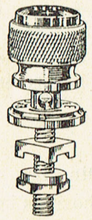
TEN PIN PLUG & SOCKET.



Invaluable for use with testing instruments. Any pins can be shorted if desired.

No. 1251. Price ..... **4/6** ea.

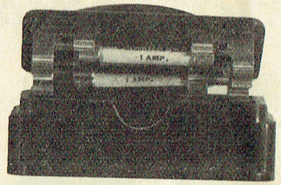
M. TYPE TERMINALS.



Non-rotating, name as Type B but not insulated and smaller. N.P. with red lettered tops for positives and Black for negatives. New and improved sub-connector nuts, 4 BA stem (suitable for an earth terminal).

No. 1002. Price ..... **7d.** ea.

TWIN SAFETY FUSE HOLDER.



Bakelite moulded, designed for safety and efficiency in use; it is impossible to touch fuses ; with cover withdrawn fuses are accessible and disconnected from the mains, receiver or eliminator is dead. Will mount on panel or baseboard. In carton with two fuses. Specify rating required.

No. 1033. Price ..... **3/6** ea.

Pyrex through Panel Bushing,
Ideal for Transmitters.

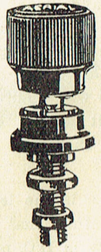
No. 1223. Price .... **1/6.**

LOW LOSS STAND-OFF INSULATORS.

Two inches long with base for mounting for Transmitters. Made of strong §in. Corrugated Pyrex Glass.

No. 1222. Price .... **2/-** ea.

B. TYPE TERMINALS.



Non-rotating name. Bakelite insulated anti-twist wedge on collar. Polished black and white letters, improved Sub-connector nuts; H.B.A. stem; Insulating washer. Earth Terminal with metal washer.

No. 1001. Price .... **9d.** ea.

Each in carton with guarantee. Marked Aerial, Earth or Plain.

RESISTORS.

CARBON TYPE—1 WATT.

TRADE MARKED FOR YOUR PROTECTION

Are noise-free and accurate. Absolutely impervious to moisture. Resistances available:

100 to 500 Ohms.
500 to 1000 Ohms.
1000 to 5000 Ohms.
5000 to 50,000 Ohms.
50,000 to 1 Meg.
1 Meg. to 5 Meg.

Price .... **7d.** ea.

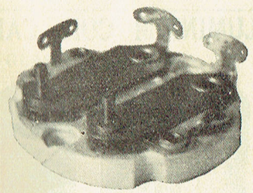
1/3 WATT.

Resistances available:

50,000 150,000
250,000 500,000
1 Megohm.

Price .... **7d.** ea.

I.F. TRANSFORMER BASES.



70/140 MMF. High grade Mica used 70/140 MMF.

No. P15 .... **2/6** ea.

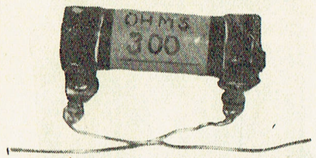
SCREEN GRID CLIPS.

No. SC16—For Glass Valves.
Price ..... **1/-** dozen

No. SC17—For Metal Valves.
Price ..... **1/3** dozen

WIRE WOUND RESISTORS.

100 M/A.

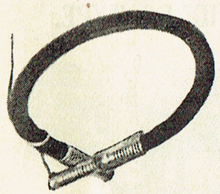


100 Ohm	250 Ohm
300 ,,	400 ,,
450 ,,	500 ,,
750 ,,	1000 ,,
1500 ,,	2000 ,,
2500 ,,	3000 ,,
5000 Ohm	

A really robust Resistor, manufactured from highest quality materials.

Price .... **1/-** ea.

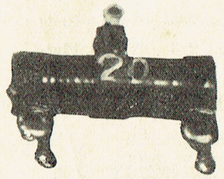
MANUFACTURERS' TYPE.



Spaghetti Resistors,
any value, from 10 to 100,000 Ohms.

Price .... **1/3** ea.

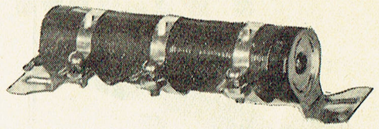
CENTRE TAPPED.



Available in the following Resistances:

7½ Ohms aside **1/6**
10 Ohms aside **1/6**
15 Ohms aside **1/6**
20 Ohms aside **1/6**

VOLTAGE DIVIDERS.



Wound with High Grade Nichrome Wire on a strong mounting Bracket. Surface of wire fully protected by Lacquer. Fitted with three movable contacts.

Overall length 3¾ inches for 15,000 Ohm, 4 inches for 250,000 Ohm.

VD16—15,000 Ohm **3/-**
VD17—25,000 Ohm **3/6**

ERIE SPARK PLUG SUPPRESSORS

The above are made in three types for Auto Radios:

No. U.S.1—Universal fitting **3/6**
No. S.P.1—Spark Plug fitting **3/6**
No. D.S.1—Distributor fitting **3/6**

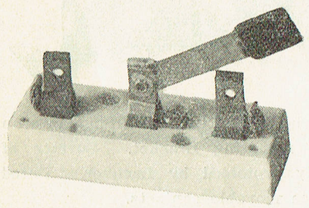
USE

T.C.C.

Condensers

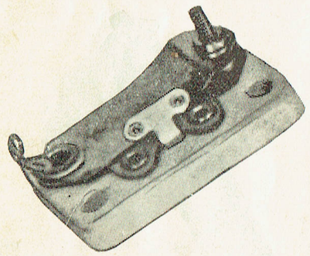
AND BE SURE!

AERIAL KNIFE SWITCHES.



No. 1501 S.P.D.T. Price 1/3
No. 1522 D.P.D.T. Price 2/6

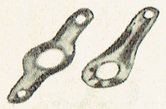
PADDING CONDENSERS.



No. 600 MMF. Capacity. Price 2/6
No. 1000 MMF. Capacity. Price 2/6
No. 1600 MMF. Capacity. Price 3/–

British made.

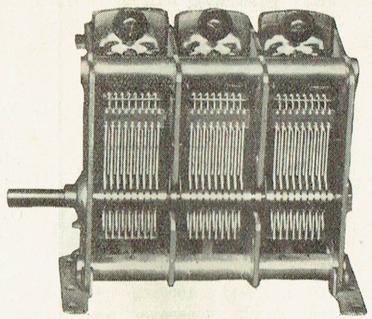
SOLDER LUGS.



No. 11 Single end. Price **4d.** dozen
No. 12 Double end. Price **6d.** dozen

Especially strong and do not break easily.

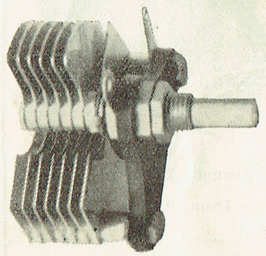
"PLESSEY" VARIABLE CONDENSERS



Exelrad Coils are especially designed for Plessey Condensers. Dials will not track accurately if others are used. Available in Clockwise or Anti-clock rotation. Mechanically perfect.

No. 1288—3 gang Anti-clock **15/–**
No. 1289—3 gang Clock **15/–**
No. 1290—2 gang Clock **10/6**
No. 1291—3 gang Anti-clock **10/6**

MIDGET TYPE.

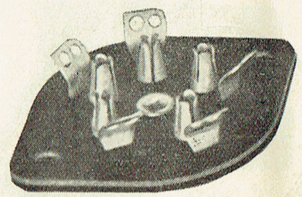


These Condensers are fitted to a Bakelite mounting Bracket. Available in the following capacities:

No. 3 Plate ..... 2/– No. 11 Plate **2/9**
No. 5 Plate ..... 2/3 No. 13 Plate **3/3**
No. 7 Plate ..... 2/6 No. 17 Plate **4/–**
No. 23 Plate .... Price **4/6**

Always Specify
EXELRAD
Transformers

SOCKETS, ETC.
EXELRAD VALVE SOCKETS.

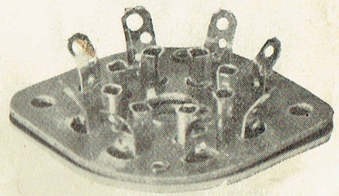


4 Pin 5 Pin 6 Pin 7 Pin
No. 7PL—7 Pin, Large

Made from highest grade Bakelite with Self-alignment Contacts.

Price .... **7/–** dozen.

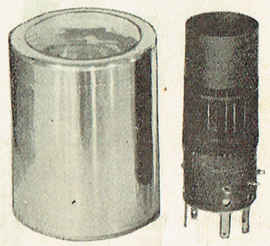
OCTAL TYPE.



Universal 8 Pin Type
for the new Metal Valves.

No. 8 PM—8 Pin .... 8/– dozen

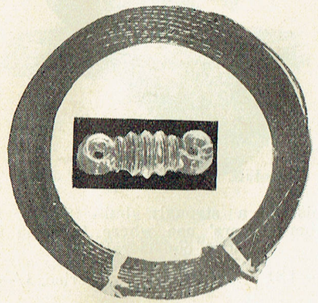
ALUMINIUM COIL CANS.



For Experimenters who may wish to wind their own Coils.

For Prices, see EXELRAD LIST, Page 11.

AERIAL EQUIPMENT



7/029—Heavy Enamelled Aerial wire. 100ft. length. Price, **4/3.**
7/029—Bare Copper. Price, **3/3.**
7/029—Tinned Copper. Price, **3/-.**
3/036—Bare Copper. Price, **2/3.**

EGG INSULATORS.

Use these to insulate the Guy Wires of your Aerial from earth.

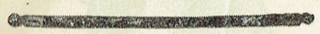
No. E49 .... Price, **9d. dozen**

GLASS INSULATORS.

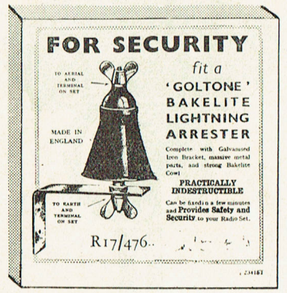
Ensure perfect Insulation from earth for your Aerial (use two at each end).

No. 101 .... Price, **9d. each**

AERIAL LEAD-IN TUBES.



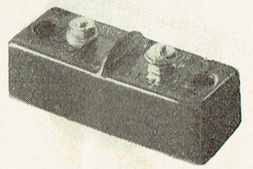
Ebonite with Brass Rod and Terminals—
6in. long .... each **8d.**
9in. long .... each **8d.**
12in. long .... each **1/–**
Flat Lead-in Strip, flexible, ideal for use where you do not wish to have holes .... each **1/–**



This is a Bakelite skirted Arrestor of high quality. Use the best and be safe.

No. R17/476 .... Price, **4/6.**

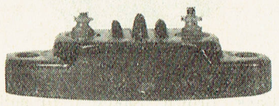
LIGHTNING ARRESTORS.
(Porcelain)



These Arrestors, although competitively priced, will give your home adequate protection from lightning.

No. LA60 .... Price, **1/- each**

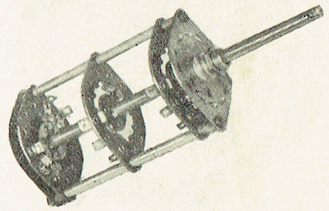
HEAVY TYPE ARRESTORS.



Larger than No. 60, easy to install and thoroughly safe.

No. LA61 .... Price, **2/- each**

WAVE CHANGE SWITCHES.

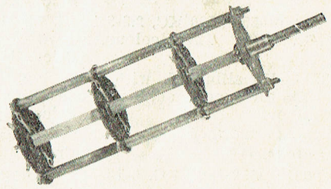


Special Dual Wave Type.

Two Position, Three Contact, with special Wiping Contact. Trouble free.
No. DW2 .... Price **16/–**
*No. AW3 .... **Price 18/6**

*Similar to DW2 but Three Position for all Wave Receivers.

No. AW4.



Special Type All Wave Switch
with pure silver Contact Bar and special shorting arrangement for shorting out unwanted coils. As used in "Air King Seven" with metal valves.

Price **21/–**

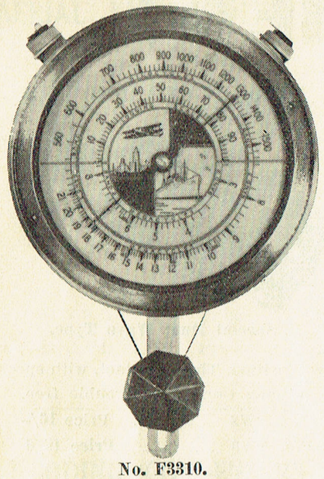
No. PAW.
Universal Type

which can be converted to any purpose. Dual or All Wave with special Silver Contacts and extra arms for switching dial lights if required.

Price **18/6**

For additional Types (see EXELRAD Price List)

EXELRAD AERO DIAL.



No. F3310.

String-drive mechanism, ratio approx. 17 to 1. Scales and Escutcheons listed separately. Type number of Scale must be quoted when ordering above Dial.

Dial Scales as Under:

Type No.: P3210. Tuning Scales: 550-1500 KC, 2.8-8.4 MC, 7.5-21.6 MC, 0-100. Remarks: Single colour, all wave. Price, **21/-**

P3211—550-1500 KC, 2.8-8.4 MC, 7.5-21.6 MC, 0-100. Three-colour, all-wave. Price, **24/-**

P3213—Uncalibrated, with 0-100 logging scale for experimental purposes. Single Colour. Price, **21/-**

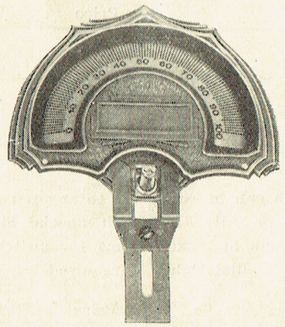
P3214—550-1500 KC, 0-100. Single Colour, B.C. Price, **21/-**

P3215—550-1500 KC, 6-16 MC. Single Colour, D.W. Price, **21/-**

P3210—As fitted to 7v All-Wave Metal Valve Model.

Note: Dial prices include Escutcheon F3350 as shown.

FULL VISION TYPE

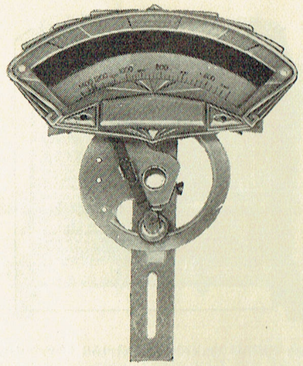


for Broadcast only. Scale is 0-100

Complete with Bronze Escutcheon.

No. D3 .... Price, **7/9.**

FULL VISION TYPE.

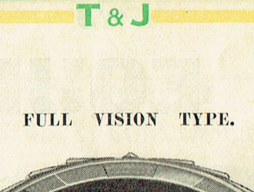


Pointer is driven by reliable Friction-drive. Scale is in Kilocycles.

Complete, with heavy Bronze Escutcheon.

No. D60 .... **7/9 each**

KNOBS, BAKELITE.



Made from high quality brown Bakelite, Octagonal shape, to fit ¼in. shaft.

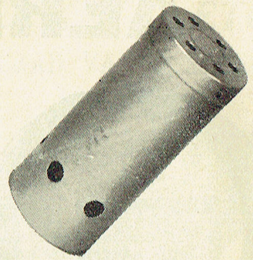
No. K3 .... Price **9d. each**

A FANCY FLORAL TYPE

Of Dark Brown Bakelite to suit ¼in. shaft.

No. K4 .... Price **9d. each**

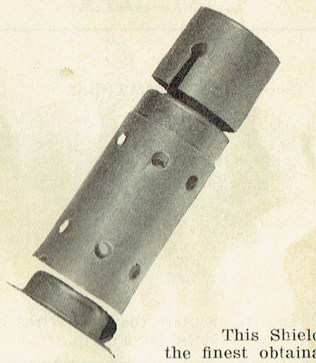
VALVE SHIELDS.



This is a strongly built Shield for experimenters' use where Price is the first consideration.

No. VS1 .... Price, **1/- ea.**

HEAVY GRADE ALUMINIUM.



A Brown Bakelite Fluted Type of plain appearance.

No. K5 .... Price, **9d. ea.**

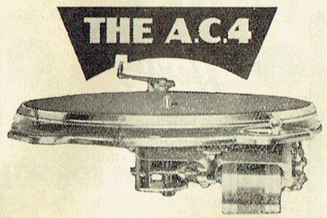
KNOBS.

This Shield is the finest obtainable For MODERN SETS.

Made in three pieces from heavy gauge Aluminium.

No. VS53 .... Price, **1/3 ea.**

GRAMAPHONE MOTORS.



GARRARD Gramaphone Motors.

are of exceptionally high quality; nothing but the best materials are used in their construction. For 230 V. A.C. operation.

No. A.C.4. Complete with Turntable.

Price ..... **£4/10/0.**

A COMPLETE RADIO GRAM UNIT IN BAKELITE

With Pick-up.

No cabinet is required; just place it on top of your Mantel Radio. Fitted with rubber feet; will not scratch or mark cabinet. Why not hear your favourite tunes just when you want to?

No. UV3. Complete with Pick-up.

Price ..... **£7/10/0.**

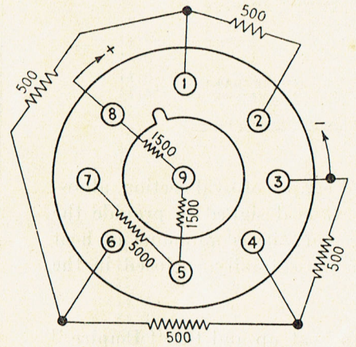
RADIO-PHONE PICKUP.

All Bakelite, with Volume Control.

Exceptionally sensitive, with 2-volts output. No. P30. Price ..... **27/6.**

OCTAL TUBE SHORT CHECKER.

A simple device for the determination of internal short circuits or open heater circuits in metal tubes, or meta-glass tubes, may be built from spare parts and an octal socket. A standard, external ohmmeter capable of' distinguishing between 9,500 ohms and 10,000 ohms serves as the indicating device.



The circuit must be followed closely to insure a complete check of every possible short-circuit in both rectifier and amplifier tubes. In the arrangement illustrated, the ohmmeter must be connected to the terminals designated with arrows on the diagram. If tubes are to be tested while hot, the polarity indicated must be observed or the emission of the cathode will indicate a short circuit.

An open filament or heater will show no reading on the meter, a good 5Z4 will be indicated by a reading of 2,000 ohms and all other tubes without internal shorts should produce a reading of 10,000 ohms, the sum of the series resistors.

The important test for possible leakage between cathode and heater accounts for the uneven distribution of resistance in the circuit. The cathode and the heater in the circuit are separated by 8,000 ohms. (Terminals 8 and 7.) As the meter recommended will distinguish between 9,500 and 10,000 ohms, a leakage in parallel with the 8,000 ohm section which would result in a net value of 7,500 ohms would be indicated.

The parts required are as follows:

1 Octal tube socket
4 500 ohm ½ watt resistors
2 1500 ohm ½ watt resistors
1 5000 ohm ½ watt resistor
2 Pin-jacks and one grid-cap with lead.

ERIE RESISTORS
are always
Dependable, Accurate, Noiseless.

THE COUNCIL OF FIRE & ACCIDENT UNDERWRITERS' ASSOCIATION OF NEW ZEALAND.

RADIO INSTALLATION RULES.
(Extracts Only.)

The following extracts from the Fire Underwriters' Rules will assist listeners in bringing their aerial equipment up to standard insurance requirements:—

Aerials.

Where the span does not exceed 100 feet, the aerial shall have a cross-sectional area of not less than 0.0045 sq. in. (7/.029 in. or No. 14 S.W.G.). Where the span exceeds 100 feet the aerial shall have a cross-sectional area of not less than 0.0070 sq. in. (7/.036 in.). All outdoor aerials shall be either copper, bronze, galvanised iron or galvanised steel. (Editor's Note: Iron and steel are useless.) Supporting structures for aerials shall be of ample strength and securely fixed in position by staying or otherwise. Indoor aerials shall not be twisted round or attached to any electrical wiring, fittings, or accessories used for lighting, heating, or power, or to any gas pipes, fittings or accessories. The mains of any electrical supply authority or any wiring connected therewith shall not be used as an aerial.

Lead-in Wires.

External lead-in wires shall be of copper or other approved metal, which will not corrode excessively, and in no case shall they be of smaller cross-sectional area than 0.0045 sq. in. (7/.029 in. or No. 14 S.W.G.).

Lead-in wires shall enter a building through a non-combustible, non-hygroscopic insulating bushing.

Within a building, lead-in wires shall not be placed within six inches of any part of an electrical installation used for lighting, heating, or power, and shall be adequately insulated therefrom.

Each lead-in wire shall be provided with a protective device connected (where practicable outside the building) as near as practicable to the point where the wire enters the building.

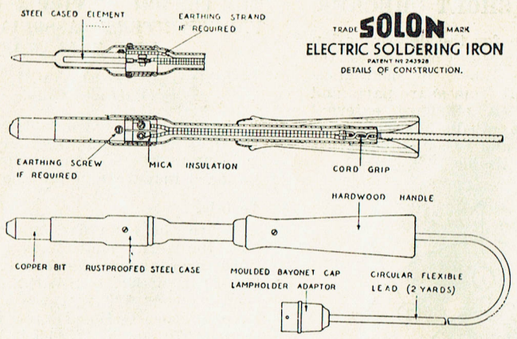
The protecting device shall be a lightning arrestor, and shall be to the approval of the Council.

The use of an aerial earthing switch is desirable, but does not obviate the necessity for the approved protective device specified in the last preceding regulation.

Protective Device Earth Wire.

(a) The earth wire may be bare or insulated and shall be of copper, having a cross-sectional area not less than 0.0045 sq. in. (7/.029 in. or No. 14 S.W.G.). It shall be taken in as straight a line as possible to a good permanent earth. It shall be connected in accordance with the Electrical Wiring Regulations.

(b) The earth wire shall be placed in such a position that it will not be subject to mechanical injury. Where the earth wire is connected to a pipe or other cylindrical earth, a substantial tinned metal clip of not less than No. 18 gauge 1in. wide of incorrodible metal shall be used.



IMPROVED BIT.—The bit is of tinned copper of oval section, allowing work to be done in a narrow space. It is designed to provide the maximum amount of heat at the working end with a minimum of heat loss due to radiation as the heating element is totally enclosed in the bit.

CONSTANT HEAT.—Four minutes to heat up and the "Empire" Model SOLON is ready for continuous use if required.

FLEXIBLE LEAD.—Six feet of HENLEY Tough Rubber Sheathed 3-core Flexible, of a serviceable brown colour, which will withstand roughest usage, with ends trimmed ready to take 3-pin plug.

EASY RENEWALS.—The handle is fitted with a patent Bakelite Terminal Box so that all connections are well away from the source of heat.

CORD GRIP.—An efficient cord grip consisting of a tough rubber sleeve securely grips the sheath of the flexible, and it prevents sharp bending where the flexible leaves the handle.

NO CORROSION.—No connections are made where heat can cause corrosion, the connections in the "Empire" Model SOLON, between the element and the flex, are made in the Bakelite Terminal Box.

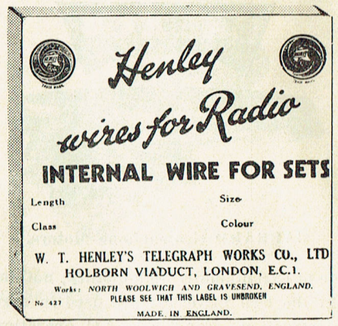
Cat No. (G)	Price
Solon Domestic or Radio Soldering Iron	12/6
Spare Elements for above	5/–
Spare Bits	2/–
Heavy Duty (1lb.) Soldering Irons	35/–
Heavy Duty (2lbs.) Soldering Irons	55/–

RESIN CORED SOLDER.

No. 10 Gauge—7lb. Reels	4/6 lb.
No. 10 Gauge—2lb. Reels	4/6 lb.
No. 12 Gauge—7lb. Reels	4/6 lb.
No. 12 Gauge—2lb. Reels	4/6 lb.

This solder is the Highest Quality available, and is therefore more economical in the long run.

HOOK UP WIRES.



25 Ft. CARTONS.

	Per Pkt.
10/010 VIR Push Back	Price 9d.
7/0124 Flexible Push Back	10d.
14/0076 Flexible Push Back	11d.
No. 18 G.048 Single Push Back	11d.
No. 20 G.036 Single Push Back	10d.
No. 22 G.028 Single Push Back	8d.

The above can be purchased in the following colours:

Red, Blue, Green, Yellow and Black.

SOLDERING HINTS.

Resin cored solder is easier to use and will not cause corrosion. Never on any account use acids, flux, or any such soldering fluid, as many of these so-called non-corrosive fluxes will cause trouble and damage in a radio set.

Keep the soldering-iron clean and well tinned at the tip. A small wire brush will be found invaluable for this purpose. Do not dip the iron into sal-ammoniac solution or rub it on a block of sal-ammoniac, because a deposit of this may remain on the job and start rapid corrosion.

See that the surface to be soldered is clean and tin the job well first.

Should the solder cool in uneven little lumps, the iron is too hot. Too cool an iron will cause a film of resin to creep between the two surfaces which are being soldered, resulting in a dry joint, which may cause weeks of worry and disappointment.

PHILIPS VALVES—English Series.

PRICE LIST - MARCH, 1936

Prices subject to alteration without notice.

Metal Clad Super Series—4-volt A.C.
(With new Universal high efficiency "P" base for 1936 construction.)

AB2	Duo Diode	10/–
ABC1	Duo Diode Triode	14/6
AC2	Triode, Oscillator, Amplifier	13/6
AF3	HF Penthode (variable Mu)	14/6
AF7	HF Penthode	14/6
AK2	OCTODE Frequency Changer	17/–
AL2	Power Penthode (indir. heating)	15/–
AL3	Special High Gain Pwr. Penthode	15/–
AZ1	Full Wave Rectifier	12/–

Metal Clad Super Series.
(With ordinary standard English or American base.)

AB1	Duo Diode	10/–
AF2	HF Penthode (variable Mu)	14/6
AK1	OCTODE Frequency Changer	17/–
E443H	Power Penthode (dir. heating)	14/6
E444	Diode Tetrode	14/6
E446	HF Penthode	14/6
E447	HF Penthode (variable Mu)	14/6
E454	Duo Diode Triode	14/6
E463	Power Penthode (indir. heating)	15/–
1561	Full Wave Rectifier	12/–
1805	Full Wave Rectifier	11/6

Metal Clad Super Series: 200 mA. A.C.-D.C.
(With new universal "P" base.)

CB2	Duo Diode	10/–
CBC1	Duo Diode Triode	14/6
CC2	Triode, Oscillator, Amplifier	13/6
CF3	HF Penthode (variable Mu)	14/6
CF7	HF Penthode	14/6
CK1	OCTODE Frequency Changer	17/–
CL2	Power Penthode	15/–
C.1	Barretter (resistance lamp)	12/–
CY2	Full Wave Rectifier	12/–

Metal Clad Super Series: 2-volt Battery.

KBC1	Duo Diode Triode	14/6
KF1	HF Penthode	14/6
KF2	HF Penthode (variable Mu)	14/6
KK2	OCTODE Frequency Changer	17/–
B217	Triode, Detector, Amp., Driver	8/–
B240	Twin Triode (Class B)	13/6
C243N	Power Penthode	15/–
B262	S.G.R.F. Amplifier Detector	11/–

Standard A.C. Types.—4-volt.

B443	Power Penthode	17/6
C443	Power Penthode	17/6
E406	Power Triode	14/6
E408N	High Power Triode	27/6
E409	Triode Amplifier	13/6
E415	Triode Detector Amplifier	13/6
E424	Special Detector Amplifier	13/6
E438	High Gain Detector Amplifier	13/6
E442	S/g Amplifier	15/–
E442S	S/g Detector LF Amplifier	15/–
E443N	Power Penthode	16/–
E452T	S/g Amplifier	14/6
E455	S/g Amplifier (variable Mu)	15/–

Standard A.C. Types.—Continued.

E499	Special High Gain Detector	13/6
F410	High Power Triode	50/–
F443	High Power Penthode	50/–
506	Full Wave Rectifier	12/–

Standard D.C. Types.
(The first figure represents filament volts.)

A409	General Purpose Triode	13/9
A415	Triode Detector Amplifier	13/9
A425	Triode Amplifier	13/9
A442	S/g Amplifier	17/6
A609	General Purpose Triode	13/9
A615	Triode Detector Amplifier	13/9
A642	S/g Amplifier	17/6
B405	Power Triode	14/6
B406	Power Triode	14/6
B409	Power Triode	14/6
B605	Power Triode	14/6
C603	(171a) Power Triode	8/6

Standard Rectifiers (For Philips Apparatus.)

328	For 327 Charger	19/3
373	For 372 Eliminator	22/–
451	For 450 and 1453 Chargers	19/3
506	For 3002, 3003, 3009 Eliminators	12/–
1002	For 1001 Charger	19/3
1010	For 1009 and 1013 Chargers	29/9
1018	For 1017 Trickle Charger	19/3
1561	Full Wave Rectifier	12/–
3006	For 3003 Eliminator	10/–

Resistance Lamps (For Philips Apparatus.)

329	For 327 Charger	6/9
452	For 450 Charger	6/9
1003	For 1001 Charger	6/9
1011	For 1009 Charger	13/3
1457	For 1453 Charger	6/9

SPECIAL SCHEDULE.
(Subject to Special Conditions of Sale.)

Heavy Duty Rectifying Valves.

367	For 366 and 1369 Chargers	33/–
1029	For 1370 Charger	55/–
1039	For 1371 Charger	99/–
1049	25 amps.	187/–
1063A	For 1064 Rectifier	200/–
1326	For 1330 Charger	27/6

Heavy Duty Resistance Lamps.

340	For 366 Charger	16/6
1012	For 1025 Charger	16/6
1331	For 1330 Charger	13/9

Technical information on any of the above valves will be supplied on application.

See separate List for prices of American types.

Write for our Special Price on Philips American Series.

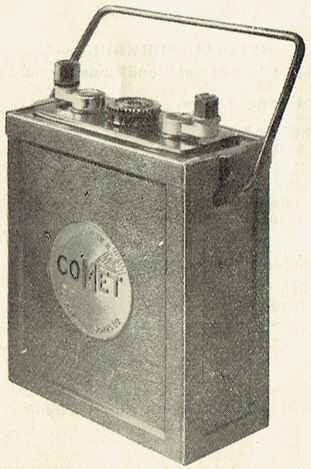
There is a Philips Valve for Every Socket

"COMET" CAR BATTERIES

For Motor Car use.

TYPE.	PRICE. £ s. d.	Amp. Hrs.	Length of Case.	CODE.	FOR FOLLOWING CARS.
3-9Cl. 45	2 8 0	65	6⅝"	COALY	AUSTIN 7 — TRIUMPH SINGER BABY — AUSTIN 12 (2 regd.)
3-9Cl. 47	2 9 0	65	8⅛"	CLOUT	MORRIS MINOR—FORD 8 H.P.—AUSTIN 16 (2) HILLMAN MINX—SINGER JUNR.—HUMBER SNIPE
3-11Cl. 49	3 0 0	80	9⅛"	COTEZ	RUGBY — FORD MODEL T CHEVROLET — Etc.
3-13Cl. 52	3 12 0	105	9⅛"	COIRE	SPECIAL FOR FORD MODEL A
3-13Cl. 53	3 12 0	105	9⅛"	COLIC	BUICK 1924 — ESSEX CHEVROLET — Etc.
3-15Cl. 55	4 4 0	115	10½"	COZEN	DODGE — DURANT BUICK 6 — GRAHAM, Etc.
3-15Cl. 56	4 4 0	115	10⅜"	COCUM	SPECIAL FOR FORD V8
3-17Cl. 57	4 16 0	130	11¾"	COMPO	CHRYSLER 70—NASH—DODGE SENIOR STUDEBAKER—PACKARD—WILLY'S KNIGHT
6-9Cl. 59	5 8 0	65	11¾"	COMIC	MORRIS COWLEY AND OXFORD—RILEY STANDARD — WOLSLEY, Etc.
MOTOR CYCLE 3-7Cl. 61	MOTOR CYCLE 2 0 0	12	4⅝"	CYCLE	FOR MOST ENGLISH CYCLES
3-7Cl. 63	2 0 0	10	6⅛"	CIRCO	FOR MOST AMERICAN CYCLES

"COMET" RADIO BATTERIES



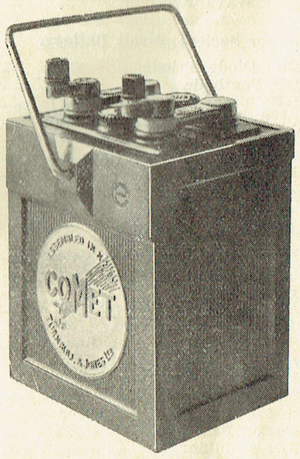
Always ask for "COMET"

or write us for further particulars.

—:—

This price list applies to Wellington Province only.

Charging ..... 2/- extra.



The TJ100 2-VOLT RADIO BATTERY

is of medium capacity and is not recommended for use with Multi-wave Receivers.

No. TJ100 .... Price, 40/- each

TJ200 IS A HEAVY DUTY RADIO BATTERY

and is recommended for use on Multi-valve Receivers, thus eliminating the necessity of frequent charging.

No. TJ200 .... Price, 50/- each

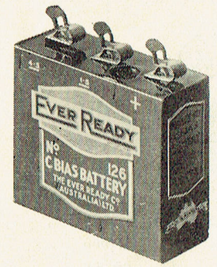
EVER-READY

WORLD'S BEST BATTERIES

Standard Dry Cell 1½ Volt.

Superdyne 45 "B" Battery.

LIST OF SPECIFICATIONS AND PRICES OF THE EVER-READY RANGE



RADIO BATTERIES

"B" BATTERIES.

List No.	Dimensions. L. in.	W. in.	H. in.	Weight. lb. oz.	No. of Cells.	Voltage.	Tappings.	Price.
S.D. 45	8⅜	4 5/16	7¼	11 13	30	45	22½, 45	24/-
H.D. 22½	7	3	5¼	4 0	15	22½	18, 22½	10/-
H.D.V. 45	8⅜	5	7¾	7 10	30	45	22½, 45	17/6
H.D. 45	8¼	6¼	3 5/16	7 9	30	45	22½, 30, 45	17/6
H.D.V. 60	11¼	3	7¾	10 3	40	60	22½, 30 / 45, 60	24/-
H.D. 60	11	6⅝	3½	10 2	40	60	22½, 30 / 45, 60	24/-
W.P. 42	6 1/16	3 5/16	3 7/16	2 10½	28	42	18, 24 / 30, 42	10/6
W.P. 45	8 5/16	2 1/16	3 7/16	2 13½	30	45	22½, 45	10/6
W.P. 60	6⅞	4⅜	3 7/16	3 12½	40	60	22½, 30 / 45, 60	15/-

"C" BATTERIES.

List No.	Dimensions. L. in.	W. in.	H. in.	Weight. lb. oz.	No. of Cells.	Voltage.	Tappings.	Price.
No. 126	4	1 7/16	4½	1 0¾	3	4½	3 4½	2/10
W.9S	5 1/16	1 5/16	3 1/16	0 10½	6	9	Every 1½v.	2/10

IGNITION BATTERY.

Quickfire 6 Volt Ignition.

Dimension: 10⅜" x 2¾" x 7¼" Price **18/-**

STANDARD DRY CELL.

Standard Dry Cell ..... 1½ volt.

TORCH REFILLS.

Number	Cells	Voltage	Height	Diameter
U4	1	1½	1⅞	1
U2	1	1½	2⅜	1 5/16
1915	2	3	4	9/16
8	2	3	2¾	13/16

POCKET REFILLS.

List Number	Cells	Voltage	Dimensions—Inches. Height	Width	Depth
1000	3	4½	2⅝	2 7/16	⅞

CYCLE LAMP REFILLS.

800	2	3	3¼	2⅝	1⅜

EVER READY

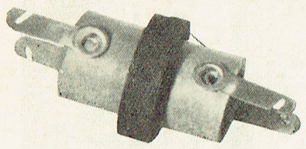
TORCH REFILLS & RADIO BATTERIES

THE WORLD'S BEST BATTERIES

WRITE US FOR QUOTATIONS

R.F. CHOKES

Broadcast and S.W.



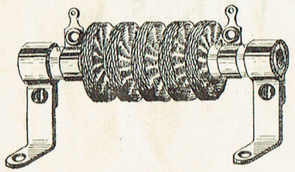
A heavy duty Duo Lateral Wound Choke for Broadcast only.

C350 .... Price **1/6**

Special Three Bank Duo Lateral Wound ALL WAVE.

No. C350S .... Price **2/3**

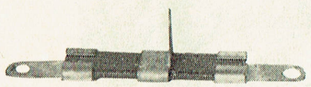
CHOKES.



Special Chokes made to own specifications on Isolantite as illustration: **3**/– ea.

Standard 5 meter 20, 40 and 80 meter .... **2/6** ea.

SPECIAL CENTRE TAPPED RESISTORS.



Safe Power Dissapation 1 Watt.

20 Ohm .... No. C2.
30 Ohm .... No. C3.
50 Ohm .... No. C5.

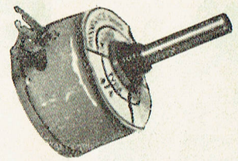
Price ..... **1**/– ea.

POTENTIOMETERS

RADIO–PHONE
(Uninsulated)

With Four Wiping Contact Arms.
Radio-Phone Wire Wound.

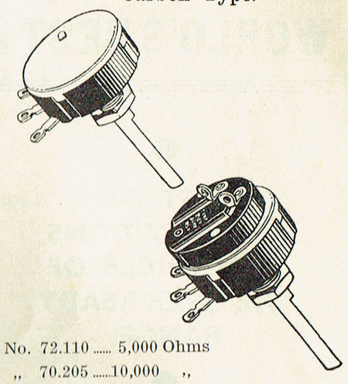
Potentiometers are trouble free and noiseless in operation. Replacements are nil. Your Radio demands the best.—Available in the following Resistances:



No. RV 1 .... 5,000 Ohm
,, RV 2 .... 10,000 ,,
,, RV 3 .... 15,000 ,,
,, RV 4 .... 20,000 ,,
,, RV 5 .... 25,000 ,,
,, RV 6 .... 30,000 ,,
,, RV 7 .... 50,000 ,,

Price ..... **4/6** ea.

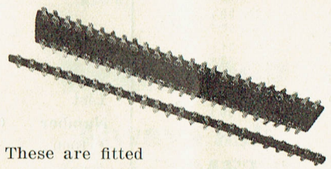
CENTRAL AB INSULATED SHAFT.
Carbon Type.



No. 72.110 ..... 5,000 Ohms
,, 70.205 .....10,000 ,,
,, 72.115 .....15,000 ,,
,, 72.111 .....25,000 ,,
,, 72.103 .....50,000 ,,
,, 72.104 ...100,000 ,,
,, 72.121 .....¼ Meg.
,, 72.105 .....½ Meg.

Price ..... **3/6** ea.

TERMINAL STRIPS



These are fitted with double ended soldering lugs. Use them to make the wiring of your Kit Set neater. Only the best grade Bakelite is used.

No. TS.2—12in. long, ½in. wide—
Price ..... **9d.** ea.

No. TS.4—14in. long, 2in. wide—
Price ..... **2/6** ea.

ORDER YOUR RADIO and ELECTRICAL REQUIREMENTS from OUR NEAREST BRANCH.

SPECIAL WIRE-WOUND RESISTORS.

(5% Accuracy)

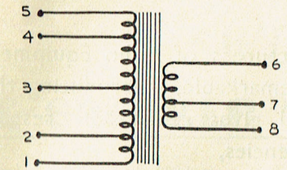
No. C6 100 Ohms
No. C7 250 ,,
No. C8 300 ,,
No. C9 400 ,,
No. C10 450 ,,
No. C11 500 ,,
No. C12 750 Ohms
No. C13 1000 ,,
No. C14 1500 ,,
No. C15 2500 ,,
No. C16 5000 ,,

Safe Power Dissapation 1 Watt.
Price ..... **10d.** ea. Price ..... **1**/– ea.

"TUBE KNOCKER."

A sponge-rubber ball, cemented to an 8-inch length of ¼ in. Bakelite shaft, is an invaluable shop tool, according to Otto Buder of St. Louis. It is used to knock tubes, condensers and other parts while the set is in operation to isolate noisy components. The other end is cut down for use as an aligning screwdriver.

"EXELRAD" UNIVERSAL OUTPUT TRANSFORMER, TYPE 96.



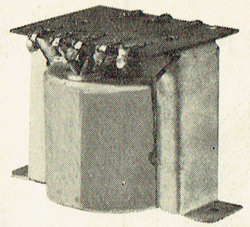
Primary Connections.

Output Stage.	Single Valve.	Push-pull Valves
19 (Class B)	—	1, 3, & 5
31	2 & 4	1, 3, & 5
33	2 & 4	1, 3, & 5
42	2 & 4	1, 3, & 5
45	1 & 3	2, 3, & 4
47	2 & 4	1, 3, & 5
71A	1 & 3	2, 3, & 4
2A5	2 & 4	1, 3, & 5
6F6	2 & 4	1, 3, & 5

Secondary Connections.

Impedance of Voice Coil.	Terminals.
1-2 ohms	6 & 7
3-4 ohms	7 & 8
5-10 ohms	6 & 8

ALWAYS ASK FOR EXELRAD COMPONENTS



Type 96

This Transformer is suitable for replacing speaker output Transformers of almost any type—see diagram at left for full particulars—built from Genuine STALLOY, like all EXELRAD TRANSFORMERS—NOT WITH TRANSFORMER IRON.

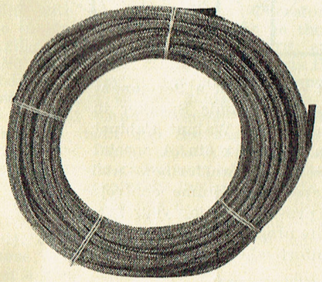
No. 96. ***Price 15/-***

EARTH–" CLAMPS."

Made from Heavy Gauge Brass.

½in. Waterpipe .... **7½d.** each
¾in. Waterpipe .... **9d.** each
1in. Waterpipe .... **10d.** each

SHIELDED LEAD-IN WIRE.



SCREENED LEAD-IN.

In localities where interference from power sources are prevalent it will be found that using shielded lead-in wire will considerably reduce noise, it having been definitely proved that the lead-in picks up most of the interference. The shield, which is the outside braid, must be suitably earthed.

YOUR VALVES.

One of the most common questions received is, "Why doesn't my set pull in the stations it used to, and why is the tone so poor?" In nearly all cases the right answer is—valves worn out.

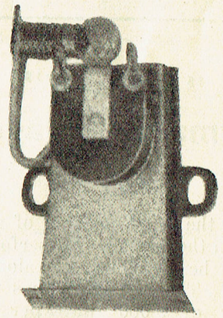
When a valve is new, the filament produces a satisfactory electron flow between the filament and the plate. This flow is controlled by the grid. This briefly describes the elementary principles of how a valve works. When the filament becomes less active its flow of electrons becomes thinner, which means that the resistance of the valve increases, and in this condition its amplifying and rectifying properties are considerably reduced, with a consequent loss of signal strength and, in the case of audio valves, distortion.

There is no hard and fast rule of how often valves should be renewed, but the usual manufacturer's rating is 1,000 working hours. This is as often as not well out, and there are many cases where good quality valves have lasted three and four years. When your valves have been in operation for 1,000 working hours, it is a sound policy to have them tested, replacing any that are inefficient with new ones, and the set will prove to be as good as it was when new.

We have the latest type of Tube Checker available for Testing all Types.

Call and let us check your Valves Free and without obligation.

PLESSEY TUNING METERS.



Price, Complete with Escutcheon.

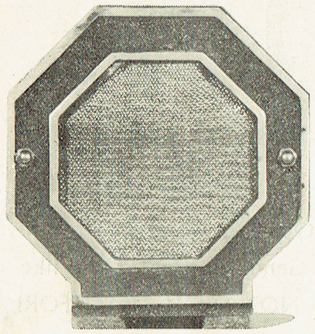
No. PT100 .... **10/- each**

(Lamp extra)

WE SPECIALISE IN AUDIO-POWER TRANSFORMERS, POWER CHOKES, Etc.

LOUD SPEAKERS " PLESSEY "

" Microvox " Extension Type

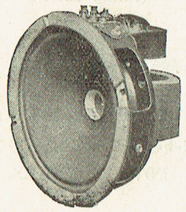


A Permanent Magnet Speaker housed in an octagonal Black and Chrome Steel Cabinet (Self-contained), fitted with an on-off switch and volume control.

MS5 .... Price **55**/– each

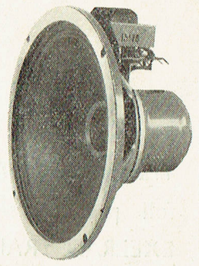
" Plessey " Permanent Magnet Type

This is the finest Speaker of the PM Type on the market. Its performance cannot be equalled let alone surpassed. The MAGNET has a Flux density of 9,000 lines per square inch; this fact alone denotes just how sensitive it really is. The output Transformer is especially constructed to handle exceptional overloads.

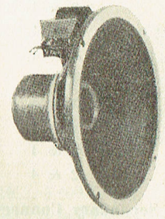


No. P872 .... Price **37/6**

Made by England's Leading Manufacturers of Radio Equipment, the output of their various types is remarkable, reproducing the high notes with remarkable fidelity, and gives remarkable response on all frequencies,



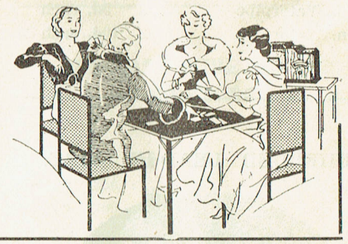
No. 807, 8 in.
Price 32/6

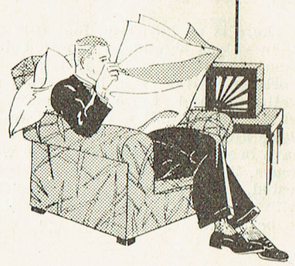


No. 808, 6½ in.
Price 27/6

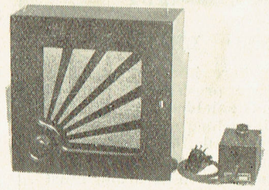
Additional Speaker.

Easily connected to your present set, this extra speaker enables you to have radio in two rooms at once. The set in the drawing-room —and the extra speaker is available for the nursery—the kitchen—the sick room—or for the study.





It consists of a Permanent Magnet Dynamic Speaker in a handsome Walnut Cabinet 12in. x 12in. x 6in. A special matching transformer and **independent** volume controls are provided. Enjoy your favourite programme in peace and comfort where you want it.



Adaptable to any set.
Price **£7/10/–**
(Wiring, if any, extra).

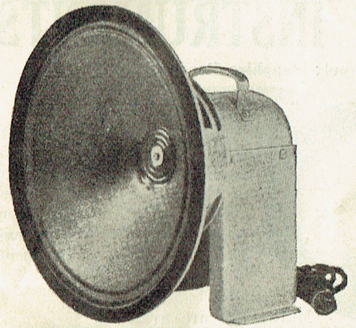
LOUD-SPEAKERS

(WRIGHT DE COSTER)

THE SPEAKER WITH THE SOLID CENTRE SPIDER.

The model 309 is very efficient so that an amplifier, to fulfill a certain requirement may be operated below its maximum rating, resulting in very much better tone quality.

The cone in the 309 reproducer is especially designed to operate perfectly with sound on film. While it emphasizes the voice frequencies, it covers an extremely full range so that the rest of the register is in no way injured. This means the voices are clearly and distinctly enunciated, yet the music will still retain all its original character.



MODEL 309.
1000 OHM. FIELD.

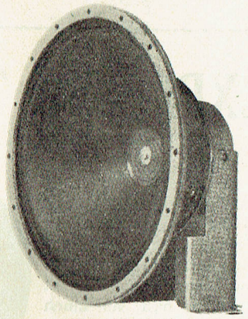
The **patented solid leather** centre spider maintains the voice coil in a perfectly centred position but still allows the cone great freedom of movement. The back of the cone housing is dustproofed and the centre leather spider is solid with no perforations. Therefore, the inside of the reproducer is thoroughly protected against dust, grit, etc.

No matter what climatic conditions the model 309 theatre reproducer is operated under, it will be doing its work in an efficient manner almost indefinitely. The cone itself and the leather centre spider are both moisture-proof. All metal parts are cadmium plated and then painted to absolutely insure long life.

The model 309 has five different input impedances: 10 (directly to the voice coil), 500, 1,000, 1,500, and 4,000 ohms. These different impedances allow the user a great deal of latitude when matching several speakers to an amplifier, eliminating the need of special impedance matching transformers. One of the illustrations above shows the back view of the model 309 where you can see the terminal strip with all these different impedances plainly marked.

Conservative maximum puwer handling capacity, 15 watts.

The field resistance of the standard model 309 is 3,000 ohms and is made to operate on 220 to 275 volts D.C. at a current of 75, to 90 mills. But any specified field resistance to operate on any D.C. voltage can be furnished. The maximum field dissipation is 25 watts and the minimum for efficient operation, not under 16 watts.



MODEL 1980.

Developed and designed for the better full console radios, phonographs and smaller indoor sound installations. The full, rich mellow tone so pleasant and much in demand by all lovers of music is further assured at good volume through the use of an extra large 2¼-in. voice coil.

Voice coil impedance: 10 ohms at 400 cycles.

Universal voice coil transformer for all output tubes.

Any special transformer furnished at no additional cost.

Standard field resistance of D.C. model, 2,500 ohms.

Field resistance made to any specification providing the field dissipation does not exceed 18 watts maximum or less than 12 watts minimum. There is no additional cost for a special field.

A. C. Model 3660 is furnished with an integral A. C. Supply utilizing an 83V rectifier tube.

Dimensions on above models: Cone, 10 inches; Outside measurement of cone bracket, 12⅛ inches; Depth, 7 3/16 inches.

Finish on above models—bright rust-proof cadmium plate.

MODEL 790—10in. 1000 Ohm. FIELD FOR PUSH PULL 45's.

MODEL 1650.—PARA CURVE.
HIGH FIDELITY MODEL.
1000 FIELD, PUSH PULL.

One of the greatest of recent developments in the speaker industry. The new curved cone extends the range of the reproducer into the higher frequencies further than was ever possible before. Sub-harmonics are completely eliminated, assuring a new purity of tonal response. **A full 12in. dynamic, equipped with a universal output transformer.** Voice-coil impedance 2.6 ohms at 400 cycles. Maximum field dissipation 16 watts. This speaker is particularly designed for the better full console radios, smaller indoor sound installations.

THE SOLID CENTRE SPIDER PROTECTS the AIR GAP AGAINST WATER, DIRT AND GRIT. THIS IS ESSENTIAL FOR OUTDOOR INSTALLATIONS.

This reproducer has a water-proof cone and all metal parts are cadmium plated. It has a large field, excellent power handling capacity and is perfectly adapted for both outdoor and indoor installations.

Voice coil impedance: 10 ohms at 400 cycles.

Universal voice coil transformer for all output tubes.

Any special transformer furnished at no additional cost.

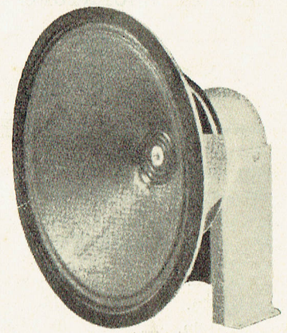
Standard field resistance of D. C. Model, 2,500 ohms.

Field resistance made to any specification providing the field dissipation does not exceed 22 watts maximum or less than 15 watts minimum.

There is no additional cost for a special field.

A. C. Model 4620 is furnished with an integral A. C. Supply utilizing an 83V rectifier tube.

Dimensions on above two models: Cone, 10 inches; Outside measurement of cone bracket, 12⅛ inches; Depth, 8-5/16 inches.



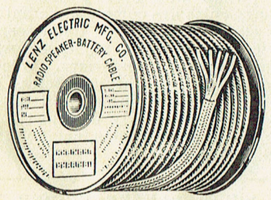
MODEL 2490.

Prices and Particulars on Application.

SPAGETTI TUBING.

1½ mil	....	3½d. yd.
2 mil	....	3½d. yd.
3 mil	....	4d. yd.
4 mil	....	5d. yd.
5 mil	....	6d. yd.
6 mil	....	7d. yd.

SPEAKER CORD.

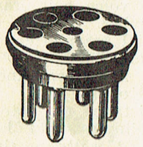


4-wire	....	Per yd. 1/3
5-wire	....	Per yd. 1/6

BATTERY CABLE.

5-wire	....	Per yd. 1/6

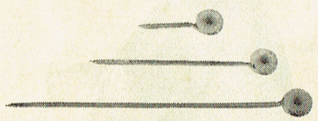
SPEAKER PLUGS.



Pure Bakelite with N.P. Pins. Cords are easily fitted.

No. S.P., 4 Pin	....	9d. each
No. S.P., 5 Pin	....	9d. each

LEAD-IN INSULATORS.



Especially imported to fill a long-felt want. Use these to prevent your Aerial Lead-in coming in contact with the roof or spouting.

No. 425, 3in.	....	4d. each
No. 430, 7in.	....	7d. each
No. 433, 12in.	....	9d. each

Made from Heavy Gauge Steel with Coach Screw Thread.

INSULATORS—Stand-off Type.

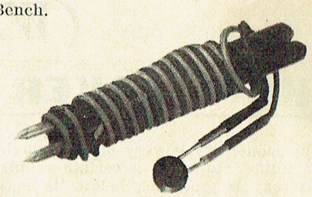
A heavy brown glazed Porcelain Insulator, suitable for Mounting.

TRANSMITTING COILS Or ANCHORING WIRES, Etc.

No. 401 .... Price **1/3** each

TEST PRODS.

A valuable addition to any Serviceman's Bench.



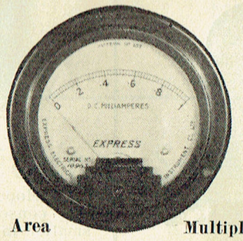
Heavy Bakelite Handles with two yards of Red and Black Cord. Brass Points.

No. TP5 .... Price **5/- pair**

"EXPRESS" TEST INSTRUMENTS

(50% More Iron; 50% Larger Magnet; Sapphire Bearings).

They are a little larger than the accepted standard of small meters, being 3¼ x 1⅞, but this additional size allows the incorporation of a Magnet which gives half as much power as ordinary types, stronger springs having higher



Torque characteristics, quicker response and a guaranteed overload factor of 600 per cent. with 25 per cent. less power consumption. Scales are 25 per cent. longer, giving easy readability.

Standard Shunts Area Multipliers are available

MILLIAMPMETERS.
(2% Accuracy)

	Price. £ s. d.
0.1 M/A	2 7 6
0.6 M/A	2 12 6
0.12 M/A	2 12 6
0.30 M/A	2 12 6
0.60 M/A	2 12 6
0.120 M/A	2 12 6
0.300 M/A	2 12 6

D.C. VOLTMETERS.
(1000 Ohm, Per Volt).

0.1 Volts	3 2 6
0.2 Volts	3 2 6
0.3 Volts	3 2 6
0.6 Volts	3 2 6
0.12 Volts	3 2 6
0.30 Volts	3 2 6
0.60 Volts	3 2 6
0.120 Volts	3 2 6
0.300 Volts	3 19 9
0.600 Volts	5 6 3
0.900 Volts	6 11 3
0.1200 Volts	9 1 3

A WRITTEN WARRANTY WITH EVERY INSTRUMENT.

A.C. VOLTMETERS (Rectifier Type).
(1000 Ohms. Per Volt.)

	Price. £ s. d.
0.1 Volts	5 9 3
0.2 Volts	5 9 3
0.3 Volts	5 9 3
0.6 Volts	5 9 3
0.12 Volts	5 9 3
0.30 Volts	5 9 3
0.60 Volts	5 9 3
0.120 Volts	5 9 3
0.300 Volts	6 13 3
0.600 Volts	7 14 9
0.900 Volts	8 18 3
0.1200 Volts	11 17 6

OHM METERS.

0.1000 Ohms	5 9 3
0.10,000 Ohms	5 9 3
0.100,000 Ohms	5 9 3
Dual Range	6 13 3
Triple Range	6 17 6

Special Low Resistance Movement approximately 6 Ohms at 3 M/A for use with Thermal Couple.

Price .... **£2/16/3.**

D.C. MULTIMETERS

In Carrying Case **£8/2/6**

A.C./D.C. MULTIMETERS
2% Accuracy.

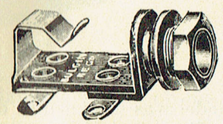
In Carrying Case **£11/17/6**

FLEXIBLE BLACK WOVEN SILK COVERING.

Ideal for Extension Leads.

14/0076	....	8/- 100 yds.
23/0076	....	11/3 100 yds.

PHONE JACKS.

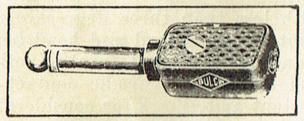


No. J2.

Highest Quality. Single Circuit which only projects 1in. behind the panel.

Price .... **1/6** each.

JACK PLUGS



(Small moulded)

A new Jack Plug with contacts Silver-plated. Easily wired and provided with Internal Cord Grips.

No. P38 .... Price, **1/-** each

METAL DUPLEX DIODE-TRIODE

We've been predicting the introduction of a duplex diode-triode in the metal series and the 6Q7 now makes its appearance, significant because there has been some question about the ability of maufacturers to produce multi-purpose types in the new construction.

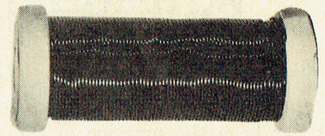
The 6Q7 has a 6.3 volt, 0.3 amp. heater. Typical conditions for the operation of the triode section as a Class A amplifier (shell tied to cathode) are as follows:

Plate	250	100 volts
Grid	—3	—1.5
Amplification factor	70	67
Plate resistance	58,000	84,000 ohms
Mutual	1,200	800 ohms
Plate current	1.2	0.4 ma.

The tube uses a 7-pin octal base. Connections, looking into the top of the socket, reading clockwise after the locater pin are: cathode, heater, unused, diode, diode, plate, heater, shell. The triode grid is on top.

When resistance coupling the triode the same external plate resistance values may be used as with the type 75. The bias should be about ½ volt more with a 250 volt supply and ¼ volt more with a 100 volt supply than when using a 75.

HENLEY WINDING WIRES



S.W.G.	Enam.	S.C.C. & Enam.	D.S.C.	D.C.C.
8	—	—	—	1/11½
9	—	—	—	1/11½
10	2/1	2/3	.....	2/–
11	2/1	2/3	—	2/–
12	2/1	2/3	—	2/1
13	2/1	2/4	—	2/2
14	2/1	2/4	—	2/1
15	2/1	2/4	—	2/1
16	2/2	2/6	—	2/1
17	2/3	2/7	—	2/2
18	2/3	2/8	4/6	2/3
19	2/3	2/11	4/8	2/6
20	2/3	3/–	4/9	2/8
21	2/3	3/2	4/11	2/11
22	2/4	3/5	5/–	3/1
23	2/6	4/5	5/2	3/9
24	2/8	4/10	5/4	4/–
25	2/9	5/4	5/9	4/5
26	2/11	6/–	6/4	5/–
27	3/–	5/6	6/9	5/–
28	3/2	6/3	7/3	5/2
29	3/5	6/7	7/6	5/8
30	3/7	7/10	8/4	6/6
31	3/9	8/4	8/8	7/1
32	3/11	9/3	8/11	7/9
33	4/3	10/3	9/4	8/5
34	3/7	11/9	9/11	10/11
35	3/9	13/7	10/11	12/4
36	4/1	15/8	11/11	14/–
37	3/7	—	13/9	16/10
38	3/11	—	15/8	19/7
39	4/4	—	18/6	23/8
40	4/10	—	21/8	26/–
41	5/3	—	25/4	—
42	5/9	—	29/–	—
43	7/11	—	35/9	—
44	9/3	—	42/–	—
45	13/2	—	—	—
46	17/3	—	—	—
47	24/8	—	—	—

INSULATING MATERIAL

SILK TAPE (Bias Cut).

½in. .006	50yd. Rolls, 4/6
½in. .008	50yd. Rolls, 4/6
¾in. .006	50yd. Rolls, 6/–
¾in. .008	50yd. Rolls, 6/9

EGYPTIAN TAPE.

½in.	Per gross yds., 4/6
¾in.	Per gross yds., 6/–
1in.	Per gross yds., 9/–

TREATED PAPER.

No. 1 .005	Per yd., 1/9

EMPIRE TAPE (Bias Cut).

½in. x 007	Gross yds., 6/–
½in. x 010	Gross yds., 10/–
¾in. x 007	Gross yds., 10/–
¾in. x 010	Gross yds., 12/–

EMPIRE CLOTH, 36in. Wide.

.007 (7 mil)	Per yd., 3/–
.008 (8 mil)	Per yd., 3/3
.010 (10 mil)	Per yd., 3/6

SILK CLOTH.

.006 (6 mil)	Per yd., 5/–
.007 (7 mil)	Per yd., 6/–

Rothermel-Brush Piezo-Electric PICK-UPS

Their Characteristics, Performance and Operation

It has been the practice in the past when reproducing phonograph records electrically to use an iron armature in a magnetic field in order to convert the mechanical movement of the stylus into electrical energy. This method necessitated severe mechanical damping to obtain a fairly uniform response because of the great mass of iron armature. Considerable inertia was necessary to provide reproduction over the lower frequency range, resulting in undue record wear and tear, amplitude distortion and frequency discrimination.

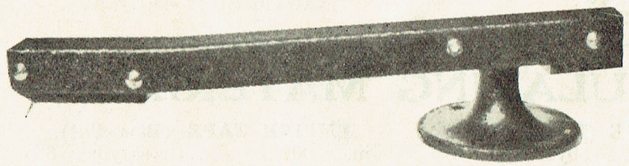
Rochelle Salt piezo-electric crystals lend themselves admirably for use in the construction of high fidelity electrical pick-ups. The chief characteristics of these instruments are clearness of attack, extreme sensitivity resulting in an exceptionally good output voltage and a greater frequency response than that which can be secured with any other type of commercial pick-up.

CARTRIDGE CONSTRUCTION.

The pick-up cartridge or head, as it is more commonly called, consists of a bimorph crystal element to which is coupled an extremely light stylus chuck. Due to the flexibility of the crystal very little mechanical damping is required, resulting in reproducing element having a uniform response, but with necessary corrections for recording deficiencies, over an exceptionally wide range of frequencies and capable of handling maximum amplitudes with as little as one and one-half ounces of weight on the record. This assembly, which is thoroughly waterproofed and scientifically treated to avoid deterioration due to atmospheric conditions, is sealed into a Bakelite housing measuring 2¼-in. by ⅝-in. by ⅞-in.

PICK-UP ASSEMBLIES.

Two types of electrical pick-ups using piezo-electric cartridge heads are available, the Rothermel-British Standard Model S.8 and the De-Luxe Model.



Standard Model ..... Price **£3/15/–**

The Standard Model S.8.—The cartridge is housed in a very neat art steel finished channel type arm offset to provide correct tracking over the record. The pivoted base which tones with the arm is drilled ready for mounting, and the unit is supplied complete with head rest and mounting template. Measurements are as follows: Centre of needle to centre of base, 8 inches; diameter of base, 2¾ inches; height, 2-1/16 inches.

De-Luxe Model ..... Price **£5/10/–**

The De-Luxe Model.—This model was designed in collaboration with Mr. P. Wilson, Technical Advisor to the "Gramophone," and embodies features which will completely satisfy the most critical musician and connoisseur of recorded music. The tubular type art bronze-finished arm carries a special high fidelity piezo-electric cartridge capable of providing an even greater frequency response than the standard model. The base is equipped with a ball race movement, which ensures perfectly smooth transit over the record whilst the shape of the arm allows for correct tracking with less than three degrees error of alignment at any point on the record and head bearings are self-aligning, and the patented front pivoting arrangement of the arm ensure that needle contact in the record groove is constant and allows for considerable lateral inertia without increased pressure on the record. The complete head is pivoted to the arm so that it can be turned back to facilitate needle change. Measurements are as follows: Centre of needle to centre of base, 9½ inches; overall length of arm, 10½ inches; diameter of base, 2-1/16 inches; height, 1⅞ inches.

ELECTRICAL CHARACTERISTICS.

The electrical capacity of the cartridge used in the Standard S.8 model is 0.0011 mfds. and impedance at 60 cycles 80,000 ohms. The capacity of the De-Luxe cartridge is .00125 mfds. and impedance 100,000 ohms at 60 cycles.

OPERATION.

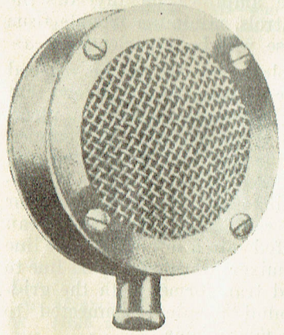
The Rochelle Salt piezo-electric crystal takes the form of a condenser and the pick-up should therefore not be connected directly into the plate or cathode circuit. The black connecting lead is the earth lead and care should be exercised to ensure that the pick-up is connected with this lead to earth and the other to grid. In general a volume control of 500,000 ohms resistance will prove most efficient with both types of pick-ups, but if it is required to give less prominence to the bass response then a control of 250,000 or 100,000 ohms will prove suitable. In locations such as with public address installations where acoustical properties may be bad a parallel resistor of 1 megohm may be used to attenuate frequencies below 1,000 cycles, whilst if it is desired to preserve the higher frequencies a condenser of .005 to .01 mfds. capacity with a 500,000 ohm volume control may be used. The use of parallel resistors and condensers are recommended only where unusual conditions prevail. Needles of the half-tone variety will be found most satisfactory and fibre needles can also be used with excellent results.

ROTHERMEL-BRUSH PIEZO-ELECTRIC MICROPHONES

Diaphragm Types
Characteristics and Operation

The diaphragm type of piezo-electric microphone, utilizing a single sound cell and duraluminium diaphragm is inexpensive and provides an output slightly higher than a condenser head and slightly lower than a carbon microphone whilst in other respects in permanence, quality and ruggedness of construction it possesses distinct advantages. Economy of installation is at once apparent when it is realised that no button current or polarizing voltage is required and further, due to the high impedance, the microphone may be connected directly to the grid, thus saving the cost of input transformers.

MODEL D104.



The piezo-electric sound cell is housed in a strong metal case, chromium-plated, measuring three inches in diameter by one inch deep. The microphone is furnished complete with a six-foot high quality low capacity shielded cable.

Write Us for Prices.

ELECTRICAL CHARACTERISTICS.

The D 104 microphone should be connected directly to the grid and ground of the amplifier input valve. This is possible due to the high impedance of the unit, approximately 80,000 ohms at 60 cycles. A parallel resistance of not less than 5 megohms should be used and any resistance of lower value will tend to impair the low frequency response. Where it is desired to use a cable of more than 30 feet in length a transformer should be used and the winding next to the microphone should have an impedance of approximately 100,000 ohms.

The frequency response ranges from 80 cycles to 8,000 cycles and the output level is approximately – 60 d.b.

ROCHELLE SALT CRYSTALS.

The standard Rochelle Salt crystals produced to-day are clear and homogeneous—void of aqueous mother liquor. These clear and glass-like crystals are of nearly uniform size, above 22 inches long with cross sections of 3½ inches wide by 2 inches high and weigh about 5 pounds. By exercising certain precautions the crystals yield easily to machining by improved methods of sawing and milling that have been developed to replace the tedious and inaccurate wet string method of cutting previously used. To-day sections of crystal cut accurately to the desired dimensions are easily obtainable. When assembled by methods developed by skilled technicians they present the finest, most accurate, most reliable piezo-electric generators and drivers that are available in the fields of acoustic and radio engineering.

WIDE APPLICATION.

It will be evident, to persons only partially familiar with the problems involved, that a substance which is capable of reproducing in motion variations of electrical potential applied to it, and conversely, of producing in voltage variations of mechanical displacement to which it may be subjected, should have immediate application in the field of acoustical reproduction. First commercial applications of the piezo-electric phenomenon were concerned with the radio microphone and loud speaker. Pick-ups and ear-phones followed soon after. Other applications include oscillographs for use in television, stethoscopes, instruments for the deaf and a long list of other devices, in which an electro-magnetic driver has hitherto been employed.

Applications of this principle are destined to become more popular and more widespread as the advantages of low cost, lightness, ruggedness and self energization become more fully appreciated. One can even predict with confidence that the phenomenon of piezo-electricity (or pressure electricity) will some day be used in the familiar telephone instrument.

The New

ROTHERMEL-BRUSH TYPE B.2.S. PIEZO-ELECTRIC SOUND CELL MICROPHONE

FOR PUBLIC ADDRESS, AMATEUR PHONE AND REMOTE BROADCAST PICK-UP USE

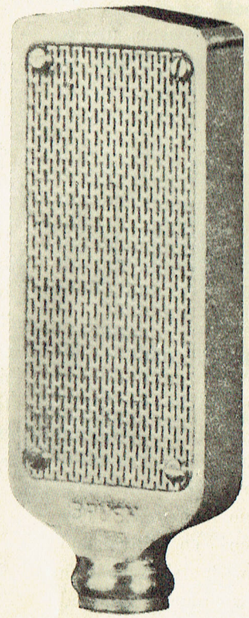
The new Rothermel-Brush Type B.2.S. Sound Cell type piezo-electric microphone has been specially engineered for use in the fields of public address, amateur phone and remote radio broadcast pick-up where an inexpensive instrument of desirable frequency characteristics is important.

The piezo-electric Rochelle-Salt Sound Cells embodied in this microphone insure immunity from ill effects through adverse temperature and humidity conditions to as high as 130°F.

In common with all types of Rothermel-Brush piezo-electric microphones, model B.2.S. requires neither button current or polarizing voltage, connection being made directly into the grid of the first valve of a conventional high gain amplifier.

No frequency discrimination will result from the use of long shielded cables, as the sound cells represent a capacity load or negative reactance and long cable will merely reduce the output with equivalent loss at all frequencies.

In order to figure loss in output level due to length of cable the following formula may be used: DB loss = 20 log $(1 + \frac{C1}{C2})$ where C1 represents cable capacity and C2 microphone capacity.



TYPE B2S
ACTUAL SIZE

General Specifications and Operation

The microphone should be connected directly into the grid of the first valve of a conventional high gain amplifier using a grid leak of from 2 to 5 megohms. No transformers, button current or polarizing voltage is necessary. Mixing should preferably be carried out after the first amplifying stage in order to avoid loss in low frequency response and the use of transformers or complicated attenuator circuits. Good quality volume controls may be used, and, as considerable amplification precedes the controls, minimum trouble from noise will be experienced.

Cable terminals can be reached by removing the four screws that hold the cover screen in place. The centre terminal is grounded to the case and is clamped and soldered to the cable shield, providing an effective anchor for the cable. The microphone can be fed into a low impedance line or mixer by using a good line to grid transformer with the grid-ground terminal connected to the microphone.

Response is flat to about 6,000 cycles and there is a slightly rising characteristic beyond this point to approximately 12,000 cycles. This rising characteristic compensates for losses in the higher frequencies usually found in associated equipment.

The instrument is furnished complete with 15 feet of low loss shielded cable.

Output level:
—66 DB (0DB = 1volt/bar).

Internal Impedance:
Capacitive (.005 mfd.)

Load impedance. Grid of valve with 2—5 megohm grid leak.

Size: 4¼" × 1 9/16" × 9/16" deep. Weight: 3 ozs.

WRITE US FOR QUOTATIONS!

Call on or write us for Public Address Equipment

Speakers, Microphones, etc.

PIONEER GEN-E-MOTORS Replaces B Batteries

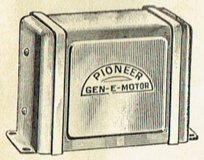
Easily attached to battery operated receivers and operate from any six-volt accumulator.

The Pioneer Model JW Gen-E-Motor replaces vibrator type power supplies in all popular makes of auto radio receivers. It may be installed within the chassis housing of any battery set.

The extreme compactness, overall dimensions being only 4¼" high by 5½" wide by 2¾" deep, makes the changeover easy. No circuit alterations need be made to affect the performance of the radio receiver. Connect the Pioneer Gen-E-Motor leads according to the complete instructions furnished with each model.

The uniform voltage output supplied by the Pioneer Gen-E-Motor eliminates the frequent noisy and weak reception that is usually traceable to vibrator failure and misadjustment.

At the remarkably low price which the new Model JW is offered, it is far more economical to replace battery vibrators with this dependable unit—and gain all these exclusive advantages of the Pioneer Gen-E-Motor.



Model JW.

No adjustments, no oiling, no servicing. High grade ball bearings run for millions of revolutions without trace of wear or need of lubrication. Absolutely noiseless.

Type JW35: 6V, 1.1 Amp, Drain Output 140 Volts 25 Mills. Price, **£5.**

Type JW18: 6V, 1·65 Amp. Drain. Output 180 Volts 30 Mills. Price, **£5.**

Type JW80: 6V, 1.9 Amp. Drain. Output 180 Volts 40 Mills. Price, **£5.**

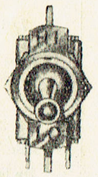
Type JW32: 32 Volts Input, .4 Amp. Drain. Output 180 Volts 32 Mills. Price, **£5.**

Type JW: FILTERS FOR ABOVE— Price, **£1/15/0.**

Type 5180AT: 6V, 1.9 Amp· Drain. Output 180 Volts 40 Mills, with Built-in FILTERS. Price, **£7/10/0.**

SWITCHES TOGGLE.

No. 450.
Single Pole, on and off, with Bakelite Base.
Price, **2/3 each.**



No. 485.
Two-Pole, Double Throw.
Price, **2/9 each.**

DIAL LIGHT HOLDERS.

Heavy Pattern, made from Heavy Gauge Metal.

No. DL2 .... Price, **6d.** ea.

RADIO PANEL LAMPS, Etc.

2.5V	Clear Tubular	**1/6** each
3.8V	Clear Tubular	**1/6** each
6.2V	Clear Tubular	**1/6** each

WAVE FILAMENT
Non-Focussing.

2.5V	Clear	**7d.** each
3.5V	Clear	**7d.** each
2.5V	½ Opal	**7d.** each
3.5V	½ Opal	**7d.** each

BICYCLE LAMPS.

4.5V	Clear	**1/–** each
4.5V	Satin Frosted	**1/3** each

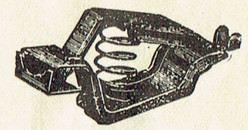
TORCH LAMPS (Spotlight).

2.5V	Clear	**1/–** each
3.8V	Clear	**1/–** each
6.2V	Clear	**1/–** each
6.2V	Satin Frosted	**1/3** each

AERIAL CLEATS.

Galvanised iron Cleats for securing halyard ropes.
No. AC3 .... Price **6d.** each

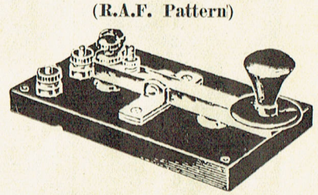
UNIVERSAL BATTERY CLIPS.



British made, these Clips have good strong springs that make a sure contact. Three sizes available.

No. 5—5 Amp		**6/9** dozen
No. 25—25 Amp		**9/–** dozen
No. 50—50 Amp		**12/–** dozen

MORSE KEY.
(R.A.F. Pattern)



An exceptionally heavy and well-made instrument with heavy Base and NP Terminals.
No. MK15 .... Price **15/–**

HENLEY ADHESIVE TAPE.

2oz. Display Cartons		**2/3** per lb.
4oz. Display Cartons		**2/–** per lb.
½ lb. Rolls, ½ and ¾"		**2/–** per lb.

TRANSFORMERS
Built to
YOUR OWN SPECIFICATION.
Write Us.

ALL BRITISH T.C.C. CONDENSERS

ELECTROLYTIC CONDENSERS.

WET TYPE (Aluminium Containers).

Type No.	Voltage D.C. Working.	Capacity Mfds.	Price each.
602 (1in. dia.)	440	4	5/–
602 (1in. dia.)	440	8	5/–
80X (1⅝in. dia.)	500 (Peak)	8	5/–
802 (1⅝in. dia.)	440	16	7/6

DRY TYPE.

Type No.	Voltage D.C. Working.	Capacity Mfds.	Price each.
902 (Aluminium Cans)	500	8	6/8
702 (Cardboard Containers)	500 (Peak)	4	5/–
,,	,,	4 × 4	6/6
,,	,,	8	5/–
,,	,,	8 × 8	10/–

DRY TYPE, in Metal Case.

501	12	1000	21/9
,,	,,	2000	23/–
,,	,,	2000+	
		2000	29/9
511	25	2000	30/–

DRY TUBULAR TYPE.

12 AT	12	50	3/6
25 AT	25	25	3/6
50 AT	50	10	3/6
200 AT	200	2	3/6

PAPER AND MICA CONDENSERS.

Working Voltage	250	350	450	200	200	200	250	250
Capacity Mfds.	Type M Flat Mica.	Type 33 Non-inductive Tubular Paper.	Type 43 Non-inductive Tubular Paper.	Type 50 Non-inductive Paper.	Type 55 Tin Cases Paper.	Type 61 Non-Inductive Paper.	Type K63 Tin Cases Paper.	Type 64 Tin Cases Paper.
.000025—.0003	10d.	—	10d.					
.0004—.0009	1/2	—	10d.					
.001	1/3	—	10d.					
.002	1/6	—	10d.					
.003	1/6	—	10d.					
.004	1/9	—	10d.					
.005	2/–	—	10d.					
.006	2/3	—	10d.	—	—	—	—	2/–
.007—.009	2/6	—	10d.	—	—	—	—	2/–
.01—.09	2/6	10d.	—	—	—	—	—	2/–
.1	—	1/–	—	3/9	—	—	—	2/3
.2	—	1/–	—	4/3				
.25	—	1/3	—	4/6	—	—	—	2/6
.5	—	1/8	—	5/–	—	—	—	2/9
1	—	2/6	—	5/–	2/9	—	3/–	
2	—	—	—	7/–	3/9	—	4/–	
3	—	—	—	—	—	10/–		
4	—	—	—	—	6/6	11/	7/–	
5	—	—	—	—	—	14/6		
6	—	—	—	—	—	17/–		

PAPER CONDENSERS.

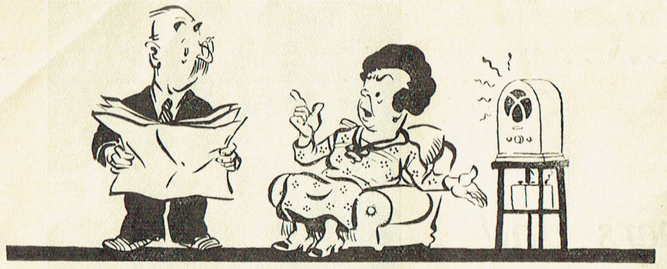
Working Voltage	250	350	450	500	750	800	1000	1500	2000
Capacity Mfds.	Type 65 Tin Cases Paper.	Type 86 Tin Cases With Tags Paper.	Type 87 Tin Cases With Tags Paper.	Type 95 Tin Cases With Tags Paper.	Type 105 Tin Cases With Tags Paper.	Type 101 Tin Cases With Terminals Paper.	Type 106 Tin Cases With Tags Paper.	Type 121 Tin Cases With Terminals Paper.	Type 108 Tin Cases Paper.
.02—.06			3/3						
.1		2/6	3/3	3/6	3/9	—	5/–	—	12/6
.25		2/9	3/6	3/6	4/6	—	6/6	—	13/6
.5		3/–	3/9	3/9	5/–	—	9/9	—	20/–
1	3/3	3/3	4/6	4/9	6/–	12/–	13/6	17/–	28/9
2	4/–	4/6	7/–	7/6	11/–	18/–	16/6	26/–	57/6
4	7/6	8/–	11/–	14/–	19/6	35/–	20/6	50/–	100/–
6	11/–	11/6	16/–	18/6	24/–	50/–	28/–	—	140/–
8	16/3	16/–	21/–	24/6	31/–	—	39/–	—	172/–

You'll find T.C.C. In all the best Commercial Receivers and Broadcasting Transmitters

You must build QUALITY into your set—you must attain the high standard of reception reached by the world's leading commercial manufacturers. But how to do this? You have not the elaborate laboratory equipment of these manufacturers, nor have you the trained staffs which have made progress possible. One thing you have, however, and that is an unmistakable record of the choice made by these specialists. Consistently, their choice for condensers has been **T.C.C.** The reasons are clear. Research and experience have substantiated the claims of high efficiency and outstanding dependability of T.C.C. These are the factors which affect you. For **Quality** and **Dependability** always use T.C.C.

T.C.C.
CONDENSERS

Distributors: TURNBULL & JONES, LTD.,
Electrical Engineers,
Auckland, Wellington, Christchurch, Dunedin, Hamilton. Palmerston North.

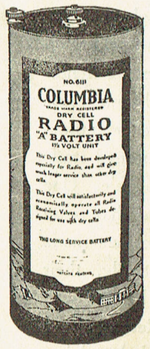


The Missus remarked after tea,
" This Wireless is not worth the fee.
The people next door
Have improved theirs galore.
With Columbia Layerbilt ' B.' "

Built to last—Columbia Batteries give you far longer service than the average battery. They are thoroughly dependable and ensure steady, even power during their long life. Insist on **Columbia** Batteries for both your Radio and Torch.

LAYERBILT "B's"

Built in layers so that every cubic inch is crammed full of energy. Columbia Layerbilt B's mean more power—longer life—increased volume and distance.

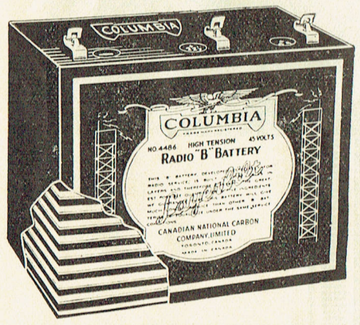


"A" BATTERIES

Specially built to give steady, even power—last longer—and give better all round service.

TORCH BATTERIES

Columbia outlast all others and give a bright, steady light. They are undeniably the best torch battery available.



British Made

COLUMBIA

TRADE MARK

RADIO and TORCH BATTERIES

We Stock and Recommend Columbia Batteries

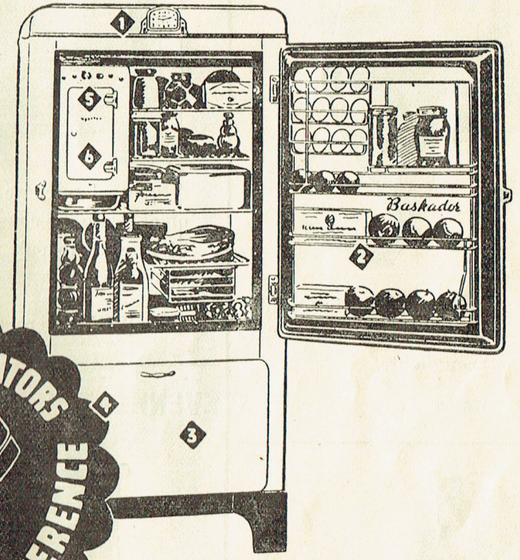
THE BEST KNOWN — THE BEST QUALITY — THE BEST VALUE

Just ONCE *in a* LIFETIME

YOU BUY A REFRIGERATOR...BE SURE IT'S

SPARTON QUALITY

● When you study carefully the many advantages offered by the Extra-Feature Sparton, you can't help but say to yourself—"Sparton looks good to me". Then, remember one more thing, the company behind this smart, ahead-of-the-time refrigerator has been building quality products for more than a third of a century. Never once in all those years has the Sparton management allowed quality to be sacrificed in the slightest degree for any reason whatsoever. This same management is still firmly upholding these rigid quality requirements.



1 ANTIFROST ELECTRIC CLOCK
2 BASKADOR
3 VEGABIN
4 20% to 30% GREATER ECONOMY
5 QUIET, FAST FREEZING UNIT
6 POSITIVE ICE TRAY RELEASE

SPARTON

The Extra-Feature Refrigerator

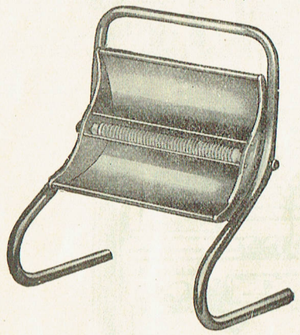
See your nearest Sparton Dealer or write us direct for Illustrated Literature.

"DON'T BE COLD this WINTER"

WE HAVE THE GREATEST SELECTION OF RADIATORS IN NEW ZEALAND.

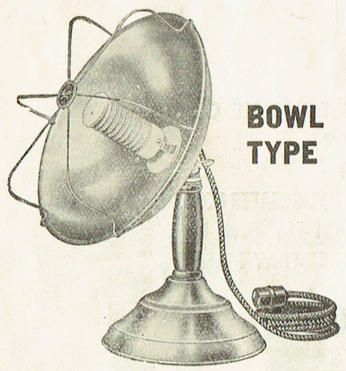
EVENHEAT "CHROMAGLOW"

(Projector Type)



A modern Type Reflector Fire in Tubular Steel Frame, finished in Chromium Plate throughout.

No. 1055, 1000 watts ..... Price, 47/6.

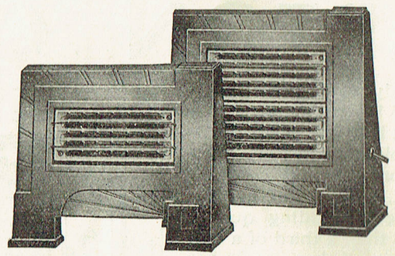


BOWL TYPE

A Bowl Type of exceptional value. Substantial base. Highly polished solid copper Bowl and high efficiency element.

No. 1003, 600 watts. Price 17/6.

EVENHEAT "WATTARAY"

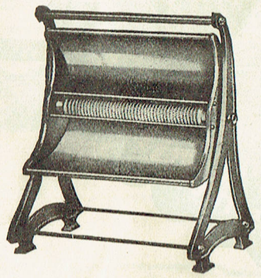


Colours available are French Grey and Brown.

A general purpose fire of artistic design equally suitable for home or office, soundly constructed of fine grain cast-iron, supplied in a variety of finishes to suit varying schemes of decoration; fitted with carrying handles.

No. 1132V, Viterous Enamelled, 1000 and 2000 watts **From 25/– to 42/6**

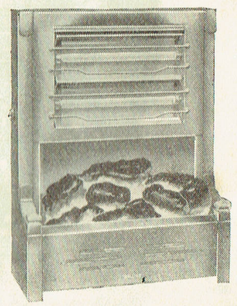
EVENHEAT "CHROMARAY"



The Reflector in this fire is mounted on elegantly designed cast-iron supports and a Chromium Plated Tube across the top serves as a carrying handle—Chromium Plated Reflector Art Frosted Silver supports.

No. 1056, 1000 watts. From 37/6.

FLICKERING COAL RADIATORS



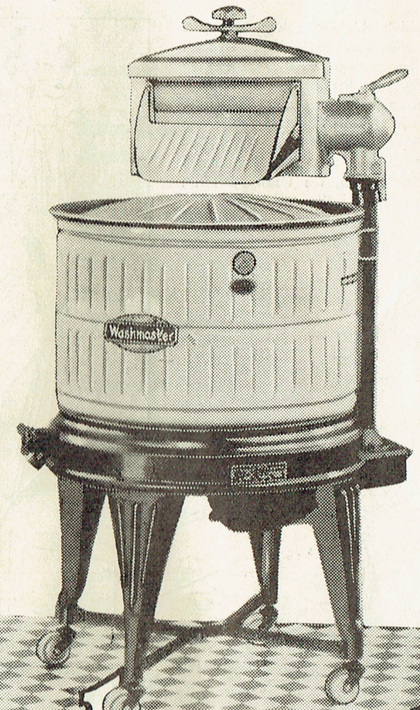
These flickering imitation Coal Fires truly impart the warmth and effect of the Coal Fire. They are clean and reliable.

From £5/10/–.

There Are Several Other Types to Choose From, All Representing Exceptional Value—Every One Made in Great Britain.

Now YOU *can have an* ELECTRIC WASHER

for £28/10/0



Tub is cream porcelain enamel inside and out; other parts attractively finished in apple green. Eliminates all menial labour.

Saves needless sewing, for buttons and fastenings remain uninjured when passing through the special "Washmaster" soft rollers.

Saves time, money and labour, and ensures better health.

Home laundry conditions are the best and most hygienic—your personal belongings are not mixed with others.

Fast washing results are ensured by the special "Washmaster" Agitator.

Four sturdy one-piece legs mounted on rubbered castors.

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You wouldn't think of going out in the styles of years ago. Styles have advanced. And so has cooking. MODERN cooking the Moffat way has eliminated the old-time fuss and bother and uncertainty. Today with a Moffat Electric Range you have such conveniences as the Therm-O-Matic Oven Heat Control and Insulated "Even Heat" Oven, the Utility Drawer, Cook-Quik Speed Element and many others. Visit our showrooms and see the modern Moffat Ranges.

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