The Listener In HANDBOOK

No 1. CALL SIGNS 6D

FEATURES

Call Signs of all the Australian Stations

List of the Principal Foreign Stations, with their call signs and wave lengths.

How to Make and Use Wave Traps.

Radio Installation Rules.

The Accumulator and Its Use.

Care of the Receiver.

H.T. and L.T. Batteries.

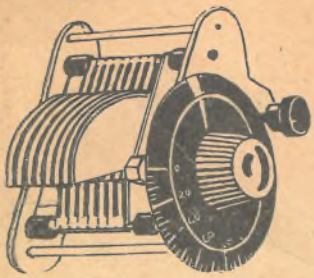
Amplification Simply Described.

Loud Speakers and all about them.

How to Build a Valve Set.

How to Make a Crystal Set.

Buckley's



.0003 cap - - 15/
.0005 cap - - 15/

W & M Condenser

These are its salient features: Square law, Ball bearing, Vernier adjustment, One hole fixing. Complete as shown, with knob and dial, 15/.

"BRANDOLA" Loud Speaker

The mellow "Brandola" has not a trace of distortion in its tone. It is famous for fine reproduction under every condition. Price,

£5/10/-

We distribute the following

RADIO RECEIVING SETS

Freshman Masterpiece, 5-Valve, £35 complete.
Gilfillan Neutrodyne, 5-Valve, £59 complete.
Hart Collins, 4-Valve Portable, £42 complete.
B. & N. 4-Valve Selective Receiver, £30/10/ complete.
B. & N. 3-Valve Selective Receiver, £21 complete.
B. & N. 2-Valve Selective Receiver, £14/14/ complete.

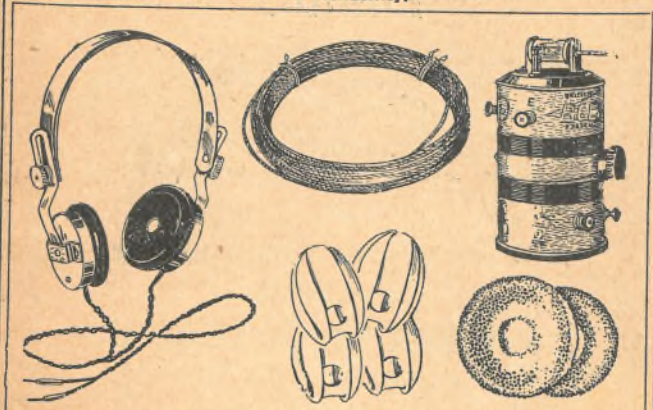
BUCKLEY & NUNN, LIMITED
Bourke Street, Melbourne

Buckley's

For Everything in

RADIO

There is so much variation in the true value of radio goods, that the most experienced wireless men find it wise always to go to a reliable store when purchasing any parts. The goods and prices listed on these two pages will show you that Buckley's well deserve their name for reliability.



Bebephone Crystal Set

The little receiver with a big reputation **14/- each**

A turn of the knob and you have 3LO. The simplest set there is to manipulate. Buckley's will sell it to you, complete, with Brandes' Headphones, pads and aerial equipment, for

45/-

Bourke Street, Melbourne
BUCKLEY & NUNN, LIMITED

For Quality Radio Apparatus

Consult—

AMALGAMATED WIRELESS (Australasia) Limited

Concerts from the other States heard without an Aerial with the Radiola Super 6-Valve Broadcast Receiver, the finest set manufactured in Australia. Another popular A.W.A. Receiver is the Radiola 1VC, a 4-Valve Set of excellent tone and volume, and handsome appearance.

Demonstrations Daily at Our Showrooms

167-9 QUEEN ST., MELBOURNE

Or at all Authorised Radiola Dealers.

Write or telephone Cent. 4861 for descriptive booklet.

Amalgamated Wireless (Australasia) Ltd.

THE SECOND LARGEST WIRELESS ORGANISATION IN THE BRITISH EMPIRE

167-9 QUEEN ST., MELBOURNE

97 CLARENCE ST., SYDNEY

BOWERS BUILDING, CHARLES ST., ADELAIDE

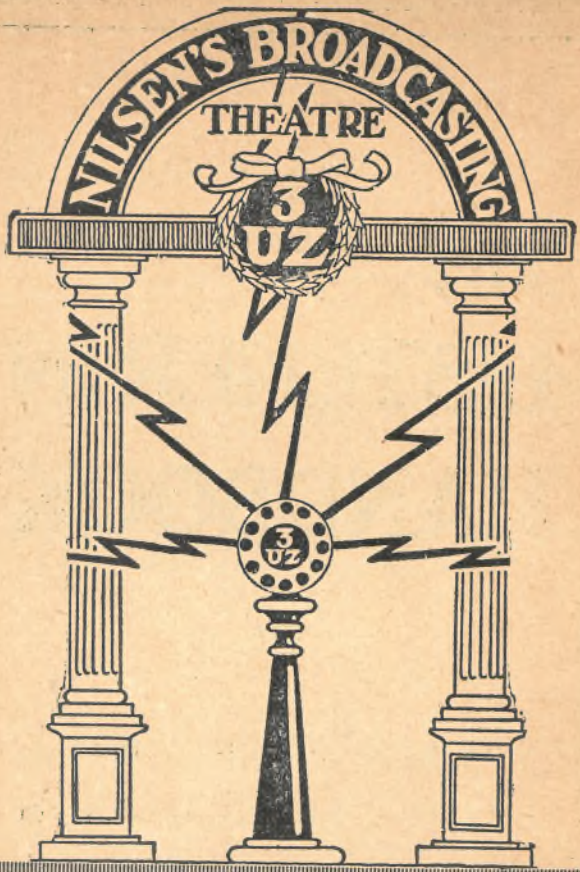
KING & KING CHAMBERS, QUEEN ST., BRISBANE.

The LISTENER IN HANDBOOK

OF

CALL SIGNS AND
USEFUL INFORMATION
FOR
RADIO ENTHUSIASTS

Price, SIXPENCE



Station 3UZ

is on the Air every Monday and Wednesday from 7.30 p.m. to 10.0. Wave length 319 metres.

Everything in Radio

All Radio Requisites of Quality at Low Prices.
"Federal" and "Victoreen" Sets a Speciality.
Write for Price Lists.

OLIVER J. NILSEN & Co.

45 Bourke Street. **332 Flinders St.**

Also at 35 King William St., Adelaide.

M130467/24
27.5.82

INDEX

First and Still Foremost

HOMECRAFTS—Australia's First Radio Dealers, and still the foremost Radio Store of Australia. "Experience Teaches."

RADIO SETS AND PARTS

Complete sets, semi-assembled sets, components—we supply anything or everything. Write for descriptive folders.

RADIO PARTS

From the smallest and cheapest to the largest and best. Our enormous stock has a radio part for every purpose at a price to suit every pocket. Write for big free Radio Catalogue.

RADIO BOOKS

Profit by the other fellow's experience. Read books that will show you how. A full range of all Australian, English and American books and magazines always available.

Material for all Hobbies

FRETWORK

A fascinating, useful and profitable pastime. Easily and cheaply started. We stock all tools, designs, material and fittings.

MECCANO

A real boys' hobby, instructive and interesting. A toy enjoyed by boys of all ages from 7 to 70. Spare and extra parts always in stock.

MODEL ENGINEERING

A hobby of outstanding interest for which Homecrafts can supply all necessary material. Rough and finished castings, boiler and engine fittings, lathes, tools and accessories. Call and see our big display.

MODEL AEROPLANES, PHOTOGRAPHY, CHEMISTRY, MECHANICAL TOYS, &c.

HOMECRAFTS PTY. LTD.

211 *SWANSTON ST., MELBOURNE*

THE CLASS "A" AND "B" BROADCASTING STATIONS OF AUSTRALIA

CLASS "A" BROADCASTING STATIONS

2FC.—Farmer and Co., Sydney. 442 metres. 5000 watts.

2BL.—Broadcasters (Sydney) Ltd., Sydney. 353 metres. 5000 watts.

3AR.—Associated Radio Co. of Australia Ltd., Melbourne, Victoria. 484 metres. 1600 watts.

3LO.—Broadcasting Co. of Australia. Melbourne, Victoria. 371 metres. 5000 watts.

4QG.—Queensland Government, Brisbane, Queensland. 385 metres. 5000 watts.

5CL.—Central Broadcasters Ltd., Adelaide, South Australia. 395 mtres. 5000 watts.

6WF.—Westralian Farmers Ltd., Perth, West Australia. 1520 metres. 5000 watts.

7ZL.—Assciated Radio Co., Hobart, Tasmania. 516 metres. 3000 watts.

CLASS "B" BROADCASTING STATIONS

2BE.—Burgin Electric Co., Kent street, Sydney. 326 metres.

2GB.—Theosophical Broadcasting Station Ltd., Sydney, New South Wales.

2HD.—Douglas, H. A., Newcastle. 288 metres.

2KY.—Trades and Labor Council, Trades Hall, Sydney, New South Wales.

2MK.—Mockler Bros., Bathurst, New South Wales, 250 metres.

2UE.—Electrical Utilities Co., Randwick, New South Wales. 297 metres.

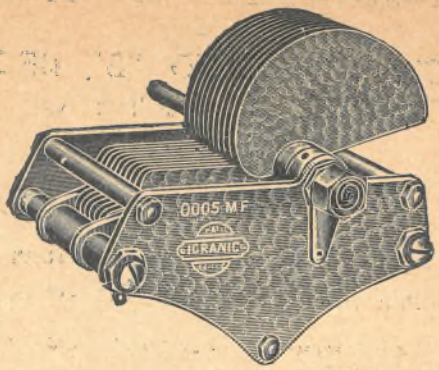
2UW.—Sandell, O., Bellevue Hill.

3UZ.—Nilsen, O. J., Melbourne. 319 metres.

4GR.—Gold Radio Electric Service, Toowoomba, Queensland. 294 metres.

5DN.—5DN Pty. Ltd., Parkside, South Australia. 313 metres.

5KA.—Sport Radio Broadcasting Co., Prospect, South Australia.



A GOOD CIRCUIT

DESERVES

RADIO IGRANIC DEVICES

IGRANIC VARIABLE CONDENSERS
THE CHOICE OF EXPERTS

——— and all discriminating amateurs.

Look through your copies of the leading radio journals; notice how often IGRANIC LOW LOSS SQUARE LAW VARIABLE CONDENSERS are used. The excellent reception enjoyed by so many amateur constructors is due to their following the example of experts and making Igranic condensers their choice.

Build **IGRANIC** condensers into your receivers!

PRICES: Single Pattern	.00015	mfd.	**25/6**
	.0003	mfd.	**27/6**
	.0005	mfd.	**32/6**
	.001	mfd.	**37/6**
Dual Pattern	.0003	mfd.	**33/9**
	.0005	mfd.	**40/6**

WRITE FOR OUR 52-Page IGRANIC CATALOGUE

Melbourne: 495 Bourke St.
Adelaide: Darling Building, Franklin Street
Hobart: 145 Macquarie St.
Launceston: 123a Charles St.

Sole Agents:
NOYES BROS.
(Melbourne) Pty. Ltd.
(Sydney) Ltd.

Newcastle: 11 Watt St.
Sydney: 115 Clarence St.
Brisbane: Perry House, Elizabeth Street.
Agent for W.A.: J. R. W. Gardam & Co., 138 Murray St., Perth.

List of Australian Stations

TABLE OF ABBREVIATIONS

A. A Class Broadcasting Station.
B. B Class Broadcasting Station.
D. Dealer's Station.
E. Experimental Station.
L. Land Station.
P. Portable Station.
S. Special.
T. Trawler.

❋ ❋ ❋ ❋

New South Wales

Call Sign	Class	Name and Address
2AB	E	A. V. Badger, 20 Neutral street, North Sydney.
2AD	E	A. L. Dixon, 59 Second street, Canterbury, N.S.W.
2AG	D	Ashfield Service Station, Ashfield, N.S.W.
2AL	E	A. E. C. Cooper, "Edale," 3 Cecil street, Ashfield.
2AR	E	W. H. Hudson, 1 Terrace road, Dulwich Hill.
2AS	E	A. J. Smith, 27 Station street, Harris Park, Parramatta.
2AV	E	A. W. Thurstan, Argyle road, Penhurst, N.S.W.
2AY	E	J. P. Cureton, 203 Burwood road, Burwood.
2BA	T	Bar-eu-mal.
2BB	E	E. B. Crocker, 38 Roseby street, Marrickville.
2BC	E	N. J. Hurll, "Myalla," Warialda.
2BD	L	Burrinjuck Dam (Public Works Department).
2BE	B	Burgin Electric Co., Kent street, Sydney.
2BF	E	L. E. Forsythe, "Hoylake," Sailor Bay road, Northbridge.
2BH	E	Broken Hill Technical College, Broken Hill
2BJ	E	C. Binns, 27 English street, Kogarah.
2BK	E	F. N. Leverrier, "Lorette," Wentworth road, Vaucluse.
2BL	A	Broadcasters (Sydney) Ltd., Sydney.
2BM	E	Bernard Martin, Mona street, Bankstown, N.S.W.
2BN	E	F. W. Kimpton, Moon street, Ballina.
2BR	T	Brolga.
2BS	E	H. B. Sunter, 3 Flat, Ambassadors' Court, Bondi road, Bondi Beach.
2BV	E	Waverley Amateur Radio Club, 89 Macpherson street, Waverley.
2BW	E	W. H. Barker, "Euripides," Wallace street, Concord.
2BY	E	E. C. Arnold, Binnia street, Coolah.
2CA	L	Cootamundra Public Works Department.
2CG	E	C. A. Gorman, 43 George street, Rockdale, N.S.W.
2CH	E	C. J. Henry, Uralla, Bridge street, N.S.W.
2CL	E	G. Caletti, "Boston," Beauchamp street, Punchbowl.

America in Daylight on Two Wecovalves

If any further proof is needed of the phenomenal sensitivity of these valves, it is provided by the results of Mr J. D. Boyle, of Maffra. Mr Boyle writes:—"Re your advertisement in the Listener In, I find the valves all you claim for them, and more . . . I have received ordinary American broadcasting in daylight on two Weco valves, and have had a letter from KTAB confirming report sent. I enclose the letter I have received from KTAB, I have also received on several occasions lately WGY and 2XAF—the latter's programme came through perfectly from start to finish, from 8.35 a.m. to 10.7 a.m."

Weco Valve Full Size

These confirmed results tell their own story.

Wecovalves are made to fit either the Weco Socket, or standard English Socket. Obtainable from all dealers, or direct from:—

Wecovalve Socket

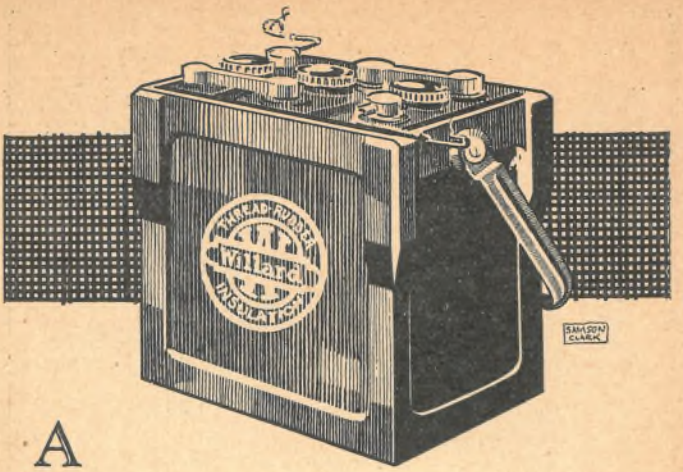
C. R. FOSTER

Agent for

STANDARD TELEPHONES AND CABLES (A/ASIA) LIMITED.

588 BOURKE STREET, MELBOURNE.

2CM	E	C. D. Maclurcan, "Naman Ila," Agnes street, Strathfield.
2CR	E	L. V. G. Todd, Denison street, West Tamworth.
2CS	E	L. Swain, 49 Everton street, Hamilton, N.S.W.
2CU	E	D. D. Campbell, Ulmarra, N.S.W.
2CK	E	H. A. Stowe, "Rawene," Royal street, Chatswood.
2CZ	E	G. W. Exton, 173 Molesworth street, Lismore.
2DE	E	W. P. Renshaw, "Waimea," Lord street, Roseville.
2DG	E	D. G. Campbell, Sunny Ridge, Kyogle.
2DI	T	Dibbiu.
2DJ	E	F. B. Cooke, Namoi road, Northbridge.
2DN	E	G. E. H. Blanchard, 60 Bligh street, Newtown.
2DS	E	R. R. Davis, "Yuruga," Fisher avenue, Vaucluse.
2DU	T	Durendee.
2DY	E	D. G. Lindsay, "Navatu," Burgoyne street, Gordon.
2EC	E	E. C. Crouch, 26 Spencer street, Mosman.
2EH	E	H. Miller, "Broadway," Ness avenue, Dulwich Hill.
2EM	E	E. J. T. Moore, 180 Kurraba road, Neutral Bay.
2FC	A	Farmers Ltd., Sydney.
2FG	E	F. Gibbons, 64 Thrupp street, Neutral Bay.
2FK	E	F. Welch, 1 Augusta road, Manly, N.S.W.
2FR	E	F. R. Bassett, "Ramona," Carrington street, Bexley.
2FT	E	L. R. Filmer, "Bundee," Toronto.
2FW	E	F. P. Woolacott, 55 St. George's crescent, Drummoyne.
2GA	E	Miss F. V. Wallace, c/r Richard and George streets, Greenwich.
2GB	B	Theosophical Broadcasting Station Ltd., Adyar House, 29 Bligh street, Sydney.
2GC	E	G. C. Cawood, Brooklana, via Ulong, N.S.W.
2GD	E	Concord Radio Club, 12 Wallace street, Concord.
2GI	L	Gundagai, Public Works Department.
2GK	E	C. G. Koets, c/o L. T. Watson, Breadalbane.
2GM	E	G. M. Cutts, 25 Malvern road, Croydon.
3GO	T	Goorangai.
2GP	E	C. S. Mackay, Urunga, N.S.W.
2GQ	E	E. Barlow, Church street, Glen Innes.
2GU	T	Gunundaal.
2GW	E	W. G. Woolnough, Florence street, Killara, N.S.W.
2HD	B	H. A. Douglas, Newcastle.
2HF	E	F. Thompson, 40 Short street, Balmain, N.S.W.
2HM	E	H. A. Marshall, Allingham street, Armidale, N.S.W.
2HR	E	H. E. Rose, Wanganbil, Warren, N.S.W.
2HT	E	H. K. R. Thomas, Strathearn, Murdoch street, Neutral Bay.
2IJ	E	A. H. Gray, 5 Flat, "The Maples," Killara, N.S.W.



A WILLARD BATTERY for Better Reception

YOUR valves, the "heart" of the set, are entirely dependent on the battery for their efficient operation. Unless the potential is steady and strong a valve cannot maintain its efficiency, and selective tuning is impossible.

Without doubt WILLARD is the ideal Radio Battery. The All-rubber Model is monobloc (in one piece) in construction. There are no joints so that leakage of current is impossible. The plates are separated by Threaded Rubber—the perfect insulation—with the result that WILLARD Battery maintains a steady voltage, and have an unusually long life. You buy a WILLARD CHARGED BONE DRY, and its life commences only when it is filled with electrolyte in your presence.

Australian General Electric Co.'s

Willard Battery Service Station

Note New Address:

482 Elizabeth St., Melbourne

(Cent. 2648. F4326).

Willard STORAGE BATTERIES

2IN	E	J. Payne, 53 Allison road, Randwick.
2JA	E	A. J. Mead, 13 Hampden street, Ashfield.
2JB	E	P. J. Browne, 131 Avoca street, Randwick.
2JK	E	J. H. Brown, Shadwell, Chelmsford avenue, Botany.
2JL	E	J. L. Young, Bulli Plain, Corowa.
2JM	E	R. C. Marsden, "Tamavua," Victoria road, Edgecliff.
2JP	E	J. H. A. Pike, Rawson street, Epping.
2JR	E	J. G. Reed, 29 Kensington road, Summer Hill.
2JS	E	J. M. Stanley, 33 March street, Orange.
2JT	E	C. F. A. Luckman, "Aldersey," Wongee road, Lakemba.
2JW	E	E. J. Williams, 51 Ocean avenue, Double Bay.
2JY	E	J. W. Young, "Yothahnee," Eastern road, Turramurra, N.S.W.
2KC	E	R. H. Fry, "Baretta," Brighton street, Croydon, N.S.W.
2KO	T	Koraaga.
2KW	E	Archibald Grant, Taylors Arm Roadside, Macksville.
2KY	B	Trades and Labor Council, Trades Hall, Sydney.
2LB	D	L. P. R. Bean and Co., 229 Castlereagh street, Sydney.
2LH	E	Leichhardt and District Radio Club, 176 Johnston street, Annandale.
2LL	E	L. S. Lane, "Alowrie," Silver street, Randwick.
2LM	E	L. M. Wilson, Corran, via Marsden, N.S.W.
2LO	E	L. N. Schultz, "Waraba," Burns Bay road, Lane Cove.
2LP	E	L. P. R. Bean, 86 Muston street, Mosman.
2LW	E	L. J. Wellman, 18 Meeks road, Marrickville.
2LY	E	R. H. Shaw, 129 Grafton street, Woollahra, N.S.W.
2MH	E	C. E. Morton, "Saida," Underwood road, Homebush.
2MK	B	Mockler Bros., Howick street, Bathurst.
2MM	L	Murrumburrah Public Works Department.
2MR	E	J. E. Stewart, Gorrick street, Mayfield.
2MU	E	J. Nangle, "St. Elmo," 11 Tupper street, Marrickville.
2NI	E	H. B. Hammond, "Chesterfield," Chesterfield road, Epping.
2NO	E	D. B. Knock, 102 Cremorne road, Cremorne, N.S.W.
2NS	E	T. Evans, Charles street, Blayney.
2OB	E	L. W. Mashman, "Gresley," 8 Donnan street, Besley.
2PA	P	Public Works Department.
2PB	P	Public Works Department.
2PH	E	P. Hoare, Mann street, Gosford, N.S.W.
2PL	P	Public Works Department.
2PQ	P	Public Works Department.
2PR	P	Public Works Department.
2PS	D	P. G. Stephen, Mona street, Granville.
2QA	T	Goonamble, N.S.W.
2QB	T	Gunner, N.S.W.

HELLESENS

Wireless Batteries

RELIABLE
DURABLE
EFFICIENT

Type "Kolin," 60 Volts,
TRIPLE CAPACITY

Hellesens Dry Cells and Wireless Batteries are made in a large variety of types and sizes, and there is a type specially suitable for every purpose.

OBTAINABLE EVERYWHERE

Factory Representatives for Australia:

A. J. Sage & Company

279 Clarence St.
SYDNEY

366 Bourke St.
MELBOURNE

2QT	E	A. H. Mutton, 31 Stafford street, Stanmore.
2RB	E	R. E. Beljon, 92 Lawrence street, Lithgow.
2RC	E	R. Chilton, c/o J. E. Sleemer, Gloucester, N.S.W.
2RD	E	W. R. Hardy, 225 Bridge road, Glebe, N.S.W.
2RG	E	E. C. Reading, Charlotte street, Bangalow.
2RJ	E	R. J. Fagan, "Sunnyridge," Mandurana.
2RL	E	A. R. Litchfield, "Springwell," Cooma.
2RM	E	R. A. MacFarlane, Wakenden street, Griffith, N.S.W.
2RP	D	R. Primmer, Gordon street, Gordon.
2RT	E	R. J. Turner, 250 Sloane street, Goulburn.
2RV	E	R. V. Thomas, 78 Malcolm street, Erskineville.
2RW	E	R. W. Gusiter, "Bellaire," Kissing Point road, Turramurra.
2RX	E	H. C. St. John, 82 Gibbes street, Rockdale, N.S.W.
2SA	E	A. Short, Young street, Lambton, N.S.W.
2SB	E	A. Sibley, 20 Carrabella street, Kirribilli, N.S.W.
2SJ	E	S. Johnson, Mortimer street, Mudgee.
2SO	E	Wireless Society of Newcastle, Y.M.C.A. Buildings, King street, Newcastle.
2SP	E	R. Evans, "Garth Craig," 6 Flood street, Clovelly.
2SS	E	A. E. Wright, Colldale, N.S.W.
2ST	E	S. E. Tatham, 160 Castlereagh street, Sydney.
2SW	E	C. L. Southwell, "Khan Unis," Kameruka road, Northbridge.
2SX	E	C. W. Slade, "Rockleigh," Lang street, Croydon, N.S.W.
2TB	D	T. H. Squelch, Byron street, Bangalow.
2TK	E	T. K. Abbott, "Murulla," Wingen, N.S.W.
2TM	E	H. E. A. Turner, "Carmen," 13 Erith street, Mosman.
2TY	E	T. R. Troy, "Glenroy," Great Northern road, West Maitland.
2UE	B	Electrical Utilities, Story st., South Randwick.
2UI	E	Illawarra Radio Club, 75 Montgomerie street, Kogarah, Rockdale.
2UK	E	H. L. Sigal, 91 Jersey road, Woollahra. Sydney.
2UW	B	O. Sandel, 140 Balfour road, Bellevue Hill.
2VS	E	V. E. Stanley, 9 McLean avenue, Chatswood.
2WB	E	W. N. Bullivant, Charles street, Albury.
2WE	E	Standard Telephones and Cables Ltd., 200 Castlereagh street, Sydney.
2WG	E	W. D. Graham, 44 Cameron street, Rockdale.
2WH	E	W. H. R. Stitt, "Wandary," Forbes, N.S.W.
2WI	E	W.I.A. (N.S.W. Division), 5 Elizabeth street, Sydney.
2WK	E	W. D. Kennedy, 16 Mabel street, Willoughby.
2WL	E	W. L. Carter, 53 Cardigan street, Stanmore.
2WR	E	Wahroonga Radio Club, East Anglia, Young street, Wahroonga.

What Is It That Makes You Look For a Certain Address?

Service plus Satisfaction

YOU GET IT AT

117 SWANSTON STREET
263 SWANSTON STREET
43 ELIZABETH STREET

WARNE'S WIRELESS GUARANTEES IT

ALL THE LATEST IN RECEIVING SETS THAT HAVE PROVED RELIABLE ARE KEPT IN STOCK—SET BUILDERS WILL ALSO FIND TRUSTWORTHY ACCESSORIES OF ALL MAKES TO CHOOSE FROM.

INFORMATION CLEAR OF ALL MISUNDERSTANDING IS AVAILABLE AT ALL TIMES FREE OF CHARGE.

WE INVITE YOU TO CALL AT ANY TIME AND DISCUSS YOUR RADIO WANTS WITH US—WE GUARANTEE SATISFACTION—DISTANCE DOES NOT KEEP YOU AWAY—OUR MAIL ORDER SERVICE IS YOUR SERVICE—LET OUR SLOGAN BE YOURS.

Watch Warne's Wireless

2WS	E	W. S. Breden, Kitchener parade, Newcastle.
2WT	E	C. R. Watt, "Warrenfels," Tenterfield.
2WW	E	Wireless Weekly, "Krotona," William Edward street, Longerville.
2WZ	E	W. J. Zech, 145 Booth street, Annandale, N.S.W.
2XA	E	H. K. James, 12 Rosemount avenue, Summer Hill.
2XI	E	W. A. Craig, "Uabba," Irrara street, Croydon, N.S.W.
2YB	E	Croydon Radio Club, Lang street, Croydon.
2YH	E	W. H. Hannan, "Glen Osmond," 23 Prince Alfred street, Mosman.
2YI	E	P. Spencer Nolan, "Monesk," 152 Bellevue road, Double Bay.
2YJ	E	R. H. Sainsbury, "Kermanshah," 6 Wallaray street, Concord West.
2ZC	E	F. M. E. Lavington, 9 Gordon road, Mosman.
2ZJ	E	A. W. Simpson, "Manoah," Lea avenue, Five Dock, Sydney.
2ZL	E	W. Otty, "Hurst Villa," Killingworth, via Newcastle.
2ZO	E	T. R. Wilmot, Coramba road, South Grafton.
2ZU	E	N. S. Gilmour, 101 Wycombe road, Neutral Bay.
2ZX	E	J. M. Bristow, "The Towers," Kurraba road, Neutral Bay.

* * * *

Victoria

3AC	E	City of Prahran Radio Club, 282 Chapel street, Prahran.
3AD	E	J. A. Davey, 28 Cole street, Elsternwick.
3AF	E	A. F. W. Bent, 14 Coronation street, Geelong West.
3AH	E	A. H. Faul, 3 St. Leonard's avenue, St. Kilda, Victoria.
3AJ	E	E. Salamy, Timor street, Warrnambool.
3AK	E	N. V. C. Cansick, 81 Southey street, St. Kilda.
3AP	E	R. D. Morris, 61 Bealiba road, Caulfield.
3AR	A	Associated Radio Co., Elizabeth street, Melbourne.
3AT	E	A. W. Thomson, "Arbroath," Ridley street, Sunshine.
3AU	E	S. H. Milligan, Hall street, Eaglehawk.
3AY	E	W. W. Jenvey, "Devonshire," 12 Lord street, Caulfield.
3BC	E	Brighton Radio Club, Higinbotham Hall, Brighton Library Buildings, Bay street.
3BD	E	E. H. Cox, 5 Gisborne street, Elsternwick.
3BG	E	Laing Osborne, Terang.
3BH	E	C. R. Whitelaw, Gillies street, Benalla.

A. ROBOTHAM
PTY. LTD.

"Marwol"

and

"Minifone"

Sets

Special Parlor for Demonstrations

---

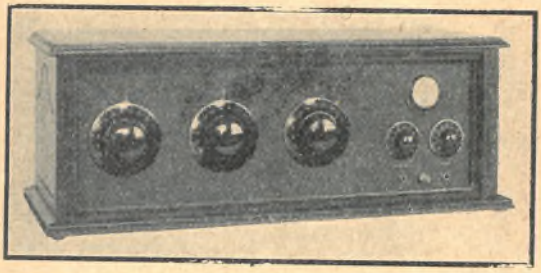
183 Bourke Street
Melbourne

Tel. Cent. 10524

3BK	E	S. C. Baker, 234 Clarendon street, South Melbourne.
3BL	E	J. C. Fitchett, 13 Holmwood avenue, Brighton.
3BM	E	H. K. Love, "Lindum," Ferncroft avenue, East Malvern.
3BP	E	J. H. Hood, 6 Alexander street, East St. Kilda.
3BQ	E	W. F. M. Howden, 10 Hill street , Box Hill.
3BY	E	H. Holst, 27 Bambra road, Caulfield.
3DA	E	R. S. Dawson, 23 Kensington road, South Yarra, Victoria.
3CB	E	W. F. Sievers, 30 Lesney street, East Richmond.
3CC	E	University, Melbourne.
3CF	E	C. I. Falconer, 13 Norris street, Canterbury.
3CI	L	Cliffy Island Lighthouse.
3CR	E	Coburg Radio Club, 2 O'Connor street, East Brunswick.
3CS	E	C. J. Sabelberg, 100 Station street, Port Melbourne.
3DC	E	S. A. Embling, 296 Williams road, Toorak.
3DJ	E	D. A. J. Stocks, 35 Highfield road, Canterbury.
3DP	E	N. Culliver, 91 Manningtree road, Hawthorn.
3DR	E	J. H. Dexter, 23 Beaconsfield parade, Northcote.
3EC	E	Y.M.C.A., Bendigo, corner of High and Short streets, Bendigo.
3EF	E	H. W. Maddick, 89A Spray street, Elwood.
3ER	E	E. H. W. Read, 147 Lygon street, East Brunswick.
3EL	E	N. J. Boyd, Pearce street, Caulfield, Victoria.
3EM	E	H. W. Doudney, 7 Dickens street, Balaclava.
3EP	E	J. Givens, 19 Logan street, Canterbury.
3EV	E	T. Evan-Evans, 25 Kalymna grove, East St. Kilda.
3FA	D	Kerang Motors, Scoresby street, Kerang.
3GF	E	G. J. Frogley, 5 Richmond Terrace, Richmond.
3GG	E	G. A. Gamon, 201 Page street, Middle Park.
3GH	E	W. M. Hale, "Ben Nevis," Harvey street, Anglesea.
3GI	E	F. G. Cresswell, 5 Loch street, Camberwell.
3GL	E	G. L. Barthold, 72 Union street, Malvern.
3GM	E	G. R. McColloch, 511 Havelock street, Ballarat.
3GN	E	H. G. Selman, 35 Queen street, Geelong West.
3GS	E	G.S.C. Semmens, State School, Queenstown. Victoria.
3HA	E	H. H. Blackman, 44 Osborne avenue, East Malvern.
3HB	E	Sunshine Radio Club, Hampshire road.
3BU	E	Connolly, Balaclava Rd., St. Kilda.

The

Gilfillan Neutrodyne



Unequalled for Sensitivity and Selectivity

Listen what The Listener In has to say about the Gilfillan Neutrodyne:—

"The outstanding features of this fine example of set are its simplicity of tuning, high selectivity, and remarkable sensitivity."

And again.—

"The tests with the Gilfillan Neutrodyne were carried out during what was the worst reception weather possible, but during one night's test eighteen stations were logged."

Remember This.—The Gilfillan Neutrodyne cannot become obsolete or inefficient, as with various other circuits and types of receivers.

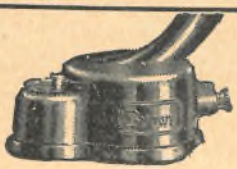
We sell on easy terms — small deposit, and balance over twelve months, or should your present receiver be unsatisfactory, we are prepared to take same in part payment.

CALL OR SEND FOR NEW ILLUSTRATED PRICE LIST OF GILFILLAN NEUTRODYNES — POST FREE ANYWHERE

Harringtons LTD 266 COLLINS ST., MELBOURNE.

3HH	E	F. H. Maughan, 15 Staniland avenue, Malvern.
3HL	E	A. T. Hutchings, "Byron Avon," Calawadda.
3JD	E	J. E. Dane, "Wahroonga," Toorak road, Hawthorn.
3JG	D	Jones and Glew, corner Moreland road and Down street, Brunswick.
3JH	E	A. J. Holland, "Cotswold," Kinnord street, Essendon.
3JK	E	J. K. Herd, Main street, Bacchus Marsh.
3JM	E	R. W. Bryson, 149 Eglington street, Kew.
3JO	E	C. L. Ruck, 3 Glentilt road, East Malvern.
3JP	E	H. E. H. Michell, "Glenard," Kean street, Caulfield.
3JR	E	W. J. Dunstan, 7 Cameron street, Ballarat East.
3JS	E	J. Schultze, 130 Glenferrie road, Glenferrie.
3JZ	E	R. P. Whalley, 4 Bridge street, Sandringham.
3KB	E	A. L. H. Kissick, 7 McFarland street, Brunswick.
3KG	E	Radio Engineering Co., 101 Foam street, Elwood.
3KJ	E	W. E. C. Sawyer, "Sunleigh Park," Hurstbridge.
3KM	D	Kerr and Muir Ltd., 241 Bay street, North Brighton.
3KR	E	K. R. Rankin, Boundary street, Kerang.
3KT	E	L. M. Seccombe, 144 Tooronga road, East Malvern.
3KX	E	M. C. McCalman, "Ivanhoe," Dryden street, Canterbury.
3LD	L	Deal Island.
3LG	E	L. G. Glew, 73 Elphin street, Newport.
3LM	E	Malvern Distrist (W.I.A.), 16 Sutherland road, Armadale.
3LO	A	Broadcasting Co. of Australia, 360 Collins street, Melbourne.
3LP	E	L. A. Paul, 137 St. George's road, North Fitzroy.
3LR	E	Elsternwick Radio Club, A.N.A. Hall, Regent street, Elsternwick.
3LS	E	R. T. Busch, "Stratford," 20 Wordsworth street, Moonee Ponds.
3LW	E	C. Hiam, 222 Carlisle street, St. Kilda.
3MH	E	M. H. Stuart, 571 Mount Alexander road, Moonee Ponds.
3MI	E	J. R. Alsop, "Nirvana," 28 Molesworth street, Kew. a
3MM	E	B. Pringle, 42 David street, Brunswick.
3MP	E	S. V. Hosken, Queen street, Surrey Hills.
3MS	E	L. J. Moore, "Avalon," Railway grove, Seymour.
3MY	E	L. D. Money, 8 Maling road, Canterbury, Victoria.
3NN	E	H. R. Brown, Yanac.
3OG	E	G. J. Menon, 6 Argyle street, St. Kilda.
3OT	E	R. M. Cameron, "Manuka," Coonil crescent, Malvern.
3PD	S	Police Department (Headquarters Station), Russell street, Melbourne.

There's a **Brown** for everyone



Of all the Loud Speakers on the market today, one is unique. One — by a brilliant application of an entirely original principle — achieves results which can be obtained in no other Loud Speaker. The **BROWN**. Here is an instrument which steadily—month by month—has so grown in public favor that it is now recognised as the one great interpreter of true radio music. There is a **BROWN** for every purpose at prices to suit all pockets.

Prices of Brown Loud Speakers

TYPE H.4—10in. high, 2000 ohms	£2 0 0
TYPE H.2—12in. high, 2000 ohms	£3 5 0
TYPE H.3—15in. high, 2000 ohms	£4 2 6
TYPE H.1—21in. high, 2000 ohms	£7 10 0
TYPE HQ—20in. high, 2000 ohms	£8 10 0
CABINET MODEL, 10in. high, 2000 ohms .	£8 10 0
TYPE Q—23in. high, 2000 ohms	£21 0 0
CRYSTAVOX	£8 5 0

Gramophone Wireless Adaptors

TYPE H.2, 2000 ohms	£2 15 0
TYPE H.1—2000 ohms	£6 0 0

Prices of Brown Headphones

F TYPE, 4000 ohms	32/6
STANDARD A TYPE, 4000 ohms	85/
NEW A.2 TYPE, 4000 ohms	50/

OBTAINABLE FROM ALL RADIO DEALERS

Melbourne: 495 Bourke St.
Adelaide: Darling Building, Franklin Street.
Hobart: 145 Macquarie St.

Sole Agents:
NOYES BROS.
(Melbourne) Pty. Ltd.
(Sydney) Ltd.

Launceston: 123a Charles St.
Newcastle: 11 Watt St.
Sydney: 115 Clarence St.
Brisbane: Perry House, Elizabeth St.
Agent for W.A.: J. R. W. Gardam & Co., 138 Murray St., Perth.

3PJ	E	V. L. Smyth, 130 McIvor street, Bendigo.
3PL	E	L. P. Learmonth, McIntyre street, Hamilton.
3PX	E	S. Taylor, "The Manor," Jackson street, St. Kilda.
3QH	E	J. F. Feldman, Forest street, South Geelong.
3QW	E	J. A. Muir, 10 Young street, Brighton.
3RA	E	R. A. Parker, 159 Prospect Hill road, Canterbury.
3RK	E	T. E. Evans, 21 Brunswick road, East Brunswick.
3RL	E	R. Lighton, "Nothgil," 232 Alma road, East St. Kilda.
3RN	E	Northcote Radio Club, 82 Gooch street, Thornbury.
3RP	E	R. L. Payne, 39 Retreat road, Geelong.
3RS	E	R. C. Shortell, 421 Inkerman street, St. Kilda.
3RW	E	R. W. Wookey, 158 Kilgour street, Geelong.
3SA	E	L. R. Simpson, "Montana," Queen street, Ararat.
3SJ	E	S. J. Mitchell, 5 Brandon street, Brighton.
3SL	E	L. W. Southwell, c/o Mrs Neal, High street, Seymour.
3SR	E	J. Sullivan, Yallourn.
3SW	E	S. W. Gadsen, 5 Miller grove, Kew.
3TG	E	T. P. Court, 4 Sorrett avenue, Malvern.
3TM	E	A. H. Buck, 759 Glenhuntly road, Glenhuntly.
3TR	E	W. S. Tregear, 22 Cole street, Upper Hawthorn.
3TU	E	R. C. Lackie, "Clifstone, 40 Bamfield street, Sandringham.
3UI	E	R. M. Dalton, 105 Murray street, Caulfield.
3UX	E	G. W. Steane, "Pymble," Earle street, Mont Albert.
3UZ	B	O. J. Nilsen, Bourke street, Melbourne.
3VP	E	C. W. Baker, "Ewell," 101 Williamson street, Bendigo.
3VR	E	R. N. Abbott, "Fleur-de-Lis," St. Elmo avenue, Alphington.
3WC	E	W. Cavanagh, 22 Mary street, St. Kilda.
3WI	E	W.I.A., Victorian Division, Ashburton.
3WM	E	W. J. M. McAuley, "Mia Mia," Union street, Brunswick.
3WP	L	Wilson's Promontory Lighthouse.
3WR	D	Wangaratta Sports Depot.
3WS	E	W. M. Sweeney, 10 Foam street, Elwood.
3XC	E	Xavier College, Kew.
3XF	E	M. Chaffer, 41 Norwood crescent, Moonee Ponds.
3XO	E	F. J. Adams, "Hambra," Moule avenue. Middle Brighton.
3XU	E	Canterbury Radio Club, 18 Northcote Avenue, Canterbury.
3XW	E	C. A. Cullinan, "Bayview," Digger's Rest.
3YD	E	C. W. Donne, "Ovalau," 3 Hughenden road, East St. Kilda.

Radio Amateurs

For the Best Results You Must Have the Best Equipment. For World-wide Transmission on a Minimum of Power Specify

PHILIPS Transmitting VALVES

and You will be Sure of the Best.

Ask Your Dealer for Full Details of Our Splendid Range of Types, or

Write for Information to

PHILIPS RADIO,
Box 2703C.
G.P.O. SYDNEY.

We also make—
Philips Lamps
Battery Chargers
Philips Radio Valves
High Tension Supply Unit
(eliminates "B" Batteries)

3YN	E	D. J. Harkin, 37 Carlisle street, Preston.
3YX	E	B. Hardie, Missouri avenue, Gardenvale.
3YY	E	A. M. Bush, 54 Brougham street, Bendigo.
3YZ	E	A. McKeown, 54 Yarra street, Alphington.
3ZI	E	K. H. Barbour, 1 Irving avenue, Armadale.
3ZK	E	F. R. Bradley, "Worthing," Beach crescent, Sandringham.
3ZN	E	M. Israel, "Atossa," Station street, Burwood, Victoria.
3ZR	E	L. Snaith, 1 Byron street, Footscray.

Queensland

4AB	E	W. F. Bardin, McIlwraith street, South Townsville.
4AK	E	J. Milner, "Beswick," Picot Estate, Kelvin Grove, Brisbane.
4AN	E	W. L. Gibson, Kirkland ave., Greenslopes.
4AW	E	A. E. Walz, cr. Eton st. and Sandgate rd., Nundah, Qld.
4AZ	E	F. V. Sharpe, Ashton Hall, Old Sandgate rd., Woolowin.
4BM	D	A. B. Milne, Mackay.
4BN	E	E. R. Cooling, Donation Lane, Toowoomba.
4BW	E	A. Cooper, Lloyd st., Mareeba, Qld.
4CF	E	C. Fortescue, "Matlock," Arthur st., Toowoomba. . .
4CG	E	C. H. Gold, Drake st., Hill End, Brisbane.
4CK	E	E. L. Norris, "Parkview," Hume st., Toowoomba.
4CM	E	Dr. V. McDowall, Preston House, Brisbane.
4CP	E	C. R. Pinney, Konedobu, Port Moresby, Papua.
4CR	E	C. F. Rich, London Bay Missionary Station, Fife Bay, Papua.
4CS	E	J. V. Geraghty, Town Hall, Gympie, Qld.
4CU	E	C. Walker, Devonport street, Clifton, Qld.
4CW	E	A. T. Buck, Geebung, North Coast Line.
4DA	E	Egleton, Grenier st., Toowoomba.
4DC	E	D. F. Cribb, Foxton st., Indooroopilly.
4DO	E	H. L. Hobler, 8 Lennox st., Rockhampton.
4EG	E	E. E. Gold, Linsday st., Toowoomba.
4EI	E	State Engineer, General Post Office, Brisbane.
4ES	E	E. N. Sagar, Moonthalie, Douglas st., Greenslopes.
4GO	E	G. Oxlade, cr. Badger ave. and Irving st., Newmarket, Brisbane.
4GR	B	Gold Radio Electric Service, Lindsay st., Toowoomba.
4HB	E	H. E. Baker, Gowrie Station, Charleville.
4HL	E	H. L. Miller, cr. Ryan and Hoogley sts., Hill End, Brisbane.
4HM	E	H. L. Milburn, 10th street, Home Hill, Qld.
4HW	E	H. D. Walsh, "Vailima," Toorak Hill, Hamilton, Qld.
4KR	E	J. R. Richardson, "Ascot Downs," Barcaldine.

KETT'S
RADIO STORES

Some Special Lines

RADIO PRESS PANEL TRANSFERS

THE MOST COMPLETE SET OF TRANSFERS ON THE MARKET
80 DIFFERENT LABELS —— EASY TO FIX.
PRICE 1/. POSTAGE, 2d. EXTRA.

PHILIPS "B" BATTERY ELIMINATOR

This unit entirely eliminates the "B" Battery, and working direct from the electric light mains, delivers a perfectly smooth supply of direct current to the plates of the valves.

FOR USE WITH ANY VALVE SET using the ordinary three-element valve. The plate current may be adjusted by means of a special rheostat, while to supply a lower voltage to the detector tube a second rheostat is inserted to give fine results.

Complete with Valve £9/15/
Spare Valves, No. 373 .. .. 17/6

LISSEN LINES

Lissen High Frequency Choke	17/6
Lissen Low Frequency Chokes, wire wound	15/9
Lissen "X" Coils, 50 turns	9/6
Lissen "X" Coils, 60 turns	11/6
Lissen "X" Coils, 75 turns	12/6
Lissen S.P.D.T. Push Pull Switches	4/3
Lissen D.P.D.T. Push Pull Switches	5/6
Lissen 5 Point Switch	4/6
Lissen S. Parallel Switch	5/6
Lissen T3 Transformers	27/6
Lissen High Frequency Transformer, 180-3500M.	25/
Lissen Reactance (11 way)	21/-
Lissencepter, Mark II., to 600 Metres	17/6
Lissenstat Minor	6/6
Lissenstat Major	12/6
Lissen Anode Resistance (variable), 20,000 to 100,000 ohm	4/6
Lissen Variable Grid Leak, ½ to 6 meg.	4/6
Lissen Anode Resistance, wire wound, 80,000 and 100,000 ohms . . . . . each	15/9
LISSENOLA SPEAKER UNIT, with Reed	25/
Lissen Wire Rheo. 7 and 35 ohm	6/
Lissen Wire Rheo. Dual	6/9

POLAR RESISTANCE CAPACITY COUPLING UNIT

For the prevention of distortion caused by the present method of coupling by inter-valve transformers. This unit consists of an anode resistance wire wound semi-non-Inductively and with small capacity. This resistance is wound on a moulded cylinder, covered with dust-proof case. Fitted to a special type Dubiller Condenser, to which is connected a grid leak located inside the tube, you have here a most complete instrument. 40,000 ohms. 21/; 80,000 ohms., 22/6.

269 Little Collins Street — Melbourne

4KY	E	H. F. Coffey, 6 Oxford street, Hamilton, Q.
4LC	E	L. C. Cusack, Radio Station, Kenedoba.
4MM	E	M. M. O'Brien, Fewings st., Toowong, Q.
4PG	E	P. J. Golden, "Bronte," Pine st., Wynnum South.
4PJ	E	P. F. Jessop, Kamma, near Edmonton.
4QG	A	Queensland Government, Brisbane.
4RB	E	R. J. Browne, "Clifden," Church street, Toowong.
4RK	E	R. K. Knight, "Forest Lodge," Jellicoe st., Toowoomba.
4RP	D	Robertson & Provan Ltd., Toowoomba.
4SM	E	W. G. Ikin, River rd., New Farm, Brisbane.
4WB	E	W. H. Bright, Hume st., Nth Toowoomba, Qld.
4WF	E	W. Finney, "Milbong," Arthur Terrace, Red Hill, Brisbane.
4WH	E	W. E. Hagarty, Kingfisher st., Longreach.
4WI	E	W.I.A. (Queensland Division), Queen st., Brisbane.
4WN	E	Woolowin Radio Club, c/o F. J. Thomas, Willmington st., Woolowin.

❊ ❊ ❊ ❊

South Australia

5AC	E	V. R. P. Cook, 37 Johns rd., Prospect, S.A.
5AE	E	J. M. Honnor, Alpha rd., Prospect, S.A.
5AG	E	W. J. Bland, Buller Terrace, Alberton.
5AH	E	F. L. Williamson, 25 Dequetville Terrace, Kent Town.
5AI	E	H. H. Lloyd, 16 Trinity st., College Town.
5AQ	E	Sacred Heart College, Glenelg.
5BD	E	F. E. Earle, 6 Hakewell rd., St. Peters.
5BE	E	F. G. Miller, Eleanor Terrace, Murray Bridge.
5BG	E	H. A. Kauper, 6 Rothbury ave., Tusmore.
5BN	E	N. L. Austin, 8 Parade, Norwood, S.A.
5BP	E	R. B. Caldwell, 53 Hughes st., Unley, S.A.
5BR	E	Blackwood Radio Club, Waite st., Blackwood.
5BW	E	J. G. Phillips, 31 Partridge st., Glenelg.
5BX	E	A. L. Saunders, 17 Esplanade, Glenelg.
5CL	A	Central Broadcasters Ltd., Grosvenor Hotel, North Terrace, Adelaide.
5DA	E	S. R. Buckerfield, 4 Regent st., Parkside.
5DN	B	5DN Propty. Ltd., Parkside.
5DP	E	H. E. Brock, 16 Pennington Terrace, North Adelaide.
5FT	E	J. S. Fitzmaurice, St. Andrews st., North Walkerville.
5GB	D	G. Bailie, Mount Gambier.
5HG	E	H. M. Cooper, 51 Hastings st., Glenelg.
5HS	E	M. W. Trudgen, 41 Florence st., Fullarton. E. Adelaide.
5HY	E	A. A. Cotton, Harvey st., Kilkenny.
5JA	E	P. J. Brewer, 21 Douglas st., Parkside.
5KA	B	Sport Radio Broadcasting Co., 51 Kintore ave, Prospect, S.A.
5KW	E	K. Wadham, 2 Elizabeth st., Parkside .
5LA	E	L. M. Atkins, Brougham st., Magill.

Crystal Clear Radio Co.

RADIO HOUSE Tel. C. 11210
174 Swanston St. Melb'ne

The Sign of Good Service

To All Radio Enthusiasts

THE HOUSE WHERE

Reliable Radio Parts Cost Less

The best and latest radio apparatus is obtainable at ACTUAL LOWER PRICES at the "Store that brings radio prices down."

Full Stocks on hand of:—De Jur, Duplex, Pilot and Advance Condensers, Rheostats, etc. Also Mullard, Philip Radiotron and Radiotechnique Valves, and Columbia, Diamond, Giant, Burgess and Hellesen Batteries.

Free Expert Advice

is available to all customers to help solve their radio problems.

Same Day Mail Order Service

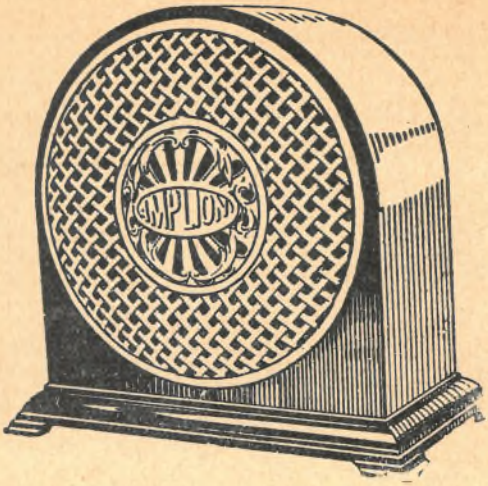
offers city shopping facilities to country enthusiasts. All orders despatched without fail same day as received. POST FREE (all retail orders over 5/).

It is our business to secure you satisfaction.

5LF	E	L. F. Sawford, Mead st., Peterhead.
5LP	D	A. L. Perry, Strathalbyn.
5MA	E	M. B. Anderson, Torrens rd., Cheltenham, S.A.
5PR	E	Port Radio Club, Port road, Alberton, S.A.
5RB	E	R. Bedford, Kyancutta Cottage Hospital, Kyancutta.
5RG	E	R. C. Gurner, 21 Victoria terrace, New Parkside.
5RM	E	R. M. Barker, 49 Newbon st., Prospect.
5SA	E	E. R. Turner, 10 Godfrey terrace, Leabrook, S.A.
5SF	E	S. F. Ackland, 74 Johns rd., Prospect.
5SR	E	South Suburban Radio Club, Castle st., Parkside.
5WA	E	W. K. Adamson, 25 Olive st., Parkside.
5WH	E	W. H. Barber, 50 Somerset avenue, Cumberland.
5WI	E	Wireless Institute of Australia (Sth Australia Division, 6 Bakewell rd., St. Peters.
5WP	E	W. S. Pitchford, "Southview," 318 Wakefield st., Adelaide.
5WS	E	West Suburban Radio Club, 44 King st., Mile End.

Western Australia

6AB	E	C. Cecil, 53 Macdonald st., Kalgoorlie.
6AG	E	W. E. Coxon, 5th Avenue, Inglewood.
6AK	E	University of W.A., Perth.
6AM	E	P. Kennedy, 210 Walcott st., Mt. Lawley, W.A.
6BB	E	J. C. W. Park, 29 Suburban rd., Mill Point. Sth. Perth, W.A.
6BH	E	F. H. Burrows, 26 George st., Kalgoorlie.
6BN	E	A. E. Stevens, 7 Ruth st., Perth, W.A.
6BO	E	A. E. Grey, Archdeacon st., Nedlands.
6BW	E	C. D. McLauchlan, 14 Clydesdale st., Victoria Park.
6CJ	E	E. J. Darley, Darley st., Perth.
6DA	E	F. W. Saw, 76 Leonard st., Victoria Park, W.A.
6DH	E	D. C. Hardisty, 2 Duncan st., Victoria Pk., W.A.
6DZ	E	E. W. Burrows, Station House, Geraldton.
6GB	E	G. B. Sutherland, 36 Fairfield st., Mount Hawthorn, Perth, W.A.
6GL	E	G. A. Lorden, 30 Thomas st., West Perth.
6GM	E	G. A. Moss, Willis st., Cottesloe Beach, W.A.
6HB	E	H. B. Johnston, 119 Bourke st., Leederville, W.A.
6HE	E	H. E. Cox, Marine Terrace West, Geraldton.
6JJ	E	T. J. Jewell, Leitchfield st., Victoria Park, W.A.
6KM	E	A. Saar, Post Office Bldgs., Eucla, W.A.
6KX	E	H. T. Simmons, 75 Nicholson rd., Subiaco, W.A.



Paramount in Reproduction

Sensitive to a degree, loud in its fullest measure, and unequalled in brilliance and clarity, the Radiolux Amplion Hornless Loud Speaker is a revelation in radio reproduction.

Used with a good receiving Set, it renders reproduction comparable with the original performance.

Prices from £6/10/ *to* £11.

British and Australian-made.

Obtainable at All Radio Dealers and Manufacturers.

SOLE DISTRIBUTORS FOR AUSTRALASIA:
(Wholesale only)

Amalgamated Wireless (Australasia) Ltd.

167-9 QUEEN STREET, MELBOURNE.

(Advt. of Amplion (Australasia) Ltd., 56 Margaret st., Sydney).

6LS	E	L. Symonds, Glyde st., Cottesloe Beach.
6LT	E	L. L. Throssell, May st., Northam, W.A.
6MU	E	M. E. Urquhart, Hawkestone st., Cottesloe.
6PL	E	P. E. C. Lindsay, 16 Clive st., West Perth.
6RW	E	R. W. Coxon, Chidlow st., Northam, W.A.
6SA	E	S. C. Austin, 39 Sussex st., Victoria Park. W.A.
6SR	E	Subiaco Radio Society, Fire Station, Rokely rd., Subiaco, W.A.
6VK	E	J. Vincent, 124 Varden st., Kalgoorlie.
6WF	A	Westralian Farmers Ltd., Perth.
6WI	E	Wireless Institute Australia, c/o W. E. Coxon, 5th Avenue, Inglewood, W.A.
6WP	E	W. R. Phipps, 97 Rupert st., Subiaco, W.A.

❊ ❊ ❊ ❊

Tasmania

7AB	E	A. C. Smith, 21 High st., Launceston.
7AH	E	F. W. Medhurst, "Cranleigh," Beach rd., Lower Sandy Bay.
7AR	E	C. F. Johnson, 33 Hill st., Hobart.
7AS	E	A. S. Gill, 17 Frankland st., Launceston.
7BK	E	T. A. C. Preston, King st., Queenstown.
7BQ	E	L. J. Crooks, 64 Frederick st., Launceston.
7BT	E	E. C. Sheldrick, 15 Richards ave., Launceston.
7CS	E	A. C. Scott, 14 Law st., Launceston.
7CW	E	C. Walch, Cambridge rd., Bellerive.
7DX	E	W. T. Watkins, 146 Warwick st., Hobart.
7GD	E	G. A. Douglas, Lochleven, Gormanstown.
7GH	E	G. L. Hall, Waddamanna.
7HL	E	Hubert F. Lovett, 14 Summerhill rd., West Hobart.
7LA	E	L. A. Hope, 210 George st., Launceston.
7LJ	E	L. R. Jensen, 15 Bayley st., Glebe, Tasmania.
7MK	E	E. E. Cooper, Edgeley House, Youngtown, Tas.
7NP	L	National Portland Cement Co., Maria Island.
7NW	E	N. W. Gillham, 38 Grosvenor st., Sandy Bay.
7OM	E	R. D. O'May, "Elonera," Esplanade, Bellerive, Tas.
7PF	E	P. O. Fysh, 46 Mary st., Launceston.
7RB	E	R. Buring, 19 Anglesea st., South Hobart.
7WI	E	Wireless Institute of Australia (Tas. Div.), 181 Charles st., Launceston.
7ZL	A	Associated Radio Co., Hobart.

Amateur Wave Band 125-250 Metres.

❊ ❊ ❊ ❊

CAUSES OF INACTION

WHEN no signal can be heard, and no other noises are noticeable, the trouble may be caused by a short-circuit in the 'phone condenser, run-down batteries, battery polarity reversed, broken connection in 'phone cord or set, poor socket contact, or poor contact in 'phone plug or jack.

FULL RANGE OF SETS
FULL RANGE OF SPEAKERS
Full Range of All Accessories at

P. A. MORRIS & CO., Pty. Ltd.

York House, Basement,
298 LITTLE COLLINS ST., MELB.

"EXCELLATONE JUNIOR" CRYSTAL SET, complete with Aerial Material and Phones, **£1/17/6**

"EXCELLATONE DE LUXE" CRYSTAL SET, complete with T wo Pairs Headphones and Aerial equipment **£3/15/**

"EXCELLATONE SUPER" 2-Valve Set, remarkable volume and simplicity, Interstate Stations on Loud Speaker, complete, with all accessories **£16/10/**

"EXCELLATONE ONE CONTROL" 4-Valve Set. the simplicity of control, with clearness and purity of tone hitherto unobtainable, complete with all accessories **£27/10/**

"EXCELLATONE NEUTRODYNES," revelation in Interstate Reception, complete with all accessories, including large Claritone Speaker and 60 Amp. Accumulator—

5 Valves, **£55**
6 Valves, **£75**

Call and Inspect these Sets in our Showrooms. Also see the famous "Addavalve" and the "Minuet" Portable Sets.

Write for Price Lists —— Freight Free in Victoria

Phone Cent. 8400.

RADIO INSTALLATION RULES

The Radio Installation Rules of The Fire Underwriters' Association as they apply to Receiving Stations in Victoria.

(a) Antennae outside of buildings shall not cross over or under electric light or power wires, nor shall they be so located that a failure of either antennae or of the above-mentioned electric light or power wires can result in a contact between the antennae and such electric light or power wires.

Antennae shall be constructed and installed in a strong and durable manner, and shall be so located as to prevent accidental contact with light and power wires by sagging or swinging.

Splices and joints in the antenna span, unless made with approved clamps or splicing devices, shall be soldered.

Antennae installed inside of buildings are not covered by the foregoing rules.

NOTE—Outdoor antenna should be of rugged construction, held securely in place and kept well away from electric light and power wires. It is advisable for the amateur not to make any connection to poles carrying light or power wires. Those unfamiliar with electric wiring will do well to have antenna and other apparatus installed by competent electricians.

The size of the antenna will depend on the span, for the ordinary receiving antenna about 100 feet long, No. 3/20 gauge soft drawn copper wire may be used, or other wire of equivalent strength. Where the span is long it should be larger.

Lead-in Wires.

(b) Lead-in wires shall be of copper, approved copper-clad steel, or other approved metal, which will not corrode excessively, and in no case shall they be smaller than No. 3/20 S.W.G., except that approved copper-clad steel not less than No. 18 S.W.G. may be used.

Lead-in wires on the outside of buildings shall not come nearer than twelve (12) inches to electric light and power wires, unless separated therefrom by a continuous and firmly fixed non-conductor that will maintain permanent separation. The non-conductor shall be in addition to any insulation on the wire.

Lead-in wires shall enter buildings through a non-combustible, non-absorbative insulating bushing.

NOTE—Although desirable from a signalling viewpoint to prevent partial grounding in wet weather, these rules do not require the insulating of lead-in wires, except where they pass through the building wall where a bushing is specified. This is to protect against possible contact with wires, pipes, or other grounded metal, which may be concealed in walls.

Protective Device.

(c) Each lead-in wire shall be provided with an approved protective device, properly connected and located (inside or outside the building), as near as practicable to the point where the wire enters the building. The protector shall not be placed in the immediate vicinity of easily ignitable stuff, or where exposed to inflammable gases or dust, or flyings of combustible materials.

(Continued on Page 37)

O. H. O'BRIEN

PRESENTS

The World's Best Radio Parts

Trimm Products

DEPENDABLE HEADSETS	£1	2	6
PROFESSIONAL HEADSETS	1	15	0
CONCERT LOUD SPEAKERS	6	0	0
ENTERTAINER LOUD SPEAKERS	4	10	0
HOME LOUD SPEAKER	2	2	6
PHONOGRAPH UNIT	3	0	0

All-American Products

R12 3 to 1 AUDIO FREQUENCY	£1	10	0
R21 5 to 1 AUDIO FREQUENCY	1	10	0
R13 10 to 1 AUDIO FREQUENCY	1	5	0
R30 INPUT PUSHPULL	1	15	0
R31 OUTPUT PUSHPULL	1	15	0
R500 RAULAND-LYRIC	3	1	0
R110 INTERMEDIATE FREQUENCY	2	2	6
R120 TUNED TYPE (Filter or Input)	2	2	6
R130 RADIO FREQ. COUPLER	1	15	6
R140 UNIVERSAL COUPLER	1	10	0
SUPERFINE KITS, containing 3 R110, 1 R120 and 1 R130	9	5	0
TOROID COILS, 1 T1 and 2T2	3	19	0

Dilecto Products (Red Stripe)

BAKELITE SHEET, from 1/64 to 1in. Thick
BAKELITE ROD, from 1/8 to 2in. Dia.
BAKELITE TUBE, from 2in. to 4in. inside Dia.

BALKITE BATTERY CHARGERS	£8	15	0
BALKITE TRICKLE CHARGERS	4	7	6

WHOLESALE ONLY

516 Collins St., Melbourne — **37-39 Pitt St., Sydney**

And at

ADELAIDE, BRISBANE, HOBART & LAUNCESTON

RADIO INSTALLATION RULES

(Continued from page 35)

The protective device shall be an approved lightning arrester, which will operate at a potential of five hundred (500) volts, or less.

The use of an antenna grounding switch is desirable, but does not obviate the necessity for the approved protective device required in this section. The antenna grounding switch if installed, shall, in its closed position, form a shunt around the protective device.

NOTE—The protective device should be an approved lightning arrester; the use of cheap, home-made devices should be discouraged. Fuses are not required, but if installed should be between the lead-in and the lightning arrester.

Protective Ground Wire.

(d) The ground wire may be bare or insulated, and shall be of copper, or approved copper-clad steel. If of copper, the ground wire shall not be smaller than No. 3/20 S.W.G., and if of approved copper-clad steel, it shall not be smaller than No. 18 S.W.G. The ground wire shall be run in as straight a line as possible to a good permanent ground. Preference shall be given to water piping. Gas piping shall not be used for grounding protective devices. Other permissible grounds are artificial grounds, such as driven pipes, plates, cones, etc.

The ground wire shall be protected against mechanical injury. An approved ground clamp shall be used wherever the ground wire is connected to pipes or piping.

NOTE—The proper connection of the antenna to the ground minimises the lightning hazard. A satisfactory ground and properly run ground wire are of primary importance.

Wires Inside Buildings.

(e) Wires inside buildings shall be securely fastened in a workmanlike manner, and shall not come nearer than two (2) inches to any electric light or power wire, unless separated therefrom by some continuous and firmly fixed non-conductor, making a permanent separation. This non-conductor shall be in addition to any regular insulation on the wire. Porcelain tubing, or approved flexible tubing may be used for encasing wires to comply with this rule.

Receiving Equipment Ground Wire.

(f) The ground conductor may be bare or insulated, and shall be of copper, approved copper-clad steel, or other approved metal which will not corrode excessively under existing conditions, and in no case shall the ground wire be less than No. 3/20 S.W.G., except that approved copper-clad steel, not less than No. 18 ¼ S.W.G. may be used.

The ground wire may be run inside or outside of building. When receiving equipment ground wire is run in full compliance with rules for protective ground wire, in section (d) it may be used as the ground conductor for the protective device.

VEALL'S

The House for *QUALITY*

ANYTHING FROM A CATSWHISKER TO A 7-VALVE SUPER SET

LET US HAVE YOUR WIRELESS ENQUIRIES

Sole Distributors for

Warren
Super Phones

Formo

Utility

Bretwood

Cossor Valves,

&c.

Joint Distributors of

BROWN, IGRANIC, BULLPHONE SPEAKERS
AMPLION AND ALL QUALITY LINES

WHOLESALE and RETAIL

A. J. VEALL

247-9 SWANSTON ST., CITY
Tel. 2058-9 Cent.

And at 302 CHAPEL ST., PRAHRAN
Win. 1605

THE USE OF HIGH TENSION ACCUMULATORS

Their Advantage Over the Ordinary Dry Battery.

THERE has recently been a great increase in the use of high tension accumulators, and at the present rate it will not be very long before the dry battery will become more or less a thing of the past.

Every user of a valve-receiver knows from bitter experience what a bugbear the H.T. battery can be. It has a tendency to become "tired" always at the moment it is most required. When partly exhausted it gives rise to most objectional crackling noises very often attributed to atmospherics of the worst kind.

It is in this respect that the H.T. accumulator undoubtedly scores. The plate voltage remains perfectly steady, and reaction is entirely smooth. For these reasons they are absolutely silent in use.

On the other hand, in return for the excellent service rendered by the H.T. accumulator this type of battery necessitates a few requirements and attentions which are not necessary with dry battery. The biggest difficulty, perhaps, lies in the re-charging, but this is quite a simple affair when properly understood. Unfortunately, the average charging station attendant takes a great aversion, for some reason or other, to undertaking the charging of an accumulator of this kind, necessitating, as it does, a very slow and prolonged charge. In other cases sheer ignorance on the part of the attendant is the undoubted cause of a premature ending of the life of what would otherwise have been a perfectly reliable accumulator.

A Low Charging Rate

The high tension accumulator, although of a high voltage, requires a very low charging rate, and is, therefore, very much more critical than the ordinary low tension accumulator, both in its initial and subsequent charging, and it is my candid advice to any listener who adopts this method of H.T. supply to carry out the charging personally if at all possible. If one is fortunate enough to possess D.C. mains, the matter is quite a simple one. All that is necessary is to place a lamp in series with the battery together with a milliammeter. The latter, reading from 0-70 milliamps, can be obtained for a few shillings, and will suit the purpose admirably.

To Prevent Creeping

In carrying out the first charge, acid should be added to a level of about ¼in. above the plates. When fully charged, each cell should register 2.2 volts, or, approximately, 90 volts across the battery terminals. The acid used should be of 1170 specific gravity, which after charge should rise to 1250 specific gravity. A film of oil should be placed on top of the acid in each cell. Liquid paraffin, which can be obtained from any chemist, is ideal for the purpose, and prevents evaporation and the formation of sulphate. A

(Continued on page 95.)

"Ormond" Condensers

Can be Obtained from Any Good Radio Dealer

Inspect the **NEW SQUARE-LAW LOW-LOSS FRICTION-CONTROL" "ORMOND" CONDENSER.** "THEY GIVE SATISFACTION."

"BRANDES" HEADPHONES, TABLE-TALKERS & BRANDOLA LOUD SPEAKERS give Clearest Reproduction Without Distortion. Famous Since Radio Began.

"DE FOREST" VALVES are made by the man who made Broadcasting possible, so you can rest assured that there is No Better Valve Made.

"HELLESEN" CELLS—Single, Double and Triple Capacity, 60 Volt Cells, have stood the Test of Time, having been on the market for the past 40 years.

"AUDALION" LOUD-SPEAKERS — Another Invention of Dr. Lee Forest, embodying an altogether New Principle, giving Absolutely Clear True Reproduction.

INSERTED BY THE VICTORIAN DISTRIBUTORS

Alexander Mair & Co.

PTY. LTD.

(Wholesale Only)

2nd FLOOR, McEWAN HOUSE,

Cr. Elizabeth and Little Collins Streets

'Phone Cent. 2910. **Melbourne** Box H510.

THE AERIAL TUNING CONDENSER

Much doubt exists in the minds of wireless users as to the best position of the aerial tuning condenser, but a study of this article will clearly show that whether the condenser is to be in series or parallel is decided by the work to be done.

"SHALL I connect my aerial tuning condenser in series or in parallel with the inductance coil?" This is a question one is constantly hearing from amateurs who are connecting up their sets. It is also a question which the amateurs could probably answer themselves if they knew a little more about the operation of this important section of the receiving circuit. Its importance can be gauged by the fact that if the aerial circuit is not properly tuned to the wave length of the incoming signals, the rest of the circuit is useless. The following facts concerning the subject will, therefore, be of interest to those engaged in wiring up their own sets, or about to do so.

Connecting a condenser in series with the aerial is equivalent to connecting it in series with the capacity of the aerial. If two capacities be connected in series the total capacity is reduced, and since a reduction of either the capacity or the inductance in a circuit decreases the wave length, the wave length of the receiving set will accordingly be reduced.

On the other hand, connecting a capacity in parallel with another capacity gives a total capacity equal to the sum of the two separate capacities. Therefore, connecting a condenser in parallel with the capacity of the inductance coil increases the wave length.

Varying the Wave Length

It will be seen that the variable condenser is a very useful means of varying the wave length of a receiving set in which fixed inductance coils are employed. On many crystal sets the inductance is variable by means of a sliding contact, and sometimes two sliding contacts. With these sets the addition of a variable condenser is not an essential, as the wave length may be varied by varying the inductance, that is, by including or excluding turns of wire from the aerial circuit.

When using fixed inductance coils, such as honeycomb coils, a variable condenser becomes necessary in order to provide a means of tuning to the correct wave length. Fixed inductance coils, used in conjunction with a variable condenser, are usually employed on valve sets, as the sliding contact type of coil is unsuitable owing to dead-end loss.

Supposing, for example, that the smallest honeycomb coil in the possession of the listener in is one of 100 turns, and that it is required to tune in for a station transmitting on 400 metres. If a .001 mfd. variable condenser is connected in parallel with the 100 turn coil, the range of wave lengths obtainable will be from approximately 500 metres to 975 metres,

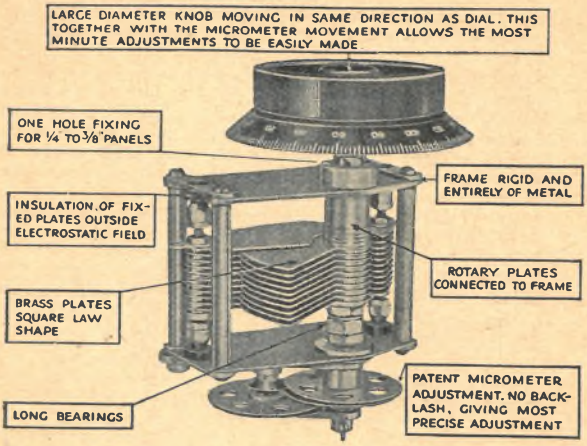
(Continued on page 95.)

ABOLISHED!!

——— The necessity for a separate and costly vernier dial ——— when you use the new

"GECoPHONE"

Slow-Motion, Low Loss, Square Law Condenser



IT HAS BEEN APTLY DESCRIBED as **"The Condenser with the Superb movement."**

Obtainable in Three Sizes:
.00025 M.F., .0003 M.F., and .0005 M.F.

You will be wise to ask to see this and the many other "GECOPHONE" accessories, such as the new shielded transformer, anti-microphonic sockets, loud speakers, etc. Also the world-famous OSRAM Valves.

Obtainable from All Reliable Radio Dealers, and

BRITISH GENERAL ELECTRIC CO. LTD.

590 BOURKE STREET, MELBOURNE

BE KIND TO YOUR CRYSTAL

A crystal set is not an amplifier, and each component must work at the peak of efficiency if consistently good results are to be maintained. A number of helpful hints are interestingly grouped in this article.

PERHAPS in formulating hints for the improvement of crystal reception, it would be as well to commence with the aerial, for the crystal receiver, however good, cannot increase the strength of the impulses delivered from the aerial system. Naturally, the first consideration is one of insulation, and if losses are to be minimised, the aerial insulators should be kept free from dirt and tarnish, and should be immediately replaced if they become cracked or broken. In addition, the writer regards very favorably the practice of connecting up the insulators with marline, a form of cord saturated with tar, as this tends to reduce leakage in wet weather. The lead-in should be kept well clear of spoutings, ridgings, chimneys, or similar absorbent objects, and all joins in the wire should be soldered. This matter of good connection particularly applies to the earth lead, which needs to be soldered to the water pipe, or whatever conducting medium is chosen.

The length of the earth lead is also important, and, where this cannot be kept within reasonable bounds on account of the distance separating the receiver and the nearest water pipe, it is preferable to arrange an independent earth. A kerosene tin, buried several feet in the ground, or a length of piping driven down, both act very efficiently.

Regarding the Tuning Apparatus.

In the matter of crystal sets, the writer's preference has always been given to the coil and variable condenser combination, believing that this type of set lends itself to fine adjustment more readily than any other. This, of course, is a controversial point, and it must be admitted that, if constructional details are well executed, almost any circuit or fashion in receivers will give good results.

The tuning coil, for instance, should be constructed with the heaviest possible gauge wire, due deference being given to the size of the completed unit. Let me make a plea, too, for abstemiousness in the use of shellac, collodion, paraffin wax, or similar "dope." The practice of steeping coils in solutions composed, in the main, of these constituents, certainly provides a convenient means of adding rigidity to the windings, but no physical strength is sacrificed if the turns are held together by interlacing cotton or thread. Take no notice of those who defend the use of dope, explaining that it impregnates the windings against moisture—it certainly does, but the fresh losses introduced more than outweigh the slight losses of a hydroscopic nature.

The Crystal Detector.

The crystal detector is all important. It may be found that sometimes, due either to the size of the

(Continued on page 45.)

Your Pass to Perfect Radio——

The "W.F." 4-Valve
HOME ASSEMBLY SET

Designed by our electrical experts, with all parts carefully chosen for utmost efficiency and purity of tone, this set represents unbeatable value at £22/10/.

Supplied with all parts already mounted on the panel and baseboard, and is complete with A. and B. Batteries, Philips Dull Emitter Valves, 'Phones, Aerial Wire, and Insulators. You simply wire parts, according to the instructions supplied, fit panel and baseboard into the cabinet, connect up with aerial and earth, and the set is ready for use.

Easy terms of £5 down and seven monthly payments of £2/12/10 arranged.

SUPPLIED ALL READY WIRED AND ASSEMBLED FOR AN EXTRA £5.

Let us demonstrate — or send you our "Leaflet L.H.2."

WARBURTON
FRANKI [Melb.] LTD.

380-382 BOURKE ST., MELBOURNE
(Opp. Danks'). 'Phone Central 8888.

BE KIND TO YOUR CRYSTAL

(Continued from page 43.)

crystal cup, or the length and situation of the set screw, that the crystal refuses to stay firmly in position. When this occurs, the cup should be packed with either tin or copper foil, which can quickly be removed if the occasion demands it.

The same can hardly be said of Wood's metal, and on this account foil is to be preferred. The crystal itself should be kept as free from dust as possible, and should not be touched with the bare fingers if this can be avoided. Fresh "spots" can often be found by dividing the crystal into several smaller pieces, trying out each individual piece thoroughly in order to ascertain which is the most sensitive.

Where the crystal has become dulled, its former sensitivity can oftentimes be restored by the application of a little pure alcohol. The crystal can either be soaked in the alcohol, or brushed briskly with a toothbrush which has been allowed to absorb a little of the fluid.

The Best Crystal.

From the point of view of sensitivity, the writer considers that a good piece of galena and a silver catwhisker is an ideal combination, despite the drawback that very little vibration is needed to upset the adjustment. Even a heavy burst of static will prove an annoyance in this latter respect.

The manufacturers seem to be fully cognisant of the virtues of galena, for an analysis of most of the well-known proprietary brands would show them to be galena, tested and selected samples, perhaps, but nevertheless galena. Where this crystal is employed, perhaps a silver whisker is best, and it will be found that regular application of a piece of fine sandpaper to the tip of the whisker will allow of the most sensitive spot being easily found.

For those who prefer a crystal more constant in its setting, the zincite-bornite combination is very good, and the carborundum detector is also coming back into favor. This latter detector requires a small applied potential, made variable by means of a potentiometer. Dry cells will provide ample bias, and the current drain is practically negligible if the battery is disconnected when the set is not in use.

The 'Phones are Important.

Invariably, those just taking their initial steps in radio do not fully realise how necessary a set of good 'phones is. This applies particularly to owners of crystal sets who, in many instances, do not feel inclined to meet the expense, considered by some to be out of proportion to the cost of the set itself. But it is well worth while. With quality 'phones, signals formerly unheard, will become intelligible, and volume will be handled as only a good unit can handle it.

Stress, too, should be laid on the matter of comfort, for a crystal set will not work a loud speaker satisfactorily.

Out of the Loud Speaker

THE World's a stage now. The drama, the field of sports, the lecture platform, famous orchestras, vie with each other to offer you entertainment and knowledge through the Loudspeaker. Let **LEVIATHAN GUARANTEED SETS** bring them in. The Clarity of tone, the great selectivity, the sureness and simplicity of operation, together with the very keen prices, make Leviathan Sets splendid propositions.

CALL FOR A DEMONSTRATION

HEADQUARTERS FOR ALL ACCESSORIES:

THE LEVIATHAN LTD.

CORNER SWANSTON AND BOURKE STS., MELBOURNE

GENERAL ABBREVIATIONS

This list gives some of the commoner abbreviations used by stations.

QSA—Your sigs. are strong.
QSS—Your sigs. are fading.
QSL—Please acknowledge receipt of message.
QRN—Static is bad.
QRM—I am being interfered with.
TNX—Thanks.
HR—Hear or here.
OM—Old man.
YZS—Best wishes.
HRD—Heard.
FB—Good.
CRD—Card.
VY—Very.
RDTN—Radiation.
STD-BI—Stand by.
RPTD—Reported.
CUAGN—See you again.
RCD—Received
SIGS—Signals.
R—Are.
UR—Your.
CUL—See you later.
MI—My.
MNY—Many.
DX—Long distance.
FRM—From.

PROTECTING THE PHONES

A Remedy for Rust

WEARING the phones for long periods causes drops of moisture to form upon the diaphragm, and these may cause rust. The remedy is to cover the diaphragm with a very thin coat of vaseline.

Watch the Polarity

All telephone receivers contain a permanent magnet, and all electric currents are accompanied by magnetism. If the two forces are in opposition, the "permanent" magnet is impaired, and does not live up to its name.

Sometimes the phones are marked with positive and negative signs, and if connected accordingly, the current flowing will assist the permanent magnet. If not marked, the polarity can be determined as follows:—Unscrew the earpiece and remove the diaphragm. Then hang up the phones and load the permanent magnet with as many small nails and pins as it will hold. When it is fully loaded send a small current through the phones, first in one direction, and then in the other. If the loading has been carefully arranged, the current flowing in the right direction will assist to hold the load; but if in the wrong direction, the nails and pins will fall.

L & H

Radio Material

PHILIPS — Valves, Battery Chargers, Battery Eliminators

LOUD SPEAKERS — Amplion, Sterling

STERLING — Radio Instruments, Battery Chargers

T.C.C. Fixed Condensers
H. & H. Radio Accessories
AND ALL OTHER RADIO SUPPLIES

Lawrence & Hanson Electrical Co. Ltd.

172-6 WILLIAM STREET
MELBOURNE

Telegrams "Lawhanson." Telephone Cent. 10396 (4 lines)

ALSO AT 120 Collins Street, HOBART;
26 Leagh Street, ADELAIDE;
Sydney, Newcastle, Brisbane,
New Zealand (8 Branches).

W.-McF.

THE "A" AND "B" BATTERIES

In this Article are Described the Purposes of the Filament and Plate Batteries.

THE "A" Battery merely supplies energy to the filament for heating purposes. It has no radio purpose. Its only purpose is to keep the filament hot. The drain on it is considerable, depending on how much current each filament takes, and how many of them there are. If we have eight one-ampere valves, the A. battery must supply eight amperes, which few of them could continuously do and stand up for very long. If we have eight ¼-ampere valves, the total supply from the A battery is two amperes. If we use eight of the .06-ampere valves, eight will take .48-ampere, or less than two of the one-quarter-ampere type. The drain on the A battery is always an appreciable part of the ampere, and more often than not it is more than one-ampere. The voltage, however, is not above five, and for some valves need be only three, and for others only one and one-half volts. It supplies large current at low voltage. It supplies this current continually so long as the valves burn. The result is that a battery must be provided of very considerable ampere-hour capacity which can run continuoutly without falling off in voltage. This means a storage battery is necessary for best operation when any considerable number of valves, other than the .06-ampere style, are employed.

The "B" Battery.

THE "B" Battery has comparatively low current, and is always in the thousandths of an ampere. Even in the most complicated sets there is never a current drain for all valves over fifty thousandths of an ampere unless there is an unnecessary voltage employed. On the other hand, although the current is low, compared with that from an "A" battery, the voltage is very high. The voltage of "B" batteries in common use runs as high as 150 volts, and there are cases where 300 volts are employed.

The "B" battery is, therefore, an entirely different problem from the "A" battery. Instead of heavy current at low voltage, it must supply light current at high voltage. The drain, like that of the "A" battery, is substantially continuous, but variable. The logical device here is the dry battery because small dry cells can be made which will give a continuous light current for a long time, and the voltage of a small cell is the same as the voltage of a big cell. Size in batteries means added current capacity, but not increase in voltage. A number of these small cells can be connected in series to give whatever voltage is desired, and the resulting battery is not bulky.

ACID FLUX NOT ADVISABLE

IT is inadvisable ever to use an acid flux for soldering the connections in a radio set. It does, however, depend on where and how the solution was used. Acid flux should never be used in soldering connections to a 'phone jack, etc.

WAVE TRAPS

The Average Wireless Receiver Without a Wave Trap Can be Compared to a Motor Car Using an Inferior Grade of Fuel. It Works—Inefficiently.

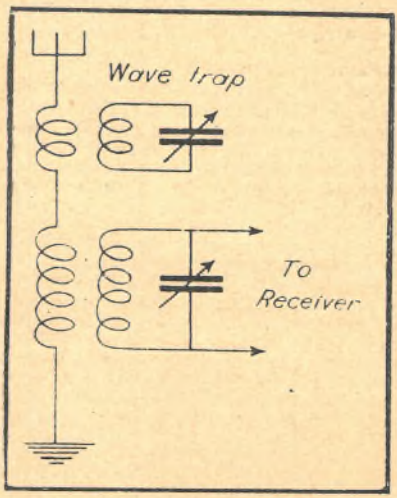
AS the majority of receivers in existence at present are not very selective, it is practically impossible to receive interstate stations without interference from one or more of the locals. With an inexpensive crystal receiver, often it is impossible to separate the local stations from one another.

Although there are various ways of making a receiver selective, the most popular method is that of adding a wave trap, as these are not only the acme of simplicity in construction, but are easy to operate, besides being very cheap.

As it is not intended in an article of this size to give the reasons for interference between stations, a complete technical description of the construction and operation of wave traps will be provided.

The Action of a Wave Trap.

Reference to the diagram will show the circuit of a simple wave trap. This is of the absorption type, consisting of two coils and a variable condenser.



The Circuit of the Wave Trap

Assuming that an electro-magnetic oscillation caused the aerial to vibrate in sympathy, a current of that frequency will flow in the aerial system.

Now, in flowing along the aerial to the set, this current must pass through the primary of the wave trap before it can reach the primary of the set. Now if the secondary circuit of the wave trap is tuned to

the frequency of the current flowing in the aerial, it will absorb the majority of it, that is, assuming that the radio frequency resistance of the secondary is low, and that the circuit has a big absorbing capacity.

It is for this reason that a small coil and a large condenser are preferable to a large coil and small condenser, it being a well known fact that a large condenser will store more electricity than will a small one.

If, instead of one current flowing in the aerial, there are two, and the wave trap is tuned to the frequency of one of them, very little of it will reach the set; therefore, it will not be heard in the receiver unless the latter is extremely non-selective.

Thus it will be seen that the duty of a wave trap is to reduce the currents from any station that it is not desired to receive, without lessening the strength of a second station. In other words, the duty of a wave trap is to eliminate undesired stations.

It must be borne in mind that, while the construction of a wave trap is extremely simple, it is essential that the best quality components be used, for, should the tuning of the trap be broad, it will not only eliminate the undesired station, but will also materially affect the strength of the station that it is desired to receive.

It is for these reasons that the trap must be constructed strictly in accordance with the instructions given, otherwise it will, in all probability, be a failure.

The Apparatus Required.

For the construction of the trap the following components will be required.

1 Variable condenser, not smaller than .0005 mfd.
1 Vernier Dial. Ratio not less than 5-1.
½lb. No. 22 D.C.C. wire.
1 piece cardboard tube, 3 inches diameter x 6 inches long.
2 terminals.

The Construction of the Trap.

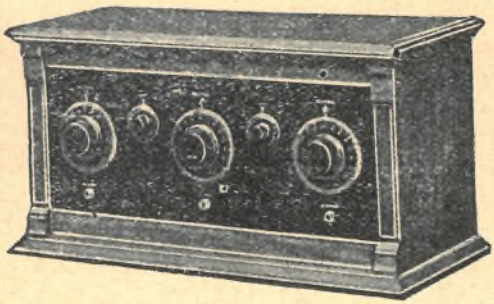
The first piece of constructional work is making the coils, which are built in the following manner:—Make two small holes near one edge of the cardboard tube, and thread a few inches of the wire through them. A hole for one of the terminals should be placed near these holes, but the terminal should not be inserted, as it would be in the way when winding the primary coil. Now proceed to wind ten turns of wire on the tube.

The wire should then be cut, leaving about six inches to spare for connecting purposes. Drill two more holes in the tube alongside the tenth turn, and thread the wire through them, drawing it tight, so that there will be little possibility of the wire coming loose. This end of the wire should be led back to a position near the hole for the terminal. The second terminal should be inserted at this position, and the wire attached. At this juncture the first terminal may be placed in position, and the end of the first turn of wire connected to it.

(Continued on Page 53)

The King Neutrodyne

is guaranteed to receive all interstate stations with full Loud Speaker strength with the maximum volume and clarity.



Assembled in Cabinet to match your furnishing.

Complete with Loud Speaker, Valves, Acc., etc., £45.

To Assemble Yourself - - £18/18/-

Assembled on Panel - - £20

We also specialise in Browning Drake, Two and One Valves. All of these sets are guaranteed to receive Interstate Stations.

British Australian Radio Pty. Ltd.

185 SWANSTON ST., MELBOURNE

Dept. "D" Wholesale.

THE CONSTRUCTION AND OPERATION OF WAVE TRAPS

(Continued from Page 51)

The Secondary Coil.

Alongside the end of the first, or primary coil, make two more holes in the tube. and thread through the wire, leaving about six inches for connections. Proceed to wind on 45 turns of wire (if the variable condenser is one of 0.0005 mfd., or if it is of 0.001 mfd. the coil should consist of not more than 35 turns). When the last turn has been wound on, the wire should be cut, leaving another six inches, and then secured in place by passing it through two holes. This completes the secondary coil.

In order to make both coils secure, one or two layers of surgical tape may be placed lengthwise along the coil. Failing this, use ordinary friction tape (this can be purchased at any dealers. and from most garages. It is also known as insulation tape).

Connecting Up.

The aerial is to be connected to the first turn of the primary coil, through the terminal. The other terminal (that connected to the last turn of the primary coil) is to be connected to the aerial terminal of the set. Reference to the diagram will make this clear. Thus it will be seen that the primary of the wave trap has been connected into the aerial system before the set.

The first turn of the secondary is to be connected to the stator terminal of the variable condenser, the terminal connected to the stationary plates. The remaining lead is to be connected to the rotor terminal of the condenser. This competes the wiring.

The Operation.

The trap is operated by tuning in on the set the station that it is desired to eliminate, and then turning the variable condenser of the wave trap until the strength of the signals is reduced as much as possible. The set should then be tuned to the station that it is desired to receive.

Final adjustment of the wave trap condenser will reduce the strength of the interfering station.

The trap may be mounted in the set if desired, but for most efficient operation it should be located at least six inches from the set.

INCREASING WAVE LENGTH

THE wave length of an ultra-short wave receiver may be increased by inserting a loading coil in series with the wire that leads to the filament from the secondary of the tuner. Inasmuch as the receiver is of low loss construction, it is a good plan to build the coil in the same manner; that is, having as little of the wire as possible coming in contact with the supporting material. A reasonably large size wire should be used. It may also be found necessary to shunt the primary of the first step audio-frequency amplifying transformer or the 'phone terminals with a mica condenser of .001 mfds.

We Chose Them as the World's Best!

Equipment for Unusual Results

No other Condenser Like It!

SANGAMO

Sangamo Condensers are unaffected by even the most extreme weather conditions. They are moulded into a compact bakelite case, and may even be boiled in water without injury. Guaranteed accurate to within 10 per cent. of their stated capacity. Priced from 2/3 to 4/6 each.

WESTON Model 506 Panel Instruments

Weston model 506 Voltmeters have an exceptionally high internal resistance (125 ohms per volt), and are thus highly suitable for both storage battery and dry battery operated sets.

Small and compact in design, but wonderfully accurate. Prices from 32/6.

Panel ammeters and milliameters are also obtainable.

Chosen by America's Foremost Amateurs.

"ACME" RADIO PARTS

Foremost amateurs in both America and Australia have acclaimed the up-to-date low-loss design of "Acme" Condensers and the distortionless amplification of "Acme" Transformers.

"Acme" Audio Transformers, £1/7/6 each.

"Acme" Super Het. Transformers (matched in sets of three), £4/2/6 set.

"Acme" Low Loss Condensers (dust-proof, Square Law), £2/5/ each.

WARBURTON FRANKI [Melb.] LTD.

380-382 BOURKE ST., MELBOURNE
(Opp. Danks'). 'Phone Central 8888.

THE "BEST" CRYSTAL SET

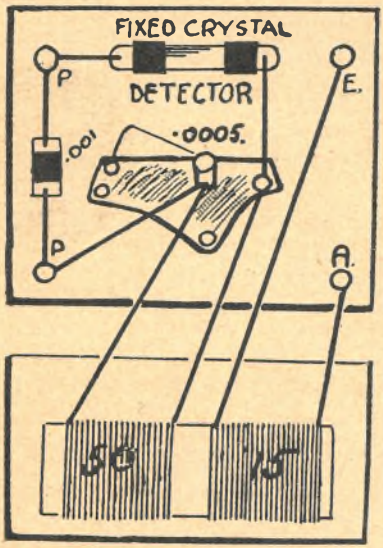
There is but One Control to this Set, yet it will bring in Stations within 50 Miles at Good Strength.

A CRYSTAL set should be both simple and efficient. It should have good volume with selectivity. These are the main attributes of the set to be described, there being but one tuning control. The set is further simplified by the use of a fixed crystal detector in place of the usual detector of the cat-whisker type with its uncertain contact.

So simple is the construction of a set of this description that it can be built in less than an hour, the only tools required being a pair of pliers, a screwdriver, brace and two drills (3-16 and 3-8 inch), a ruler and scriber (a compass will do), and a fairly fine file.

An Examination of the Circuit.

Reference to the diagram will show the position of the apparatus as well as the actual wiring of the set. The large rectangle represents the panel and the smaller the baseboard. Thus it will be seen that the coils are the only components mounted on the baseboard.



This Diagram Illustrates the Relative Positions of the Apparatus as well as the Actual wiring.

How the Circuit Operates

The aerial is connected to the terminal, A, placed on the right-hand side of the panel, and the earth to the top right-hand terminal marked E. These terminals are connected to the primary coil, this coil

(Continued on page 57)

WIRELESS
Receiving Sets and Parts

Always first with the latest, our Radio Dept. offers a wide range of selection and the finest values in sets and parts.

Stocks include:—

DE FOREST LOUD SPEAKER:
THE "AUDALION"
DE FOREST VALVES

"RADION" PANELS
"RADION" SOCKETS
"RADION" TUBING

BRANDES HEADPHONES
BRANDES LOUD SPEAKERS

HELLESENS BATTERIES
And All Sundries.

— Send for Lists —

McEWAN'S
MELBOURNE'S BUSIEST HARDWARE STORE
119-125 ELIZABETH ST., MELB.

THE "BEST" CRYSTAL SET

(Continued from Page 55)

being placed in what is termed inductive relationship with another coil (marked 50), known as the secondary coil.

Due to a property of electricity known as induction, the currents flowing in the primary coil will cause another current with similar characteristics in the secondary coil when the latter is connected into a circuit. In other words, energy flowing in the primary coil will be transferred to the secondary coil.

A maximum transference of energy will take place when both coils are tuned to the same frequency. However, as this is not desired in a receiver of this type, as it would result in a loss of selectivity (the ability of a set to tune out one station in favor of another), only one coil is tuned. Provided good quality apparatus is employed little difficulty will be experienced in receiving any station at will.

Naturally there will be exceptions when stations operating on high power use wave lengths very close to one another. (Technically the frequency spacing should be not less than 15 kilocycles.)

Assuming that a current is flowing in the aerial, it will only be induced into the secondary coil when the latter is tuned to the frequency of the current. When this is done, the current will flow through the crystal detector and be converted to audio frequency, that is, electricity at sound frequencies. It will then pass to the 'phones to be converted by them into sound.

The small fixed condenser placed across the 'phones usually improves the tone; the use of this is optional.

The Apparatus Required.

For the construction of this set the following components will be required by the builder.

1 ebonite panel 7 by 6 by 3-16 inches.
1 straight-line frequency condenser 0.0005 mfd. capacity.
1 vernier dial.
1 piece cardboard tube 3 inches in diameter and 5 inches long.
½lb. No. 22 D.C.C. wire.
4 terminals.
1 fixed crystal detector.
1 0.001 mfd. fixed condenser.
1 pair phones.
100 feet aerial wire, insulators, lightning arrestor, lead-in tube and earthing switch.

The Construction of the Set

Square up the panel by means of rule and file; then drill holes for the four terminals, the variable condenser, and the crystal detector. It will be seen from the diagram that the holes for the terminals are placed near the edges of the panel. They can be conveniently mounted about one half-inch from

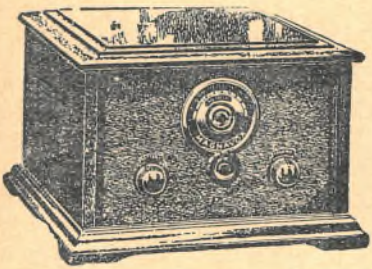
(Continued on page 59)

Radio

RECEIVING SETS

"MAGNAVOX"

Junior 5-Valve Receiving Set



£28/10-

(Without Accessories)

THE "Magnavox" is noted for its simplicity of operation and extreme selectivity. A single calibrated dial is the one control, which enables the Victorian, Interstate and Long Distance Stations to be tuned in instantly once the wave length is known. And the "Magnavox" is wonderful value at £28/10/.

KELLOGG

R.F.L. Receiver

7 VALVE SET

£95

(Without Accessories)

THE operation of the Kellogg is simple in the extreme. By rotating a single control knob, any station within range can be instantly tuned in. Reception is clear, and perfectly distortionless when heard on the loud speaker.

MAIL ORDERS PROMPTLY DESPATCHED.

Order by Post

THE

LEVIATHAN

LTD.

CR. SWANSTON & BOURKE STS. ——— MELBOURNE.

THE "BEST" CRYSTAL SET

(Continued from page 57)

the edges of the panel. All the holes, with the exception of that for the shaft of the variable condenser, are to be drilled with the 3-16 drill, the 3-8 being used for the shaft.

The position for the holes should be marked with the point of the scriber, those for the variable condenser being marked from the template that usually accompanies such components.

Reference to the diagram will show the approximate positions of the apparatus. When all the holes have been drilled the apparatus should be placed in position, the mounting screws being well tightened. Remember when drilling the panel to drill any holes that may be wanted for the vernier dial.

The baseboard should be about half-inch thick. Attach the panel to the baseboard by means of three small screws, the necessary holes being drilled at least one-quarter of an inch from the bottom of the panel.

The Construction of the Coils

At approximately a quarter of an inch from one edge of the cardboard tube, make two small holes with the point of a compass. Pass one end of the wire through these holes so that about six inches will project from one of them, this being for connection purposes. Wind on 15 turns of the wire, then cut the wire off, so that there will be at least six inches to spare, and thread it through two more holes. This constitutes the primary coil.

The secondary coil is wound in the same manner, but consists of 50 turns of wire. It should be separated from the primary cell by a quarter of an inch.

The Wiring As It Is To Be Done

Attach the end of the first turn of the primary coil to the aerial terminal and the end of the last turn of this coil to the earth terminal. Then connect the end of the first turn of the secondary coil to the terminal of the variable condenser attached to the stationary plates. Join the last lead of the secondary coil to the terminal of the variable condenser that is connected to the rotary plates. A wire must then be connected from this terminal to the bottom 'phone terminal.

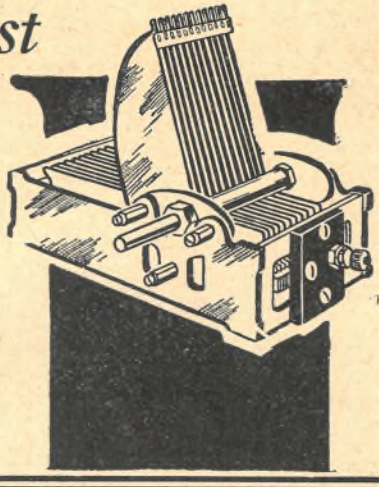
The top 'phone terminal must be connected to the end of the crystal detector nearest it, the other terminal of the detector being connected to the stator terminal of the condenser.

One terminal of the 'phone condenser goes to the top 'phone terminal, and the other to the bottom terminal. This completes the wiring of the set.

The Operation of the Set

Attach the aerial to the terminal marked A and the earth to E. The 'phones are to be connected to the remaining terminals. Turn the dial of the condenser slowly until signals are heard; then vary the dial until best results are secured.

The Best



Straight Line Frequency CONDENSERS

.00025, 9/6; .00035, 10/-; .0005, 10/6

Manufacturers —Radio Corporation of Aus. Pty. Ltd.
SUNSHINE, VICTORIA.

LOUD SPEAKERS

And All About Them.

A LOUD speaker is an electro-magnetic instrument used in wireless for magnifying the sounds received, and distributing them by means of a horn, or other device, modelled or arranged in accordance with acoustical principles, so that they are audible over a certain distance.

Essentially, a loud speaker consists of a permanent magnet, around the cores of which a large number of turns of very fine copper wire is wound. The function of the permanent magnet is to give a constant tension to the diaphragm which is arranged immediately above, but not touching, the cores round which the wire is wound.

As the current which comes from the wireless receiver is varying, by reason of the sound interruptions to which it has been subjected, the electro-magnet, through the coils of which the current passes, varies the pull on the diaphragm, causing it to vibrate in accordance with the sounds received. The movements of the diaphragm, in the air, reproduces the sounds, which are magnified in the horn.

The construction of the loud speaker, it will be seen, is identical with that of the ordinary telephone receiver, and a horn fitted to the earpiece of a high-resistance receiver may be used for a fairly efficient loud speaker.

As the gap in the magnetic field must be very small, provision is usually made for adjusting the size of this gap, according to the amount of volume required.

The sound-amplifying and distributing element in loud speakers usually takes the form of a horn, and speakers with horns of all shapes and sizes are now on sale. It is considered that a horn two feet long gives critically good reproduction, though there are many makes with horns only half this size which have a "tone" nearly as good as the larger type.

Some horns are made of metal, but in the very efficient types the horns are made of moulded composition in which some sort of papier mache is used.

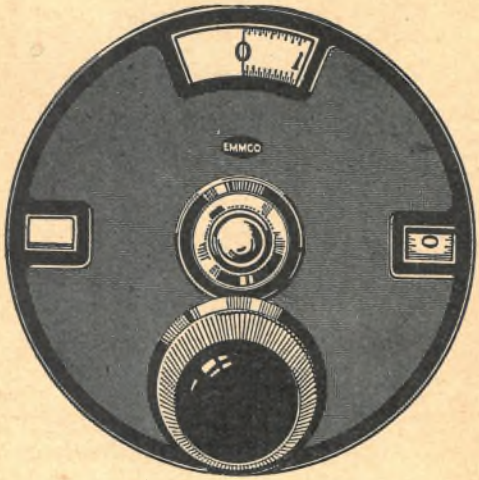
"The Big Noise"

Loudness is not the main qualification of a loud speaker. The "big noise" in wireless is becoming too commonly sought after nowadays. It may be all very well for the owner of the set who is never satisfied unless he is filling his home with clamant reproduction from his loud speaker—regardless of sweetness of tone and sonority; but if the same individual conducts public demonstrations in the same way, the offence becomes nothing less than a serious abuse of the science, and the people who listen to it would probably be far more pleased had they listened-in on a simple crystal set.

It is bad practice to strain the installation by unduly high plate-voltages, high filament temperatures,

(Continued on page 63.)

Make Your Old Set Up-to-date with EMMCO Vernier dials



Bakelite frame, 9/6. Metal frame,

You'll be amazed at the difference. Selectivity, easy control, and a wonderful finish that makes your old set look like new.

You can get them from ANY Dealer

With Clockwise or Anti-Clockwise movement

Manufactured by

ELECTRICITY-METER MFG. COY.

Sydney, N.S.W.

LOUD SPEAKERS

(Continued from page 61.)

and tight couplings to get extra loud-speaker effects. In this lies trouble other than distortion, for the lives of the valves may be considerably shortened by such practices.

These points should be borne in mind, particularly when loud speakers are used for reception of broadcasting, and it must be remembered that a loud speaker is capable of giving clear reproduction only up to a certain point, beyond which, only distortion results.

There are numerous types of loud speakers, ranging from the usual type with a large horn, to a hornless compartment in the cabinet, from which the sounds come. The sizes of loud speakers range from the "baby" speaker of a few inches, to the mighty "Tremendous," which, as its name implies, is a very large instrument.

To Improve the Tone

Successful operation depends on a variety of circumstances, chiefly, perhaps, on a well-balanced receiving set and proper tuning thereof, the main requirement being signal strength sufficient to actuate the diaphragm of the loud speaker properly.

Distortion may be assigned to two main causes; those which may exist in the loud speaker itself, and those to be found in the receiving set, the latter being the main offender.

The resistance of the loud speaker when conected in the anode circuit should not be under 2000 ohms, and sometimes the addition of a small fixed condenser of a .001 or .005 microfarad capacity across the terminals of the loud speaker will have the effect of giving a more mellow reproduction.

In short, to get good loud speaker results, pay strict attention to the tuning of the circuit, and the only adjustment the loud speaker will need will, perhaps, be to alter the position of the diaphragm slightly.

WIRELESS SAFETY

THE protection from lightning of wireless instruments and the building which houses them should enter potently into the mind of every owner of a wireless set. A wireless aerial over a house is not a menace, although some landlords have gone as far as to prohibit the erection of aerials because "they will attract lightning." This is not so. It has been proved again and again that a properly grounded aerial is a safeguard rather than a danger to the buildings round. A wireless aerial will prove a much more efficient lightning protector than the ordinary lightning rod, owing to its usually nearer proximity to the clouds and to its greater surface.

With every aerial provision should be made to connect it direct to ground outside the building. This is in addition to the usual indoor connections. The connection may consist of a spring clip and length of wire connected to the ground connection.

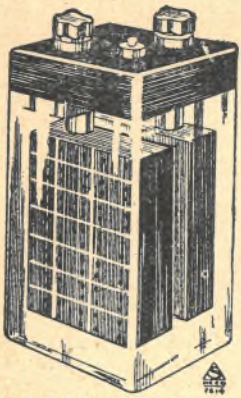
VOLUME & CLARITY--

are the outstanding factors that make for pleasureable "listening-in," and to secure such depends very greatly upon the battery with which your set is equipped.

Exide

Wireless Batteries

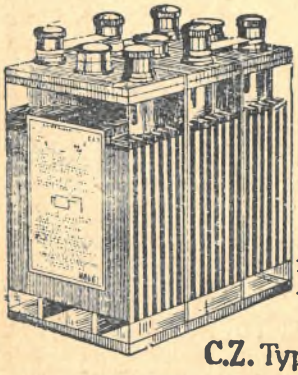
stand supreme in the service they give, assuring at all times a steady and evenly flowing current at a constant voltage. There is an "Exide" of suitable type for every set.



"D.T.G." & "D.F.G." Type.

"Exide" "D.T.G." & "D.F.G." Types

Of special design to supply small currents at low discharge rates, suitable for dull emitter work and immeasurably superior to dry cells from a point of view of both efficiency and economy. Supplied in moulded glass box with "Sealed in" lid to prevent evaporation. Need be recharged only every six months, unless the full capacity has been taken out in a shorter period.



C.Z. Type.

"Exide" "C.Z." Type (Celluloid)

Supplied in Celluloid Containers in capacities from 20 to 60 ampre hours (continuous ratings) in the following types:—
C.Z. 2, C.Z. 3, C.Z. 4, C.Z. 5, C.Z. 6.

Filled with Electrolyte and charged ready for use. Prices range from 21/- to 39/

Ask your Radio Dealer to Demonstrate the "Exide"

A. P. SUTHERLAND,
Sole Distributor for Victoria and Tasmania, 2 Maffra St., Sth. Melbourne.
Phone Cent. 4688 and 4689.

THE CARE OF THE ACCUMULATOR

The Accumulator is an Important Part of your Set. Look after it. This Article Tells How.

ELECTROLYTE is the solution in a storage battery. It consists of sulphuric acid diluted with distilled water until it has a specific gravity of approximately 1280. The specific gravity of water is 1000. The acid that is present in the electrolyte solution increases the weight of the liquid to a specific gravity of 1280. When a battery is fully charged the specific gravity of the electrolyte solution should be 1280 to 1300. As the battery is gradually discharged the acid leaves the water and works its way into the pores of the battery plates. When sufficient acid leaves the electrolyte solution to bring the solution to a specific gravity of about 1100 the battery is generally about completely discharged.

In charging the battery the acid is forced out of the plates back into the solution, and when the battery is completely recharged the specific gravity should again be about 1280.

It is when the battery is in a discharged condition, and when the acid is in the plates, that the battery deteriorates. To prolong the life of a storage battery the acid should be kept out of the plates as much as possible, and keeping the battery in a charged condition is the only means of doing this.

Use of Hydrometer

A hydrometer permits the operator to know the conditions of charge that exist within the battery. It is a glass tube-like barrel container with a small glass float within. A rubber bulb is connected at one end and the electrolyte is sucked up into the barrel chamber. The glass float will float differently at the various specific gravity readings. The float is graduated and readings are at the point where the float submerges under the electrolyte.

A full charge will float the graduated tube high, and when the battery is discharged it will sink.

Dangerous When Discharged

It is when the battery is in a discharged or partially discharged condition that the acid attacks the plates and causes the noises that are often mistaken for static in a radio receiver. The foregoing remarks regarding maintenance also apply to the accumulator type of "B" battery. Always keep the electrolyte solution about one-eighth or one-fourth inch above the top of the plates.

To Keep in Condition

To keep the accumulator in condition the electrolyte should be kept about one-quarter of an inch above the top of the plates. Any shortage should be made up with distilled water, which should be added after the recharging period. This is imperative owing to the more or less violent bubbling during the re-

(Continued on Page 67)

EUTROPE'S Radio Values

BUILD YOUR OWN SET AND SAVE POUNDS!

COMPLETE COMPONENT PARTS
For Two-Valve Set **£3**

COMPLETE COMPONENT PARTS
For Three-Valve Set **£5/10/-**

COMPLETE COMPONENT PARTS
For Four-Valve Set **£6/15/-**

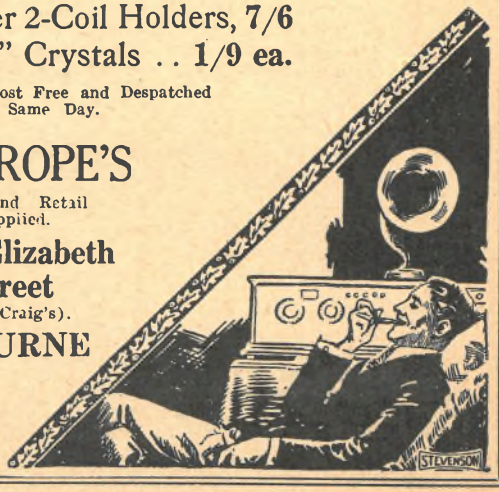
If you are thinking of improving your set, consult us. All repairs undertaken.

Tangent Loud Speakers **£3/17/6**
Ebonite Horn

Lightning Arrester Switches **2/3**

Vernier 2-Coil Holders, **7/6**
"Lisenin" Crystals . . **1/9 ea.**

Mail Orders Post Free and Despatched Same Day.



EUTROPE'S

Trade and Retail Supplied.

21-23 Elizabeth Street
(Opp. Craig's).
MELBOURNE

THE CARE OF THE ACCUMULATOR

(Continued from page 65.)

charging period, when the electrolyte might sputter over and damage whatever it came in contact with.

Ordinary drinking water will not do, as it contains many mineral salts and other matter that is injurious to the battery. Boiled water is not distilled water, and is the worst kind to use, because the mineral salts are concentrated in it, and it is not long before enough have accumulated in the cells to start an electrolytic action which would result in the framework of the plates being eaten away and the battery ruined.

How to Store Your Accumulators

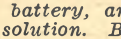
First, the battery should be fully recharged, then the electrolyte removed from each cell and distilled water put in its place.

When the battery is wanted again for service the battery should be given a slight charge while the water is in each cell. The battery should then be discharged and recharged to maximum capacity. The water should then be replaced with the regulation battery electrolyte and the battery discharged.

The accumulator should again be charged, this time being given a good overcharge, after which it should be ready for service.

TO KEEP THE ACCUMULATOR IN ORDER.

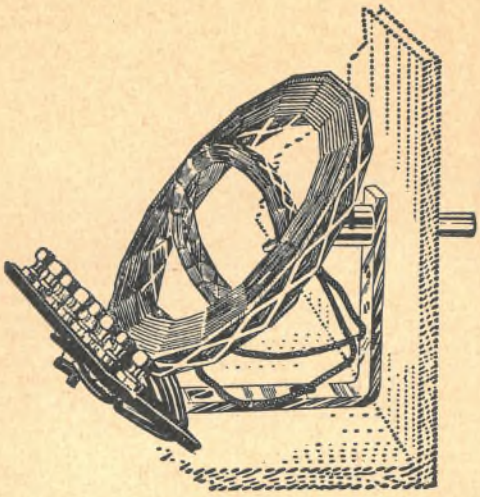
1. *Keep the battery charged.*
2. *Never lay tools on top of a battery, or they may cause a complete discharge by short-circuiting it.*
3. *Add nothing except distilled water.*
4. *Acid should never be added unless some has been spilled from the cells accidentally.*
5. *Boiled water is not distilled water.*
6. *A discharged battery will freeze easily, while a fully charged one will not freeze in this climate.*
7. *To find the positive and negative poles of a battery when no marks are visible, fill a glass vessel half full of salt and cover with water. Run a wire from each terminal of the battery, and hold them about one inch apart in the solution. Bubbles will rise from the negative wire. Also there is usually more greenish corrosion around the positive terminal than the negative.*
8. *Never light a match and look in the vent caps. The hydrogen gas in the battery is liable to explode and cause serious injury to the eyes.*
9. *Keep the battery charged and don't let it get "thirsty."*



Don't omit to clean the insulators occasionally, especially if the installation is near the sea or in a smoky atmosphere.

Don't forget that the earth connection is an important adjunct to the aerial.

ALADDIN



UNIVERSAL TUNER

For Use in the Following Circuits:

Standard Regenerative, Wave Traps, Capacity Feedback, Browning Drake Superheterodyne Oscillator, Antenna Adapter for Superheterodyne,

FROM ALL DEALERS, 14/6

Wholesale Only:

ALADDIN RADIO Co. Pty. Ltd.

524 COLLINS ST., MELBOURNE

SUCCESSFUL SOLDERING

The hints given in this article will enable the beginner to make efficient soldered joints in his wireless receiver.

THE other evening I took a receiver to a friend's place with everything connected up, and the filament switch pushed home. I am now using another rectifier. The reason is that I did not solder my connections; one worked loose during the journey and placed the "B" battery in parallel with the "A" battery. I now invariably solder all connections, and would advise the beginner to do likewise.

Procure a soldering iron which you can handle easily, neither a small one nor a big, heavy one. One end of the copper has the four faces brought to a point, the other end having a handle of some description attached. Also obtain an old knife, a stick of solder, and some flux, either resin or candle. Only an expert can use spirits of salt without damage to the receiver. If the iron has a coating of solder on its point you can proceed to begin operations. If not, then give it a coat as follows:—

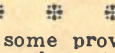
Heat the iron until it will melt the solder easily. Twist it, point down, into a block of sal-ammoniac. This will make a hole, but will also give off irritating fumes. Run a little solder into the hole, and continue twisting the iron until it has a coat of solder for about half an inch up the side of the iron, which should first be carefully cleaned with an old file.

The Joints Must Be Clean.

Scrape the articles (say two wires) clean with the knife and apply a small quantity of the flux on the scraped parts. Melt a small quantity of solder on the iron and move it backwards and forwards over the wires which are to be soldered. This is known as tinning, and must be done to all articles requiring to be soldered. When both wires are tinned, hold them together and apply the iron with a little solder.

A Few Hints.

Always keep the iron clean.
Use resin or candle for flux.
Tin both surfaces to be joined.
Have your soldering iron hot.
Do not heat the iron until the tinning comes off, which it will do when the iron is nearly red hot.
Do not use spirits of salts as flux.
Do not try to work with a cold iron.
If these few hints are followed, no trouble will be experienced in soldering all joints. C.A.C.

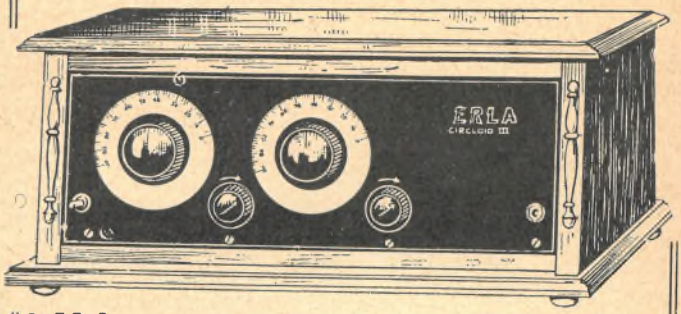


Don't omit to make some provision for the contraction of the aerial ropes that will take place in wet weather.

Don't forget that soot on an insulator makes an excellent conductor, and that the efficiency of the set will suffer as a consequence.

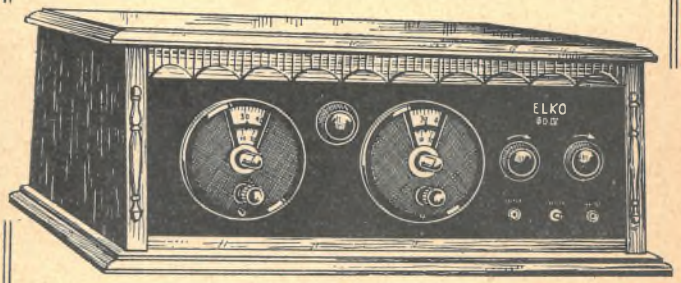
Don't contemplate using a frame aerial if you only have a crystal receiving set.

Sets that anyone may be proud to show to friends!



3-Valve "Erla" Set - £24/10/-

The circuit has been designed in the "Erla" Laboratories, and incorporates the distance properties of tone Radio Frequency, the pure tone rectification of the Crystal and the Audio Amplification of the "Erla" Audio Transformers, which are without doubt the "last word" in low frequency amplification. Kiernan's Price, without Loud Speaker, £24/10/.



4-Valve "Elko" B.D. Set £25/4/-

A Four Valve incorporating a circuit which has taken America by storm. The distance-getting properties are 100 per cent., both in clarity and, above all (so vital at present), selectivity. All Interstate Stations are guaranteed, even while Local Stations are working. Appearance is of a well-balanced panel, using only two main and one auxiliary control. Kiernan's Price, without Loud Speaker, £25/4/.

KIERNANS

220-8 Smith Street, Collingwood

291-3 Elizabeth Street Melbourne

132 Bridge Road Richmond

A RADIO FREQUENCY AMPLIFIER

The addition of a Radio Frequency Amplifier constructed according to these details will enable you to Increase the Range of Your Receiver.

THE radio-frequency amplifier described in this article is so designed that it may be used with any standard straight detector valve circuit, with or without reaction, and this without any alterations whatsoever to the set. It should, therefore, appeal to the many who possess no R.F. stage on their existing receivers and who would like to hear more distant stations without the need of making new sets.

Coupling Employed

The type of radio-frequency coupling employed is a form of series tuned anode, and is shown in Fig. 1, on the left-hand side of the dotted line. The right-hand part of this circuit, it will be seen, is a conventional single valve circuit, the left-hand part being added by means of the R.F. unit. Reaction is normally obtained by means of the potentiometer, which is worked as near the negative end as possible. The use of a reaction coil coupled to L2 may be tried, and in some cases it will be found desirable to obtain reaction by a combination of the two methods.

The aerial coil of the set becomes the tuned anode coil L2, and the plug-in coil, L1, becomes the aerial tuning inductance.

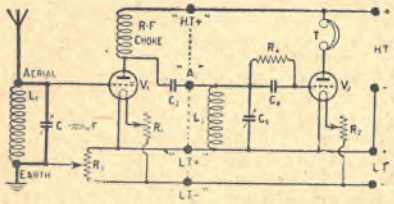


Fig. 1.—This circuit shows how the amplifier is added to an existing single valve receiver.

Components for the Amplifier

The components which are required to build this radio-frequency amplifier are both few and inexpensive. They are given in the following list:—

Panel 6 by 4 by ¼in.
Cabinet to take same.
One .0005 mfd. variable condenser.
Rheostat.
Potentiometer.
Valve holder.
Six terminals.
One board-mounting coil socket.
.002 mfd. fixed condenser.
One ounce No. 30 S.W.G. d.s.c. wire.
One 2ft. length buz-bar wire.

Constructional Work

Having collected together all the necessary com-

(Continued on page 73.)

A Dull Filament Valve

in the TRUE Sense

The Standards by which a Valve is Judged are

Economy, Results and Life

It is the Filament that Counts.

Only MULLARD P.M. Valves have the Wonderful P.M. Filaments.

For 2 Volts—
P.M.1 HF .1 ampere (General Purpose).
P.M.1 LF .1 ampere (First Stage Audio).
P.M.2 .1 ampere (Power).

For 4 Volts—
P.M.3 .1 ampere (General Purpose).
P.M.4 .1 ampere (Power).

For 6 Volts—
P.M.5 .1 ampere (General Purpose).
P.M.6 .1 ampere (Power).

Obtainable from Every Radio Dealer in Australia

Mullard

THE · MASTER · VALVE

A RADIO FREQUENCY AMPLIFIER

(Continued from page 71.)

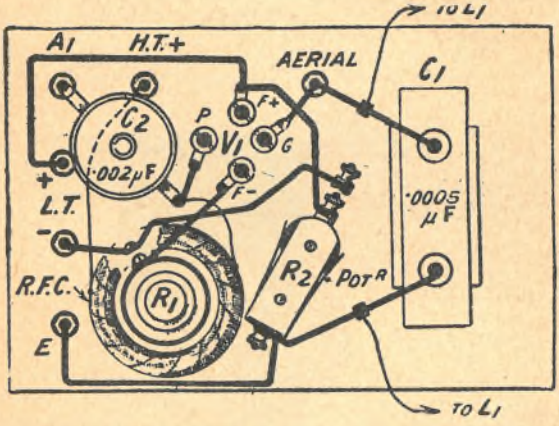
ponents, the unit may be constructed, and it will not be found to take very long. Commence by marking out the panel on the side which is to become the back.

Mounting Components

Having marked out the panel and then carefully drilled the holes, the components can be mounted. The fixed condenser, it will be noted, is not screwed to the panel at all, but is held in place by the wires, which make connection to it.

Making the R.F. Choke

It will be seen that a coil of wire is placed over the rheostat. This is the radio-frequency choke, and, since it has to be put into position before the set is wired, its construction will be dealt with next. A



This diagram shows how the actual wiring is done, as well as the positions of the components.

former, such as the wooden handle of a chisel, is obtained, and about 200 turns of the 30-G. wire is wound on hank fashion, after placing three lengths of wire along the handle, with which to hold the coil together while it is being removed from the former.

After removal it is bound all round with a long length of the same wire, the three small pieces being removed as necessary. This choke is intended for use when the set is to be used on the lower range of broadcast wave-lengths. Having completed the choke, it may be slipped over the filament resistance, and the wiring may be commenced.

It should present no difficulties whatever, if the wiring diagram of Fig. 2 is followed carefully. Two pieces of flexible wire, or, if preferred, two lengths of No. 26-G. D.C.C. wire, are used to connect up the coil-holder, and they are taken through two small holes drilled in the top of the cabinet.

(Continued on page 83.)

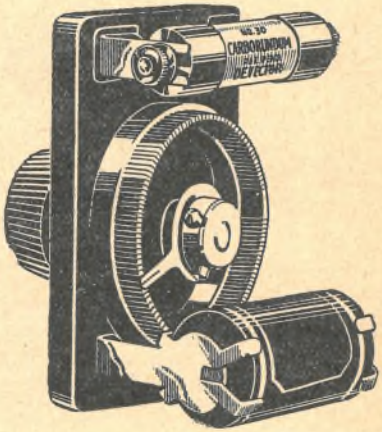
The Carborundum Stabilizing Detector Unit

No. 32

By regulating the detector resistance, the Carborundum Stabilising Detector Unit provides these advantages:—

1. *The resistance may be made to match the circuit impedance, resulting in maximum volume.*
2. *The resistance may be made high with increased selectivity owing to decreased damping effect.*
3. *In reflex sets the resistance may be adjusted so the detector circuit is always closed to just the proper degree, eliminating the open and short circuit howls of ordinary high and low resistance detectors.*
4. *Indirectly, by regulating the detector resistance in reflex sets, self-oscillation, the underlying cause of obnoxious howls and squeals, may be controlled.*
5. *In reflex sets the tubes may be operated at the peak of regeneration, increasing the sensitivity.*

You can stabilise your reflex—increase range and volume—and improve tonal quality with the Carborundum Unit.



Adaptable to any set

Because of the resistance - controlling feature, whereby the detector may be made to match the impedance of any circuit, the Carborundum Unit can be substituted for any detector in any set.

The unit has proved of particular value in Harkness Reflex because it affords positive regulation of regeneration, making the set operate at highest efficiency on all wave lengths.

It has been used with excellent results in place of the tube detector in reflexes, neutrodynes and super-heterodynes, affording clearer and sweeter reproduction.

Sole Agents Victoria and New South Wales:

ELIZA TINSLEY Pty. Ltd.

640 BOURKE ST., MELBOURNE; and 484 KENT ST., SYDNEY

AN AUDIO FREQUENCY AMPLIFIER

The addition of this amplifier to the crystal set described on page 55 will enable a loud speaker to be operated from stations within a 20-mile range. It will increase the volume of any receiver.

THERE are times when the listener-in using a crystal or single valve circuit wishes he could get more volume from his set. He may, for instance, wish to connect several pairs of head-phones for the purpose of entertaining friends, and when all the phones are connected the incoming signals may be perfectly satisfactory as regards clearness, but yet lack volume. The purpose of this article, therefore, is to show the amateur how he may construct a one-valve amplifying unit which may be readily attached to his set whenever he desires.

The amplifying unit is so designed that it may be added to the set without having to alter the latter in any way except to remove the head phones and connect them to the amplifying unit. It is designed also with a view to keeping the initial and upkeep costs as low as possible.

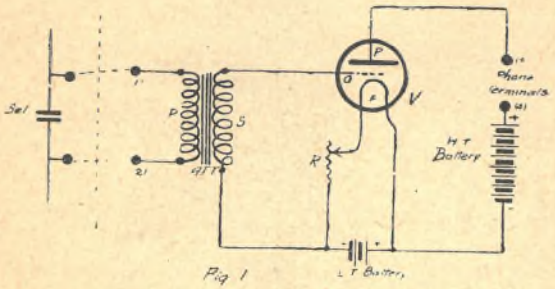


Fig. 1.—The Theoretical Circuit of the Amplifier.

With regard to the amplifying unit to be described, the arrangement is such that at the point where the audio-frequency impulses would ordinarily pass through the 'phones in the crystal set, they are passed into the amplifying unit instead, and, before eventually reaching the 'phones, are "stepped-up" or increased in volume.

What is Required.

1 audio-frequency transformer, ratio 5 to 1.
1 dull emitter valve.
1 valve socket.
1 30-ohm rheostat.
2 dry cells.
1 60-volt high-tension battery.
4 terminals.
1 baseboard, measuring 8in. x 11in. x ½in.
1 piece of quarter-inch ebonite, measuring 5in. x 4in.

(Continued on page 79.)

"SferavoX"

(SAY "SERRAVOX")

Product of
The Societe Francaise
Radio-Electrique
Paris

Distortionless

Powerful

£5/5/-

Sensitive

Beautiful

£5/5/-

SFERAVOX CONE

ON SALE EVERYWHERE

Factory Representatives for Australasia:

Brown & Dureau Ltd., Temple Court, Collins Street, Melbourne; and at Sydney, Perth, Brisbane, Wellington and Auckland (N.Z.).

The World's Highest Efficiency Valves

Acclaimed by leading amateurs as unsurpassed in VOLUME — PURITY — LENGTH OF SERVICE.

Radiotechnique

SCIENTIFIC SUPER VALVES

Used throughout the French Army and Navy Broadcasting and Commercial Stations.

RADIO MICRO

Fil.3-3.5V., .06 amp. Dull Emitter, Detector and Amplifier.

13/6

SUPER AMPLI

Fil. 5V., .25 amp. 201A type, Detector and medium power Amplifier.

Products of La Radiotechnique, Paris

Manufactured at Europe's largest purely valve factory

On Sale Everywhere

Factory Representatives for Australasia:

Brown and Dureau Ltd., Temple Court, Collins st., Melbourne; and at Sydney, Perth, Brisbane; Wellington and Auckland, N.Z.

A. ROBOTHAM
PTY. LTD.

Wireless Accessories

WRITE FOR CATALOG

Mail Orders Attended to Promptly

183 Bourke Street
Melbourne

Tel. Cent. 10524

AN AUDIO FREQUENCY AMPLIFIER

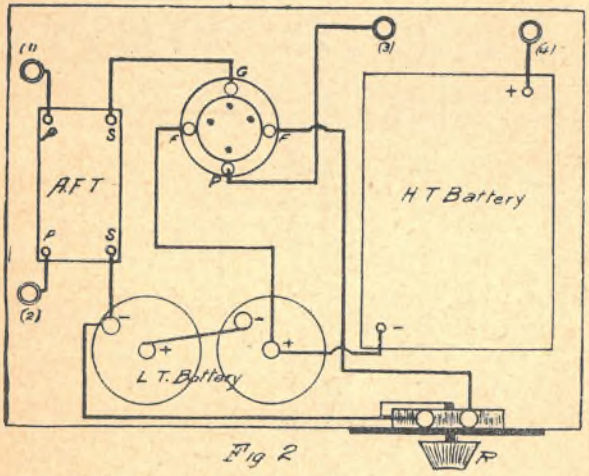
(Continued from page 75.)

A short length of No. 16-gauge tinned copper wire for wiring up the set.

A ratio of 5 to 1 is suggested for the audio-frequency transformer, but a ratio of 4 to 4½ to 1 will also serve the purpose. A dull-emitter valve is recommended for reasons of economy as regards the low-tension or "A" battery. This type of valve operates with dry cells—usually two cells—which costs only a fraction of the cost of an accumulator. They are clean to handle, do not require recharging, and, with reasonable care, will give good service for several months. The valve socket and valve should be bought at the same time to ensure the correct type of socket being obtained. Dull-emitter valves require a 30 or 35 ohm rheostat.

How the Circuit is Wired

Fig. 1 shows the circuit arrangement of the amplifying unit. The audio-frequency transformer is indicated by the letters AFT; P represents the primary,



This diagram shows the actual wiring of the amplifier.

and S the secondary winding of the transformer; V is the valve, R the rheostat, LT the low-tension or "A" battery, and HT the high-tension or "B" battery. The four terminals are indicated by the figures (1), (2), (3), and (4). One end of the primary winding is connected to terminal (1), and the other end to terminal (2). The grid, G, of the valve is connected to one of the secondary terminals, and the negative terminal of the low-tension battery to the other end of the secondary winding. The plate, P, of the valve is connected with the 'phone terminal (3), while the other 'phone terminal (4) is joined to the

(Continued on page 81.)

NORRIS & SKELLEY WIRELESS PTY. LTD.,
213 Elizabeth St., Melbourne

AN AUDIO FREQUENCY AMPLIFIER

(Continued from page 79.)

positive wander plug of the high-tension battery, the negative terminal of this battery being connected to the positive of the low-tension battery. The filament, FF, of the valve is connected in series with the rheostat and the low-tension battery.

The Layout

The layout of the apparatus on the baseboard is indicated in Fig. 2. The baseboard, which measures 8 inches by 11 inches, has been made sufficiently large to accommodate the high and low tension batteries in order to make the amplifying unit complete on one base for facility in moving it about. The piece of ebonite measuring 5 inches by 4 inches is screwed (upright) to the front edge of the baseboard, well to the right, so that it may be clear of the low-tension battery. The ebonite should be drilled with a hole of suitable size for the rheostat at a distance of 2 inches from the top, and equidistant from either side. The rheostat is then attached behind this small "panel" with the knob in front.

The audio-frequency transformer is placed on the left-hand side of the baseboard, and the 60-volt high-frequency battery on the right-hand side. In between them is the valve socket (at the rear) and the low-tension battery (near the front). Terminals (1) and (2) are screwed to the left-hand side of the board near the audio-frequency transformer, and terminals (3) and (4) at the back of the board behind the high-tension battery.

When the various components have been placed in position, the wiring should be done. This is clearly set out in Fig. 2, and needs no further comment.

The method of connecting up the amplifying unit to the crystal set is very simple, as also is the method of operating it. It is assumed that the cord of the head 'phones is connected to two 'phone terminals on the set, crystal or valve. Therefore, place the amplifying unit alongside the set, and remove the head 'phones from the terminals of the latter. Connect the head 'phones to terminals (3) and (4) of the unit, and then join terminal (1) to one of the 'phone terminals of the set by means of a piece of wire. Similarly connect terminal (2) to the other 'phone terminal. In effect, the amplifying unit has now been connected to the set in place of the head 'phones, the latter having been connected to the 'phone terminals (3) and (4) of the amplifying unit.

All tuning is done on the set as hitherto, and is quite unaffected by the addition of the amplifier. The only controls on the latter are the rheostat to vary the current flowing through the valve filament, and the wander plugs on the high-tension battery to vary the potential applied to the plate of the valve. Turn the knob of the rheostat, R, a short distance to cause the valve filament to glow, and, after tuning the set, readjust the rheostat, either backward or forward, until the most suitable position is found. They try the positive wander plug, that is, the one from terminal

(Continued on page 83.)

The Carborundum Detector

No. 30

IT'S PERMANENT

You can improve any reflex or crystal radio set by installing The Carborundum Detector.

Heavy, five-pound contact pressure makes the Carborundum Detector permanently sensitive. Carborundum manufactured in the great electric furnaces at Niagara Falls, is the only rectifying substance than can be used with a heavy pressure contact; consequently, it is the only material suited for permanent detectors. Carborundum Detectors are built solidly and hold their adjustment indefinitely. They are guaranteed not to "burn out." When used with the controlling unit, Carborundum Detectors excel all other crystals in permanency, efficiency, selectivity, volume and perfect adaptability to any set.

This detector is made with a Carborundum manufactured specially for radio purposes.

It is a fixed, permanent detector that retains its sensitivity indefinitely. It will not burn out. There are no adjustments to be made — no need to go searching for a sensitive spot.

The minute you get your first reception with the Carborundum Detector its gives sharper, truer toning. You will get full true tones, without distortion.

Another thing to consider is that it will increase the selectivity of your set, and at the same time make it possible for you to get greater distance.

The Carborundum Detector has revolutionised radio reception with reflex or crystal sets. It is the Detector that you have long been wishing for. And remember that it is fixed permanently, and absolutely guaranteed by its makers.

Be certain to get the genuine Carborundum Detector. The Carborundum Detector can be had from all dealers.

SOLE AGENTS, VICTORIA and N.S.W.—

Eliza Tinsley Pty. Ltd.

640 Bourke Street, Melbourne, and 484 Kent Street, Sydney.

AN AUDIO FREQUENCY AMPLIFIER

(Continued from page 81.)

(4), into various points on the high-tension battery until the most critical position is obtained.

If a telephone jack is used on the set for connecting the head 'phones in circuit instead of the screw terminals, the method of connecting the unit to the set is very much simplified. Instead of using four terminals on the unit a telephone plug and cord and a jack are required. The free ends of the cord are connected one to each terminal of the transformer primary winding, while the jack is connected to the plate of the valve on one side and the positive terminal of the high-tension battery on the other. The jack may be held in position convenient for use by drilling a hole of suitable size for it in the small ebonite panel to the right of the rheostat. When adding the amplifying unit, therefore, all that is necessary is to insert the transformer plug into the 'phone jack on the set, and plug the head-set into the jack on the rheostat panel.

❊ ❊ ❊ ❊

A RADIO FREQUENCY AMPLIFIER

(Continued from page 73.)

How to Connect Up the Amplifier

As soon as the wiring is completed, the set may be put on trial. The L.T. is connected in the usual manner to the two terminals marked for it. The H.T. + for the R.F. valve is placed on the H.T. + terminal on the unit, the aerial is put on the terminal marked aerial, the earth on the earth terminal, and the terminal marked A1 is connected to the aerial terminal of the set with which the unit is used.

Operation

The set and the R.F. amplifier are now operated in the following manner: Place a coil of the size usually employed in the aerial socket of the ordinary receiver in the R.F.-coil socket, and a coil one or two sizes larger in what used to be the aerial socket. The best size of reaction coil must be found by trial if reaction is used.

Place the potentiometer as near to the negative end as possible without making the set oscillate, and tune simultaneously with the two variable condensers. An off position for the potentiometer is obtained by turning it to the left as far as possible. This should always be done to avoid wasting the L.T. current when the set is not in use.

In Practice

The amplifier was found to be quite satisfactory in practice, the radio-frequency amplification effect serving to make stations which were difficult to hear and tune before quite satisfactory.

It must be noted that the choke described is intended for stations on the lower wave lengths, and while it might prove satisfactory on the higher waveband, this will not necessarily be the case. A similar choke suitable for 6WF would need about 350 turns.

For Highest Efficiency

USE

McMICHAEL

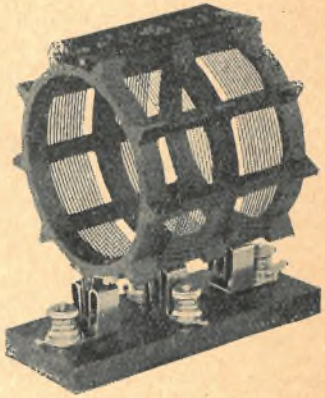
COMPONENTS

Long-Wave Transformers

For Superheterodynes

Filter and Intermediate types. Give high amplification and silent background .. .. ..

35/- ea.



Dimic Coils

As used in all the latest circuits, including the remarkable Elstree Six. High Selectivity and widest adaptability .. 16/6 ea.

Mounts, 4/6 ea.

H.F. Plug-in Transformers

All sizes, and for neutrodynes and superheterodynes .. ..

16/6 ea.

Oscillator Couplers, Resistance Capacity Units, Fixed and Neutrodyne Condensers, Vernier Dials, Dual Rheostats, etc.

OSBOLDSTONE & Co. Pty. Ltd.

Manufacturers' Representatves:

Fink's Buildings, (5th Floor), 6a Elizabeth Street, Melbourne

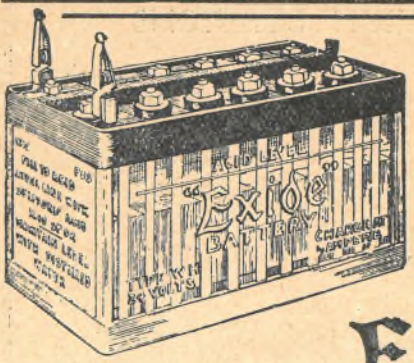
Cent. 10781

FOREIGN STATIONS

Below is given a list of the most important American and European stations, together with their wave lengths.

Call	Station.	Wave-length
SMSM	Karlscrona	201.3
—	Gefle	204.1
—	Kiev	211.9
LOAA	Luxemburg	217.4
—	Kovno	219
—	Strasburg	222.2
—	Leningrad	223.9
HFF	Belgrade	225.6
SASC	Malmo	229
PTT	Bordeaux	238.1
—	Helsingfors	240
—	Konigsberg	241.9
—	Toulouse	245.9
—	Gleiwitz	250
—	Stettin	252.1
—	Kiel	254.2
SASB	Gothenburg	260.9
	Brussels	265.5
SMVV	Norrkoping	272.7
EAJ8	San Sebastian	
—	Zagreb	275.2
EAJ4	Madrid (F)	
EAJ17	Seville	277.8
EAJ13	Barcelona	
EAJ1	Barcelona	280.4
—	Dortmund	283
—	Reval	285.7
2EH	Edinburgh	288.5
6KH	Hull	
5PY	Plymouth	
5NG	Nottingham	
6FL	Sheffield	
6ST	Stoke-on-Trent	
6LV	Liverpool	
5SX	Swansea	
2DE	Dundee	
	Lyons	291.3
	Liege	294.1
EAJ11	Bilbao	
SMXQ	Trollaattan	
2LS	Bradford	
—	Dresden	
—	Agen	297
—	Hanover	
—	Carthagena	
—	Jyvaskyla	
PTT	Munster	303
6BM	Bournemouth	306.1
PTT	Marseilles	309.3
5NO	Newcastle-on-Tyne	312.5
—	Milan	315.8
2RN	Dublin	319.1
WJAZ	Mount Propect	322.4
—	Leipzig	322.6
2BE	Belfast	326.1
—	Nuremberg	329.7
WBZ	Springfield	331.3
—	Reykjavik	333.3
—	Copenhagen	337
Petit Parisien	Paris	340.9
EAJ5	Seville	344.8
—	Prague	348.9

Call	Station.	Wave-length
5WA	Cardiff	353
—	Breslau	357.1
KGO	Oakland	316.2
2LO	London	361.4
—	Graz	365.8
—	Oslo	370.4
EAJ7	Madrid	375
WGY	Schenectady	379.5
WHAZ	Troy	
—	Stuttgart	379.7
2ZY	Manchester	384.6
—	Radio Toulouse	389.6
—	Frankfort-on-Main	394.7
—	Breman	400
	Warsaw	
SMZK	Falun	
EAJ3	Cadiz	
WOR	Newark	405.2
WJY	New York	
5SC	Glasgow	405.4
—	Berne	411
WCCO	Minneapolis	416.4
SASA	Stockholm	416.7
1RO	Rome	422.6
—	Hamburg	428.6
EAJ9	Bilbao	434.8
OKB	Brunn	441.2
FPTT	Paris	447.8
WJZ	New York	454.3
SASE	Boden	454.5
—	Bergen	461.5
—	Elberfeld	468.8
PTT	Lyons	476.2
—	Berlin	483.9
WEAF	New York	491.5
2BD	Aberdeen	491.8
5IT	Birmingham	
—	Zurich	500
SASD	Sundsvall	545.6
—	Buda Pesth	555.6
—	Orebro	566
—	Berlin	
EAJ6	Madrid	577
—	Linkoeping	588.2
—	Vienna	
—	Ostersund	720
HB1	Geneva	760
—	Odense	810
HB2	Lausanne	850
—	Leningrad	940
—	Basle	1000
Popoff	Moscow	1010
HDO	Hilversum	1060
—	Ryvang	1150
—	Soro	1150
LP	Berlin	1300
SAJ	Karlsborg	1350
RDW	Moscow	1450
5XX	Daventry	1600
SFR	Paris	1750
KAB	Norddeich	1800
PCFF	Amsterdam	2125
FL	Paris	2650



New High Tension

Exide

Wireless Batteries

For high tension work and tuning in long distance stations with volume and c arity both the "W.H." and the "W.J." New "Exide" Wireless Batteries mean real satisfaction, nct only in reception itself, but a'so in the longer service they give without need of recharging, both types on y needing to be recharged once every six months.

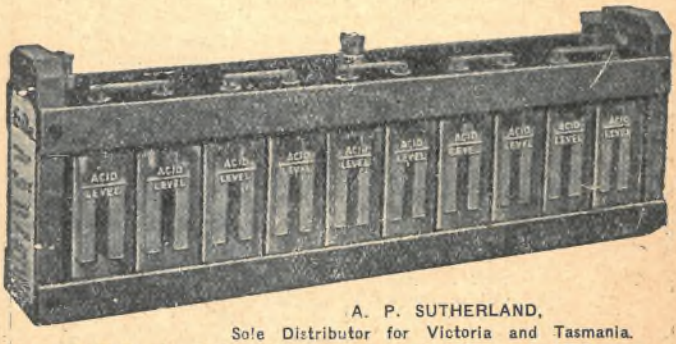
The "W.H." Type is made in 12-cell units (thus giving 24-vo'ts per battery), and has a capacity of 5,000 milli-ampere hours. The moulded glass container allows easy inspection of every plate.

Price per 24 Volt Unit, £3/5/

The "W.J." Type is made up in 20-volt units (with 10-volt tappings), and a capacity of 2,500 milli-ampere hours. Every plate can be readily inspected—all being clearly visible in the moulded glass boxes in which each set of plates is contained. Convenient in shape, measuring 2⅝in. wide x 5¼in. high x 13⅞in. long. Weight 8¼lb. (including acid).

Price per 20 volt Battery 32/6

Ask Your Radio Dealer to Demonstrate



A. P. SUTHERLAND,
Sole Distributor for Victoria and Tasmania.
2 Maffra St., South Melb. 'Phone Cent. 4688 and 4689.

THE CARE OF A RECEIVER

A Collection of Hints to help you look after Your Receiver.

TROUBLE often arises even with a well-constructed radio set owing to lack of proper care and the non-observance of a few simple rules.

The modern battery, whether of the dry cell or accumulator type, is quite reliable, but naturally if abused it will provide trouble. Dry cells, for example, should never be exposed to heat of any kind, and must be protected from dampness. They should be tested at regular intervals, and a small sum invested in a suitable voltmeter is money well spent. Meters can be obtained with a double range enabling both "A" and "B" batteries to be checked.

The lighting battery, or accumulator, should be kept quite clean and free from corrosion. During charging, an accumulator gasses freely, and a fine stream of acid rises through the vent holes. This spray collects on the top of the cells, and in time will badly corrode the terminals.

The cell tops should be kept clean and dry, and the terminals bright. A little vaseline can be smeared over the brass to prevent corrosion.

The level of the liquid in an accumulator should be always above the plates—from about quarter to half an inch, as evaporation takes place continuously. Should the level fall below the plates pure distilled water only should be added in the requisite quantity. Acid should never be added by the unskilled. If the liquid in the cell is spilt or leaks out the accumulator should be taken to a battery depot for replenishment.

Perhaps the best method of testing a battery is with a hydrometer, and this instrument is now procurable with readings suitable for the non-expert.

Keeping Clean Important

All moving contacts in a radio set should be clean and bright. Brass, for example, has an irritating habit of getting some black, greasy matter on it. This dirt causes an imperfect contact, which in its turn causes noises and weak signals. Variable condensers should have their plates inspected regularly, as dust lodges and sets up short circuits. A pipe-cleaner is excellent for getting in between the plates. Connections between the moving spindle and the bearing are often doubtful, and sometimes a noise can be traced to this source.

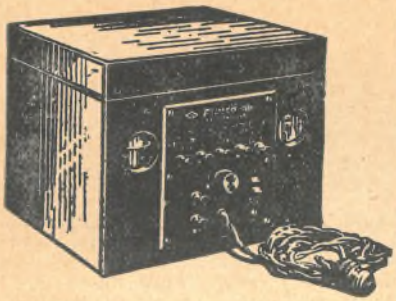
Switch studs should be regularly cleaned, also the spaces between them. Petrol may be used for this purpose. Occasionally valve sockets become dirty; the contacts should be cleaned with a piece of fine emery cloth on a pencil tip. It is, perhaps, superfluous to add that all terminals should be tightened up regularly.

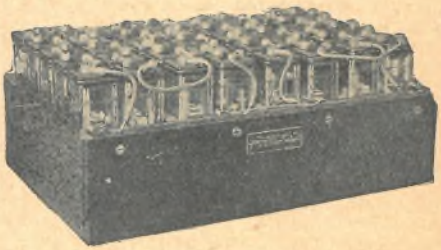
Rheostats cause most irritating noises at times. Occasionally dust lodges between turns of wire, and the wire itself becomes dirty. The dust can be blown out

(Continued on page 89.)

PHILCO

DRYNAMIC RADIO BATTERIES





"Philco" Takes Care of Every Radio Need

A and B BATTERIES and B SOCKET POWERS (Eliminators)

Write for Information to

New System Telephones PTY. LTD.

280 Castlereagh st. SYDNEY. **25-27 Queen's Bridge St., MELBOURNE.** **Charles St., ADELAIDE.**

THE CARE OF A RADIO RECEIVER

(Continued from page 87.)

with an ordinary pair of bellows while the wire can be cleaned with a very fine grade of emery cloth. It must be remembered that dust is usually a conductor, and its undesired presence naturally brings trouble.

Valves should not be switched straight on, as a freshly charged accumulator will give abnormal current for some little time, when first put into use. It is preferable to use the rheostats to extinguish the valve filaments; at least, the rheostats should be turned back from the normal operating position before switching off.

A battery switch, if used, should be connected in the lead common to both batteries, so that it completely isolates the receiver. It is well to disconnect the batteries when changing valves, as those with the standard English base can, in some cases, be wrongly inserted and burnt out.

Aerial and Earth

A lightning arrester and adequate earthing switch should always be included in a wireless installation. While this arrangement does not afford complete immunity from lightning, its presence adds much to the safety of the installation. Lightning arresters should preferably be mounted on an outside wall in an accessible position, and a cover should be provided. The arrester should be permanently connected, and the switch is used to earth the aerial when not in use. A double pole switch is best, as it serves to isolate the receiver from all outside connections. All connections should be soldered, and the earth wire should be of as heavy a gauge as convenient, as it is most essential that the tiny energy from the distant transmitter must be given as free a path as possible.

TESTING THE POLARITY OF BATTERIES

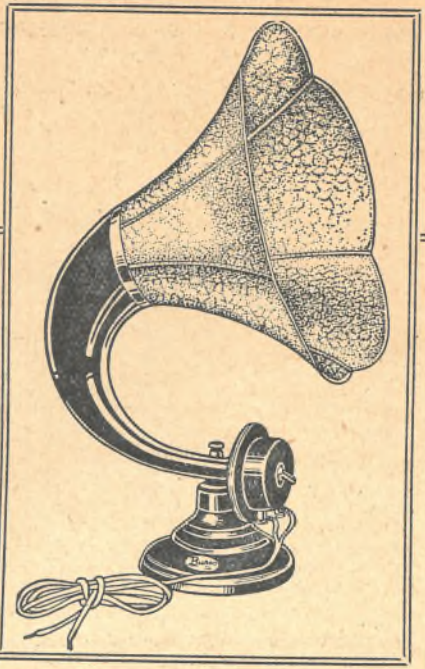
TO determine the polarity of the two conductors of a circuit, connect the conductors in circuit with enough resistance in series to limit the current to about one ampere or less, and then dip the two wires in a vessel of acidulated water or in water in which a small amount of ordinary household salt has been dissolved. The wires should be kept about an inch apart.

The wire from which bubbles are given off more freely is the negative, and the other the positive.

It is possible to determine the polarity of an accumulator by observing the color of the plates. The plates connected to the positive pole are of a dark-brown color, the negative plates being slate-grey.

In charging accumulators, the positive pole of the charging current should be connected to the positive terminal of the accumulator, and the negative pole to the negative terminal.

In primary batteries, the zinc pole is the negative and the carbon or copper pole the positive.



"BURNS"

FOR

Volume, Clarity, Beauty

Reproduction that is wonderfully clear, and entirely free from distortion, yet possessing ample volume—that is Reproduction by BURNS—the speaker that is the standard of quality.

Built with an aluminium Sound Column and Pyralin Bell, the BURNS is practically Non-vibratory. In appearance it is exceedingly beautiful, the graceful sweep of the horn giving the instrument a most dignified appearance.

You owe it to your pleasure to see and hear the BURNS. Ask your usual dealer, or write for illustrated folder and name of nearest agent.

No. 205B. — With highly-polished black pyralin bell £6-6-0

No. 205D. — With polished Mahogany tinted pyralin bell £6-17-6

Wills & Paton Pty. Ltd.
305 Lit. Collins Street, Melbourne

Wholesale Distributors for

"BURNS"
LOUD SPEAKER

BROADCASTING TIMES

Below is given a list of the Class A Stations of Australia, together with their wave length, power, and hours of transmission.

2FC.—442 Metres. 5Kw.

Morning Session, 7.0—11.35. Midday Session, 12.0—2 p.m. Afternoon Session. 2.30—4.45 p.m. Early Evening Session. 5.45—7.40. Night Session, 8.0—12 midnight.

The evening session broadcast from this station is varied, and includes theatrical transmissions from Sydney's leading theatres; dance music is broadcast by the Wentworth Cafe Orchestra; Sydney's leading artists participate in the transmissions from the studio.

The system of fading in and out is a popular feature.

2BL, Sydney.—353 Metres. 5Kw.

Early Morning Session, 7.15—8.0. Morning Session. 10.0—2.0. Afternoon Session. 3.0—5.15. Early Evening Session. 6.0—7.30. Evening Session. 7.45—12 midnight.

The evening session is varied, programmes from different places in Sydney being given, interspersed with vocal items from the studio; classical concerts are also transmitted from the studio, while dance music is transmitted from one or more of Sydney's leading dance resorts.

3AR. Melbourne.—484 Metres. 1½Kw.

This station has been authorised to use 5Kw.

Morning Session, 11.30—1.0. Afternoon Session, 2.0—5.7. Early Evening Session, 6.45 (Children's Corner). Evening Session. 8.0—11.0.

The evening service is varied, and includes transmissions of dance music from various dance halls, concerts from different halls, as well as excellent studio concerts.

3LO, Melbourne.—371 Metres. 5Kw.

There is no early morning session. Midday Session, 12—2 p.m. Afternoon Session, 3—5 p.m. Evening Session, 5.45—7.15. Night Session, 7.20—11.40.

The night session includes transmissions from Melbouren theatres, concert halls, and occasionally concerts from country centres. Melbourne's best artists are engaged to broadcast from the studio, while jazz music is provided by the 3LO Dance Band. From 11 to 11.40 dance music is broadcast by one of Melbourne's best dance orchestras.

4QG, Brisbane.—385 Metres. 5Kw.

Midday Session, 12.55—2.0. Afternoon Session, 3.30—4.30. Early Evening Session, 6.25—7.40. Night Session. 7.45—10.00.

Excellent programmes are given during the evening session, in which Brisbane's best bands and orchestras participate. Transmission is also given from Brisbane theatres.

(Continued on page 93.)

BURGESS BATTERIES

will add to the effectiveness of any radio receiving set. They are famous

FOR

their uniform quality and absence of internal noises—important factors in

Clear Receiving

ASK ANY RADIO ENGINEER.

Obtainable from All High-class Dealers.

If your local dealer cannot supply, write us, giving his name. We will fulfil your order and we pay carriage.

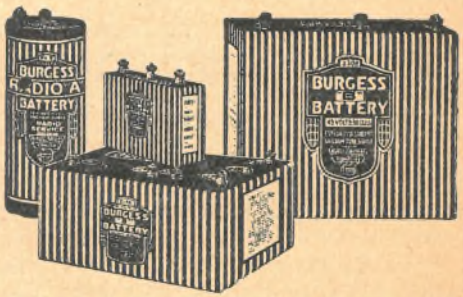
DISTRIBUTORS:

New System Telephones **PTY. LTD.**

280 Castlereagh St., **SYDNEY.**

25-27 Queen's Bridge St., **MELBOURNE.**

Charles St., **ADELAIDE.**



BURGESS RADIO BATTERIES

BROADCASTING TIMES

(Continued from page 91.)

5CL, Adelaide.—395 Metres. 5Kw.

Morning Session, 11.30—2.0. Afternoon Session, 3.0—5.0. Evening Session, 6.30—11.0.

The evening session is, in the main, composed of concerts from the studio, Adelaide's leading artists being engaged.

6WF, Perth.—1250 Metres. 5Kw.

Midday Session, 12.30—2.0. Afternoon Session, 3.30—4.30. Early Evening Session, 7.0—8.0. Evening Session, 8.0—10.30.

The programme for the week is varied, usually being.—Monday, Band Night; Tuesday, Melody and Song; Wednesday, the Theatre; Thursday, Popular Orchestral Programme; Friday, Varied Evening; Saturday, Concert Night; Sunday, Church Service—close down 9.0.

7ZL, Hobart.—510 Metres. Temporary Power, 250 Watts (¼ Kw.).

Morning Session, 11—12 noon. Afternoon Session, 3—4 p.m. Evening Session, 7.0 (Children's Corner). Night Session. 8—10.0.

The programme for the night session is, in the main, given by prominent Tasmanian artists.

❋ ❋ ❋ ❋

PROPER WAY TO CHARGE BATTERY

A STORAGE battery can be charged only by a direct current, and when charging, the positive wire of the charging current must be connected to the positive of the battery, and the negative to the negative. The voltage of the charging current should be somewhat greater than that of the battery, while the amperage should not be above one-tenth of the capacity. When a battery is charged or discharged very quickly it will overheat and the paste will fall out of the grids. Not only will this prevent the battery from taking a charge, but it will short circuit the plates at the bottom. For this reason the battery must be charged slowly.

❋ ❋ ❋ ❋

SOME AERIAL DONT'S

DON'T run your aerial over a public highway; you will probably have to take it down.

Don't allow it to cross overhead wires; there is always a risk of its falling on to them, with perhaps disastrous results.

Don't forget that the insulation of the aerial is one of the most important points if efficiency is desired.

Don't use insulators that are unnecessarily heavy.

Don't use any common bit of rope to support the ends of the aerial.

"General Radio"
Universal Four

The General Radio Universal Four Valve set is designed upon a circuit that laboratory experiments have proved to be reliable under all receiving conditions.

The complete kit as offered at £16/10/0 features General Radio Quality Parts, and is supplied with full construction diagrams and erection particulars.

There is nothing difficult in assembling the Receiver, and amateur set builders would be well advised to investigate the "General Radio Universal 4," which has earned a well-merited popularity.

Complete Kit with Full Construction Details from all Radio Dealers

Price £16/10/-

Wills and Paton Pty. Ltd.

Wholesale Distributors for

"GENERAL RADIO"

305 LITTLE COLLINS STREET, MELBOURNE

THE AERIAL TUNING CONDENSER

(Continued from page 41.)

that is, even with the capacity all out the 400 metre station cannot be tuned in.

If the coil be now connected in series with the variable condenser, wave lengths below 500 may be tuned in, and this is, therefore, the best arrangement under the particular circumstances of this case.

It may be argued that the question of series or parallel arrangement may be settled by including a series-parallel switch in the aerial tuning circuit, so that the coil and condenser may be connected in series or in parallel, as desired. The great objection to the series-parallel switch, however, is that it complicates the circuit, and thus tends to decrease the efficiency of the circuit.

Connect in the Aerial Lead

If it be decided to connect the condenser in series, care should be taken to see that it is placed on the aerial side of the tuning coil, and not on the earth lead. The latter connection will have the undesirable effect of insulating much of the apparatus from the earth.

Regarding the values of the condensers to be used, it must be borne in mind that when two condensers are connected in series the resulting capacity is less than the smaller of the two. For this reason the condenser used in the series arrangement should have a fairly large maximum capacity, say, .001 mfd. or even greater. The condenser for the parallel arrangement need not be so large, and its maximum capacity should be somewhere about .0005 mfd. A smaller capacity for the parallel condenser (.001 mfd.) alters the capacity fairly considerably, whereas the same amount of movement of the .0005 mfd. condenser has only half the effect on the capacity compared with that of the bigger condenser.

❊ ❊ ❊ ❊

THE USE OF HIGH TENSION ACCUMULATORS

(Continued from page 39.)

quantity of oil can also with advantage be placed in the ebonite container, which will prevent any chance of "creeping."

On the first charge the charging rate should not exceed .03 amps. (30 milliamps), and the charging should be continued for five hours after the cells are gassing. The specific gravity of the acid should then be tested and should be found to be 1250 specific gravity. Charging should then be continued for a further three hours.

Except in the case of the first charge, as mentioned above, the charging rate should be .05 amps. (50 milliamps) until the cells gas freely. Do not exceed this charging rate or the cells may be permanently injured.

Always keep the batteries fully charged by passing a current through them at least six hours every five or six weeks.

E. A. Machin & Co. Pty. Ltd.

LOUD SPEAKERS

SUPERB TONE—WONDERFUL VOLUME.

MADE IN ALL SIZES, IN BLACK CARBON FINISH AND TORTOISESHELL FLARES.

WE ALSO STOCK:—HYDROMETERS FOR "A" and "B" BATTERIES.

BATTERY CHARGING CLIPS.

VOLTMETERS.

WINCHESTER "B" BATTERIES IN ALL VOLTAGES.

E. A. Machin & Co. Pty. Ltd.

Branch Service Station:
342 ST. KILDA RD., MELBOURNE.
Phone F2405.

E. A. Machin & Co. Pty. Ltd.

C.A.V. Battery

BUILT UP TO A STANDARD, NOT DOWN TO A PRICE.

STOCKED IN ALL SIZES, FROM 25 ACTUAL AMP. HOUR TO 200 AMP. HOUR CAPACITY.

C.A.V. "B" ACCUMULATORS, ALSO STOCKED, IN ALL VOLTAGES.

WE REPAIR, RECHARGE AND GIVE SERVICE TO ALL MAKES OF BATTERIES.

E. A. Machin & Co. Pty. Ltd.

Head Service Station:
413-15 ELIZABETH ST., MELBOURNE.
Phone F1651.

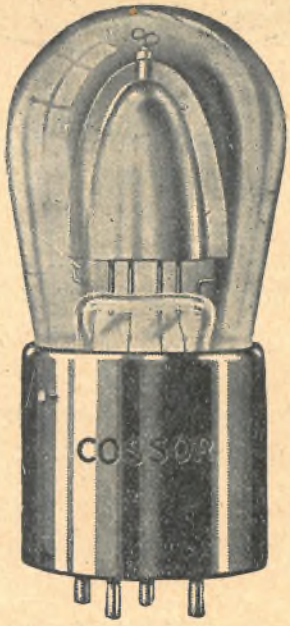
A Great Improvement in Valve Design

THE NEW

Cossor

Point One

—the Long-life Dull Emitter with the new .1 amp filament.



Obtain Full Particulars from the
VICTORIAN DISTRIBUTORS

A. J. VEALL
247 Swanston Street, Melbourne
Cen. 2058/9.
302 Chapel St., Prahran

DANE TAYLOR & CO.
501 Latrobe Street, Melbourne
Central 977

Printed and Published by EDGAR H. BAILLIE for United Press Proprietary Ltd., "Herald" Building, 62-74 Flinders Street, Melbourne.

The new Cossor Point One

—the first Valve in which the filament, grid and anode are secured together at top and bottom in *permanent* alignment.

Sectional view of the elements in the New Cossor Point One

In the above illustration a section of the Anode is cut away in order to expose the grid and the filament. Observe the seonite insulator which securely holds in position the grid and the anode. To all intents and purposes this insulator becomes an integral part of these two elements—the slightest individual movement of either of them is quite impossible. Through the centre of the insulator is passed the fine wire which retains the filament in position. Thus—come what may—even the hardest shock cannot disturb the exact relative positions of the filament, grid and anode.

TYPES and PRICES:

COSSOR POINT ONE—RED TOP: For Radio Frequency use 1.8 volts, consumption 1/10th amp.	13/6
PLAIN TOP: For Detector 1.8 volts, consumption 1/10th amp.	13/6
COSSOR STENTOR TWO.—GREEN TOP: For power use 1.8 volts, consumption .15 amp. ..	17/6

Matched Tubes for your Neutrodyne Set or Super-Hetrodyne

N
621.3845
LIS

Brunet Phones

F Type
16/6

D Type
22/6

ON SALE EVERYWHERE

3-1 & 5-1 19/6

ALL BRUNET
Products are used exclusively by the French Army and Navy and at Eiffel Tower, Paris.
Paris,
AND CARRY
A TWO-YEAR
GUARANTEE.

Brunet Transformers

LOUIS COEN WIRELESS

PTY. LTD.

63 SWANSTON ST., MELBOURNE
75 RUNDLE STREET. ADELAIDE.