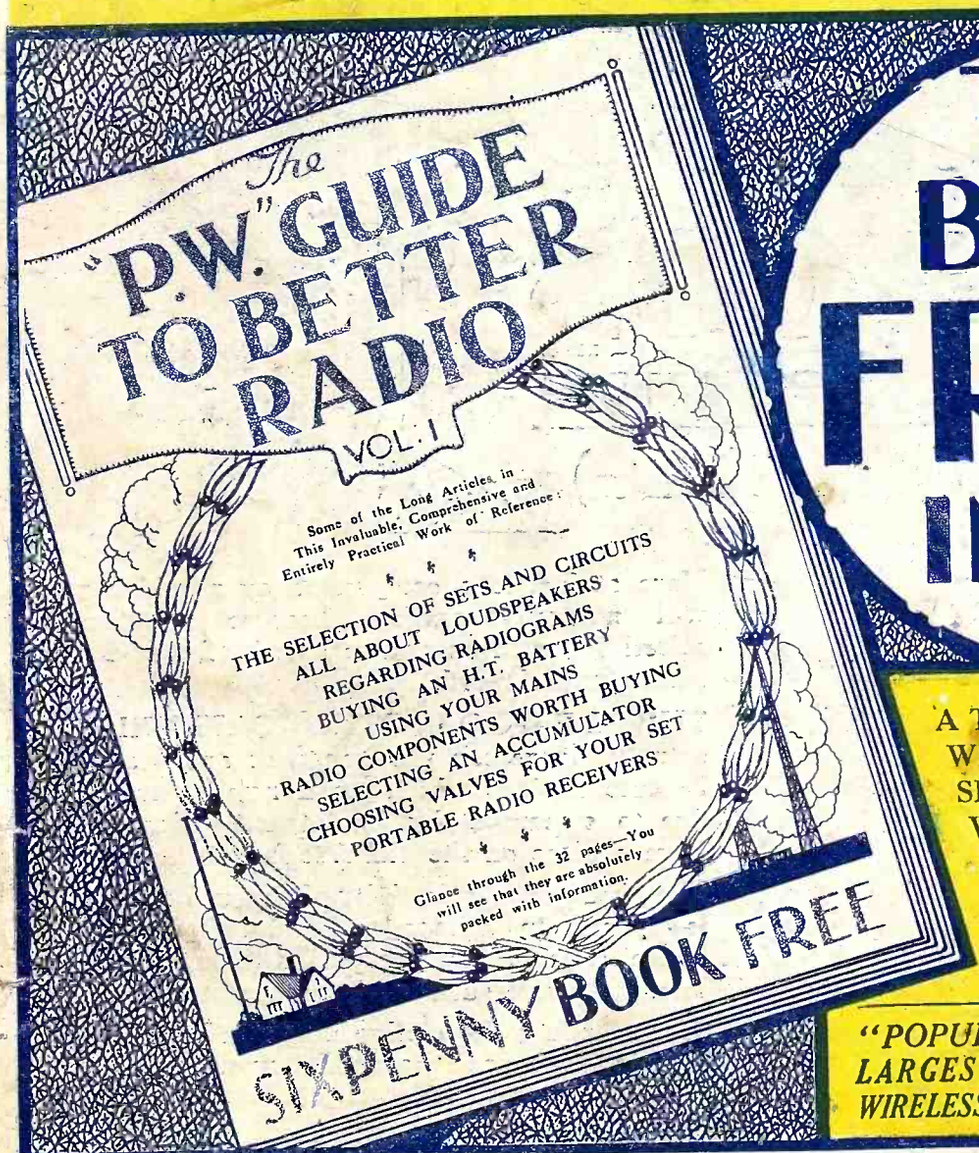
REGISTERED AT THE G.P.O. AS A NEWSPAPER.

SIXPENNY RADIO BOOK FREE THIS WEEK

Popular Wireless

Every Thursday PRICE 3d.

No. 488. Vol. XX. INCORPORATING "WIRELESS" October 10th, 1931.



THIS BOOK FREE! INSIDE

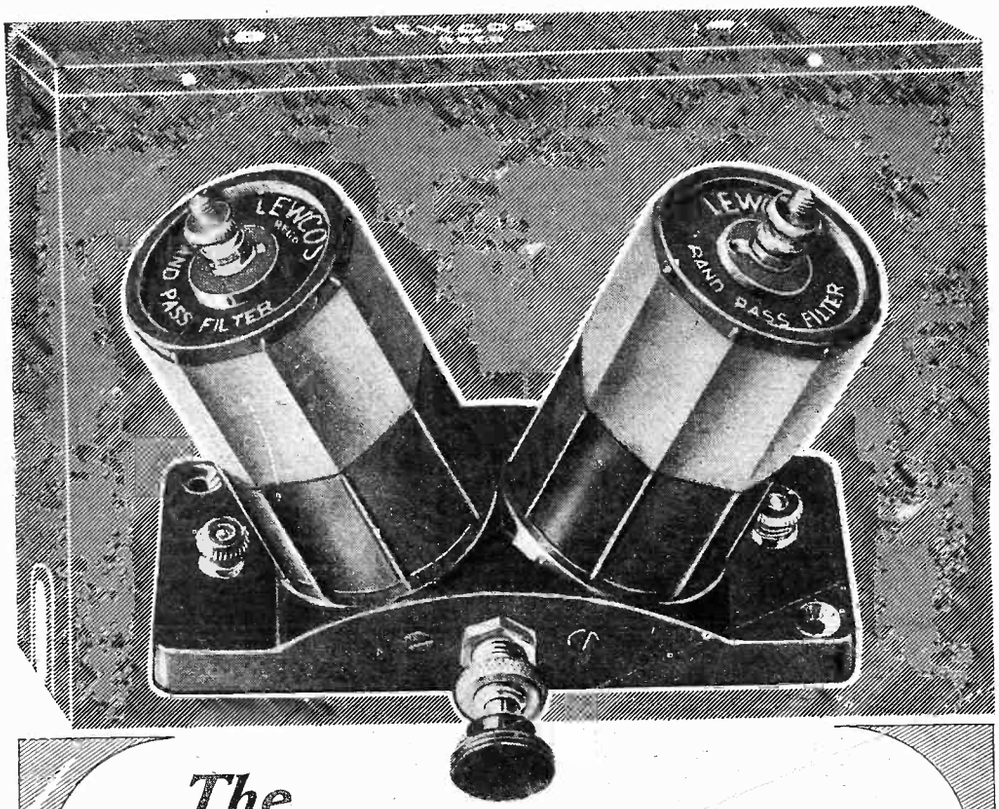
A THIRTY-TWO PAGE BOOK WHICH EVERY LISTENER SHOULD POSSESS. IT IS WRITTEN THROUGHOUT IN NON-TECHNICAL LANGUAGE, AND WILL SAVE YOU TIME, TROUBLE AND MONEY

"POPULAR WIRELESS" HAS THE LARGEST CIRCULATION OF ANY WIRELESS JOURNAL IN THE WORLD

Build your B.P.3 with a Ready Radio TESTED KIT

Advt. of Ready Radio, Ltd.

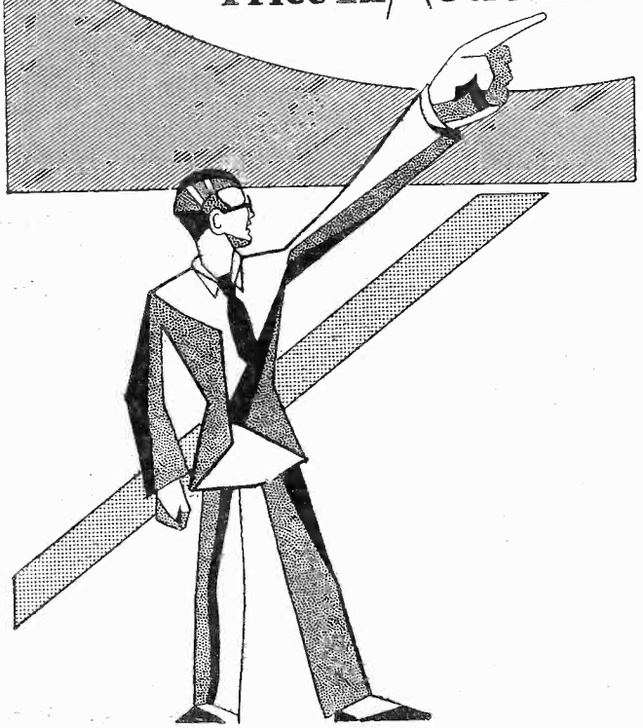
See pages 293, 299, 300, 303, 305.



The Selectivity Problem SOLVED BY LEWCOS

The LEWCOS REGD. BAND PASS FILTER

Price 12/- (Screen 2/6 extra)



Here at last is a component over which you will naturally enthuse because it ensures selectivity such as you've heard of, but never before experienced.

THE LEWCOS BAND PASS FILTER actually increases the range of any Receiver because stations which are normally inaudible, due to swamping by local transmissions, now have a place on the dial free from interference.

The phenomenal selectivity of this unique device is apparent on both long and medium wave bands; hence it is infinitely superior to any existing selectivity unit, such as wave traps, etc.

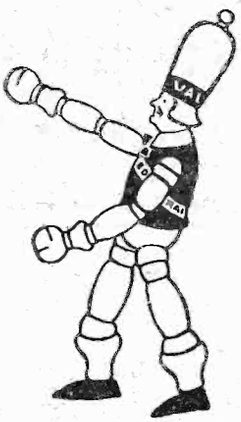
Write for fully descriptive leaflet, Reference R.73, showing flat-topped response curves.

THE LEWCOS BAND PASS FILTER IS SPECIFIED FOR THE NEW "B.P." THREE described in this issue.

LEWCOS RADIO PRODUCTS FOR BETTER RECEPTION

THE LONDON ELECTRIC WIRE COMPANY AND SMITHS LIMITED, CHURCH ROAD, LEYTON, LONDON, E.10

REASONS WHY YOU SHOULD USE MAZDA INDIRECTLY HEATED RECTIFIERS



MAZDA INDIRECTLY HEATED RECTIFIERS

TYPE	PRICE
Full wave	
UU.30/250 - - -	12/6
UU.2 - - - -	15/-
UU.60/250 - - -	15/-

If you are using rectifying valves in your A.C. mains receiver there is a definite advantage to be gained by using **Mazda indirectly heated Rectifying Valves.** You are safeguarding the condensers, chokes and valves of your receiver. When you switch on an ordinary rectifying valve, operating temperature is reached considerably before that of the receiving valves. A surge is caused and damage is frequently done.

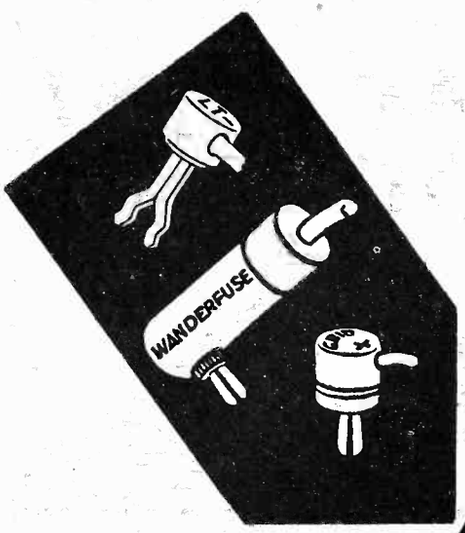
Mazda indirectly heated Rectifiers heat up *with* the receiving valves, and so afford you absolute protection.

THE AMAZING MAZDA THE BRITISH VALVES

THE EDISON SWAN ELECTRIC CO. LTD.
RADIO DIVISION:
155 CHARING CROSS ROAD, LONDON, W.C.2

EDISWAN RADIO

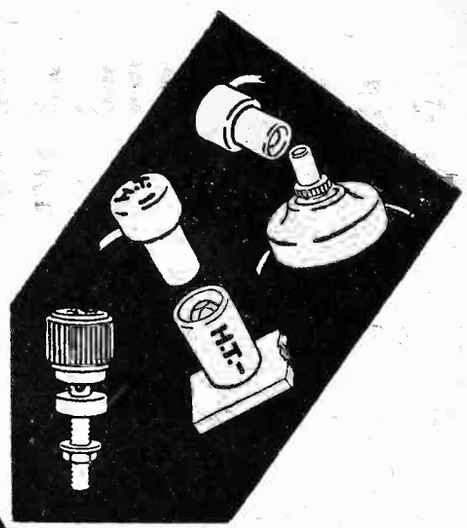
V136

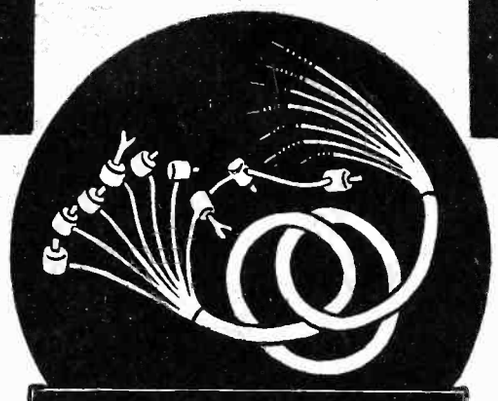


THE BEST SETS ARE WELL CONNECTED

Set manufacturers, Government Departments, technical experts, the leading wireless journals, ALL use and specify Belling-Lee Radio Connections. Make them *your* choice.

BELLING-LEE BATTERY CORDS as illustrated, complete with engraved Wander Plugs, spring grip Spade Terminals, and 54" cords in 5, 6, 7, 8, 9 and 10 way, from **4/-** to **6/6**, and 30" cords from **2/6** to **5/-**. With fuse **1/-** extra.





BELLING-LEE
FOR EVERY RADIO CONNECTION

Advertisement of Belling & Lee Ltd., Queensway Works, Ponders End, Middlesex.

THE WHOLE FLEX GRIPPED—

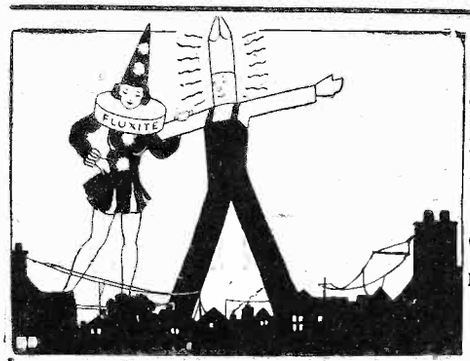
copper, rubber *and* fray. A feature of all Belling-Lee Plugs. No loose straggling ends to cause short circuits. And for absolute safety you should put a Wanderfuse in the H.T. lead instead of the ordinary Wander Plug. It is a Wander Plug and Fuse *combined*, and takes no extra head-room.

Belling-Lee Wander-fuse, with 60 m/a fuse	1 6
Engraved Wander Plug	2d.
Spade Terminal	2d.

FOR THE OTHER END of the CORD!

The Belling-Lee Battery Cord is the neatest method of connecting set to battery, for all leads are enclosed inside *one* outer silk covering. To make a sound job at the set end also, fit your receiver with either Belling-Lee Terminals or Plugs and sockets. Then you *can't* go wrong.

Belling-Lee Terminals Type "R"	3d.
Type "M"	4½d.
Type "B"	6d.
" " Plug and Socket	6d.
" " S.G. Safety Anode Connector	6d.



"We're Fluxite and Solder, the reliable pair,
Famous for Soldering—known everywhere!
We've soldered all connections, and here's the reward—
Good Programmes come clearly
From Home and Abroad!"

See that Fluxite and Solder are always by you—in the house, garage, workshop—anywhere where simple, speedy, soldering is needed. They cost so little, but will make scores of everyday articles last years longer! For Pots, Pans, Silver, and Brassware; RADIO; odd jobs in the garage—there's always something useful for Fluxite and Solder to do.

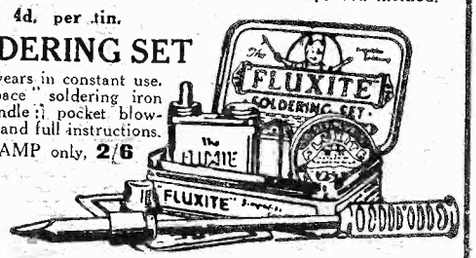
All Hardware and Ironmongery Stores sell Fluxite in tins, 8d., 1/4 and 2/8.

ANOTHER USE FOR FLUXITE
Hardening Tools and Case Hardening. Ask for Leaflet on improved method.

NEW "JUNIOR" SIZE, 4d. per tin.

FLUXITE SOLDERING SET

Simple to use and lasts for years in constant use. Contains special "small-space" soldering iron with non-heating metal handle; pocket blow-lamp, Fluxite, Solder, etc., and full instructions. COMPLETE, **7/6**, or LAMP only, **2/6**



FLUXITE LTD.,
(Dept. 324),
ROTHERHITHE, S.E.16

ALL MECHANICS *WILL* HAVE

FLUXITE

IT SIMPLIFIES *ALL* SOLDERING

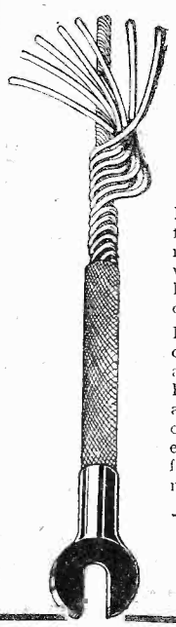
(INDOOR) FORMO (ARTHUR PREEN & Co LTD) **(LOW-LOSS)**

7 in 1 AERIAL

STAND No. 81
MANCHESTER SHOW

has eliminated unsightly, inefficient and costly outdoor aerials.

LABORATORY TESTS PROVE 25% INCREASE IN SIGNAL STRENGTH.



Have you ever considered the fact that aerials are the only remaining part of modern wireless reception that have lagged behind in the swift development of wireless?

Do not waste any more money on repairing your outdoor aerial. Simply place the FORMO Low-Loss Aerial around the picture-rail or other convenient place, and enjoy improved and trouble-free reception of stations you may never have heard before.

Price—15 ft., **3/9**
20 ft., **4/6**

Packed in Strong Carton ready for use. Obtainable from all Radio Dealers. Catalogue from:

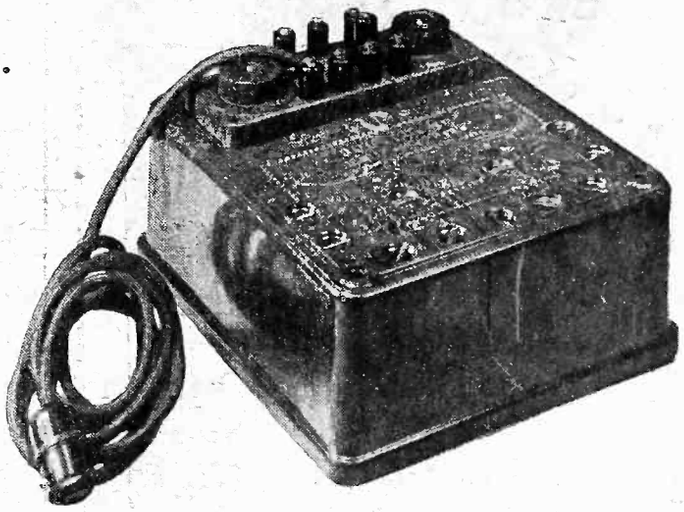
ARTHUR PREEN & CO., LTD., Golden Square, Piccadilly Circus, London, W.1. Crown Works, Southampton.

20 MILLIAMPERE A.C. ELIMINATOR 60/-

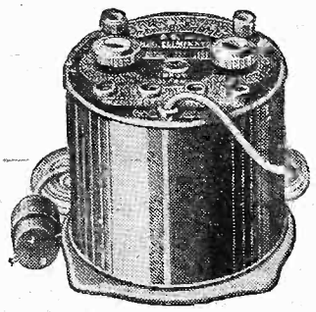
20 Milliampere Output at 120 volts.

Fitted with two variable wire wound resistances, 0/120, and 1 fixed, 120 volts. Incorporating Westinghouse Metal Rectifiers

60/- Cash, or on Easy Terms.



D.C. MODEL 1. ELIMINATOR



30 milliampere output at 120 volts. **27/6**

D.C. Model 2. With two variable wire wound resistances, 30 milliampere output at 120 volts. **42/-**

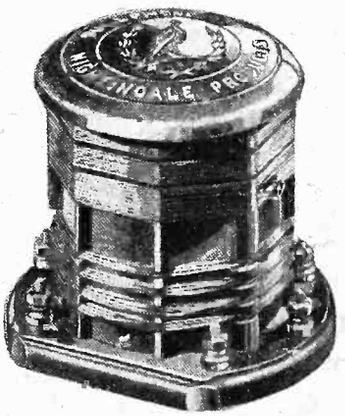
Or on Easy Terms.

All Bullphone Eliminators are Shrouded in all Bakelite Shockproof Cases and are guaranteed for two years.

BULLPHONE A.F. COIL

(Aerial or H.F. Transformer)

This Coil is suitable as a dual range aerial unit with fixed aperiodic aerial and reaction windings and may also be used as a tuned anode, tuned grid or high frequency transformer. **5/6**

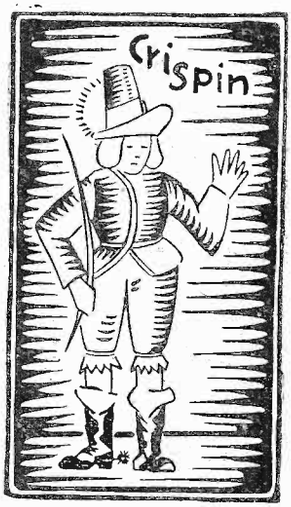


BULLPHONE LTD., BARKINGSIDE, ESSEX

Telephone Chigwell 162.

Do You Know?

Historical Signs—No. 1



The Sign of St. Crispin

CRISPIN, a Christian martyr and shoemaker of Soissons, because of his goodness to the poor in making their shoes without payment, was, after his martyrdom in 286 made the patron saint of the shoemakers. In the middle-ages and onwards the sign of St. Crispin was used by all true craftsmen among leatherworkers.

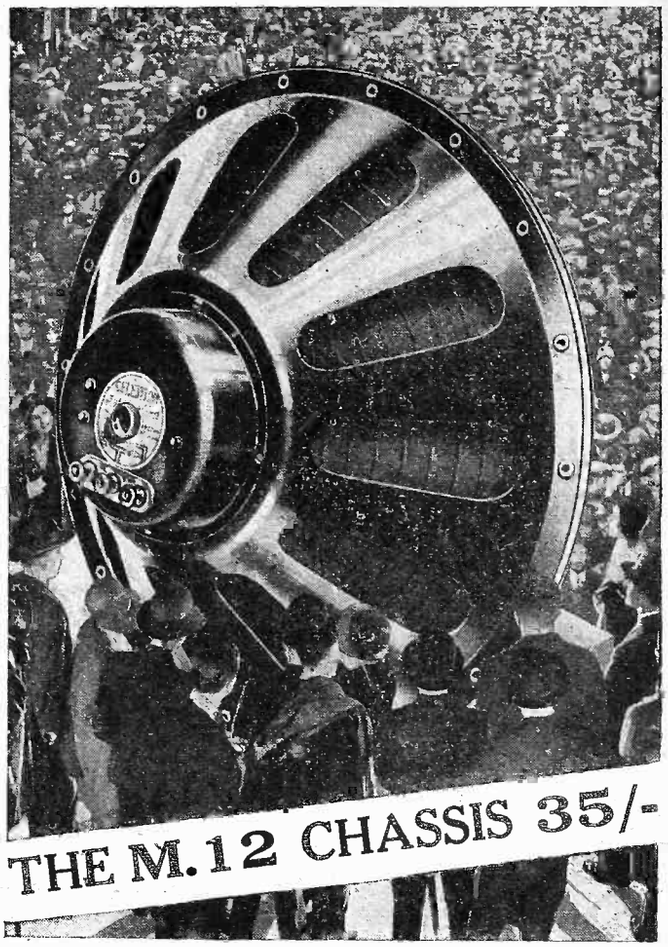
To-day, in the same way, "the green case" is a recognised sign of condenser efficiency—indicating as it does the product of experience and skill. For every T.C.C. Condenser is the result of a quarter of a century's specialised experience—that of designing and making condensers—and condensers alone. Be sure your next condenser has this backing—be sure its T.C.C.

Look for the initials T.C.C. on the condenser in the green case

T.C.C CONDENSERS

The Telegraph Condenser Co. Ltd., Wales Farm Road, N. Acton, W.3

9113



The Most Amazing Speaker Ever Made

Outstanding in its wonderfully realistic tone, and its ability to handle great volume. That ***essential*** to absolutely true reproduction—The ***RE-INFORCED DIAPHRAGM***—is found ONLY IN CELESTION SPEAKERS. That is why the Celestion M.12 gives such out standing results, and why it covers a tonal range never before attained in a cone speaker.

Three terminals allow any output valves to be accurately matched. At **35/-** the M.12 represents ***the finest value ever offered.*** Truly a speaker of outstanding merit.

A demonstration will instantly convince you. Insist on your dealer demonstrating CELESTION or write for literature to:

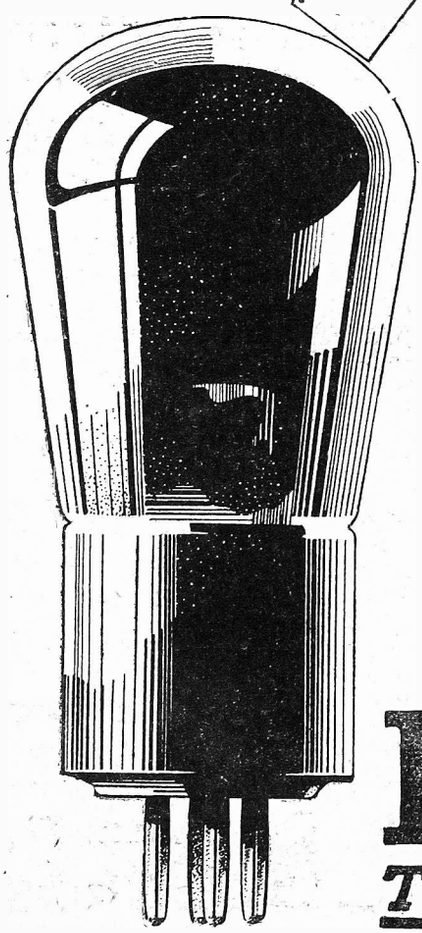
CELESTION LTD.,
London Rd., KINGSTON-ON-THAMES

London Showrooms:
106 Victoria Street, S.W.1

CELESTION
The Very Soul of Music
LOUD-SPEAKERS

FOREMOST NAME IN SOUND REPRODUCTION

The Mullard 2-volt range offers a choice of valve types fitted both by construction and performance, to take their place as the vital components of your receiver. Among them is the P.M.2D.X, the Mullard 2-volt super detector, which can also be used as an L.F. Amplifier immediately prior to the output stage. Buy one to-day from your dealer, Price 8/6.



Mullard
THE·MASTER·VALVE

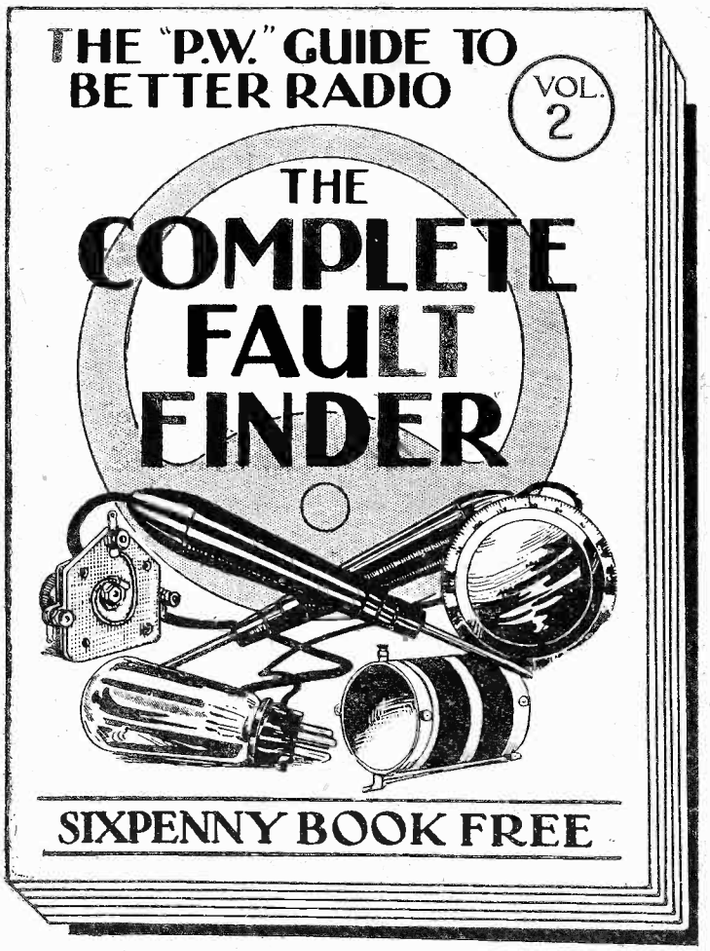
Advt. of the Mullard Wireless Service Co., Ltd., Mullard House, Charing Cross Road, London, W.C.2.

NEXT WEEK!

Every copy of next week's "P.W." will contain

Another GREAT GIFT BOOK

AN AID to Better Reception



Practical Help for Every Listener

Specially compiled by the Technical Staff of "P.W.," this valuable and unique book helps you to

GET THE BEST OUT OF YOUR SET!

There is sure to be an enormous demand

SO

Out Next Thursday

ORDER NOW

POPULAR WIRELESS

Usual Price— 3d.

EXPRESS KIT SERVICE

THE NEW B.P. THREE READY FOR IMMEDIATE DELIVERY

Send 6d. in Stamps for NEW 116-page "Radio Buyers' Guide of 1932 Radio."

Pilot Author's Kits remove all doubt. Containing components "First Specified" in the list of parts and as used by the author himself in the original Set, you are able to duplicate the set as originally constructed by the Author. No other Kit of Parts offers you this wonderful safeguard against disappointment.

C.O.D CASH H.P. as usual

PILOT AUTHOR'S KITS

DETAILED PART LIST FOR NEW B.P. THREE

CHECK this list of parts with the Author's specifications, photographs and diagrams on pages 290-1-2.

	£ s. d.
1 Baseboard, 10" deep ...	1 6
1 Panel, 18" × 7" (drilled to specification)	6 0
1 Lewcos band-pass coil	12 0
1 Utility ·0005 - mfd. double gang variable condenser	1 2 6
1 Igranic Vernier dial for same	5 0
1 A.E.D. volume control, 500,000 ohms	8 6
1 Ready Radio on-off switch	10
1 R.I. L.F. transformer, G.P. type, 7—1	10 6
1 Ready Radio H.F. choke	4 6
1 Ferranti output choke	7 0
1 T.C.C. ·0003-mfd. fixed condenser	1 6
1 Dubilier ·02-mfd. condenser (non-inductive) ...	2 0
1 T.C.C. ·01-mfd. condenser	3 0
2 T.C.C. 2-mfd. condensers	7 8
1 Graham-Farish 2-meg. grid leak and holder	1 4
1 Varley 100,000-ohm spaghetti resistance ...	1 6
1 Ready Radio 25,000-ohm spaghetti resistance	1 6
1 Telsen ·0005-mfd. reaction condenser	2 6
1 Bulgin fuse holder, with fuses	2 6
1 Bulgin two-way switch, Type S.86	2 0
1 Terminal strip, 18" × 2"	2 0
11 Belling-Lee Indicating terminals, Type R. ... Glazite, wire, screws, etc.	2 9 3 0
4 G.B., 3 H.T. and 2 L.T. plugs, and 2 spade terminals	1 6
Author's Kit "A," Cash or C.O.D.	£5 13 1
3 Osram valves (as specified): H.L.210, L.210, P.215	£1 7 6
1 Mahogany cabinet, with lift-up lid	17 6

Any parts supplied separately. If value over 10/- sent carriage paid or C.O.D. All post charges paid. State your requirements in the coupon. Immediate dispatch C.O.D. You pay the postman. We pay all post charges.

SPECIAL C.O.D. LINES FOR NEW B.P. THREE.

1 Lewcos Band-pass Coil	12/-
1 Utility ·0005 - mfd. Double Gang Variable Condenser	22/6
1 Igranic Slow Motion Dial	5/-

55 NEW B.P. THREE

KIT "A" Author's Kit "A" less Valves and Cabinet **£5:13:1**
or 10/5 down and 11 monthly payments of 10/5

KIT "B" Author's Kit "A" with Valves less Cabinet **£7: 0:7**
or 12/11 down and 11 monthly payments of 12/11

KIT "C" Author's Kit "A" with Valves and Cabinet **£7:18:1**
or 14/6 down and 11 monthly payments of 14/6

PILOT RADIO KIT PRICE CHART FOR OTHER FAVOURITE P.W. SETS

ITEM NO.	SET.	KIT "A," less Valves and Cabinet:	KIT "B," with Valves less Cabinet.	Kit "C," complete with Valves and Cabinet.
52	POP-VOX FOUR (Author's Kit)	CASH or C.O.D. £5 18 11 or 10/11 down and 11 monthly payments of 10/11.	CASH or C.O.D. £8 6 5 or 15/3 down and 11 monthly payments of 15/3.	CASH or C.O.D. £9 7 5 or 17/2 down and 11 monthly payments of 17/2.
50	P.V. STAR (Author's Kit)	CASH or C.O.D. £5 11 11 or 10/3 down and 11 monthly payments of 10/3.	CASH or C.O.D. £7 10 11 or 13/10 down and 11 monthly payments of 13/10.	CASH or C.O.D. £8 18 5 or 16/4 down and 11 monthly payments of 16/4.
51	P.V. PLUS (Author's Kit)	CASH or C.O.D. £4 7 8 or 8/- down and 11 monthly payments of 8/-.	CASH or C.O.D. £6 6 8 or 11/7 down and 11 monthly payments of 11/7.	CASH or C.O.D. £7 6 8 or 13/5 down and 11 monthly payments of 13/5.
53	P.W. SUPER QUAD	CASH or C.O.D. £7 15 6 or 14/3 down and 11 monthly payments of 14/3.	CASH or C.O.D. £10 14 6 or 19/8 down and 11 monthly payments of 19/8.	CASH or C.O.D. £11 14 6 or 21/6 down and 11 monthly payments of 21/6.
54	COMET 3 FOUNDATION CIRCUIT	CASH or C.O.D. £4 0 0 or 7/4 down and 11 monthly payments of 7/4	CASH or C.O.D. £5 7 6 or 9/10 down and 11 monthly payments of 9/10.	CASH or C.O.D. £6 7 6 or 11/8 down and 11 monthly payments of 11/8

★ *Any parts supplied separately if value over 10/-. Sent carriage paid or C.O.D. All post charges paid.*

SPECIAL C.O.D. LINES FOR "P.W." SETS.

Fill in the Coupon. Pay the postman, we pay all post charges.

Peto-Scott Side Control Swivel, Jointed Brackets ..... Per pair	3/6
Peto-Scott Side Control Ebonite Discs with Knurled edge ..... Per pair	3/-
Cyldon (·0005-mfd.) Extenser, Type Ex2T5	37/6
Aluminium Screen to specification, 13" × 8"	2/9
Peto-Scott P.J. Coil (No. 2) ...	1/6
Peto-Scott P.J. Coil (No. 3) ...	2/-
Formo (·0005-mfd.) Extensers, ... The pair	29/-
2 ·0005-mfd. Cyldon Type Ex5v. Extenser Condensers, ... Each	16/6
2 Peto-Scott Ready Wound Coil Quoits, tapped to specification ..... The Pair	4/3

POPULAR ACCESSORIES ON OUR C.O.D. LIST.

B.T.H. Minor Gramophone Pick-Up and Tone-Arm ..... C.O.D.	27/6
Blue Spot Inductor Type Speaker Unit and Chassis. ..... C.O.D.	39/6
Blue Spot Mains Disturbance Unit ..... C.O.D.	10/6
WUFA Speaker Unit and Chassis, No. 40. ..... C.O.D.	40/-
Telsen Speaker Unit and Chassis ..... C.O.D.	11/-
Wearite "Popular Type" Frame Aerial. ..... C.O.D.	32/6
B.T.H. Synchro-Blue Gramophone Motor. For A.C. Mains	39/6

SEE OUR FULL PAGE ANNOUNCEMENT IN LAST WEEK'S ISSUE OF "POPULAR WIRELESS"

● PAGE 198.

EXPRESS ORDER FORM

To PETO-SCOTT CO. LTD.
Please send me C.O.D./CASH/H.P.

.....

.....

.....

.....

for which I enclose Cash/H.P. Deposit £ s. d.

Name.....

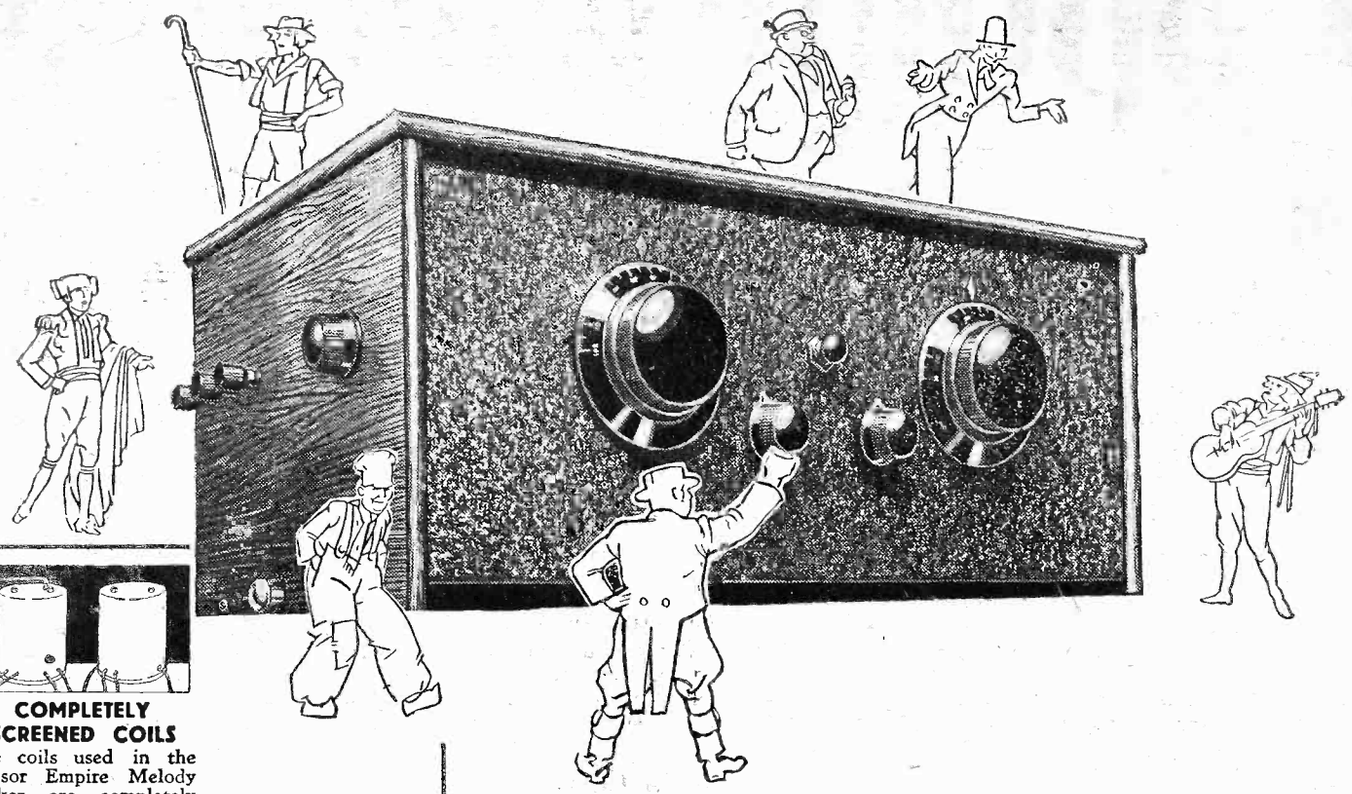
Address.....

.....

P.W. 10/10/31

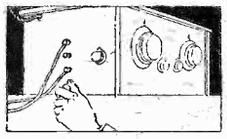
PETO-SCOTT

PETO-SCOTT CO. LTD. *Head Office:* **77, CITY ROAD, LONDON, E.C.1.** *Clerkenwell* 9406. **62, HIGH HOLBORN, LONDON, W.C.1.** *Chancery* 8266. MANCHESTER: 33, WHITELOW ROAD, CHORLTON-CUM-HARDY. *'Phone: Chorlton-Cum-Hardy* 2028. NEWCASTLE, STAFFS: 7, ALBANY ROAD *'Phone:* 67190.



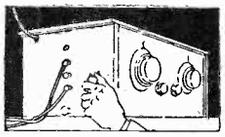
COMPLETELY SCREENED COILS

The coils used in the Cossor Empire Melody Maker are completely screened in metal "pots" entirely eliminating direct pick-up, thus further improving selectivity.



EXTERNAL WAVE-CHANGE SWITCH

Wave Change Switching is effected by operating the switch at the end of the cabinet—"in" for long—"out" for short.



SERIES AERIAL CONDENSER

The variable Series Aerial Condenser permits adjustment of selectivity to give the fine tuning necessary to cut out powerful local stations.

COSSOR METALLISED SCREENED GRID VALVE

Even better performance is ensured by the use of a Cossor Metallised Screened Grid Valve with its record low inter-electrode capacity and its ability to eliminate stray coupling effect between anode and nearby components.

ALL-METAL BASEPLATE

Construction is simpler than ever, due to the Metal Baseplate, which is supplied with every hole drilled, thus automatically positioning every component.

Britain's Greatest Radio Value

Never before has such a powerful 3-valve Screened Grid Receiver been obtainable for so modest an outlay. The Cossor Empire Melody Maker is the greatest value-for-money ever offered in Wireless Receivers.

It has "All-Europe" range Its selectivity is remarkable. It will cut out the powerful transmissions of nearby stations and bring you the programme you want to hear.

Yet in spite of its efficiency the Cossor Empire Melody Maker is so simple that you can easily assemble it yourself—no Wireless knowledge is necessary.

The Cossor Empire Melody Maker Model 234 for battery operation is obtainable from your usual Radio Retailer. Get full details—use the coupon.

Cossor EMPIRE Melody Maker Model 234

Sold as a complete Set of parts including Valves and Cabinet

Complete Kit including handsome oak Cabinet, three of the latest type Cossor Valves, all the parts necessary for assembling the Receiver as Illustrated and full-size "easy-to-follow" Constructional Chart. Price **£6·15**

or 15/- down and nine monthly payments of 15/-

To Messrs. A. C. Cossor, Ltd., Highbury Grove, London, N. 5.

Please send me free of charge one of your Constructional Charts No. C. 13 which tells me how to build the Cossor Empire Melody Maker.

Name .....

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WAR ON INFRINGERS
LINDBERGH'S RADIO
BATTERY NEWS
A ROMANTIC CAREER

SET-BUILDING NOTE
THE SMACK WENT BACK
A PALPABLE HIT!
FRENCH NEST EGG

RADIO NOTES & NEWS

War on Infringers.

CERTAINLY the radio trade has no great reason to complain of the support it receives at home, with the results of the show at Olympia available. And a further cause of joy to the manufacturers and all radio workers is to be found in the decision of the big licensing Pool, consisting of Marconi's, the Gramophone Co., and Standard Telephones and Cables, to refuse licences to sellers of imported foreign-made receivers.

The Big Three announce that they are "going all out" after infringers of their patents, which includes the sale of imported broadcasting receivers.

Marconi's at the Faraday Exhibition.

IT is safe to say that the Marconi Company's contribution to the Faraday Exhibition was one of the most, if not the most, striking collection of historical radio gear ever brought together in one place. Besides replicas of Marconi's earliest apparatus used in 1895 at Boulogne, the exhibit included a complete collection of valves ranging from two experimental two-electrode valves made by Dr. Fleming from 1904 to 1908, to a great 100-kw. valve as used to-day.

One of the kites used by Marconi in his first transatlantic experiments was shown also.

Radio Society Note.

"WHEN the clubs are opened, the secretaries sing"—to parody a well-known rhyme. The first carol of the season comes from Raynes Park, S.W.1, 9, Westway, the official domicile of Mr. A. L. Odell, hon. sec. of the Bec Radio Society, which resumed its meetings on Sept. 29th, at Bec School, Beechcroft Road, Balham, S.W.17.

Two meetings weekly are held, on Tuesdays and Thursdays, at 7.30 p.m., the Tuesday meeting being for advanced members and the other for beginners. Prospective members please apply to the hon. sec. for particulars of enrolment and copies of the syllabus.

Have You Heard Lindbergh?

THOSE short-wave hunters who can read Morse—and all should have that ability—will probably be interested to know that the call-signal of Col. Charles Lindbergh's short-wave transmitter on his aeroplane is K H C A L, and that it operates on 53·41, 37·42, 35·5, and 22·66 metres.

The gallant colonel is not a "demon" operator, and therefore if any of you amateur Morse readers happen to pick up his signals the speed of transmission will not be too high to baffle you!

LEILA LIKES LISTENING!

This is Leila Hyams, one of the Metro-Goldwyn-Mayer's stars—and she appears to forget all about her boy friend's set when her favourite tune comes through.

Youth at the Helm.

A NOTE of praise for G. L. B. (Shepherd's Bush), aged sixteen and never queued up for his grub during the war. He has rebuilt his hook-up *a la* "Titan" Two, using the Extenser and incorporating interwave coupling and flexi-coupling, which gives the set great sensitivity and selectivity. His diagram is a credit to him—and us! Other readers have worked along similar lines, and we suggest that he and they would do well to take a look at big brother "Modern Wireless" for September, where they will find something to their advantage.

The "Clear-Cut" Cone.

AN ingenious correspondent—N. A. P., of Chatham—rightly says it will interest me to know to what practical use suggestions made in "P.W." can be put. Being mightily smitten by the look of the "Clear-Cut Cone" ("P.W." 447), and the "Sound Deflector" ("P.W." 468), he combined these two into an open-backed cabinet, and drove a Blue Spot unit from a Detector and Pentode combination.

What kind of results did that produce, ses you? Well, N. A. P. affirms, "Using the 'Clear-Cut Cone' results are almost, if not quite, equal to moving-coil work, both for volume and quality."

Looks as though some of you other fellows ought to "go NAP" on that idea, too!

"Omba Pende."

THANKS to A. J. F. F., of Singapore, I have before me "Omba Pende," which seems to mean "Short Waves," and is the organ of the Amateur Wireless Society of Malaya (Singapore), Vol. 1, No. 1, and good luck to our wee sister. Anything "P.W." can do—delighted.

There are just a few minor printing blemishes, and a slight "rawness" in the "make-up" of some of the pages, but for

(Continued on next page.)

"ARIEL'S" REVIEW OF RADIO TOPICS *(Continued)*

a first number it is quite a notable achievement, and quite honestly I think it a bright magazine worthy of encouragement. Copies would be received by me with pleasure—especially as I took the hall-porter of "Raffles Hotel" for an enforced ride in a rickshaw in 1911. But rubber ain't what it was then, alas!

Lions Roar on Radio.

QUITE recently I was referring to 7 L.O's gallant attempt to relay a real lion's roar. And now comes the rumour that the Johannesburg short-waver (on 49·4 metres) has leanings towards a broadcast of that kind.

It should be an interesting item on the programme, but I should hate to be the engineer that has to go out and tell the lion that he is wanted on the "mike"!

Battery News.

AS you have probably discovered, there is a deal more to learn about accumulators than the glass bead and distilled water racket. They could well be a lifetime's study.

Nothing has so powerfully demonstrated to me how elementary is my understanding of this type of cell as the articles by the Chief Engineer of the Chloride Electrical Storage Co., published in that firm's "Chloride Chronicle and Exide News," price twopence. The summer number contains article No. 30, and I hope that Exides will reprint the lot and sell them at a nominal price, though they would be worth half a guinea.

A Romantic Career.

YOUNG David Sarnoff, the President of the Radio Corporation of America, who was recently in London, got his first big chance in life because he didn't mind the temperature being at zero or below it! When they wanted a wireless operator on a seal-fishing expedition to the Arctic he volunteered for it, and on his return to civilisation they compensated him with a "cushy job" on the radio station at the top of the Wanamaker Building in New York.

Here, one night, he picked up distress signals from the sinking "Titanic," and he stuck on duty for 72 hours until the full list of survivors' names was safely received. From that day David Sarnoff was a marked man, and now he's right at the top of one of America's biggest combines.

Note on Set-Building.

MR. ALF. MANN has made a new short-wave set which he considers to be unbeatable and a short history of the job may provide a few tips. First he read all "P.W." short-wave articles for the past three years, and then taking Mr. P. W. Harris's "Short-Wave" Three circuit as a basis laid out a set to suit his discriminating views.

Three layouts were scrapped before he satisfied himself, and now he has a wonderful receiver.

Note on Set-Building (Continued).

HE put a copper screen (earthed) between the detector and amplifier stages, and got increased strength and stability; then he did the same for the first and second amplifiers, with further improvement but slight feed-back; then he discoupled the H.T. positive, fitted an aluminium panel behind the wooden panel, and earthed the moving vanes of the variable condensers to it, thereby getting 50 per cent more volume and no hand capacity.

He put the screens in one at a time so that if he found anything wrong he would know at once which screen was responsible and would not scrap *all* screening.

The Smack Went Back.

IN case other readers may suffer from the habit of shooting first and making inquiries afterwards, I draw attention to a letter from C. H. L. (Clevedon), who says that the Editor deserves a smack on the hand for publishing a picture of a microphone being put into a hen-coop for the broadcasting of the nightingales' utterances. What does C. H. L. want the "mike" put in?! A steak pudding? The coop had been kept around long enough for the birds to get accustomed to it; had the "mike" been planked down without concealment the birds would have been suspicious, and might not have obliged with their performance. The caption makes this clear, surely.

D.R.!

A Palpable Hit!

THEY say that if your poor old head is unlucky enough to get in the way of a nasty crack from a descending crowbar, your sensations, when returning to consciousness, are very mixed.

It's true, and I know it, for a shrewd blow has just descended upon my pate, and I'm feeling very, very "mixed" indeed, as I look at a letter from Hemel Hempstead.

"Regular Reader," I thank you. 'Twas a hit—a palpable hit, and fortunately nobody besides you noticed that little slip.

The "Super-Coil" Three.

FROM a rectory near Sleaford in Lincolnshire, comes an interesting letter about the "P.W." Super Coil Three—a letter which I dare not show to the Technical Hounds. If I let them read all the complimentary things said of that design they would never get their hats on again.

Apparently this enthusiastic constructor added the Star Turn selector coil and an output filter, with the result, "it would be impossible to better it."

But what is this? Three or four pages further on in the letter I find that he is going to make it a radiogram as soon as the pick-up arrives! And I am open to bet that before the season is out even that super "Super Coil" will have a rival in his affection!

That's the worst of this radio game—as soon as a man gets absolutely satisfied, another circuit comes long and out come the pliers and the screwdriver again!

The French Nest Egg.

ISN'T it queer that the French don't seem to be able to evolve a really good national broadcasting service? The other day their Minister of Posts and Telegraphs referred to a scheme for eleven big new stations, but it was all very vague and indefinite.

Our cross-Channel friends can't seem to find the right man for radio—they are still looking in vain for a Monsieur Eckersley or a Vicomte Reith. It certainly isn't the boodle that holds them back, for the French P.O. is sitting on a £600,000 nest-egg specially laid aside for radio.

ARIEL.

SHORT WAVES.

"I am told there is a prospect of a colossal boom in wireless this winter," says Mr. G. Murdoch.

There have already been some colossal booms in my wireless for the last twelve months.

"Pictorial Weekly."

* * *

FINE—FOR OTHERS.

I am looking forward to the time when I shall awake at 7 a.m., turn on the wireless and—remain in bed! Then, listening to the broadcast exercises, I shall think luxuriously of the thousands of poor wretches all over the country who are at that moment strenuously knees-bending in the cold bedrooms. And that will be closely approximate to my idea of perfect content.

"Sunday Pictorial."

* * *

Grannie (discussing the loudspeaker): "It makes me so nervous when I think of all the different things struggling to get out."

"Punch."

* * *

Mrs. Binks: "Very few people wear headphones nowadays."

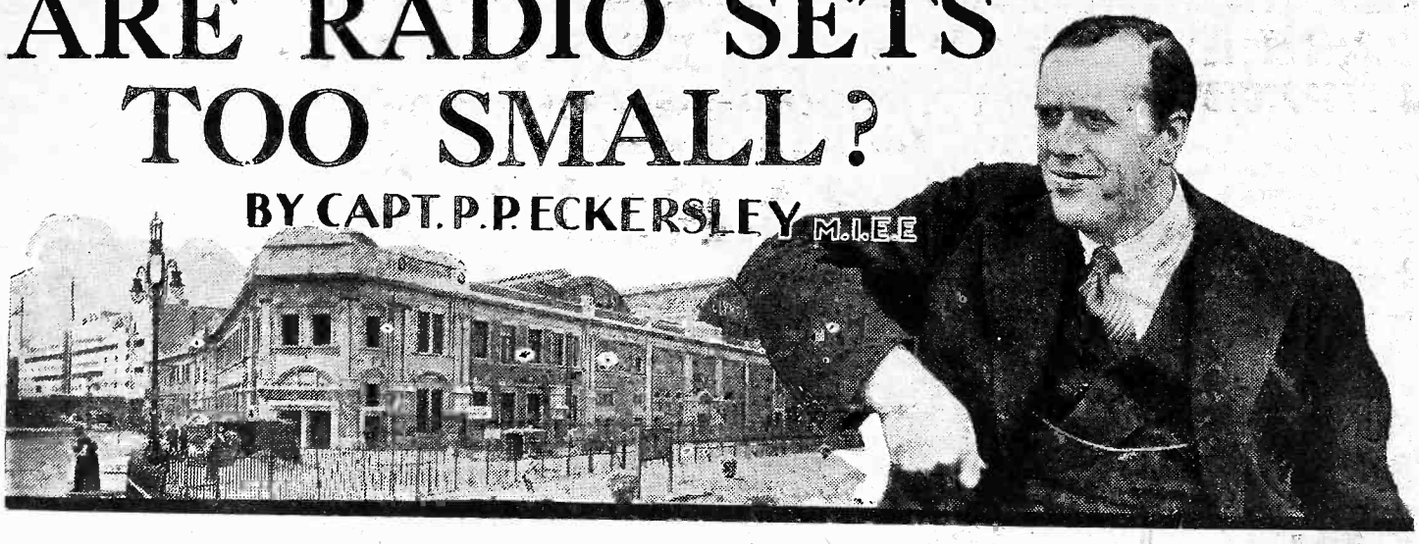
Mrs. Jinks: "Yes, and I think it's a shame. John's ears were just starting to look natural, and now he's looking as much like a donkey as ever."

* * *

Artists say the B.B.C. gives them ridiculous fees for their broadcasts. Wireless fiends say the B.B.C. gives them ridiculous broadcasts for their fees.

ARE RADIO SETS TOO SMALL?

BY CAPT. P. P. ECKERSLEY M.I.E.E



One of the advantages of a keenly analytical mind is that it can always see new aspects of old problems, and invest even the familiar things with new interest. Read this article and you will certainly enjoy Capt. Eckersley's analysis of radio under home conditions.

I HAVE just moved into a new flat. I must have some means of listening to the programmes. In these days rents are high and flats are small. My wireless set is about as easy to accommodate as a grand piano: not because my set is as bulky but because it fails hopelessly to harmonise in appearance with anything else.

The essential loudspeaker is an unlovely thing, and no one would exactly rave about the lines of a wireless set. But, as a minimum, we have got to have a loudspeaker. Here again, quality of reproduction fights against æsthetic value. No one can deny that, firstly, a loudspeaker must be large, either as a whole diaphragm or as a movement plus baffle, and secondly, it should be at head level and thirdly, it must stand away from the wall because it radiates backwards as much as frontwards.

Ludicrous Acoustics!

For some time we thought we might have a corner cupboard, and thus accommodate the set on one of the shelves and put the loudspeaker above it. But the acoustics of the corner are ludicrous, and one could never get real pleasure listening to a loudspeaker speaking frontways at one and backways into a corner, and thence out again.

Let us tackle this problem a little more fundamentally. Take first the question of the radio-gram. This, I think, must be a piece of furniture. What piece of furniture? Oak, mahogany, white wood, with or without scroll work?

It is impossible to decide, because different tastes and different rooms demand different finishes. Obviously, for certain markets the manufacturer could build chassis and give his customer a choice of body work.

The Tendency to Compress.

This is a possible solution to the problem of building a radio-gram. If you must have a big thing, make the best of it, and if it's big make it, with the fewest adaptations, able to fit the design of anyone's room.

There is still the question of the loudspeaker. If you build this in between the legs of the radio-gram you have to face two problems, box resonance behind the speaker and the source of sound being low down near the floor. I don't think there is one solution to this problem.

One might have a loudspeaker which pulls out of the whole set and stands where the user wills, or remains in the set, if it's too much of a bother to move it, but then gives slightly poorer quality.

There are other ideas which might be worked out, but basically I feel a radio-gram must be a piece of furniture, and must therefore make a virtue of necessity.

But the tendency with the ordinary wireless set is to compress. Manufacturers are making their tuning circuits, mains

A "RADIO APPOINTMENT"

This is Mr. P. J. Pybus, the new Minister of Transport, who received a radio message notifying him of his new appointment when on the "Mauretania" in Mid-Atlantic.

units, loudspeakers, etc., smaller and smaller. It is interesting to discuss whether they are right in so doing.

From an electrical performance point of view they are wrong; æsthetically they have justification. If you can't make a wireless set harmonise with other furniture, why, then, make it as small as possible.

But from an electrical point of view, you are intensifying circuit component design enormously. The effectiveness of a tuning coil, to assume a proper measure of selectivity, is in proportion to its bulk.

True a lot of small coils in cascade are as good, or even better than, one big coil, if you are talking of sheer selectivity, but each coil must be screened, there must be both a long-*and* short-wave coil in each compartment and so on.

Why Not Separate Them?

Then cutting down the power supply bulk means transformers which are on the verge of a factor of safety, means starving the valves of the power they deserve, means more mains hum than would otherwise be necessary. Every time a little more trouble is taken to assure good performance, it seems as if more space is required.

I wonder if it would not be a good idea always to separate mains unit and set? Thus the mains unit could be designed, surely, to go in a cupboard, under the stairs, in the cellar, anywhere out of sight.

Even if one used batteries, the same idea applies. Then you wire to a plug into which you plug the (smaller) set or the same-sized set with better performance.

But still this loudspeaker problem haunts us. If you take a little 10-in. cone moving-iron loudspeaker without a baffle, you are surely bound to lose bass? Typical loudspeakers are mounted in boxes, and doesn't one know it! But what else can one do?

A Big Problem.

I once saw a loudspeaker which was really of the horn type, but the horn was covered up in an ingenious way and the whole instrument was effectively flat. I feel such a type would stand unobtrusively against a wall when out of use, and could be simply swivelled round in use.

Unquestionably it's a big problem, and one that must have a determining effect on circuit design.

There is, of course, finally the idea of a remotely controlled set when one dials for programmes. When, and if such an idea is worked out commercially, it will largely help to solve the problem, but we still shall require a loudspeaker.

THE MIRROR OF THE B.B.C.

PROSPECTS FOR ROME.

B.B.C. SPORTS—MORE MONEY FROM RADIO?—B.B.C. IN THE EMERGENCY—PROGRAMME "HIGH LIGHTS."

THE meeting in Rome next week of the International Broadcasting Union will receive the report of the Technical Committee which deliberated at Brussels last month. It will be recalled that at the latter place Mr. Noel Ashbridge, Chief Engineer of the B.B.C., put up a stout fight for agreement on the necessity of immediate changes in distribution of channels.

But he was outvoted. Another blow to British aspirations was the unprecedented conjuncture of Germans and French to defeat the proposal for a meeting of "Administrations," that is, Post Offices, this autumn.

So now the only hope lies in the possibility of some "gentlemen's agreement" emerging at Rome. And I believe this is slender. If the British case is again blocked it may mean the end of the Union, because the patience of the B.B.C. is taxed to about the limit, and its withdrawal would, of course, end the Union.

Then there would be straight international competition, with the best channels to the strongest in the sense of power at the aerials. This is what I have been expecting for years. We should have a proper struggle for the air channels; and then see where the present obstructionists get off.

B.B.C. Sports.

I hear the economy campaign is threatening the B.B.C. staff sports. Some time ago a commodious sports ground was bought somewhere down Surbiton way. It was fully equipped, but has been only partially used because of the difficulty of the staff in finding time. Now all this will be curtailed, if the ground is not actually disposed of.

More Money from Radio?

Still smarting from the defeat of their attempt to get the extra half-million instead of the £200,000 a year agreed from the B.B.C., the Whitehall pundits are planning another attack next year, this time basing their demands on the possibility of the sale of time on the air.

There is also the suggestion that the B.B.C. does not take the full advantage of its publishing rights. From these two sources the Treasury believe that the B.B.C. should be able ultimately to pay for an attenuated but adequate broadcasting service and at the same time provide at least two and a half million pounds a year to public funds.

I gather Savoy Hill is alive to the danger and is taking the necessary counter-action.

B.B.C. in the Emergency.

I do not think the B.B.C. is doing itself justice in the present emergency. There is a lot of economics and a good deal of admonition to rigid economy. Also there is the new religious mid-week service. So far so good.

But why not let us have every day a simple and comprehensive explanation of exactly what is happening? The community at large (that is, the listening public) is in a state of bewilderment at the reasons for rapidly changing situations.

There is real need for simple non-technical and non-tendencious explanations. Why not have ten minutes nightly after the second general news bulletin?

Programme "High Lights."

Some weeks ago I gave the first intimation that Mr. Edgar Wallace, who you will remember was then very much in the news through one of those "million dollar a minute" kind of offers to write film scenarios for Hollywood, would give a series of broadcasts called "Stories for Broadcasting."

The name of the series has now been changed to "The World of Crime," Mr. Wallace having decided to substitute personal recollections for sensational fiction—which is a much more attractive title, and will convey a better idea of what our world-famous writer is going to talk about when he gives the first talk during the National programme on Saturday, October 10th.

Continued on page 317.

THEIR LEADER LISTENS!

Anton and his orchestra, at a Streatham cinema, recently gave selections from operas aided by a big amplifier. He is shown here wearing the headphones to synchronise the orchestra with the record being played.

"P.W." ALWAYS LEADS!

Our claim to the largest circulation of any wireless paper is once again justified by the net sales certificate which we have received from Messrs. Price, Waterhouse & Co.

It shows that even over the six months ending in mid-summer "P.W.'s" AVERAGE NET SALE WAS

129,806

copies per issue!

POPULAR WIRELESS

is the paper that made

WIRELESS POPULAR

FOR THE LISTENER

This week our popular contributor tells of an odd experience that befell him when returning from his holiday abroad.

THIS must be the oddest experience I have ever had in all my life. I am writing this somewhere in France. Exactly where, I don't know.

Among the Jura Mountains, I think; but geography was always a weak point with me. We crossed the Swiss frontier about a couple of hours distant from the spot where we now are—where we have been all the night! I am on the road home; but the amusing thing is that I am stuck on the road!

We were behind our schedule time at the frontier; and instead of stopping at dusk according to our rule, we decided to press on. We may have missed our way in the dark. We got into some wild country.

And about nine o'clock last night, in an apparently uninhabited world, something ceased to function in the bowels of the car, and it came to rest. It is still resting.

I am not much good at mending a car even in daylight. In the dark I am no good at all. Who is? I examined what I could see with a torchlight; but I knew it was hopeless from the first. We were in for a night of it.

We had passed through a village about ten miles back; but it was no use walking back; everybody would be in bed by that time; and the place probably hadn't a mechanic in it, anyhow. We were destined to spend a night on the roadside. It was cheap lodging.

The Break-Down.

We had our wireless, and we had something to eat. We had bought a German sausage in Switzerland; a thing about a foot long and as thick as your wrist. We reckoned we could lunch off that until we got to Calais!

And we had one of those long twists of

(*Continued on page* 320.)

THE MANCHESTER EXHIBITION

IT was eight years ago that the first Manchester Radio Exhibition was organised by the Manchester Evening Chronicle. And, although it proved a great success, it can hardly be said that, compared with current shows at Olympia, it was then much more than merely a provincial display.

But, guided by the able hands of its original enthusiastic sponsors, it has increased in size and importance year by year until now at last it has deservedly earned the description of "National."

Henceforth the "Manchester Show" is to be known as the Northern National Radio Exhibition, and is to have the full backing of the Radio Manufacturers' Association. And it is particularly fitting that this should be so, in view of the fact that the Manchester broadcasting station has also this year emerged from the local status and become the North National.

Figures and Facts.

This has given radio in the North an immense fillip, and both the radio trade and the licence figures for this area have expanded very considerably. Quite often it has happened during the past months that the sales of various makes of sets and components have actually been greater in the North than in the South of England (in which the London district is included).

A case in point concerns one of our "P.W." coil designs. One of the most successful suppliers of these records that his total sale throughout the whole of the country is somewhere in the neighbourhood of fifty thousand. And yet a Manchester concern whose goods circulate almost exclusively in the North states that they have exceeded that figure!

Bigger Than Ever.

From such evidence as this and many other facts known to us, it seems quite a foregone conclusion that the Northern National Radio Exhibition will prove a tremendous success.

It is considerably larger than last year's show, but whatever space is available we are sure it will be taxed to the utmost by the number of visitors descending upon it from all parts.

The exhibition opened at three o'clock on Wednesday the 7th of October. The proceedings in connection with the opening were arranged to form the subject of a broadcast from the North Regional station.

This year the Manchester Show becomes, for the first time, the Northern National Radio Exhibition and has the full backing of the R.M.A. It opened on Oct. 7th and will remain open during next week.

At the City Hall.

We have made very special arrangements to include a critique of the exhibits in our next issue, and a member of our technical staff is visiting Manchester for this purpose.

As before, the show is being held at the City Hall in Deansgate. This is not a particularly cheerful part of the City, but is within easy reach of the stations. Indeed, there is an excellent service of trams which enables you to get there with a minimum of trouble.

And whatever the external conditions, the interior of the hall will be one of the most brilliant places in the country. Both the organisers and the firms exhibiting are making a strenuous effort to render the show the brightest and best yet.

It isn't Olympia in miniature—it is Olympia itself transported and perhaps, in various respects, even improved. And another big section of the population is having the opportunity to see for itself how the British Radio Trade has grown in dimensions and advanced in technique.

You Ought to Go.

The Manchester show always has had a vitality and an underlying enthusiasm that is so often sadly lacking in exhibitions. You obtain a keen sense of the people behind the things arrayed. Exhibitions are frequently mere displays of goods, and as such tend to become unutterably boring.

Radio exhibitions in general are in the nature of exceptions to this, and we are certain visitors to the Northern National will thoroughly enjoy their experience and find that they can go and go again without losing interest.

The exhibition will remain open daily from 11 a.m. to 10 p.m. until October 17th, and the price of admission is 1s. 6d. including tax. Arrangements have been made with the railway companies for reducing railway fares.

Intending visitors are invited to write to Provincial Exhibitions, Ltd., The City Hall, Deansgate, Manchester, enclosing stamped, addressed envelopes, for railway vouchers.

These vouchers entitle their holders to travel the return journey up to 60 miles from Manchester for the cost of a single fare.

A number of competitions have been arranged in connection with the Northern National Radio Exhibition, and the exhibits concerned are being prominently displayed. These will prove a popular feature.

A FINE SHOW PIECE

An "outsize" in valves compared with one of ordinary dimensions. Giant components and accessories always make attractive exhibits at Radio Shows.

ARE PORTABLES STILL POPULAR?

A correspondent who lives in the country went to the Radio Show as a prospective purchaser of a portable set, and in this informative article tells you of the impressions he gained concerning the models exhibited.

"EXHIBITOR, what of the portable?" Thus my mental frame of mind as the express bore me at over 60 miles an hour towards that Mecca of all good enthusiasts—the "Show."

A Long Journey.

I was travelling the hundred-odd miles or so from my country home to see the goods in person before buying a portable receiver. And when I say "portable" I mean portable! Namely, one of passable weight and housed in neat suit-case style so that when I hiked down the street with it everyone's eyes would not goggle at my "luggage."

I was prepared really to enjoy myself; metaphorically to wallow for a space in portables. True, there had not been much about such apparatus in the papers, in the adverts, or even in the technical journals; but, after last year—well, surely there must be a plentiful crop!

But I was mistaken. Indeed, I will go further—I was disappointed. Out of the 250 or so exhibitors there were only around about 50 makes of portables to be found!

There was stacks and stacks of all-mains sets and apparatus on show, but, as a prospective purchaser, these had no interest for me, for the metal masts for mains are still years from our out-of-the-way dwelling. But yet I was very interested in all this all-mains fare.

From it I learned the truth—I learnt why my pet item was so lacking. It had nothing to do with the increased popularity of hiking, nor yet with the high cost of running a motor-car. No, not at all; but let me tell you what conclusion I came to.

Portables have never been used very extensively for the purpose for which they were originally introduced, namely, to provide entertainment on picnics and other outings in the open. Rather, their popularity has been due mostly to their convenience as receivers that can be taken from room to room quite easily, and which can be put out of the way when not in use.

For Indoor Use.

It was through this particular advantage that transportables came along. A transportable was at first simply a more elaborate sort of portable but finished in a more elegant manner.

With the advent of all-mains design the transportable jumped into prominence. And since the majority of all-mains receivers can be moved about as easily as portables, they have more or less ousted the latter as indoor receivers.

Another thing that has contributed to the popularity of the portable, but in a lesser degree, is that they enable radio to be taken to a house where a set is non-existent. But this aspect of their usefulness is fast dying out as radio becomes more and more universal, for before so very long there will be but few houses without a radio of some sort.

With this reasoning I decided that it was only natural to find fewer portables at the show this year, and set myself to see whether portable sets had progressed in quality if not in quantity. I found that they had without a doubt, and here are a few of the items that were of particular interest.

First of all, like the remainder of the sets, the prices were down quite considerably. But the size in most cases did not seem to be cut down at all, although this is largely made up for by the improvement in quality that has taken place over the older type of portable.

There was one portable that struck me as a good effort, however, in keeping down the size. It was 12½ in. × 11 in. × 8 in., and employed a super-heterodyne circuit.

As a matter of fact, super-het. circuits are very much to the fore in portables this year. One firm is showing a six-valve super-het.

The majority of the sets that are not supers. employ a four-valve arrangement, which consists of an S.G. H.F. valve followed by a detector and then two L.F. stages. In only a few cases are pentode valves utilised, and this may be the reason that current consumptions are kept within quite reasonable limits.

An Old Pattern.

The old type of five-valve circuit with two aperiodic, three-electrode H.F. valves is not very much in prominence, although there are still a few makes employing this arrangement. Its chief advantage lies in the fact that only one tuning condenser has to be used.

But the modern portables are just as easy to operate, for only in one or two are there more than one tuning control. This effect is, of course, largely obtained by ganging.

One set has the controls so arranged that the two circuits in it can be either tuned separately, or at the same time with one knob. Another interesting item is the provision of direct calibration of the tuning of a receiver in wave-lengths with the more important stations mentioned by name.

Super-Het. Sets.

In the super-het. circuits the new double-grid combined oscillator and first detector valves are naturally largely used. Another item which shows that portables are well up to date is the absence of a G.B. battery in one of them, grid-bias being obtained automatically.

So far as the general design is concerned, the sets follow more or less recognised lines. The loudspeaker is in the lid, and the remainder of the case is roughly separated into three divisions, one for the set proper with the controls, one for the valves, and the third for the batteries.

Items of Interest.

Also, both long and medium waves are available. The usual arrangement is to have a three-position switch, the centre position being off.

Two items of particular interest are the presence of a moving-coil speaker in at least one of the portables, and a specially hinged lid in another. In the latter case the hinge is so arranged that when open the lid of the case can be rotated independently of the rest of the case, so that orientation of the frame is possible without a turntable or without swinging the set round.

Yes, I think, on the whole, the user of a portable has not been forgotten. My visit was not in vain, and the only difficulty I met was on the way home in the train, trying to make up my mind which set I liked best.

THESE "GUARDS" AREN'T ON PARADE!

An "unofficial demonstration" of the wireless van used by the Guards during recent manœuvres.

WHAT IS SHOCK EXCITATION?

by

Dr. J. H. T. Roberts.
F.Inst.P.

Here is a concise and eminently readable explanation of a phenomenon that is often referred to but is seldom clearly defined.

WHEN reading the account of the operation of a particular type of receiving circuit, you sometimes come across the term "shock excitation," and perhaps you may not be quite clear what it means. It sounds rather a mysterious term, but as a matter of fact it is really very simple and can be explained quite easily.

Atmospherics and Noise.

Perhaps I should say first of all that generally when we come across this term "shock excitation" with reference to a radio circuit it is in connection with the effect of *atmospherics* upon the circuit.

Most atmospherics are due to lightning flashes or similar electric discharges which radiate out into the ether a torrent of irregular ether waves. I call them "irregular" to distinguish them from the "regular" waves which are sent out by an ordinary oscillating valve circuit.

Perhaps this distinction can be made clearer by comparing radio waves and sound waves. If we look at the matter in this way, the atmospherics may be compared to *noise* and the regular radio waves may be compared to *musical sounds*.

If you strike a non-resonant object, such as a battered tin canister, you produce simply a *noise*, whereas when you strike a resonant object, such as one of the strings of a pianoforte, you produce *musical sound*.

Unrelated Waves.

Whilst making this distinction between noise and musical sound, I should perhaps add that the distinction is one of degree rather than of kind. The noise produced by striking the tin canister consists of definite wave-lengths, but there are so many different wave-lengths, and each one persists for so short a time, that you get in the result a conglomeration of unrelated sound-wave and this is what we call "noise."

A definite musical sound, on the other hand, comprises one wave-length (the fundamental) with or without a number of other wave-lengths (the harmonics), and the point here is that these different wave-lengths bear a definite relationship to one another instead of being entirely unrelated as in the case of a noise.

When you strike a key of the pianoforte the hammer hits the string and "shock excites" it; the string, however, being left in a state of vibration in its own natural frequency. The string may be set into vibration, as you know, in another entirely different way, that is, by resonance with another vibrating body having the same frequency.

Vibration Due to Resonance.

For example, if you depress the loud or sustaining pedal of a piano (so as to remove the dampers from the strings) and then sound a tuning fork close by the instrument, you will find that at least one string of the piano will pick up the note of the tuning fork.

This string of the piano must be one which has the same or practically the same natural frequency as the tuning fork, and it is set into vibration by the continued and synchronous atmospheric impulses from the tuning fork, the effect being known as "resonance."

If the string is struck and the duration of the impulse is short compared to the time of a complete vibration of the string, then the striking object will have retired or receded before the string returns to the mean position from which it has been displaced, and consequently the string will be left vibrating instead of being damped by the striking object.

All Manner of Wave-lengths.

Now to return to the question of shock excitation of a radio circuit. A lightning flash or other source of atmospherics sends out radio waves on all manner of wave-lengths.

When these wave-lengths strike a receiving aerial, one or other of them may set the receiving circuit into vibration by a kind of resonance, whilst those which are of higher frequency than the natural frequency of the circuit in question act in the same way as the striker on the pianoforte string, and so "shock excite" the circuit.

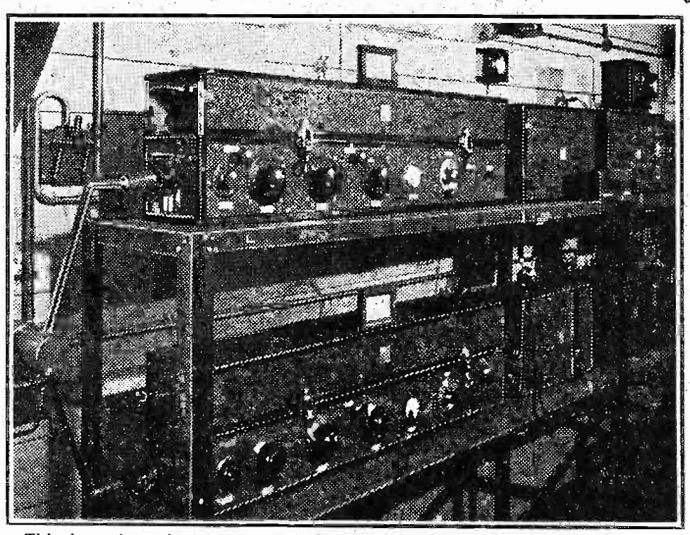
You will see from the foregoing that in the case of a circuit which has a low natural frequency (e.g. one tuned for long wave-lengths) since its natural period of vibration is longer it will be more likely to be shock excited than one where the natural period of frequency is extremely short.

Record Surface-Noise.

It may be of interest to mention that there are reasons for believing that the surface noise from a gramophone record consists of small shock-excitations, and on this basis methods have been devised (using electrical reproduction) whereby the noise can be separated out from the regular acoustic frequencies, the noise of shock excitations being then suppressed by suitable filter circuits, whilst the regular desired frequencies are retained.

It is due to the large variety of wave-lengths in atmospherics that make it impossible to avoid them no matter to what wave-length the set is tuned.

SOME LONG SETS FOR THE SHORT WAVES



This is a view of one corner of the short-wave reception room at Geltow, which is Germany's wonderful radio receiving station.

FROM THE TECHNICAL EDITOR'S NOTE BOOK.

Tested and Found—?

SOME GOLTONE ITEMS.

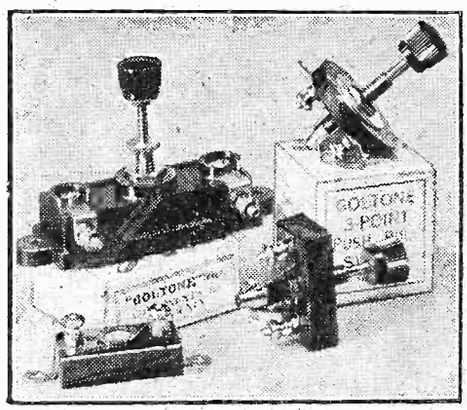
In a range of Goltone components that recently reached us were three Midget fixed condensers, three Midget type condensers, and several two-point and three-point switches.

The three-point switch seems to me to be a very sound design. Its action is brisk, by which I mean it goes on and off with a nice click, leaving no doubt whatever as to its position, there being no "half-way" position possible.

It is provided with a panel disc carrying the words "Push for Long Waves, Pull for Short," a feature which constructors will no doubt appreciate.

The Goltone compression type condenser is skilfully arranged either for baseboard or panel mounting, and is a good piece of work. The "Goltone" Midget condenser also exhibits sound commonsense in its design, in that it has its value very plainly marked at the top.

EXCELLENT COMPONENTS



We can recommend the use of these "Goltone" components in "P.W." sets.

NEW "LOTUS" COMPONENT.

I have remarked before that I tend to find the best examples of modern radio engineering in variable condenser construction and that this branch of the radio industry seems to be largely the preserves of the best craftsmen of the day.

Well, I have no need yet to modify these views of mine; indeed, there is growing evidence in their favour.

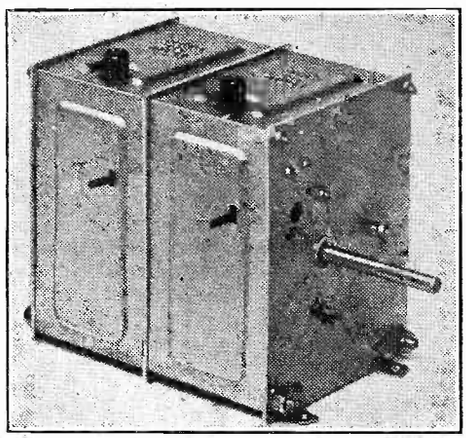
Take, for example, the new "Lotus" variable condensers, these surely prove my point admirably.

Lotus Radio, Ltd., always did produce beautiful gear of this nature, but their latest efforts are even better than before.

I have in front of me as I write a "Lotus" Two-Gang, and, honestly, there is not a point in it that I could criticise if I were in my most carping mood.

Its construction is first-class in every respect and it is undoubtedly one of the best components of any kind that has come my way.

A "LOTUS" GANG



An extremely useful device particularly for band-pass sets.

It comprises two totally screened ·0005-mfd. sections, matched with almost unnatural precision.

I particularly like the accessibly placed trimming adjustments. These, which are liberal and completely dependable in their actions, have their slotted knobs protruding through the top of the metal casing, so that it is the easiest possible task to adjust them when the component is built into a set.

The price of the Lotus Two-Gang is 20/-, and for 5/- extra it is supplied with a fine disc drive. A drum drive is also available at an additional cost of 7/6.

These prices reveal the good value for money that is obtainable in radio these days.

The "Lotus" Two-Gang has several important uses in present-day radio receivers, as is being revealed in "P.W.'s" set designs.

READY RADIO "INSTAMAT" MAJOR.

This is an output transformer for accurately matching moving-coil loudspeakers to set outputs of unknown quantities—and qualities. As many readers will know, it is vital that the last valve of a set should be matched with the loud speaker. There is only one ratio of impedances that gives optimium volume plus greatest fidelity.

In the majority of cases the amateur is unable to determine the values in question with any degree of accuracy even with the aid of the published characteristics of valves and speaker.

But a perfect result is assured if means are provided for an immediate adaptation of the conditions. This is possible with the new Ready Radio component, for switches are fitted to it so that you can change from one ratio to another, noting the aural effects as you do so, with only the lapse of fractions of seconds between.

"Instamat" Major is an excellent production and it has few practical limitations in use. It is able to handle up to 150 milliamperes of D.C. current through its primary without serious saturation trouble—a far greater current than is met with even in the most ambitious of ordinary receiving sets. Further, it has an extremely low primary resistance—so low, in fact, that there is negligible voltage drop even when paralleled power-valves are employed.

As far as I know, there is no other component like it on the market, and its production is a very creditable feat on the part of Messrs. Ready Radio, and one for which they will undoubtedly earn the thanks of many moving-coil enthusiasts.

The price of this four pounds of scientific radio engineering is 35s.

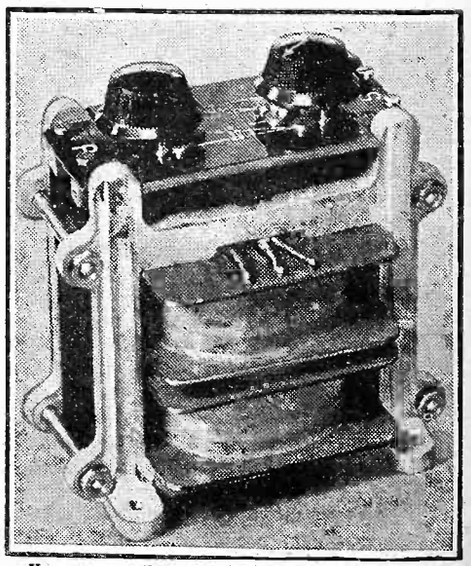
PLEASE NOTE

Manufacturers and traders are invited to submit radio apparatus of any kind for review purposes. All examinations and tests are carried out in the "P.W." Technical Department, with the strictest of impartiality, under the personal supervision of the Technical Editor.

We should like to point out that we prefer to receive production samples picked from stock, and that we cannot in any circumstances undertake to return them, as it is our practice thoroughly to dissect much of the gear in the course of our investigations!

And readers should note that the subsequent reports appearing on this page are intended as guides to buyers, and are, therefore, framed up in a readily readable manner free from technicalities unnecessary for that immediate purpose.

IMPROVING MOVING COILS



You can exactly and quickly match your moving-coil speaker with any set output by means of this new Ready Radio product.

More about the "POP-VOX" FOUR

By G.V. DOWDING,
Associate I.E.E.

Further constructional notes and the operating details are given this week.

THE screen is a very simple affair in this "Pop-Vox" Four set. It consists of a piece of ordinary wood, any kind will do, covered with either thin copper sheeting or with tin foil. But the covering must be complete and on both sides. If a number of separate sheets are used, then these must overlap quite a bit and come into clean, close contact. No glue or other such adhesive should be used between overlapping sheets. The necessary contact to the screening material can be made by soldering if desired, but if not a wire should be screwed down over a tag of the foil, as shown in the wiring diagram.

The hole through which the S.G. valve passes must not be any larger than is required for the valve easily to pass through it. The valve holder is fixed on to a piece of wood in order to raise it and make the component more accessible.

About the Coils.

The full specifications of the coils employed are given on the next page so that you can make them yourself if you so desire. By the way, even if you don't wind the P.J.'s we certainly recommend you to wind your own Coil Quoits. This is an extremely simple task, and you will get just as good results with your own home-made versions as could be obtained with any factory construction.

The mounting of the components should present no difficulties. The screen can be fixed by screws passing up from under the baseboard and this article, the screen I mean, acts as a fine panel bracket if a couple of screws are driven into it from the front of the panel. Some makes of Coil Quoits have mounting feet moulded on to them, although there are others that are supplied with separate fixing pieces, but in either instance the fixing of these little articles is quite straightforward. There is no technical objection to the wiring-up of the Coil Quoits before they are finally screwed into place.

Mounting the P.J.'s.

Those P.J. coils not equipped with mounting brackets may be screwed to the baseboard by small screws passing through the ends of the formers.

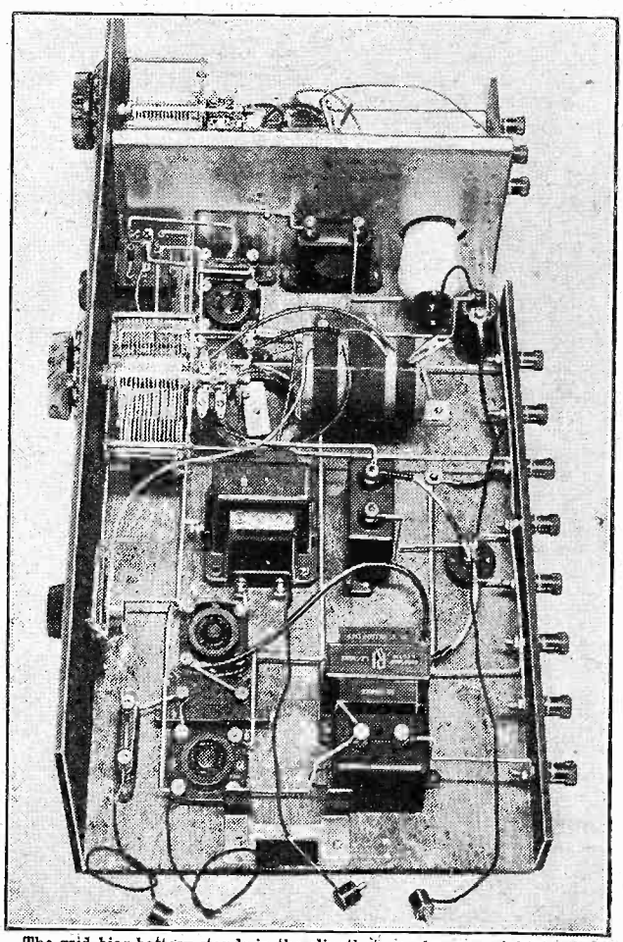
It pays to make the wiring neat and orderly, for tidy wiring is easy to check up and generally means greater efficiency.

In the H.F. Section.

As was indicated on the wiring diagram, a part of the baseboard has to be covered with metal foil. We ought to have mentioned this before, because it is obviously necessary to do that part of the job prior to the screwing down of the components. You should use copper or tin foil and ensure that, (1), this baseboard foil makes good contact with the foil on the vertical screen and, (2), that none of the leads or component terminals accidentally short-circuit through it.

Pay particular attention to the connections of the coils—a slip in these is not hard to make! Commercial P.J.'s have coloured leads to denote their various winding ends, as described on the next page, and it is a good plan, if you wind your own P.J.'s, to cut little labels from stiff paper, write the appropriate colours on these and fix them to the coil leads.

PLACING THE G.B.



The grid-bias battery stands in the clip that can be seen right in the foreground of this photograph.

Spaghetti Resistances.

During the wiring you will appreciate the advantages of the Spaghetti resistances, for those act as their own connecting leads! But don't pull on these "Spags," for in a few makes the metal end pieces are not very robustly fixed.

There is sufficient space at the one end of the baseboard for the large grid-bias battery, and this can be kept in position by a grid-bias battery clip for baseboards. Such an item costs only a few pence.

Place the battery in position before you cut and fix the grid-bias leads. These leads should be of flexible wire—single strand stuff is apt to break with apparently little provocation!

Grid Bias for the S.G.

The H.T. current to the S.G. valve is somewhat reduced by the provision of a one-cell grid-bias battery. Don't try to do without this little battery. That would be a very false economy indeed, for it will save its few pence of initial cost time and time again. The Siemens make has a small flap enabling it quickly to be screwed securely to the baseboard.

But you must not regard this little battery as a component having an indefinite life. It might last a whole year, but at length it is bound to run down. A periodic test, say once every two or three months, is

(Continued on next page.)

MORE ABOUT THE "POP-VOX" FOUR

(Continued from previous page.)

advisable. Remember it acts like a tap and regulates your H.T. to some moderate extent.

Mains Unit Can Be Used.

The "Pop-Vox" Four, like all other "P.W." sets, has been so designed that it will work perfectly with any good make of H.T. mains unit. But if you can and do intend employing one of these attractive accessories, make sure you purchase a model capable of supplying enough current, and a bit to spare, for the particular valves you buy.

Don't be tempted to purchase cheap foreign valves of doubtful origin and merit. Truly, to buy British is the soundest common sense in this regard, although I must hastily add there are one or two foreign brands carrying well-known names which are quite satisfactory from every point of view. You will be completely safeguarded if you refer to the makes given in our accessory list, for all these have been fully tested in our Research Dept.

Also, take note of the types recommended.

Final Adjustments.

An H.T. battery of higher capacity type than the ordinary "normal" is advised.

When the set is hooked up for its first aerial test it will be necessary to adjust the compression condenser that is fixed on the baseboard. But once set this component need never be touched again. It functions only on the long waves, and you should slowly turn its little knob first the one way and then the other until you have just the selectivity you desire.

Also, you will need initially to find the best tapping points on the coils.

And the tappings on the aerial or first long-wave Coil Quoit constitute the second long-wave selectivity adjustment.

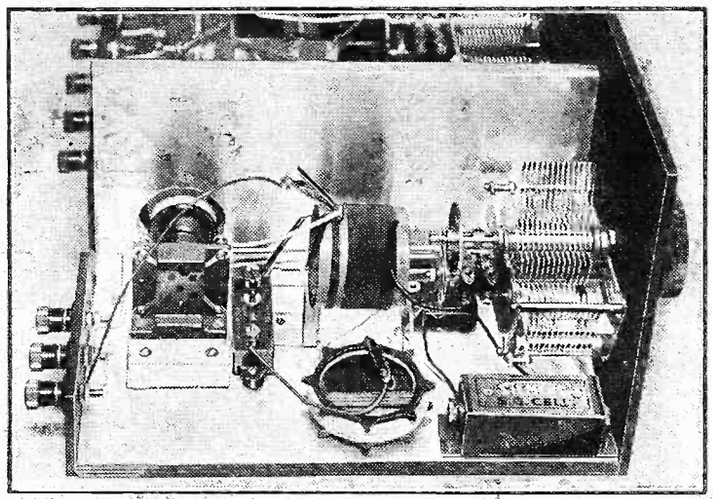
The P.J. Coil Tappings.

The P.J. coil tappings have little or no effect on the long waves, for it is one of the advantages of this receiver design that the two sets of inductances in each case operate more or less independently in this respect.

The Tappings on the P.J. coils need to be adjusted while you are tuned to an ordinary wave station.

Once these adjustments are made you can leave them permanently "set."

ADJUSTING FOR BEST SELECTIVITY



You vary the clips between the tapping points until you have just the degree of selectivity necessary for your local conditions.

COIL DETAILS.

P.J.2.—Former 2 in. diam., 2 in. long. Medium-wave aerial unit. Wire 30 D.S.C.

AERIAL WINDING, 9 turns, tapped at 4 and 6. Beginning "A" (red flex); end "X" (blue flex). Space ⅜ in. between aerial and grid.

GRID WINDING, 64 turns. Beginning marked "G" (white flex); end marked "Y" (black flex).

P.J.3.—Former 2 in. diam., 3 in. long. Intervalve medium-wave unit. Wire 30 D.S.C.

PRIMARY, 30 turns, tapped at 10 and 20 from beginning marked "A" (red flex); end marked "X" (blue flex). Space between pri. and grid windings ⅜ in.

GRID, 64 turns. Beginning marked "G" (white flex); end marked "Y" (black flex). Space between grid and reac. windings ¼ in.

REACTION, 34 turns. Beginning marked "Z" (green flex); end marked "R" (yellow flex).

1st LONG-WAVE UNIT.—Coil Quoit, 30 D.S.C. Wire, 150 turns tapped at 30 and 60 turns away from the "E" end.

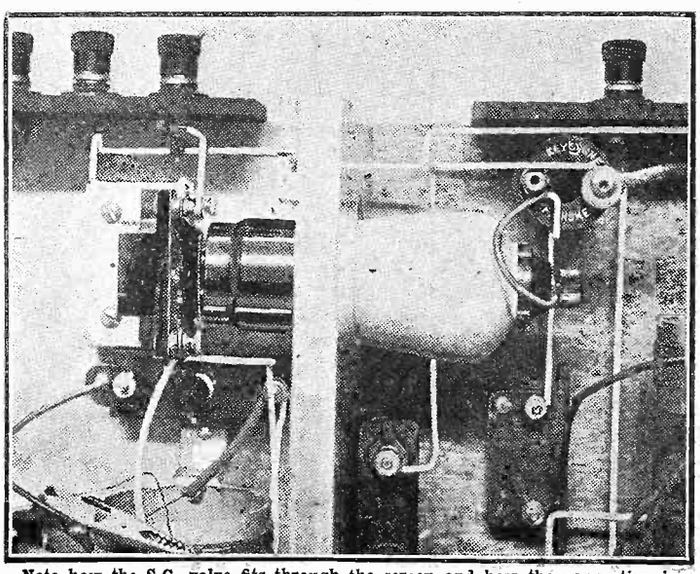
2nd LONG-WAVE UNIT.—Coil Quoit, 30 D.S.C. Wire.

REACTION.—60 turns. End joined to "E" of Grid Winding.

GRID WINDING.—150 turns tapped at 60 from "E."

Winding of ALL coils in SAME direction.

PERFECTLY ADEQUATE SCREENING



Note how the S.G. valve fits through the screen and how the connection is made to its anode terminal by a short flexible lead.

THE COMPONENTS AND ACCESSORIES WE RECOMMEND

1 Panel, 21 in. × 7 in. (Permcol, Goltona, Lissen, Peto-Scott).
1 Cabinet for above with baseboard 10 in. deep (Camco, Osborn, Pickett, Gilbert).
2 ·0005-mfd. Extensers (Wavemaster Cyldon, Formo).
1 ·0001, ·00012 or ·00015-mfd. differential reaction condenser (Igranic, Lotus, Ready Radio, J.B., Lissen, Formo, Wavemaster, Graham-Farish, Telsen, Cyldon).
1 Triple-pole change-over switch (Wearite).
2 2-mfd. condensers (Helsby, T.C.C., Dubilier, Igranic, Ferranti, Mullard, Lissen, Telsen).
1 1-mfd. fixed condenser (Lissen, etc.).
1 ·001-mfd. maximum compression condenser (Formo, Lewcos, R.I., Sovereign, Telsen, Graham-Farish).
2 ·01-mfd. fixed condensers (Lissen, T.C.C., Mullard, Dubilier, Ediswan, Ferranti, Igranic, Graham-Farish)
1 ·001-mfd fixed condenser (Telsen, etc.).
1 ·0003-mfd. fixed condenser (Ferranti, etc.).
1 Horizontal valve holder (Junit W.B., Bulgin, Parex).
3 Ordinary valve holders (Benjamin, Telsen, Igranic, Lotus, Lissen, Clix, Bulgin, Formo, Wearite, Graham-Farish, Dario).
1 2-meg. grid leak and holder (Ferranti, Telsen, Ediswan, Ready Radio, Igranic, Graham-Farish, Watmel).
1 1-meg. grid leak and holder (Ferranti, etc.).
1 L.F. transformer (Telsen Igranic, Lissen, Varley, R.I., Ferranti, Lotus, Lewcos).
1 Output choke (R.I., Graham-Farish or as above).
1 75,000-ohm Spaghetti resistance (Lewcos, Ready Radio, Bulgin, Graham-Farish, Varley, Telsen).
1 25,000-ohm Spaghetti resistance (Bulgin, etc.).
1 600-ohm Spaghetti resistance (Tunewell, etc.).
1 10,000-ohm Spaghetti resistance (Varley, etc.).
1 H.F. choke (Peto-Scott, Lewcos, Telsen, R.I., Ready Radio, Parex, Lotus, Graham-Farish, Wearite.)
1 Fuse and holder (Bulgin, Ready-Radio).
1 P.J.2 coil (Ready Radio, R.I., Wearite, Goltone, Melbourne, Parex, Peto-Scott, Formo, Ferranti, Lewcos).
1 P.J.3 coil (Peto-Scott etc.).
2 Coil quoits (Wearite, Peto-Scott, Melbourne, Parex, Ready Radio, A.E.D.).
4 oz. of No. 30 D.S.C. wire.
1 Terminal strip, 14 in. × 2 in.
1 Terminal strip, 4 in. × 2 in.
11 Terminals (Igranic, Belling & Lee, Eelex, Clix).
3 Crocodile clips, wire, flex, screws, G.B. battery clip, copper foil, etc.
LOUDSPEAKER.—Amplion, Celestion, B.T.-H., Blue Spot, Undy, W.B., Graham-Farish.
VALVES.—2, 4, or 6-volt. 1 S.G., 1 H.L., 1 L.F., 1 power or super power (Six-Sixty, Mazda, Eta, Osram, Cossor, Fotos, Lissen, Tungsram, Dario).
BATTERIES.—120 to 150-v. H.T. super-capacity H.T. Grid bias for H.F. valve, 9 or 15-volt. Grid bias for L.F. valves to suit types used. (Drydex, Pertrix, Ever Ready, G.E.C., Lissen).
ACCUMULATOR.—2, 4 or 6-volt to suit valves. (Exide, Ediswan, Lissen, Pertrix).
MAINS UNITS.—State type of mains, voltage and details of set when ordering. (Regentone, Ekco, Tannoy, Atlas, R.I., Heayberd, Lotus).

REMARKABLE WIRELESS EXPERIENCE IN MANCHESTER

Local experts perplexed

Mr. T. A. Kennedy's own story of Battery Record

Everybody who owns a wireless set will be interested in the following letter received from Mr. T. A. Kennedy, of Willington, Manchester, whose experience surprised and puzzled even local experts.

"*Dear Sirs :*
As I write I am listening to the Wireless on a McMichael Screened 3-valve Pentode employing two EVER READY super-capacity batteries, which yesterday completed their 56th week (14 months) continuous use, Surely this is a very exceptional length of time for any battery to last ?

I wrote you on their completion of 8-9 months never expecting a further 5 months' use. Local dealers here are perplexed and say I am mistaken but I know positively that the batteries were put into commission on June 5th, 1930."

(*This letter may be inspected at the office of the Company.*)

When a set is adequately powered, and only then, it is economically powered ! That is the secret of Mr. Kennedy's success. There is an EVER READY Battery made to fit every type of set, portables included ; and Mr. Kennedy chose the EVER READY battery made for his. Result : 14 months of trouble-free wireless for two guineas ! Why not fit *your* set with the battery made by an exclusive process and guaranteed to give satisfaction by the firm that has been making reliable batteries for over 29 years ? Write to the address below for a free list of popular wireless sets and the EVER READY Battery specially recommended for each of them.

EVER READY

THE BATTERY THAT LASTS A LONG TIME

THE EVER READY CO. (GT. BRITAIN) LTD., HERCULES PLACE, HOLLOWAY, LONDON, N.7.

"SQUARE PEAK"

(REGD TRADE MARK)

NEW EXTENSER MODELS

of the famous "Square Peak" Coil . . Approved by "P.W." Set Designers . . Already specified and used in the "Modern Wireless" and "Wireless Constructor" Exhibition Sets—the "Super Quad" and the "Exhibition Four."

This new Model BP7 is fitted with terminals in place of wave-change switch, enabling the coil to be used with Extensers or any type of remote switch control. Identical in all other respects with the original model BP5, of which users write:—

"I have fitted one in my receiver and the results are amazing. ***The sharpness of tuning is uncanny.***" (Midlands)

"For selectivity I have seen or heard nothing to equal the 'Square Peak' Coil, and although I have built dozens of receivers I have never obtained such wonderful tone." (F.A.G.)

READY NOW

MATCHED COILS ENSURE PERFECT GANGING . . . .

Reg. Design. Pat. Pending.

15/-

The Varley "Square Peak" band-pass aerial Coil (dual-range) Model BP7 gives a constant square-topped peak and separation of substantially 9 kilocycles over the whole of *both* wave-bands. (*Model BP5 complete with wave-change switch, same price.*)

THE "SQUARE PEAK" COIL

NEW H.F. INTERVALVE COIL. (Dual range.) Without switch, for use with the "Square Peak" Coil type BP7. Completely screened. Its inductance *inside the screen* is exactly matched to that of the "Square Peak" Coil to ensure perfect ganging.

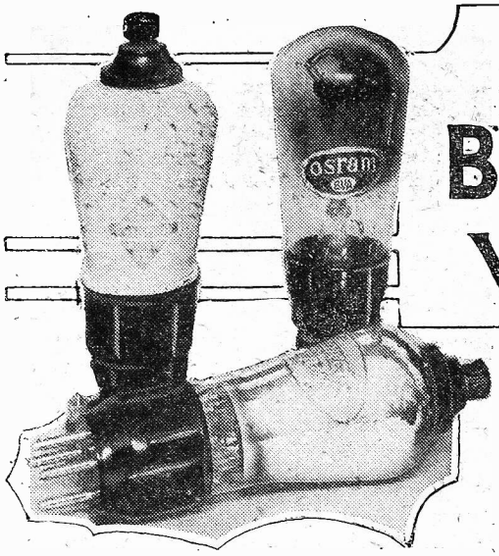
List No. BP8. Price **8/6**

(*Also supplied with wave-change switch. Model No. BP6. Same price.*)

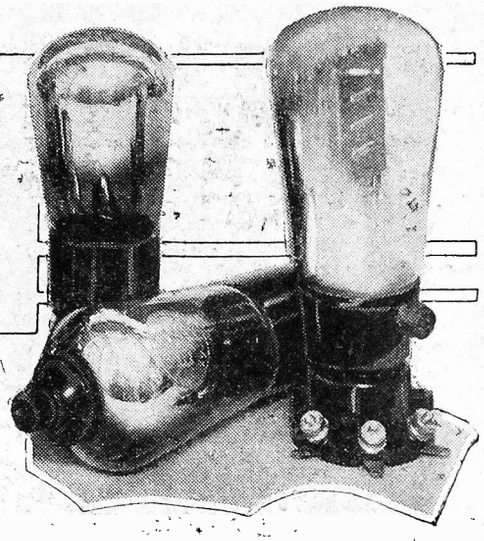
Varley

STANDS 82/83, MANCHESTER

Advertisement of Oliver Pell Control Ltd., Kingsway House, 103, Kingsway, London, W.C.2. Holborn 5303.



NEW BATTERY VALVES



A brief outline of the many new battery valves that have made their appearance on the market during the past few months.

By K. D. ROGERS.

THOUGH the recent National Radio Exhibition at Olympia provided no surprises in the way of revolutionary set designs, it gave a very clear indication of the vigour of the radio trade, and the valve manufacturers in particular.

There were numerous new designs of both battery and mains valves which attracted widespread attention from visitors, and though nothing startling appeared, nevertheless there were many very valuable additions to the valve ranges.

An example of these is the new Mazda Pen 220, which has been brought out specially for use in small battery-operated sets, where anode consumption is a vital factor.

Ideal for Portable Sets.

Probably the biggest problem which confronts the designer of the portable battery receiver is that of anode current consumption. Realising this, the Mazda engineers set out to produce a power valve which gave an unusually large power output with only 100 volts H.T., and with a very low anode current consumption. The result is the Mazda Pen 220, which incorporates new methods of construction and new features of design which have never before been employed in the pentode valve.

The results are remarkable; for the same anode consumption as with an ordinary power valve, the output is two and a half to three times as great. Thus one can get with an anode consumption of five milliamps, and 120 volts H.T., a power output sufficient to work a moving-coil speaker in an ordinary room. As a matter of fact, a signal voltage of only three volts is required to provide the maximum power output with this remarkable little valve.

More New S.G. Valves.

Another new two-volter in the same range is the Pen. 220A, which has a consumption of ten to twelve milliamps at 100 to 120 volts and with a corresponding larger output.

A new metallised detector valve has also been brought out by the same firm specially designed for use with the pentode, and known as the H.L.2. There are also two new two-volt screened-grid valves, the S.215A and S.215B, which, with the old valves with which we are so familiar, provide an impedance range from some 350,000 to 800,000 ohms. But good as these valves are, it is undoubtedly the pentode which will create the most interest during the coming season.

Mullards also have prepared an intensive campaign, and their new range of valves has a very wide scope. Among the battery-heated type newcomers, the two-volt range shows a steady increase in efficiency and in many cases a decrease in battery consumption.

A Special Detector.

The two-volt S.G. valve, for instance (the P.M.12), has been improved; the impedance having been put down to 180,000 ohms with a mutual conductance now of 1·1, as against ·9 before. The P.M.1 H.L. is a general-purpose valve which was introduced a month or so ago and has an impedance of 18,500 ohms and an amplification factor of 28, while a newly-designed detector, P.M.2 DX, has been placed on the market with improved characteristics and a filament consumption of ·1 of an amp.

Two-volt power valves which "P.W." readers will find very useful are the Mullard P.M.2A, which has an impedance of 3,600 ohms and an amplification factor of 12·5, and the P.M.202, which has an impedance of only 2,000 ohms and an amplification factor of 7, bringing the slope to 3·5 milliamps per volt.

The P.M.252, an old favourite, has been redesigned, and now appears with an impedance of 1,900 ohms and an amplification factor of 7, giving a mutual conductance of 3·7; these are remarkable figures and will make a tremendous difference to two-volt valve set owners.

Now let us come to the Osram releases; here we find quite a number of two-volt valves which have been introduced during the last year or which made their first appearance at the Exhibition. First amongst these is the S.22, which readers of "P.W." will notice has often been used in our recently-designed sets, and with extremely good results.

With or Without Grid Bias.

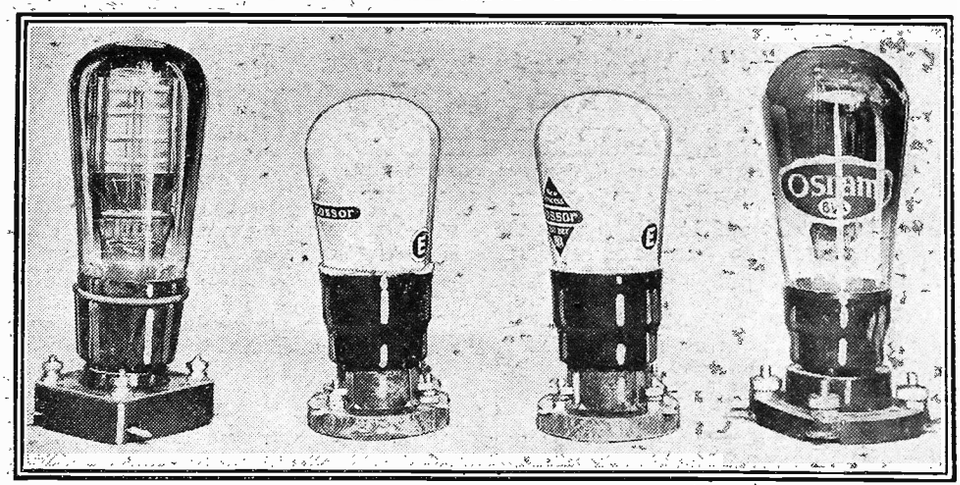
It is a two-volt S.G. valve having an unusually steep slope, the actual figure being 1·75 milliamp per volt. The impedance is 200,000 ohms and the amplification factor 350, and the valve is designed to operate, if desired, with no negative grid bias, though it usually is better to apply 1·5 volts.

The average anode current at 120 to 150 volts with a bias of 1·5, which is the usual figure to employ for this valve for best results, is 1·5, while the screening current is about 1·6. With no bias at all the makers' figures show the anode current increases to 4 milliamps; so it is obviously a great economy to use bias with this valve.

Another new screened-grid valve is the S.21, having a mutual conductance of 1·1, with the same impedance as the S.22. It has been placed on the market specially for

(*Continued on next page.*)

DO YOU USE ANY OF THESE?



A group of two-volters that are earning widespread popularity. They are from the Lissen, Cossor, and Osram factories.

NEW BATTERY VALVES.

(Continued from previous page.)

use where two or more S.G. stages are employed, and it is claimed that with the use of this valve cross modulation can be very largely avoided.

The H.2, a high magnification detector that made its appearance not very long ago, and has an impedance of 35,000 ohms and an amplification factor of 35, is a useful valve; while the H.L.2, with its impedance of 18,000 ohms and its amplification factor of 27, is an even more useful detector than the H.2.

Two Economical Power Valves.

Going on towards the power and super-power types, we come to the L.P.2, which has been out for some time but is nevertheless worthy of mention here. It has an impedance of 3,900 ohms and a mutual conductance of 3·85, while the P.2—its larger brother, so to speak—has a mutual conductance of 3·5 and an impedance of 2,150 ohms. This latter is an extremely useful loudspeaker valve, and at 125 volts anode potential the average anode current varies between 10 and 14 milliamps as the grid bias is varied between 9 and 10½ volts, the limits advised by the makers.

Another Useful Pentode.

Then, again, I must not forget the PT.2, a pentode valve having a particularly low anode current, the latter being only 7 milliamps at 120 volts. This valve has been designed for sets employing only one stage of L.F. amplification, for it is extremely sensitive to weak signals and has, of course, a rather restricted grid swing.

The D.G.2 (double-grid valve) really ought to be placed in a class by itself, for it has been designed and brought out by many manufacturers, including Osram, Marconi, Mullard, Cossors, Six-Sixty, Tungsram, etc., especially to act as the frequency changer in super-heterodyne circuits. Readers will remember the famous "P.W." "Super Quad" uses a double-grid valve as a mixer valve, with particularly fine results.

It can be used as an amplifier, however, though as such it is rather heavy on anode current. For instance, with anode volts of 15 to 25 and the inner grid volts at 20, and the recommended bias of —3 or —4½ volts, the *inner grid* current comes to something like 11 milliamps, while the average *anode current* is only 1·2 to 2 milliamps.

Among the Cossor battery valves which have made their appearance during the last few weeks, the metallised detectors are particularly interesting, and these in conjunction with the already popular metallised S.G.'s, are very useful.

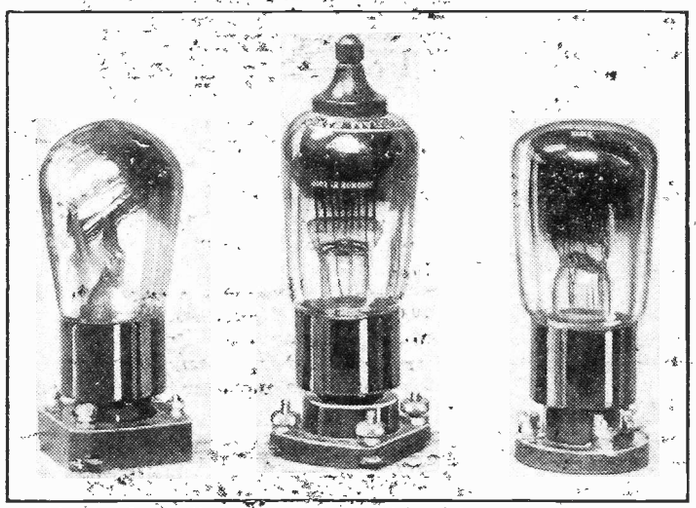
The New "Double-Grider."

The large range of Six-Sixty valves has been made still larger by the addition of several interesting newcomers, among which some fine output valves will be of special interest to POPULAR WIRELESS readers.

The double-grid valve, of course, figures in the S.S. list, as does a new special detector with improved characteristics.

I have recently had in for test a batch of Tungsram valves, whose barium filaments are famous throughout the Continent and are rapidly gaining favour in this country. Among these there is the new screened grid valve, which has particularly interesting characteristics, the impedance being 430,000 ohms, while the magnification factor is 300. Most of the new valves in this make have been introduced in the mains section, and there is nothing very much to any about the two-volters, though perhaps a few details of the main two-volt valves will be of interest as, though low in price, these valves are very efficient.

SENSITIVE AND SURE AMPLIFIERS



This photograph shows a group of Tungsram valves, including the new Tungsram S.G. amplifier.

For Detection.

The best detector is undoubtedly the P.D.220 in the two-volt class. This is followed very closely by the L.210. This latter valve also makes an excellent two-volt L.F. valve, while in the four-volt L.F. series the recommended type is the G.409. Of the power valves the P.215 and the P.220 are available, while in the super-power class the S.P.230 is a remarkably good valve for two volts working, and the P.414 in the four is to be recommended.

There is also a new valve (P.460) on a par with the famous P.X.4, giving an undistorted output of over two watts. It takes ·6 amp., and while it can be used with a four-volt accumulator it is more especially designed for use as a directly-heated A.C. valve. There are several interesting specimens in the six-volt range of the Tungsram type, though there are no H.F. types in this class.

Additions to Other Ranges.

Dario valves are also going ahead, and several new ones have made their appearance, notably some very steep-slope valves that give excellent results.

Three more Eta battery valves have been added to the well-known range, two being of the H.L. detector type and the other a super-power.

The first two are the B.Y.1210 and B.Y.2020, with amplification factors of 12 and 20 respectively, and impedances of 10,000 ohms and 20,000 ohms.

The third valve is the B.X.604, having an amplification factor of 6 and an impedance of 4,000 ohms. Sold at 8/-, it makes a very attractive super-power, especially as it takes quite a reasonable anode current.

CAPT. ECKERSLEY EXPLAINS

Some further light on an answer given in his Query Corner.

To the Editor "POPULAR WIRELESS."

Dear Sir,—I have been guilty of misleading B.R. of Chelmsford on the question of the connection to be adopted when using D.C. mains for high-tension supply of wireless sets.

B.R. asked me was it safe to connect his filaments to earth if the negative of supply was earthed? I replied: "Yes, it was safe provided the negative remained earthed."

So far I was perfectly right and I was at pains to point out that if the supply company started to unearth the negative and earth either of the other conductors, leaving the neutral in the air, then short circuits would occur. Where I misled your correspondent was in making him think that the supply companies having once earthed the negative would never earth the others.

Possibility of Alterations.

Apparently, however, it is the custom of supply companies to do just this thing, and of course in doing this anyone with a wireless set and without a condenser in the earth lead is liable to short-circuit the mains.

Secondly, the I.E.E. lays down regulations to say that whatever conductor is earthed there must be a condenser in the earth lead. I answered a specific question, however, of B.R. of Chelmsford, and answered it really accurately, but I am afraid so accurately that in the upshot it was misleading.

It would, I think, be advisable, in the general interest, to give this letter prominence, in order that all those who are intending to use D.C. mains should be aware that it is against the law to use the mains for high-tension unless the filaments of the set are connected to earth through a condenser which, of course, must be built to withstand the maximum pressure between any one conductor and earth. 250 volts would surely be sufficient.

"Thanks"——To Two Readers.

I must apologise to B.R. of Chelmsford, and to others who may have been misled, although I must point out that my answer was substantially accurate.

May I also take this opportunity of thanking two gentlemen who have written to me pointing out the misconceptions that might arise by a too literal interpretation of my answer, namely Mr. H. J. Henwood of Ilford and Mr. E. H. Skinner of Beckenham.

Yours faithfully,

P. P. Eckersley.

A Valveless Amplifier!

—well-known inventor's brilliant achievement

The "Microbox" is one of the latest inventions of Mr. S. G. Brown, F.R.S., inventor of the very first loudspeaker, and a host of other devices, including the already famous Battery Superseder, which he introduced at this year's Radio Show. The "Microbox" is no bigger than the ordinary pick-up, yet it is a self-contained amplifier producing all the volume and rich tone of an expensive multi-valve reproducer. All you have to do is to change your present gramophone tone-arm and sound-box for the "Microbox" and connect it up to your loudspeaker. The little power required (10 volts at ½ amp.) can easily be supplied by a small accumulator. The only other component required—a transformer—is supplied with the "Microbox." The price of the two complete is 3 gns.

The MICROBOX combines pick-up and amplifier on the microphone principle. Price (with transformer) **3** Gns. (or 9 payments of 8/6).

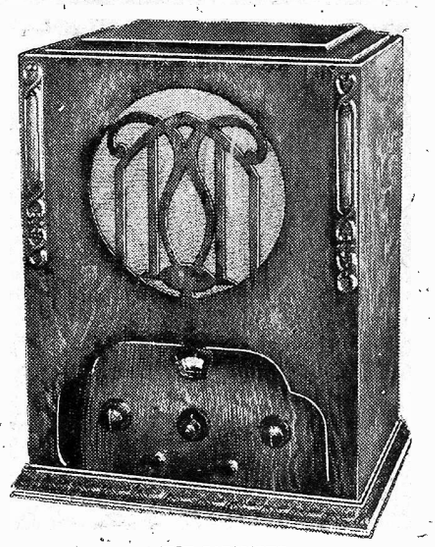
Mains unit. A.C. £3/15/0. D.C. £3/3/0.

Is yours a popular 'kit'?

—if so, here's something to interest you!

Excellent idea—the Kit. But not quite perfect unless you get a speaker worthy of the set, and a hiding place for your batteries. Well, you can get both in an S. G. Brown Kit-Cabinet Speaker. These S. G. Brown KIT-CABINET SPEAKERS are definitely built to save you time and trouble—and money. Scarcely worth while to make your own when you can walk away with one of ours having spent so little.

They are priced from only 39/6. (See photograph and full description on right.)



KIT-CABINETS.

MODEL 1. For Mullard 1932 3-valve Kit or Radio for the Million V.3 Kit (incorporates S. G. Brown SOLO Speaker). Price **47/6** (or 6 monthly payments of 10/-).

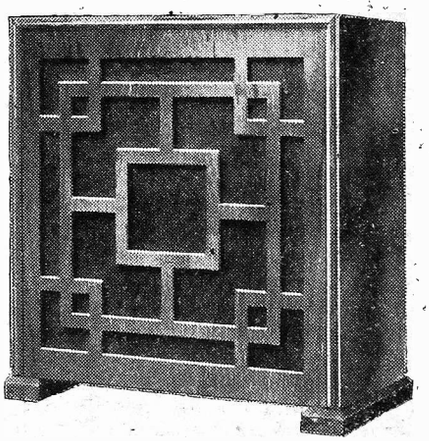
MODEL 2. Stand-on KIT-CAB. for 1932 Melody Maker, Osram 1932 Music Magnet, etc. Price (with Brown SOLO Speaker), 39/6 (or 6 monthly payments of 8/-.)

Is your set 'muffled' by your loudspeaker?

—ten to one you'll answer 'No'—but are you sure?

Improvements in loudspeaker design have recently been so rapid that speakers which were the last word three years ago sound amazingly inefficient when heard beside such speakers as the new S. G. Brown permanent magnet moving coil (which costs only £4/7/6). Nine people out of every ten "muffle" perfectly good sets with old-fashioned speakers—and don't realise it. Are you quite sure you are not one of them? Go to your dealer and hear the new S. G. Brown Speakers for yourself. You'll know then whether you are doing your set justice, or not.

Send to 19 Mortimer Street, W.1, for free leaflet describing the FAITHFUL MODELS MADE BY



S. G. BROWN PERMANENT MAGNET MOVING COIL UNIT costs £4/7/6. Complete with handsome cabinet shown it costs **£4/19/6** (or 8 monthly payments of 13/6).

Yours faithfully

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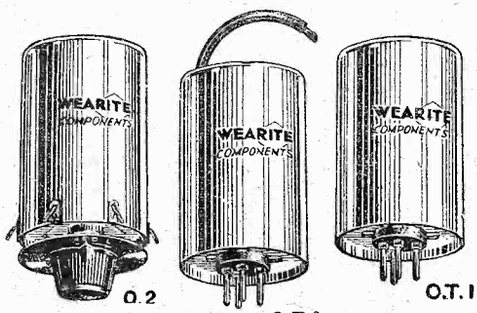

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Price, per set of three **37/6**

"WEARITE" H.F. CHOKE

A first-class component with a very fine performance. It covers efficiently the remarkable range from 10 to 2,000 metres without any marked resonances. Self-capacity very low.

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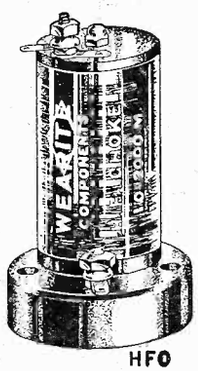

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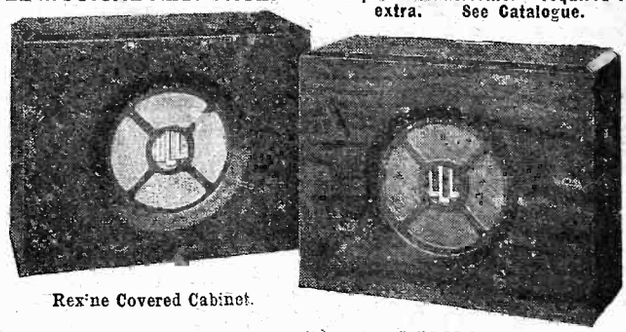

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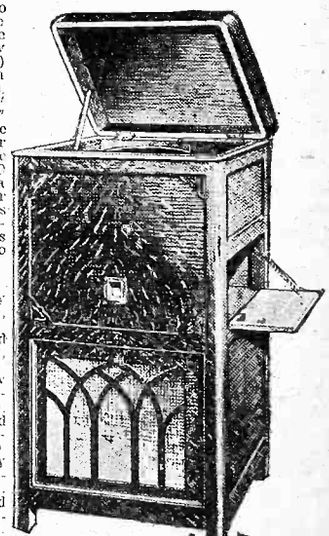

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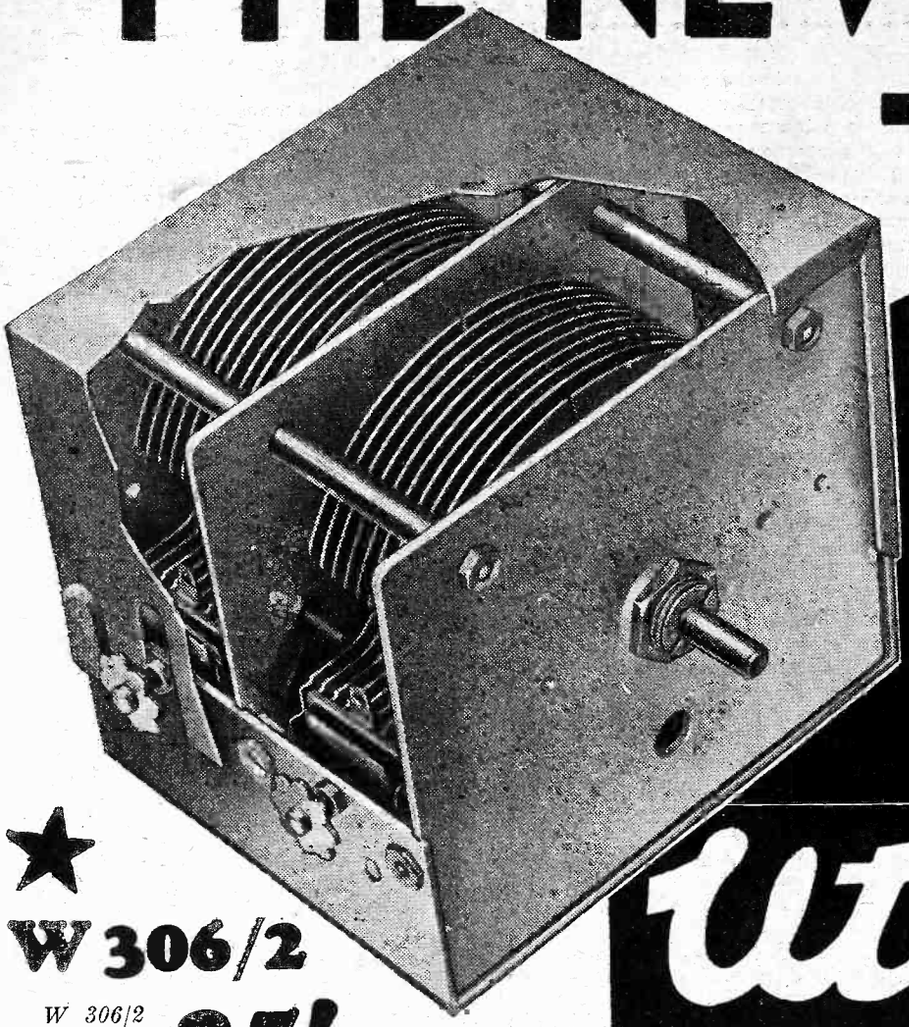
THE NEW B.P. THREE



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Again "Popular Wireless" designers have specified 'Utility' Condensers, this time for the B.P. Three. For this fine 3-valve set the choice is Utility W 306/2, our very latest fully-screened condenser complete with trimmers.

This new condenser is so accurately made and adjusted that it is balanced within one half of one per cent. Never before has a British-made condenser with such a high efficiency ratio been available to the amateur, and he is now assured of the accurate hair-splitting tuning which is imperative if he wishes to get the utmost from his circuit.

Remember then to insist on the new Utility complete with Disc Dial, the dial specially made for it.

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RECORD BUSINESS AT OLYMPIA

Huge orders for Sets and Components were placed at the National Radio Exhibition, all previous records being broken.

BUSINESS at the Radio Exhibition at Olympia this year broke all records.

If only other industries could do as well as the radio industry! Let's hope they will! Radio manufacturers have certainly every reason to be well pleased with themselves, for it is estimated that there will be an increase of at least ten million pounds in business done over last year.

One Million Sets!

Orders have been placed for one million wireless sets valued at £10,000,000, as against 649,100 sets last year, when the value was £7,000,000.

Huge orders for valves have also been taken. The figure this year is 8,000,000, to a value of £3,500,000, compared with 5,321,800 valves valued at £2,600,000 last year.

Batteries also have been in very heavy demand. Orders for ten million, representing £4,000,000, have been taken, an increase of one and a half million batteries, and £600,000 over last year's figures.

It is estimated that at least £10,000,000 has been spent on components, and an extra £1,000,000 on additional apparatus, such as Home talkies.

"The results of our Show at Olympia are very encouraging," declared one prominent manufacturer to me after the Exhibition had closed. "It means that thousands of workers throughout the country are going to reap a rich harvest during the coming year.

Passed All Expectations.

"This Exhibition has certainly done the whole trade an enormous amount of good."

"It has been the most successful radio show ever held in this country," Mr. R. M. Ellis, chairman of the Radio Manufacturers' Association, told me.

"At my own stand we took record orders, one being for 3,000 all-electric 4-valve and 3-valve sets and another for 2,500. The number of sets and accessories sold has exceeded all expectations."

Here are a few reports I gathered from some of the leading exhibitors.

Columbia: Thirty per cent up on last year; 200 sets sold in a day.

Igranic: Fifty per cent better.

Marconiphone: If sales continue at the same rate until the end of the show we shall have done three times as much business as we did last year.

Exide: We are looking forward to the season with unquenchable optimism.

Cossor: Sales are far ahead of last year.

A fleet of 300 motor-lorries left Olympia at midnight on the closing night of the Exhibition conveying the Exhibition in its entirety to the City Hall, Manchester.

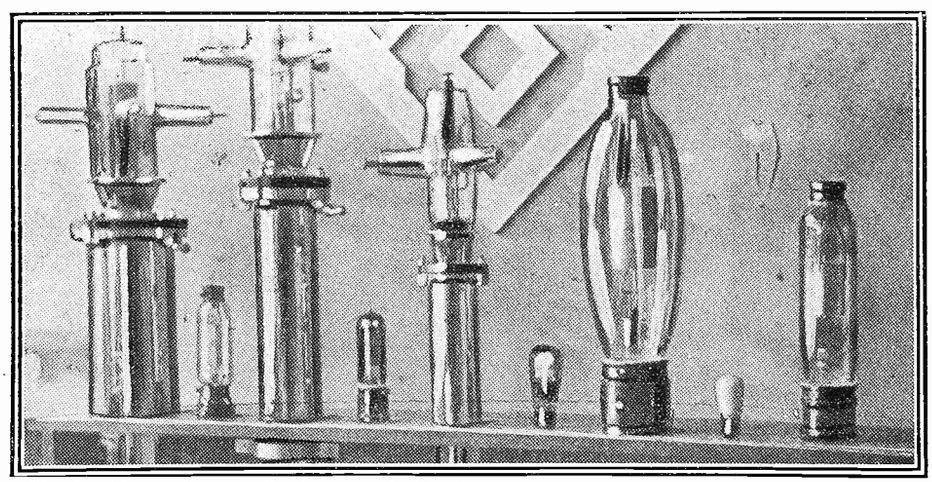
A "Boom" Year.

Every record has been broken at Olympia this year. The attendance has been 50,000 in advance of last year, and the average increase of business done is 50 per cent more than last year.

It would certainly seem that this will be a boom year for radio. The interesting thing is that year by year the demand for radio sets increases, and year by year technical progrces is made.

Competition comes chiefly from the United States. The British public has been attracted by offers of 7- and 9-valve sets at prices which apply to smaller sets made in this country, and inexperienced people who like a lot for their money have not troubled to enquire into the efficiency of the apparatus, which is the only test worth applying. It is stated in the trade that illegitimate competition from outside has been pursued also by pirating British patents. Patents are held by leading British firms covering practically the whole range of components. These patents have been pooled, and an important step has lately been taken for defending them against foreign exploitation, licences being limited to the British trade.

THE VALVES THEY USE IN GERMANY



The five bigger valves are the types used in the German broadcasting stations, while the four smaller ones are representative of those used in German receiving sets.

In connection with the new broadcast symposium, "The Changing World," which is scheduled for the winter and spring sessions, the B.B.C. has sent me five pamphlets, each dealing with one of the phases of life to be discussed.

B.B.C. Pamphlets.

The first of these, "Industry and Trade," is by Professor Henry Clay, formerly Professor of Social Economics at Manchester University, and is introductory to and explanatory of twenty-four talks on the subjects "How Wealth has Increased," "Why does Poverty Continue?" "How has Private Enterprise Adapted Itself?" and "How has the State met the Change?"

The pamphlet is comprehensive in scope, and is well illustrated by pictures of industry, and by graphs and statistical tables.

OUR NEW P.M.G.

Major Ormsby-Gore, the new Postmaster-General.

As an introduction to the twelve talks he is to deliver on "The New Spirit in Literature," Mr. Harold Nicolson has written an essay which is well worth the attention of the listener.

Professor H. Levy has written an essay, "Science in Perspective," which introduces twenty-four talks on this subject by Professor Julian Huxley, Dr. John Baker, Mr. Hilaire Belloc, Professor J. B. S. Haldane, Sir Oliver Lodge, and several other scientists. The pamphlets cover a good deal of ground, and the problems to be discussed are very clearly set out.

On Political Problems.

Another pamphlet is devoted to the political problems to be discussed by various speakers under the heading of "The Modern State." The explanatory pamphlet is by Mr. John A. Hobson.

Professor John Macmurray has written an essay on "Education and Leisure," as introductory to the twenty-four talks by Professor Macmurray, Professor J. Dover Wilson, Sir Percy Nunn, and Professor P. Delisle Burns.

All told, these pamphlets are well worth acquiring, and I advise readers to lose no time in writing to Savoy Hill for the complete series.

DX: 43 RADIO TIMES

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Conducted by

Every item's a better item if you've a Dryden

Relayed from ALL SAINTS', MARGARET STREET
Introduction and Passacaglia *Reger*

(*Note on page* 12)

Adagio ..... *Lemare*
Grand Chœur, Intermezzo, Finale (7th Sonata) *Guilmant*
Nocturne ..... *Bonnet*
Minuet Scherzo ..... *Jongen*
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Directed by GEORGES H

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Relayed fro
THE BOURN
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Allegro ; Allegro ;

Time Signal, Greenwich, at

6.45 REGINALD NEW
At THE ORGAN of THE BEAUFORT CINEMA
Relayed from WASHWOOD HEATH, BIRMINGHAM
Coronation March, The Prophet ..... *Meyerbeer*
Selection, The Desert Song ..... *Romberg*
Sanctuary of the Heart ..... *Ketelbey*
Introduction, Act III, Lohengrin ..... *Wagner*

5.15 The Children's Hour

7.30 A RECITAL OF GRAMOPHON
By CHRISTOPHER STO
ECHOES OF OPERETT

8.0 A Second Helping of

★ **Makers of the world famous Exide offer greatest dry battery value**

Obtainable everywhere from all good dealers in sizes and types to suit every wireless set. Also for torches, pocket lamps, cycle lamps and bells.

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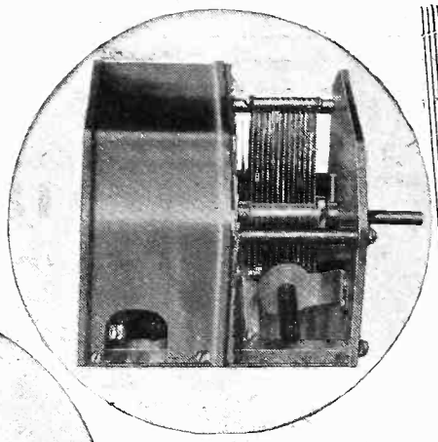
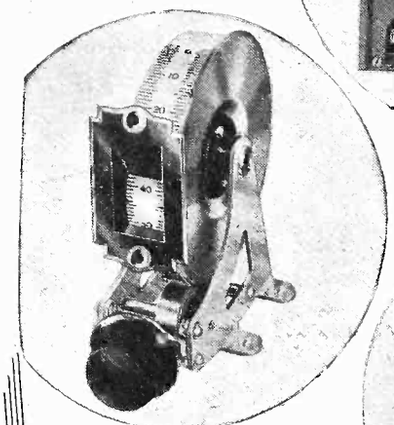
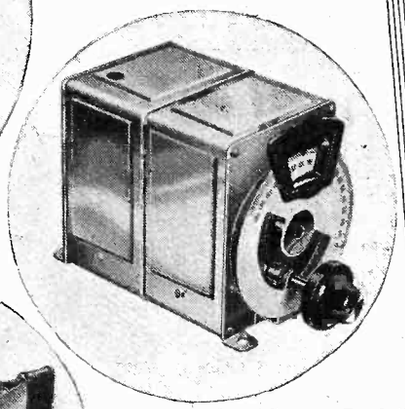


J.B. DREADNOUGHT (·0005) 2-gang, 20/-; 3-gang, 29/6.

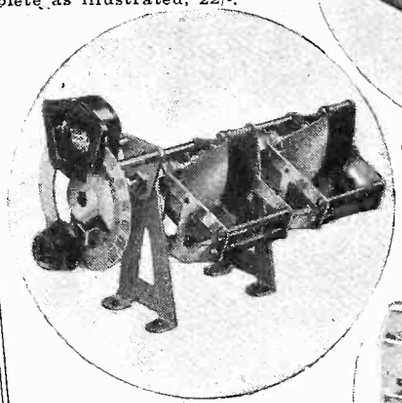
BASEBOARD DRUM DIAL, 4" Drum. Ratio 16-1. 7/6.



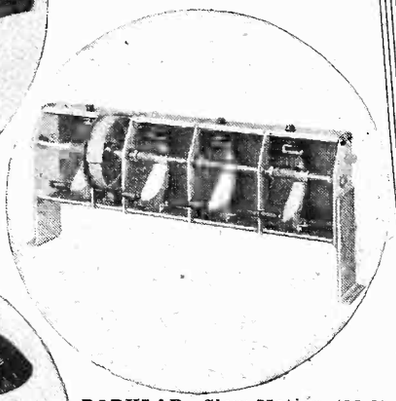
TYPE RM SCREENED 2-GANG (·0005) for V3 Kit Set, complete as illustrated, 22/-.



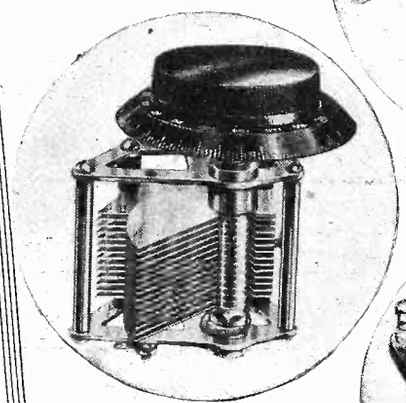
TYPE U.20 for "Square Peak" Coils, 24/-.
TYPE U.30 (3-gang), 34/6.



J.B. CHASSIMOUNT, 2, 3, 4, 5 or 6 stage. Prices from 15/-.

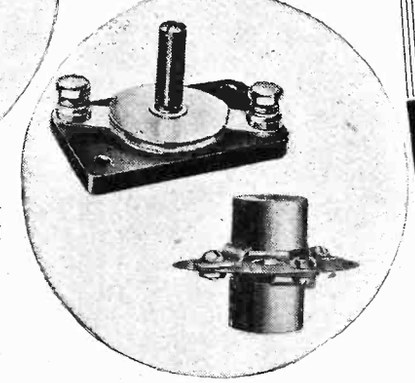


POPULAR. Slow Motion (35-1) as illustrated, 8/6. Plain type, 6/-. 4" dial, 1/6 extra.



BASEBOARD TRIMMING CONDENSER. Ebonite Base. Mica insulation. ·00005 and ·0001, 1/- each.

GANG COUPLING DEVICE. Gangs two condensers while insulating rotors. 9d.



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J.B. leave nothing to chance. Laboratory research is followed by exhaustive testing. The J.B. standard of achievement is high, and no J.B. Condenser or Dial is ever introduced until it satisfies this exacting standard. Add excellence of materials and workmanship, and you will see why, since the earliest days of broadcasting, home constructors and manufacturers have used J.B. consistently and in increasing numbers.

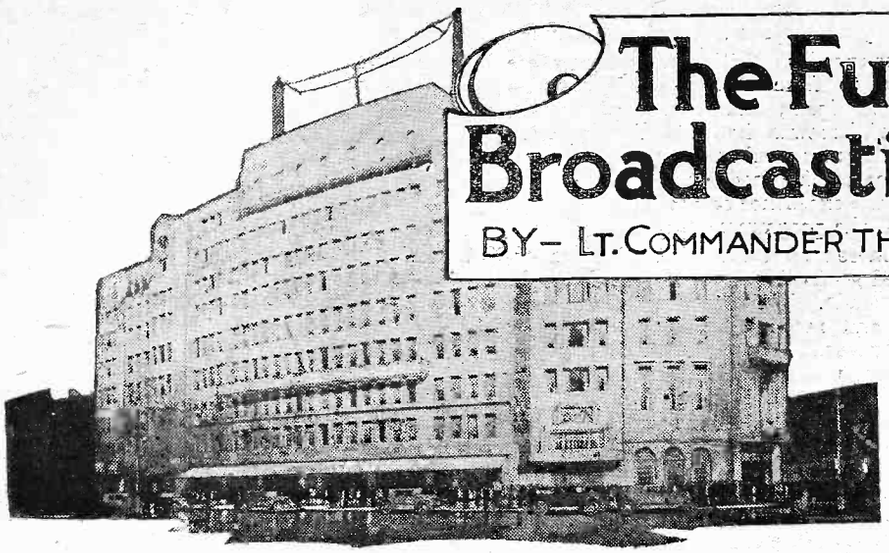
See these J.B. Precision Instruments at your dealers, or write for the new J.B. catalogue, which gives full particulars.

JB

REG TRADE MARK

PRECISION INSTRUMENTS

Advertisement of Jackson Brothers, 72, St. Thomas' Street, London, S.E.1. Telephone: Hop 1837.



The Future of Broadcasting in Britain

BY—LT. COMMANDER THE HON: J. M. KENWORTHY *RN., M.P.*

The problem facing the B.B.C. is very much the same problem that faces the householder—how best to make both ends meet! And here are some very practical if somewhat surprising suggestions by a recognised authority.

IT would have been strange if, in the new financial situation, the B.B.C. had remained unaffected. After balancing the Budget the present Government was at its wits' end for money, and here was a nest-egg in the listeners' licences that even the present Chancellor of the Exchequer could not overlook.

Mr. Snowden made a hard fight to retain the £17,000 a year for Grand Opera subsidy, and succeeded; but he has had to raid the listening public for general revenue.

The May Committee on Economy, going right outside its terms of reference, made some suggestions for raising money in this way. Their crude proposal was that the B.B.C. should hand over £400,000 of capital at once.

The Post-Office "Rake Off."

This was rather too "steep," however, and I am glad it was successfully resisted by the Corporation. The financial bargain struck is that the B.B.C. hands over an additional £50,000 of its revenue this year, and will be mulcted of another £150,000 next year.

It must be remembered that this is on top of the very heavy tribute already paid to the Exchequer for a number of years. This year the amount received by the Exchequer from broadcasting will be £646,166 out of a total licence revenue of £2,050,000.

Next year the Treasury will net £775,000 out of an estimated revenue from listeners of £2,250,000. But this is only an estimate, and if the extra impost means a falling off in the programmes, to which possibility I shall return presently, some listeners may give up paying their licences and the anticipated amount may not be realised. In addition, the Post Office takes the ridiculously large commission of ten per cent for the cost of collection.

Cuts in Staff Salaries.

In any case the Treasury will take £1,000,000 from the B.B.C. next year. In his statement in the House of Commons the Chancellor of the Exchequer said it was hoped there would be no falling off in the quality of the programmes, but that sacrifices were to be made by the staff of the B.B.C. There are apparently to be dismissals, cutting down salaries and so on.

Everyone will sympathise with the unfortunate members of the staff, especially as there is bound to be a slight rise in the cost of living owing to the country coming off the gold standard; and no doubt many of the persons concerned will be hard hit.

One of the economies that might well be made would be to drop the special B.B.C. orchestra. Sir Hamilton Harty and other prominent musicians have criticised the maintenance of a permanent orchestra and consider that the money would be better spent by engaging first-rate artists, bands, etc., and paying them adequate fees.

Now the B.B.C. has undoubtedly shown a patriotic attitude in making a voluntary offer to the Treasury, and this has been accepted. But the new situation raises the whole question of the future of broadcasting in Great Britain.

This rapidly developing service needs considerable and continuing capital expenditure if it is to keep up to date and take advantage of modern inventions and discoveries. We cannot afford to lag behind other countries in technical efficiency here;

THE AUTHOR

Lt.-Comdr. The Hon. J. M. Kenworthy, M.P., has always been specially interested in radio, and the wider policies that govern its development.

and neither would this be fair to the listening public.

We should, therefore, seriously consider whether there should not be some modification of the original policy of treating the B.B.C. as a purely public Corporation and of denying them all sources of revenue except the proceeds of wireless licences.

The American System.

In other words, cannot we strike a happy mean between the present system, which will be shaken by the new financial conditions imposed, and the American system where there is no revenue from licences but a very handsome income made by the broadcasting companies in the United States by entirely different methods? In other words, why not "sell the air," or a part of it, and combine the two systems.

Now a word as to the American system. Broadcasting in the U.S.A. relies on three sources of revenue. The ether is leased to advertisers. As few people will listen to straight advertising by itself on the wireless, the great firms using this medium must provide first-class entertainment to which people *will* listen, and a short talk is interposed.

This talk is straight advertising publicity.

Then the advertisers must use the Radio Corporations as their agents for engaging artists, bands, etc., and they pay a commission for their service; and, thirdly, the artists themselves pay a commission on their fees to the Radio Corporations.

We must, of course, make allowances for different national outlooks. The Americans will stand more straightforward advertising than the British people. But it is easy to exaggerate this difference.

Artistic Advertising.

No one in this country objects to advertising that is artistic and pleasing, indeed rather the other way about. For example, really beautiful posters have been appearing on our hoardings lately.

Many people realise that they brighten the drab streets of our industrial cities. I I would draw attention also to the advertisements and posters of the Empire Marketing Board.

These are straight advertising of Empire goods; but many of them are beautiful, others are instructive, and I have never heard any objection taken to them by anyone.

Again, advertising in some of our high-class weekly illustrated papers has reached a very high plane of artistic merit.

In the United States the most famous of

(*Continued on next page.*)

THE FUTURE OF BROADCASTING IN ENGLAND.

(*Continued from previous page.*)

the radio orchestras is the "Lucky Strike" Band. This is to advertise an immensely popular brand of cigarettes, and the manufacturers have engaged what is undoubtedly the finest dance band in the world.

Source of Great Revenue.

The B.B.C. could not possibly pay for such a band without additional aid. The American public, and indeed anyone else within radio distance of it, cannot help listening; and then there is a few minutes talk about the cigarettes.

Now why in this country should not a very great source of revenue be tapped by letting out the ether for a part of the time to great commercial houses on the American system? In their own interests the advertisers would not annoy the listening public by too much advertising boost, and they would be bound, also in their own interests, to keep the quality of the programmes very high indeed.

The Midland Regional station might well be used for this purpose. And it is not only a question of the provision of really first-class orchestras and dance bands; but also of the obtaining of the services of great artists who, as things are, would demand fees, and quite naturally so, outside the capabilities of the B.B.C., under the new financial conditions, to pay.

The great singers, Galli-Curci and Chaliapine; the violinists of the rank of Kubelik and Heifetz; Moiseivitch, the pianist, come to my mind.

Why Not Try It?

There is no reason why they should not perform for some great British firm, taking a fee for so doing, as in the Albert Hall or Covent Garden Opera House. The only difference would be that their art would be available for the whole population of these islands. In any case the B.B.C. now is not giving a full alternative programme, owing, no doubt, to the heavy drain on their fees made by successive Chancellors of the Exchequer.

The very idea of letting out the ether in this way for advertising purposes will shock the super-sensitive; but we are living in abnormal times. And there is this to be remembered also. English is very rapidly becoming the universal language, especially on the continent of Europe.

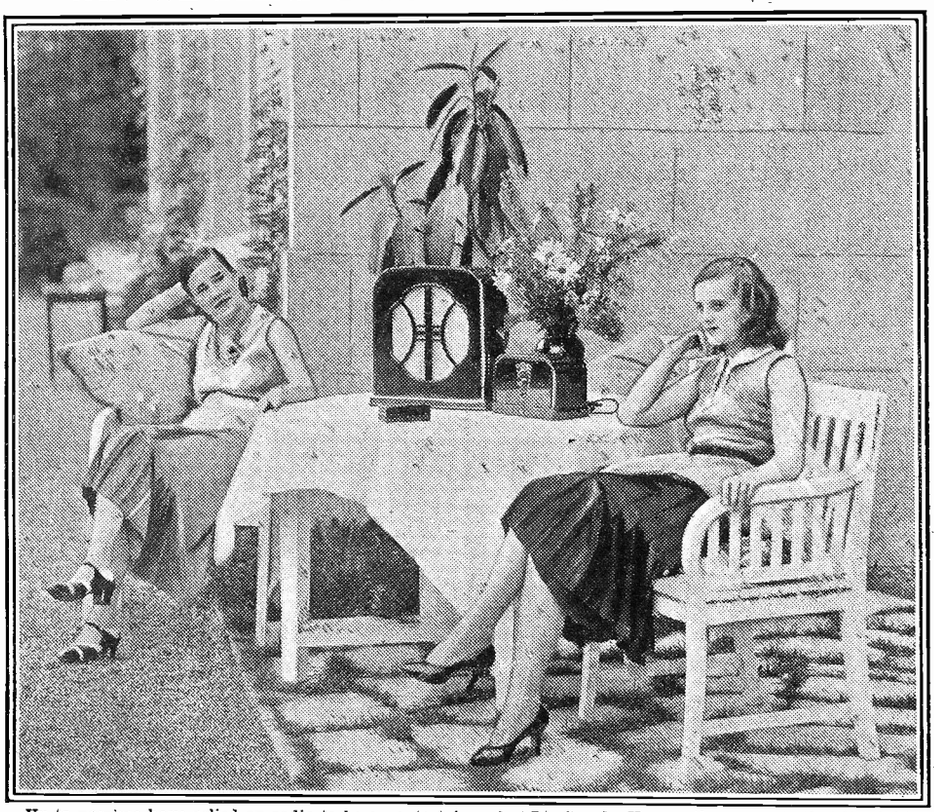
Super-excellent British programmes are listened to from Bergen in Norway to Seville in Spain; and from Calais on the West to Warsaw in the East. A great many of the listeners would understand the short reference to the goods in the English language, the excellence and sale of which had enabled the programmes to be paid for.

The more we can advertise British manufactured goods the more we shall help the export trade. While if some of our great stores and multiple shops advertised in this way we might attract additional visitors and buyers to this country and help the tourist and hotel industry.

In any case, why should not this experiment be tried? If it were a failure, no one would be any the worse; though I don't think for a moment it would be a failure. It would mean some alteration in the B.B.C.'s charter; but I do not believe Parliament would object, under all the circumstances, if the situation were properly explained.

What I suggest is that we should avoid complete commercialisation, as in the United States; and, while keeping the B.B.C. a public Corporation, with the services of the public as its first and chief object, we should, at the same time, be able to draw a substantial revenue, which I know is only waiting the opportunity to be spent in the way I have suggested and described.

CAN WE BLEND BUSINESS WITH BROADCASTING?



Up to now we have relied on radio to be an entertainer, but Lt.-Comdr. Kenworthy suggests that it might do a little salesmanship as well. Would the ladies like to hear, by wireless, of the latest bargains?

YOU WILL MEET "D.R." NEXT WEEK

TIPS FOR CONSTRUCTORS

A tip which sometimes helps in getting rid of H.F. from the L.F. stages is to connect the moving vanes of a differential reaction condenser to filament, and each set of the fixed vanes to different ends of the high-frequency choke, adjusting the position of the moving vanes to give the required result when setting for the first time.

* *

Do not run a long lead to an H.F. grid-bias battery, but use one of the special small cells which can be placed in close proximity to the S.G. valve.

* *

A discarded three-point wave-change switch can easily be fitted up in place of the ordinary on-off switch, with the additional advantage that its third contact can be arranged to break the H.T. circuit as well.

* * *

If you have a spare H.F. choke in the junk box remember it often happens that when connected in series with the primary of an L.F. transformer both quality and reaction effects are improved.

* * *

Use a hacksaw for cutting ebonite, and remember that the finer its teeth the less the smoothing up that you will have to do after.

"LINEN" LOUDSPEAKER DIAPHRAGMS

The Editor,
POPULAR WIRELESS.

Dear Sir,—As a considerable amount of publicity is given from time to time in wireless papers regarding the making of linen diaphragm loudspeaker units, I hasten to advise you of a matter which has a very important bearing on this subject.

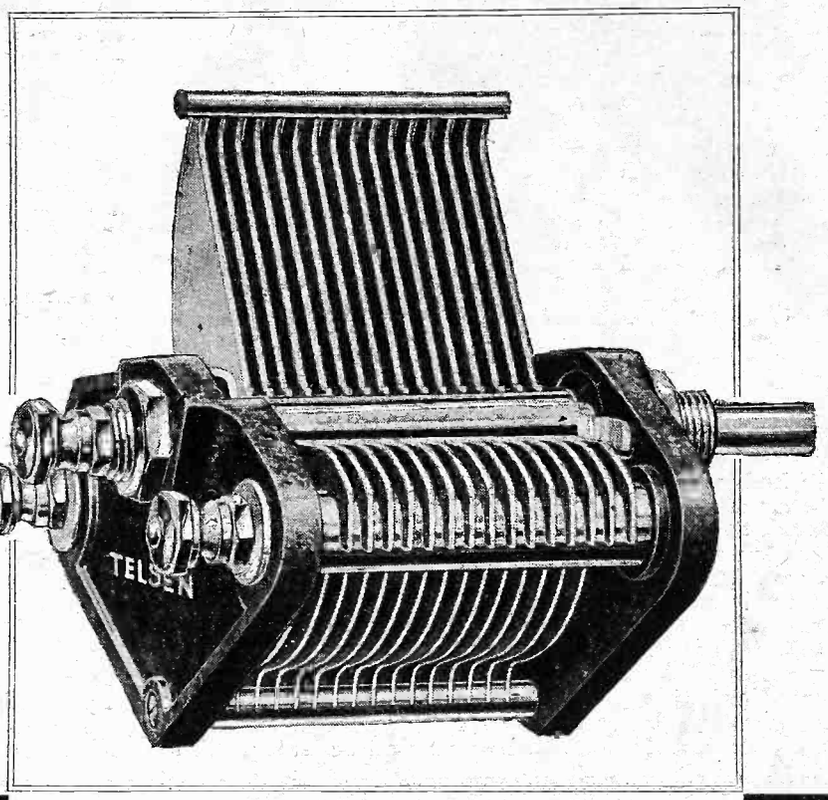
A few weeks ago there was brought to my notice a sample of material which was being sold as "doped" linen, for use in the construction of a linen diaphragm speaker, and as I was not satisfied with the texture of the sample, I had a test made and discovered that it was an all-cotton fabric. I immediately took the matter up with the firm selling the material, and received, in reply, an unconditional apology and a promise to discontinue advertising the fabric as "linen."

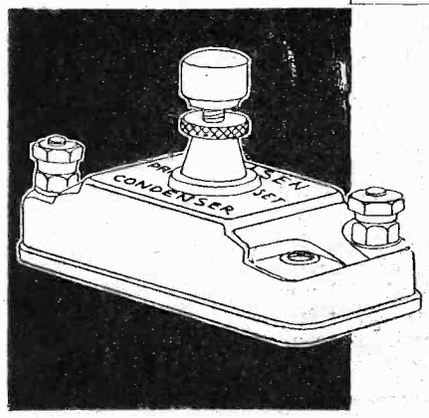
The firm in question intimated that they were innocent of any intent to misrepresent their wares, and that they merely referred to the material "in a wireless term," but I should point out that to sell an all-cotton fabric or material other than a flax product as linen in any circumstances would constitute misrepresentation within in the meaning of the Merchandise Marks Act, and my Association is prepared to institute proceedings against any person or persons guilty of this offence.

I would appreciate your assistance in the matter of giving this letter publicity in POPULAR WIRELESS and allied publications.

Yours faithfully,
G. A. E. ROBERTS,
Secretary and Inspector.
7, Donegall Square West, Belfast.

TELSEN VARIABLE CONDENSERS

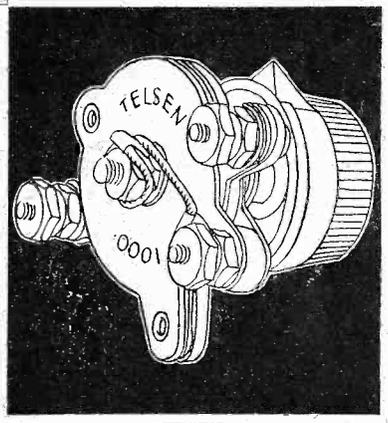




TELSEN LOGARITHMIC VARIABLE CONDENSERS

The Telsen Logarithmic Variable Condenser is of robust construction and high insulation. The H.F. losses are very low and the frame is braced at three points, so that the possibility of distortion and short-circuiting is negligible. Substantial terminals are provided with alternative connection to the stator.

Telsen Logarithmic Variable Condenser—
Made in capacities of ·0005, ·00035, ·00025 .. .. Price 4/6



TELSEN PRE-SET CONDENSERS

These Condensers have been carefully designed to give proper separation of vanes when the adjustment is unscrewed, which results in a very low minimum capacity, giving a wide range of selectivity adjustment when used in the aerial circuit.

Telsen Pre-Set Condenser—

Made in capacities of :

Maximum capacity		Minimum capacity	
·002	....	·00025	Price 1/6
·001	....	·00004	Price 1/6
·0003	....	·000005	Price 1/6
·0001	....	·000001	Price 1/6

TELSEN

THE SECRET OF PERFECT RADIO RECEPTION

Send for the "Telsen Radio Catalogue" and book of "All-Telsen Circuits" to—The Telsen Electric Co., Ltd., Aston, Birmingham.

TELSEN BAKELITE DIELECTRIC CONDENSERS

These Condensers are of a new and improved type, and of compact dimensions. The moving vanes are keyed on to the spindles so that they cannot be pushed out of line, and there is a definite stop at each end of the travel. The connection to rotor is made by means of a phosphor-bronze pigtail, so that there is no crackling due to rubbing contacts. The connection to the stator vanes is absolutely positive—a very important point.

Telsen Bakelite Dielectric Differential Condenser—
Made in capacities of ·0003, ·00015, ·0001 .. .. Price 2/-

Telsen Bakelite Dielectric Reaction Condenser
Made in capacities of ·0003, ·00015, ·0001 .. .. Price 2/-
Made in capacities of ·00075, ·0005 .. .. Price 2/6

Telsen Bakelite Dielectric Tuning Condenser—
Made in capacities of ·0005, ·0003 .. .. Price 2/-

CVS—58

STATIONS WORTH HEARING

Some practical distant-programme notes compiled by a special contributor who nightly searches the ether in order to obtain really up-to-the-minute information for "P.W." readers.

THE coming of those splendid autumn conditions for which all true wireless men long has been somewhat delayed this year. Or rather, perhaps, I should say that the progress towards first-rate conditions which began so promisingly suffered from setbacks of unusual severity and duration. At the end of September, for instance, we had a rather dreadful ten days during which atmospherics abounded and the receiving set seemed to have lost all its own life.

Not Up To Standard.

This was fortunately followed by a big improvement, but we are still rather behind the position in normal years. Genuine autumn conditions will probably come with a rush. One night we shall find stations pouring in at every division of the condenser dials.

A good many of our old friends are distinctly disappointing at the moment. On good nights they are very much there, but on bad nights it is often difficult to hear anything of them at all. I am referring to such stations as Vienna, Milan, Katowice, Lwow, Barcelona, Bordeaux, and Hamburg. All these should now be reliable, but for some reason or other they are not.

It is just this kind of thing, though, that makes wireless so interesting. There is far more pleasure in hunting down and working up to good loudspeaker volume a station that is on the weak side than there is in using the volume control to tone down a terrific transmission that simply finds itself.

One very promising sign is that apart from atmospherics there is a good deal less interference than there was on the medium wave-band. We are not nearly so much bothered as we used to be by spark signals, and I do not seem to notice the same amount of mush from big commercial stations. In the absence of background interference big amplification can be used successfully on weak signals, and you can give a sensitive set a real chance of showing what it can do.

Some Good "Goers."

Among the best medium-wave stations just now are Trieste, Horby, Gleiwitz, Heilsberg, Turin, Gothenburg, Brno, Lwow, Brussels No. 2, Toulouse, Frankfurt, Sottens, Beromunster, Rome, and Langenberg.

There are many others, too, which are worth trying for. You will probably not find them good on every night of the week, but given favourable conditions, the majority of them should be receivable. Here is a list worth noting: Leipzig, Grenoble, Bordeaux, Barcelona, Katowice, Berlin, Madrid, Stockholm, Lyons La Doua, Vienna, Prague, Sundsvall and Munich.

"Letting Loose" at Toulouse!

We shall soon be hearing a good deal more even than we do at present from our old friend, Radio Toulouse. He has just sent me particulars of the new station which is now nearing completion. Here is a problem for you to think over: If Toulouse, using 8 kilowatts, was one of the strongest European stations, what will he be like when he is putting 85 kilowatts into the aerial?

That is what he is going to do presently. The new station is at St. Agnan, about twenty miles from Toulouse itself. The two aerial masts are 120 metres in height and 200 metres apart.

A new system of modulation is to be used, which is described as being "of purity hitherto unknown." As the present Toulouse has frequently been heard on crystal sets in Northern Africa great things are expected of the new station, and regular reception in America is prophesied.

SHORT-WAVE NOTES

News and views regarding an exciting and fascinating wave-band.

By W. L. S.

AS a result of an accumulation of requests, from places as far apart as Bow and Burma, I am making for "P.W." a short-wave receiver of a type that has not, I believe, been too prominent in the past. I refer to a set intended essentially for short-wave broadcasting, and capable of operating a speaker at real "hefty" volume.

"Amateur-band" work will be neglected entirely, and the aim will be to cover the whole range of short waves with about three changes of tuning coils. The set will be an S.G.4, and, rather than talk now, I will go ahead with the work.

Well Done, "Plymouth."

My little log on W 2 X A D has prompted quite a number of readers to send in their own, which I much appreciate. Strangely enough—for I had not expected it—most of them tally quite closely with my own. Even in the wilds of Scotland W 2 X A D appears to be subject to the same changes that I log in the south.

The "prize" this week, however, must be awarded to W. H. R., of Plymouth, who writes a *nineteen-page letter* and includes a very fine log of W 2 X A D and W 2 X A F. I am keeping this for reference, since I myself did not log W 2 X A F to any great extent. On W 2 X A D, however, we agree quite well.

It is specially interesting to note that W. H. R.'s log, written up before my own appeared in print, also has a footnote to the effect that September 1st was the best day ever recorded for long-distance reception.

You may remember that I had to scrap my previous idea of 100 per cent on that night and call "X A D" 100 per cent *plus*. On that same night W. H. R. found W 8 X K coming in as early as 8.15 p.m., although he is usually absent until 9.30, or even later.

Last Sunday's "Thriller!"

The same gentleman was responsible for getting me out of bed very early last Sunday morning to hear V K 2 M E, and I did not regret it, cold and draughty though it was. From 6.30 a.m. till 8 o'clock I listened to him at a strength that surprised even a hardened case like myself. Will Australia on telephony ever cease to thrill us, I wonder; or shall we, in the days of inter-planetary working, looking back with scorn at the times when "Hearing Mars was thought to be wonderful?"

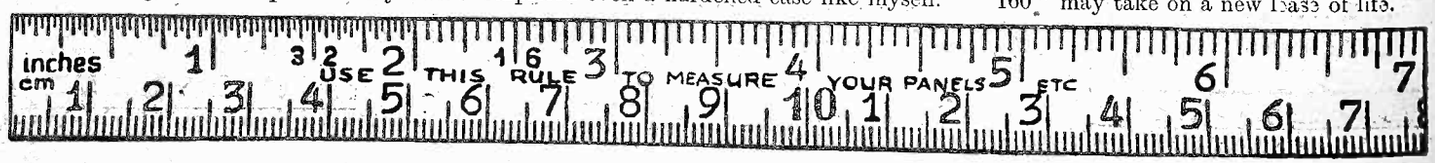
When you read this we shall be back on G.M.T. once more, and our ideas of times will have to be revised. I do not know whether W 2 X A D's schedule will have changed, but if it stands as at present he will, of course, be starting up at 8 p.m. instead of 9 p.m. Likewise we shall hear more of the 25-metre and 32-metre Americans on account of their starting an hour earlier by our time.

Don't Forget the "Hams."

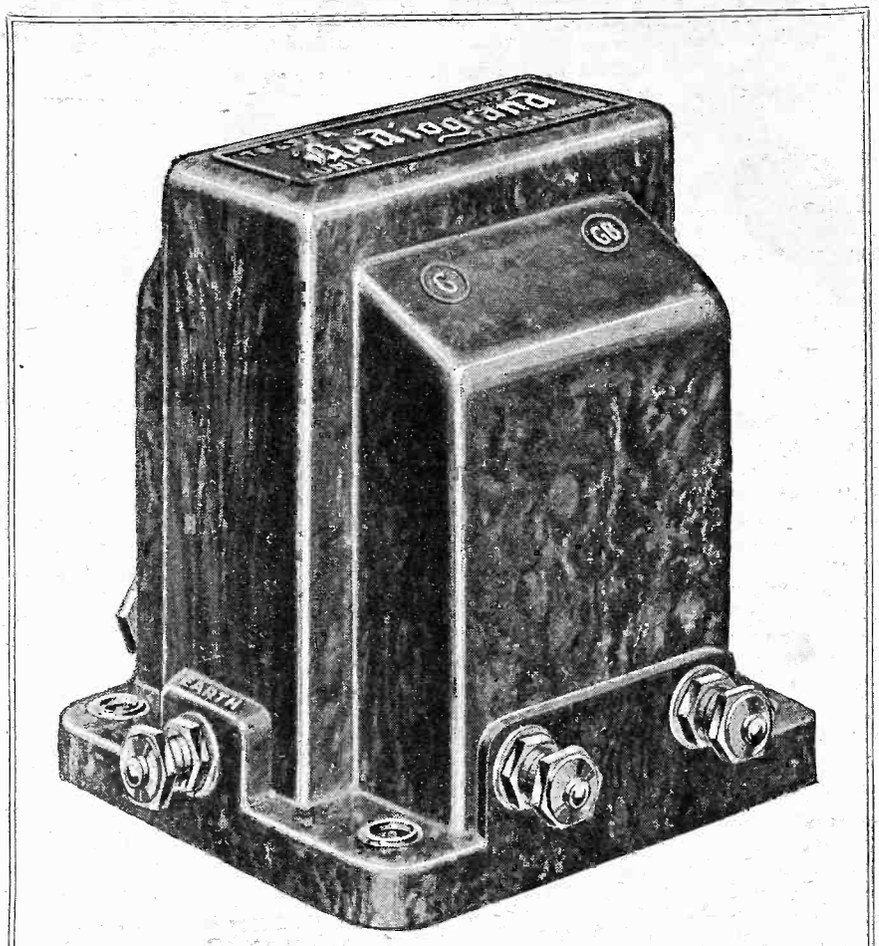
I seem to have been neglecting the "hams" of late in these notes. Do not think from this that I have forgotten them, or that they are inactive. Far from it.

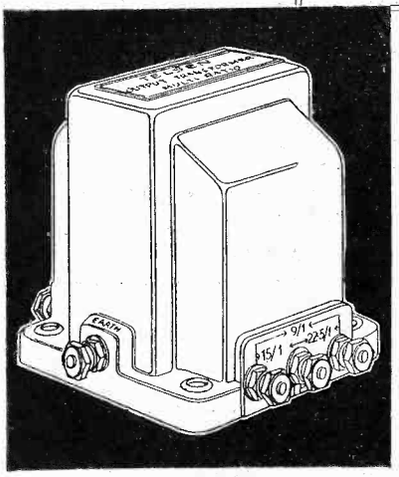
It is natural, however, that a certain lack of interest during the summer (*has* there been one?) should occur. Perhaps it is all to the good, for they all come back refreshed in the month of October, brush the cobwebs off the transmitters, and, in some cases, build brighter and better ones.

The current opinion among them is that 80 metres will be very useful this winter. There are, once more, long odds on a very bad period for 20 metres, and 40 is always overcrowded. The tendency is to revert to the higher bands, so that "80" and "160" may take on a new lease of life.



TELSEN TRANSFORMERS & CHOKES





TELSEN OUTPUT TRANSFORMERS

Telsen Multi-Ratio Output Transformer, giving three ratios of 9-1, 15-1, 22·5-1 .. Price 12/6

Telsen Output Transformer, Ratio 1-1 .. Price 12/6

Telsen Pentode Output Transformer .. .. Price 12/6

TELSEN L.F. & OUTPUT TRANSFORMERS

Telsen transformers have achieved fame in the radio world on account of the high standard of their quality and performance. Designed and built on the soundest engineering principles, these robust, full-size transformers will give not only efficient but enduring service.

TELSEN L.F. TRANSFORMERS

Telsen "Ace" Transformer, Ratios 3-1, 5-1 Price 5/6

Telsen "Radiogrand" Transformer, Ratios 3-1, 5-1 .. .. Price 8/6

Telsen "Radiogrand" 7-1 Super Ratio Transformer .. .. Price 12/6

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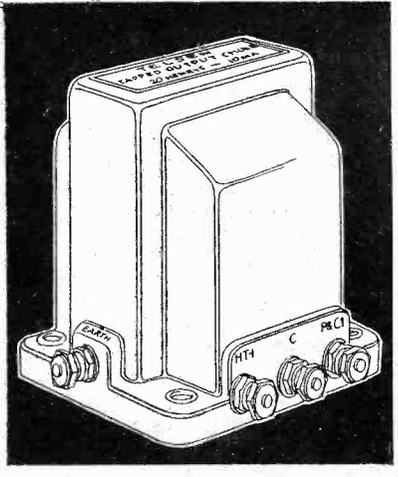
ALL-BRITISH RADIO COMPONENTS

Send for the "Telsen Radio Catalogue" and book of "All Telsen Circuits" to—The Telsen Electric Co., Ltd., Aston, Birmingham.



TELSEN L.F. CHOKES

Telsen L.F. Intervalve Coupling Choke, 40, 100, and 125 henrys Price 5/-

TELSEN OUTPUT CHOKES

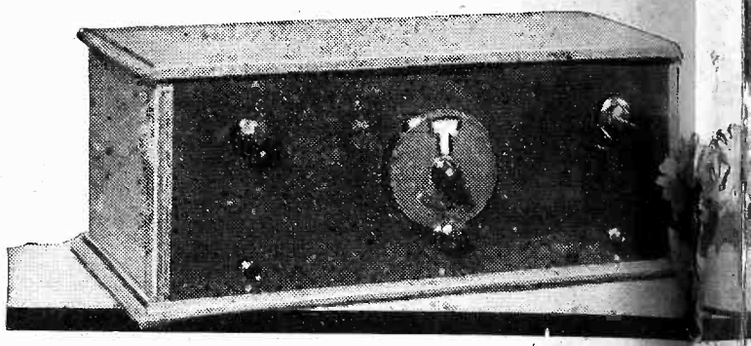
Telsen Output Choke (Plain), 20 henrys .. Price 8/-

Telsen Output Choke (Tapped), 20 henrys Price 8/6

Telsen Heavy Duty Power Grid L.F. Choke, 40 henrys .. Price 8/-

CVS—58

THE NEW "B



A powerful three-receiver employing o the very latest syste "simple selecti

NO one need cherish any doubts as to the merits of band-passing. It is a very sound scheme, both theoretically and in practice. Various methods of applying it have appeared in several of "P.W.'s" most successful sets.

An Ideal Combination.

The object of band-passing is to obtain selectivity without sacrificing quality. The term is really quite self-explanatory, and means just what it says, i.e. the passing of a band of wave-lengths.

An ordinary tuned circuit of high efficiency and comprising a coil tuned by a variable condenser will select any one individual wave-length and enable this to develop a certain amount of energy.

The immediately adjacent wave-lengths are handled much less effectively, and the energy from these tends to fall away quickly. Thus you get a condition that can be represented graphically by a kind of sharp-pointed mountain, the peak indicating the energy developed from the selected energy, and the steep sides the sharply decreasing energy due to the adjacent waves.

But selectivity of this type is not what we want, for no broadcast programme is carried on the wings of one wave-length only. There are "side-bands" of wave-lengths slightly shorter and slightly longer that also need to be tuned in, if fidelity is to be achieved in the reproduction.

Saving the Side-bands.

Band-passing aims at including these side-bands, but rigidly excluding any more wave-lengths either longer or shorter. And for this you can picture a square column, the flat top covering the desired wave-length plus its "side-bands" and the vertical sides showing that no other waves are allowed to develop energy in the receiving system.

That is the ideal, and as with most ideals is unattainable in practice. But you can approach it by having two tuned circuits instead of the usual one and coupling them together in a certain manner.

In the New "B.P." Three the coupling is carried out by a fixed condenser. Needless to say, the sizes of the coils and the capacity of the coupling condenser have to be very carefully chosen.

Two-Band Tuning.

The New "B.P." Three really is new, for it is one of the first sets to give practical expression to the work that has been undertaken during the past months by our leading component manufacturers.

The interesting result of this useful activity is that complete double-band band-pass arrangements are now available in single compact units.

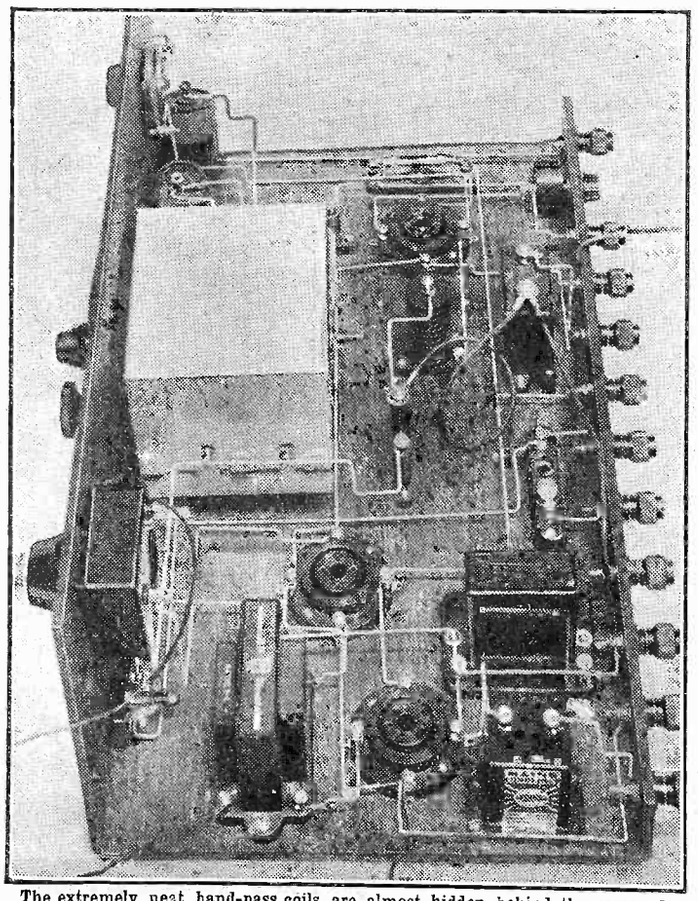
For instance, the Lewcos Band-Pass unit which figures in the original model of the New "B.P." is hardly larger than a normal dual-wave coil, and yet it embodies all the inductances needed for covering both ordinary and long wave-lengths.

The form it adopts is intriguingly reminiscent of a "V" twin-cylinder motor-cycle engine, and it is wonderfully small.

And it will be observed that there are only four terminals on it, so that it brings with it no little simplification.

The New "B.P." also introduces you to a second important component development—the mass-production, highly effective and inexpensive two-gang condenser.

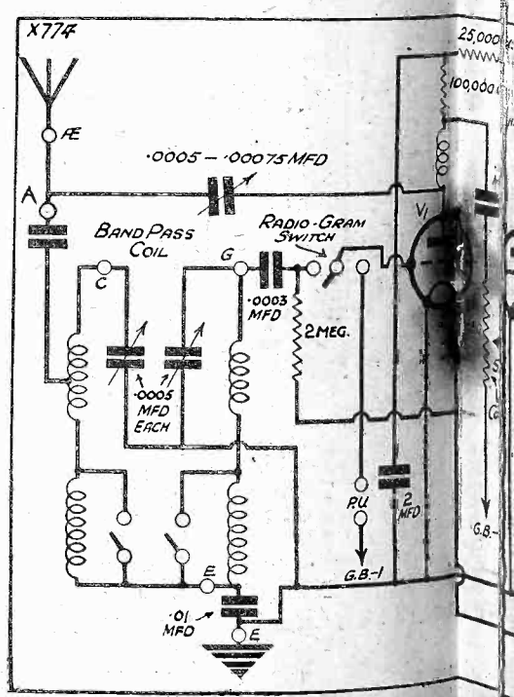
SEEN THE "BAND-PASS"?



The extremely neat band-pass coils are almost hidden behind the screened dual-condenser.

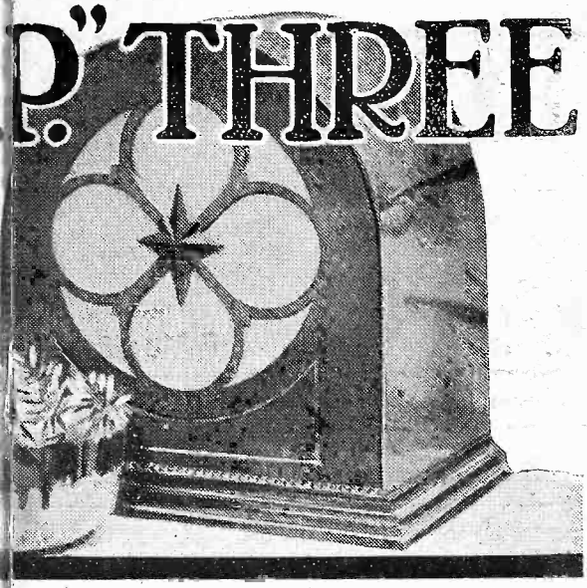
CHOOSE YOUR COMPONENT MA

1 Panel 18 in. × 7 in. (Permcol, Peto-Scott, Becol, Wearite, Goltone).
1 Cabinet to fit, with 10-in. baseboard (Pickett, Peto-Scott, Camco, Gilbert, Osborn, Ready Radio).
1 Band-Pass coil (Lewcos, Varley, R.I.).
1 ·0005-mfd. double gang variable condenser (Utility, Cyldon, J.B., Polar, Wavemaster, Lotus).
1 ·0005-·00075 reaction condenser (Telsen, Ready Radio, Polar, Cyldon, J.B., Lotus, Graham Farish).
1 Vernier dial for same (Igranic Indigraph, or disc drive supplied by makers of condenser).
1 Volume control, 500,000 ohms (A.E.D., Wearite, R.I., Varley, Magnum, Sovereign, Igranic, Graham Farish).
1 On-off switch (Ready Radio, Telsen, Bulgin, Goltone, Lissen, Graham Farish. Igranic, Lotus, Peto-Scott, Wearite).
3 Valve holders (Lotus, W.B., Burton, Wearite, Telsen, Igranic, Graham Farish, Clix).
1 L.F. transformer (R.I. type 1:7, Telsen, Ferranti, or Varley, Igranic, Lotus, Lewcos, Graham Farish, of ordinary ratio).
1 H.F. choke (Ready Radio, Telsen, Lewcos, Lissen, R.I., Varley, Sovereign, Watmel, Peto-Scott, Atlas, Graham Farish, Dubilier).
1 Output choke (Ferranti, Telsen, Graham Farish. Lotus, R.I., Igranic, Varley, Lissen, Bulgin).
1 ·0003-mfd. fixed condenser (T.C.C., Telsen, Lissen, Dubilier, Mullard, Ferranti, Ediswan, Igranic, Graham Farish, Goltone).
2 ·01-mfd. condensers (T.C.C., etc.).
2 2-mfd. condensers (T.C.C., Formo, Dubilier, Mullard, Igranic, Lissen, Telsen, Helsby, Ferranti).
1 2-meg. grid leak and holder (Graham Farish, Lissen, Telsen, Dubi-



The detector is followed by one resistance- and one transf

P." THREE



This is in essence two variable condensers welded into one and driven by a single tuning dial. So you see your two circuits that are necessary for band-passing are not present as two sets of components.

Concentrated Compactness.

The band-pass coil is no larger than any normal tuning unit, while the two-gang condenser is compact and has merely three terminals. Here you have band-passing without the complicating drawback of a multiplicity of parts.

The system is particularly applicable to the popular det.-2 L.F. type of circuit, for such a hook-up provides plenty of amplification and is yet remarkably straightforward.

No Screening Whatever.

There are none of those screens that are so frequently needed in S.G. circuits, and at every point there is an adequate margin safeguarding the interests of the less expert constructor.

Indeed, the New "B.P." is one of the stoutest propositions we have been able to bring to your notice. But we must make it quite clear that we lay no claims to the inception of the "motif," as it were, of this particular set.

The circuit includes nothing originating in our own Research Dept. Our contribution lies in the creation of a "layout" for the components employed, and we cannot honestly say that this was a particularly tricky task. The components almost laid themselves out on panel and baseboard. It follows then that the results your own New "B.P.'s" give must very closely approximate to those worked to by the component makers themselves.

This automatic standardisation, which must inevitably follow if you all build your sets with the recommended parts and adhere to our layout, is a particularly attractive feature of the design both from your point of view and ours.

It represents exactly the opposite extreme to that which I indicated in an article describing a previous set with none of this one's limitations. Your individual freedom of choice is still present in that you are free to build this set or not, your decision depending upon your reactions to its design and performance. And we know that many of you will welcome it with open arms as it fulfils so many obvious needs.

Its utter simplicity of assembly, and its comparative inexpensiveness are bound to constitute very powerful attractions. And as it is remarkably easy to operate and gives powerful loudspeaker results it certainly "catalogues" with great advantage.

Provision for a Pick-up.

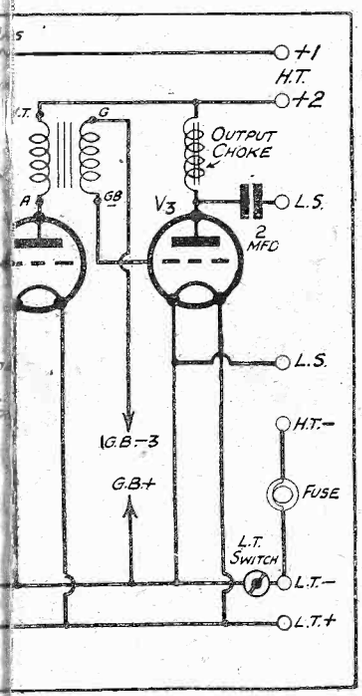
It will be noted on reference to the theoretical diagram that we have included provision for a gramophone pick-up. But you will observe that this is accomplished in a most economical manner, though I must say that there is none which is more effective.

Even if you do not immediately contemplate using a pick-up the extra parts and work involved in incorporating this section of the circuit in the finished receiver are such that it is an almost negligible addition. And yet your set is immediately ready for pick-up work should you at any

(*Continued on next page.*)

S FROM THIS LIST

lard, Ferranti, Igranic).
ohm Spaghetti resistance
eady Radio, Telsen, Lewcos,
ulgin, Graham Farish).
n Spaghetti (Ready Radio,
ye).
er (Bulgin, Ready Radio).
switch (Bulgin, Ready Radio, Wearite, Melbourne, Red Diamond, Ormond).
1 Terminal strip, 18 in. × 2 in.
11 Indicating terminals (Belling & Lee, Igranic, Eelex, Clix, Goltone).
Glazite, Lacoline, Quickwire.
G.B., H.T., and L.T. plugs, or spade terminals (Igranic, Belling & Lee, Eelex, Clix).



-coupled stage of L.F. amplification.

ACCESSORIES.

LOUDSPEAKERS.—Amplion, Blue Spot, B.T.-H., Graham Farish, Celestion, Mullard, Undy, W.B.

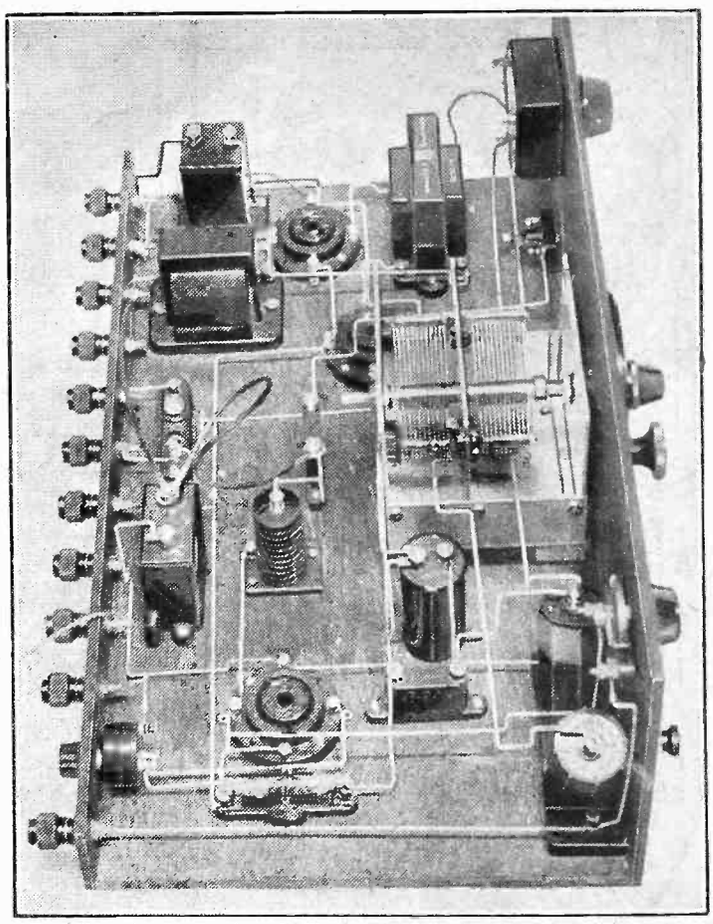
VALVES.—1 H.L. or H2 type, 1 L type, 1 power or super-power. (Osram, Mazda, Mullard, Six-Sixty, Cossor, Eta, Fotos, Lissen, Tungsram, Dario.) (H.T. current consumption at 120 volts 15 milliamps, using P2 type of valve.)

BATTERIES.—H.T., 120-volt max., Super-capacity (Ever Ready, Magnet, Ediswan, Pertrix, Drydex, Lissen, Columbia).
G.B., 9-18 volts, to suit output valve, as above.

ACCUMULATORS. — Voltage to suit valves. (Exide, Lissen, Pertrix, G.E.C., Ediswan.)

MAINS UNIT.—Heayberd, Regentone, Atlas, Lotus, Tannoy, R.I., Ekco.
(State type of set and milliamp consumption, also details of mains when ordering.)

LOOK AT THIS LAYOUT



Even the not-very-experienced will appreciate the clean lines and good spacing of the New "B.P." Three layout.

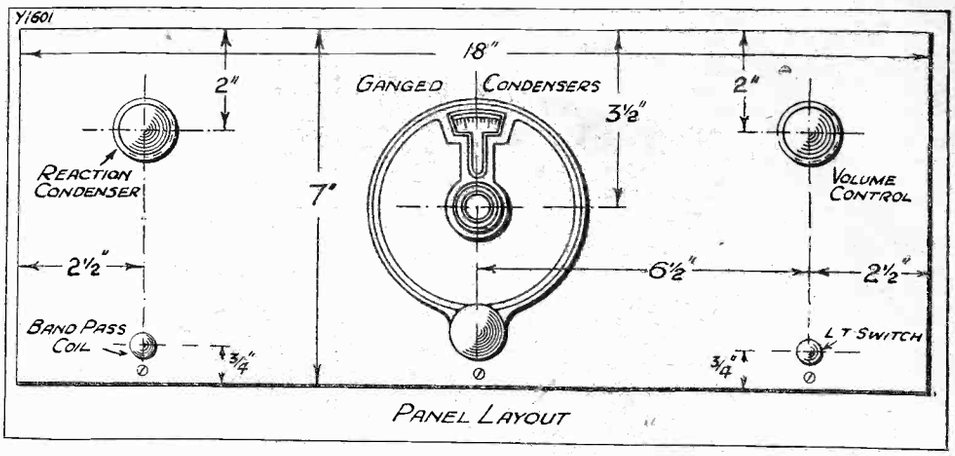
THE NEW " B.P." THREE

(Continued from previous page.)

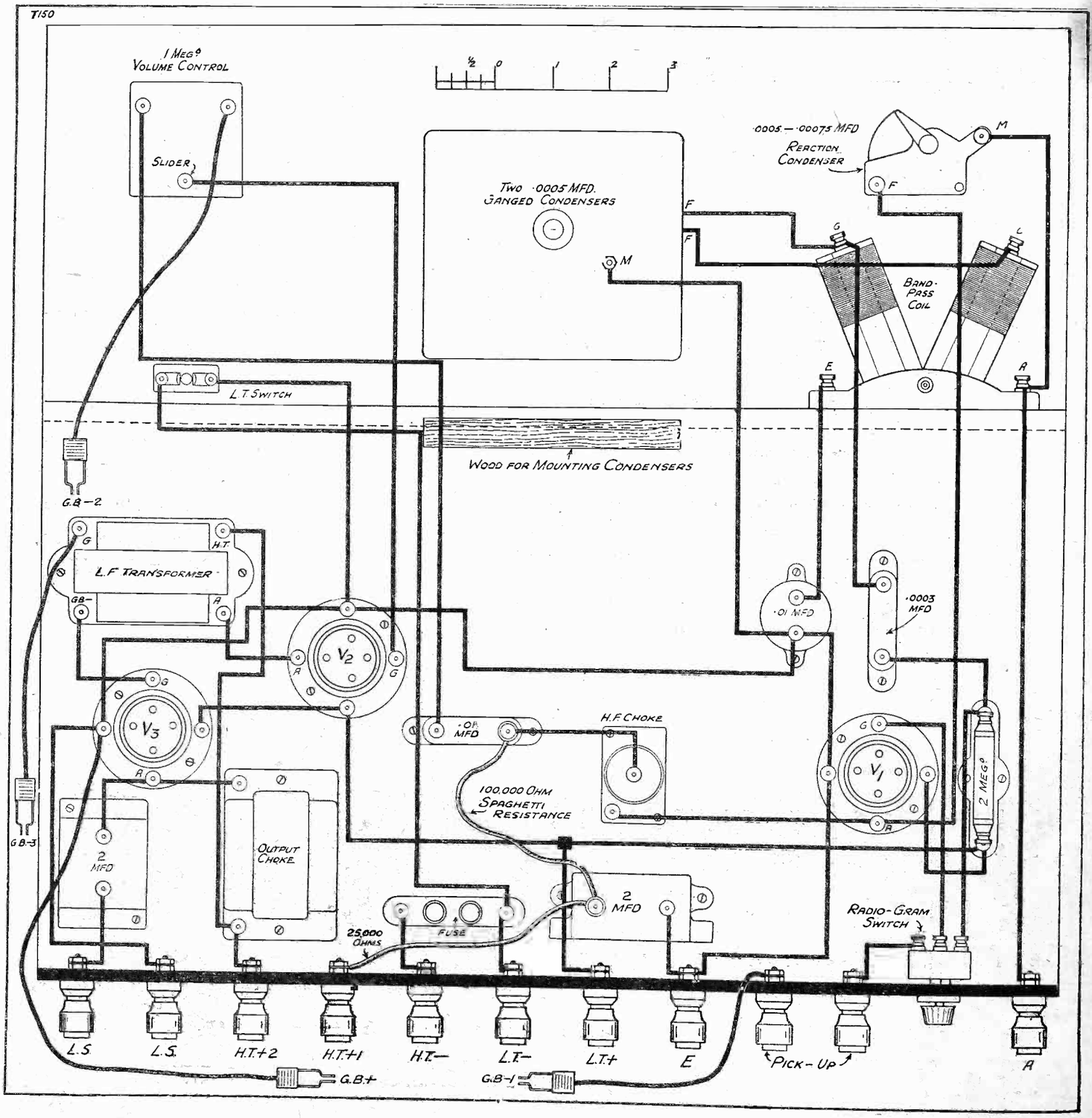
time in the future wish to so use it.

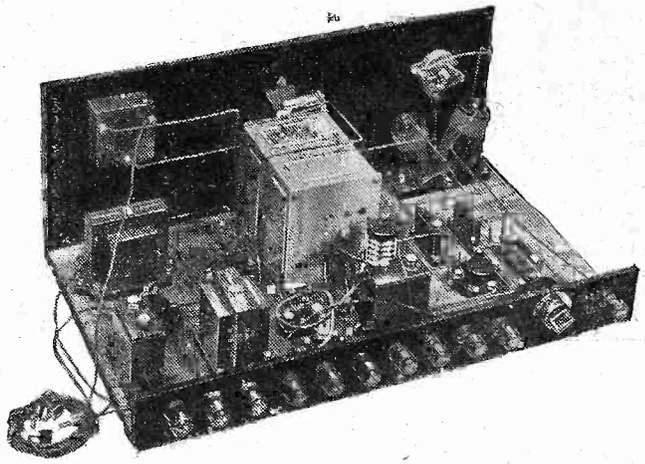
The only point to watch in such an event is that you feed the G.B.—1 lead with about 1½ volts grid bias. This can, of course, be taken from the same battery that serves the other G.B.'s.

Well, that completes our survey of the New " B.P." Three, and there remain now only the constructional details, and these we propose to give you next week. Many of you, however, will not need to wait for these, in view of the set's straightforwardness.



PANEL LAYOUT





B.P. 3

KENDALL'S TEST REPORT

"I have carried out comprehensive tests under varied conditions upon a model of the 'B.P.' Three, and have formed a high opinion of the capabilities of this receiver.

"The model used for the tests was assembled with the makes and types of components which I have chosen specially for the Ready Radio Kit, and I am satisfied that it gave the full results possible from this remarkably efficient circuit.

"I was impressed by the extreme ease of handling of the receiver, and noted particularly the excellent quality of reproduction. Selectivity and sensitivity were both most definitely above the normal level expected from even the best receivers of this type, and the instrument was extremely stable. For the connoisseur I recommend the use of an 'Instamat' Output Transformer instead of the choke condenser output."

Mr. G. P. Kendall, B.Sc., now Chief Engineer of Ready Radio Ltd., was for many years Chief of Research for "Popular Wireless" and "Modern Wireless."

FULL LISTS OF KITS AND COMPONENTS AND FURTHER DETAILS ON PAGES 299, 300, 303, 305

G.P. Kendall

Ready Radio

EASTNOR HOUSE, BLACKHEATH, S.E.3

Telephone: Lee Green 5678. *Telegrams: Readirad, Sedist.*

Showrooms: 159 Borough High Street, London Bridge, S.E.1 *Telephone: Hop 3000.*

DO WE NEED H.F.?

A provocative article by W. L. S., in which he asks a time-honoured question, and deals with it in the light of modern developments.

PLEASE believe me at the outset when I state that I am not writing this in the hope of starting an argument. I am asking the question in all good faith, as one who has an open mind and would like to be convinced in one direction or the other.

Two Schools of Thought.

I am in the unhappy position of sympathising to an equal degree with two different schools of thought. On the one hand, we have those who say that H.F. amplification is an indispensable part of the modern receiver; on the other, those who think it is complicated, difficult and unnecessary.

Probably the first school is in the vast majority. Hear me out, though, while I plead the cause of the other, heard less often, but nevertheless worth a hearing.

Admitting, in the first place, that a modern high-frequency amplifier does give enormous amplification of the signals coming in from the aerial, before they reach the detector, is there very much point in doing so? Our modern valves are so efficient that a detector *will* detect any signal that is strong enough to make itself heard above the inevitable "strays" of all description.

The Noise-Level.

How, then, does one benefit from a general amplification of the whole range of noises, wanted and unwanted, before they reach the detector? Just imagine that a comparative novice in radio matters had asked you this question. What could you reply?

It is my personal opinion that he is right about the "signal-noise" ratio. Our general background of noise has so high a level nowadays that any signal loud enough to cut through it will be loud enough to detect without previous amplification.

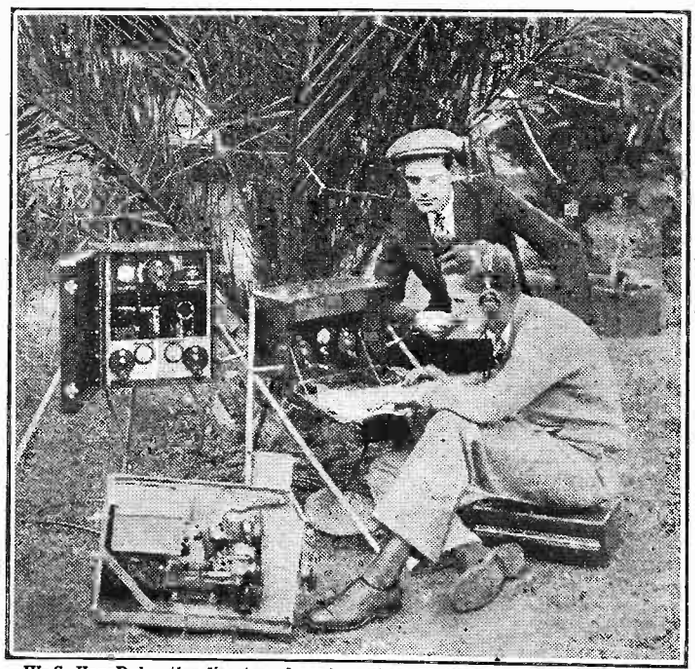
Why, then, do we not concentrate upon an efficient detector, and follow it up with L.F. amplification *ad lib*, instead of worrying about carefully screened H.F. stages, ganged controls, and so forth?

To put the matter in another way, we can say this. Once a signal has been detected, it matters not in the least how weak it is. Our problem is to receive a *clear* signal free from noises, even if its strength, when we have finished with it, be infinitesimal.

Once the signal is there, in the anode circuit of the detector, as a signal free from interference, we can amplify it to any extent we like, and it will *still* be clear of interference! There you have the "anti-H.F." man's case in a nutshell.

Now, to anticipate the replies from the opposition, I will quote one that will certainly be forthcoming. "Yes," say they, "we grant you this; but the H.F. side of the set serves the double purpose of giving amplification *and* selectivity. The latter can only be obtained by means of a multitude of tuned circuits, which are provided in this way."

RADIO "ON LOCATION"



W. S. Van Dyke, the director of an important Metro-Goldwyn-Mayer talkie, inspecting the radio apparatus he used in order to keep in touch with civilisation while taking scenes in Central Africa.

This, at first sight, is rather a poser to answer. Why, however, can we not use an equivalent number of tuned circuits without the H.F. stages? Why not use efficient band-pass coupling to a detector only, and follow that up by as much straight-line L.F. amplification as we like?

Some Further Points.

And why, indeed? Writing still as an impartial chairman to this imaginary debate, I find it very hard to see why the "anti-H.F." man has not scored up to the present.

Further points that he has in his favour are these: That L.F. is easier to arrange for than H.F. amplification; that the set will probably have fewer controls; and that it will *certainly* need less screening.

Representative Receivers.

The only point against his case is that the amplification that one can obtain from a good L.F. stage does not approach that obtainable with screen-grid valves *in front* of the detector.

So, before we close, let us imagine and compare the set that would be favoured by each party. "A," the multi-stage H.F. exponent, would probably use two screen-grid stages, extensively screened, and perhaps stabilised, in addition, in some way that materially reduces their efficiency.

These would be followed by a detector, which would have to be specially looked after to prevent overloading from the tremendous input it *could* receive from the foregoing valves. After this there would probably be two good note-magnifiers.

In all there would be three controls, or, perhaps, one ganged control and two trimmers.

Force of Habit.

"B," the man that likes to make his detector do all the work, would use something of this sort: There would be a very loosely-coupled aerial circuit, perhaps a band-pass coil of one of the commercial varieties, a detector of the high-amplification factor class; and after this there would be not more than three "note-mags." Thus he would have four valves against the other man's five, and, at the most, two controls instead of three.

Further, from my personal experience, he would receive everything that "A" received, and probably with less interference.

This being true, why is it that nearly everyone that wants distant reception, myself included, uses a set of the "A" class? I think the answer is that, even in radio matters, one does not like to be thought a heretic. Convention is a wonderful thing!

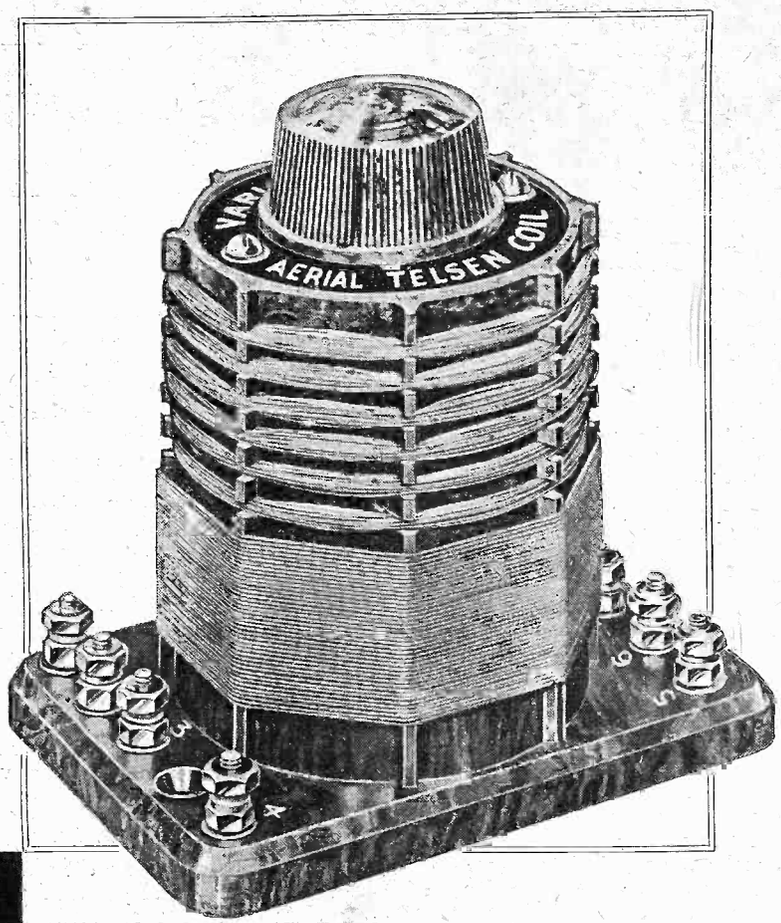
W.L.S. writes regularly for
MODERN WIRELESS,
Britain's Leading Radio Magazine

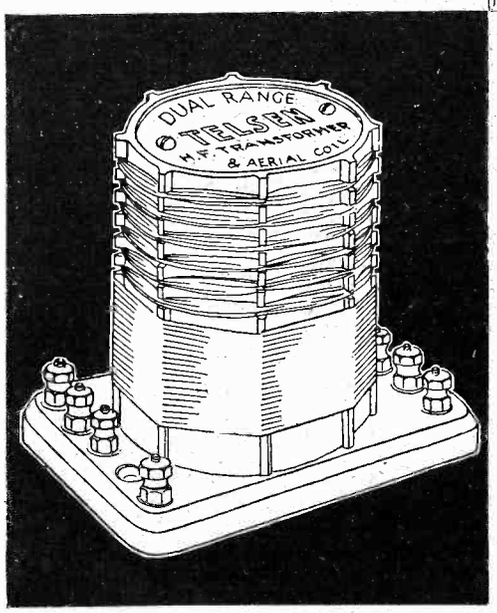
TELSEN DUAL-RANGE COILS

TELSEN DUAL-RANGE AERIAL COIL

The Telsen Aerial Coil is the very latest development in dual-range aerial coil design. It incorporates a variable series condenser which can be set to give any desired degree of selectivity, making the coil suitable for all districts, whatever reception conditions may be. It has been tested in various parts of the country, and down to distances of five miles from Regional stations a single tuned circuit will definitely separate the Regional programmes. This adjustment also acts as an excellent volume control and is equally effective on long and short waves. The waveband change is effected by means of a three-point switch. A reaction winding is provided and the primary and secondary windings are separated so that the aerial circuit can be isolated in mains-driven or screened-grid receivers.

Telsen Aerial Coil with Variable series Condenser incorporated. Price 7/6





TELSEN H.F. TRANSFORMER AND AERIAL COIL

This Coil is primarily designed for H.F. amplification in conjunction with screened-grid valves. It is arranged so that it can be connected as a tuned-grid or tuned-anode coil, or alternatively as an H.F. Transformer.

It also makes a highly efficient aerial coil where the adjustable selectivity feature is not required. A reaction winding is incorporated. When used as an H.F. Transformer the wave-change is effected by means of a two-pole (four-point) switch. When connected otherwise a three-point switch should be used.

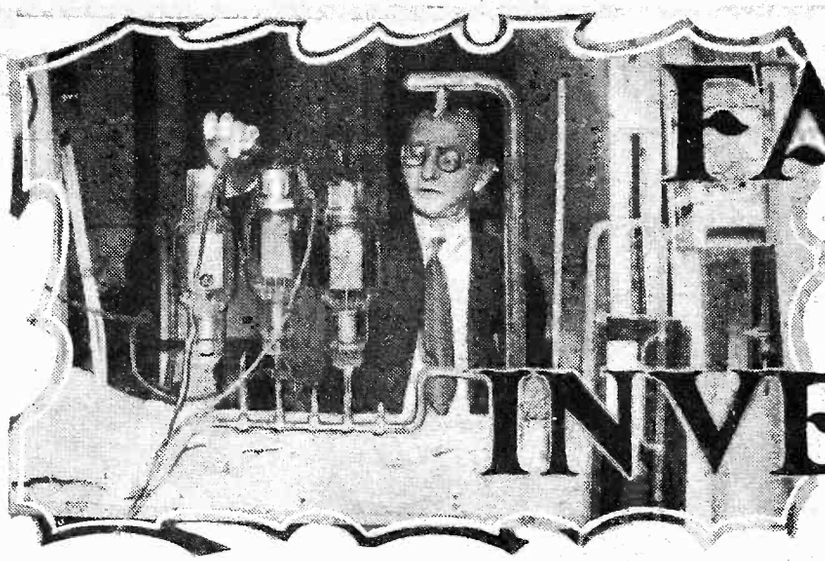
Telsen H.F. Transformer and Aerial Coil .. Price 5/6

Send for the "Telsen Radio Catalogue" and book of "All-Telsen Circuits" to the Telsen Electric Co., Ltd., Aston, Birmingham.

TELSEN

THE SECRET OF PERFECT RADIO RECEPTION

CVS—53



FAMOUS RADIO INVENTIONS

A SURPRISING ARTICLE By CARDEN SHIELS.

Did you know that poor old Reaction was dead ? This is one of the astonishing facts disclosed by our contributor in this clever survey of radio ideas !

THE biggest of the so-called "master" patents in the wireless industry—the one which covered "reaction"—died a natural death last year, after enjoying a lucrative life of sixteen years. The famous "grid-leak" patent shared a similar fate about the same time, and others are due to make their exit in the near future.

Meanwhile, of course, their place is being filled with more up-to-date improvements, because though patents may come and patents may go, the inventor works on for ever. No sooner is one invention out of the way than another looms up to take its toll out of the public. And this is only as it should be.

For Services Rendered.

People are very often inclined to regard the payment of patent royalties as an imposition, forgetting, perhaps, that if it were not for the professional inventor we should not make the rapid progress we do. If Fleming had not invented the valve we should, presumably, be anchored to the crystal and a pair of headphones.

It is possible, of course, that if Fleming had not discovered the valve, someone else would have done so, and we should still be where we are. That may be so, but one may be quite sure that whoever "did the trick" would have secured patent rights and extracted royalties just the same.

The fact of the matter is that an industry like radio rides on the back of the research men, and it is only fair that we should be prepared to pay a reasonable return for the work they do.

One important patent in the radio industry has recently received an unexpected new lease of life. This is the well-known "push-pull" circuit which was owned by the Western Electric Co.—now the Standard Telephones & Cables, Ltd. The patent was first filed in January of 1915, so that in the ordinary course of events it was due to expire in January of the present year.

An Interesting Patent.

The patentees, however, applied to the High Court for an extension of time on the ground that they were prevented from fully exploiting the invention during the period of the War, because as a "controlled establishment" they were then chiefly occupied in the manufacture of munitions and on other important war work. This argument was accepted, and the Court added a further term of four years to the patent, which will accordingly continue to draw royalties until January, 1933.

Another outstanding invention is that covered by the so-called "eliminator" patent, which in the ordinary course of events will expire at the end of this year. The "eliminator" circuit covers any means for rectifying and filtering or smoothing current drawn from the electric-supply mains in such a way as to make it suitable for use as the high-tension supply to a wireless receiver.

All sorts of different rectifiers for converting alternating current into direct current were known before the date of this patent, but no one had previously thought of smoothing-out the rectified current so thoroughly as to allow it to be utilised to feed the plate current of an amplifying valve.

The "pulses" of direct current delivered by a rectifier depend, of course, upon the periodicity of the A.C. supply. In the case of D.C. mains units there are various kinds of irregularities in the "raw" mains supply, due principally to the commutator brushes which connect the dynamo at the generating station to the distributing lines.

Keeping It "Alive."

All such fluctuations must be smoothed out before they reach the plate of the valves, otherwise they will get through to the loud speaker. The "eliminator" patent covers the ordinary smoothing arrangement of chokes and condensers used for this purpose.

It sometimes happens that an inventor fails to pay the annual renewal fees required to keep a patent alive for the full term of sixteen years. In this connection it should perhaps be explained that when a patent is originally filed the fees then paid cover the first four years of its life. After that it is necessary to pay a further £5 for the fifth year, £6 for the sixth, and so on up to the sixteenth year.

It often takes several years to get an invention on to the market. If at the end of the four "free" years the patentee has made no profit, he may well be tempted to let the whole thing drop, in order to save the £5 renewal fee which then falls due.

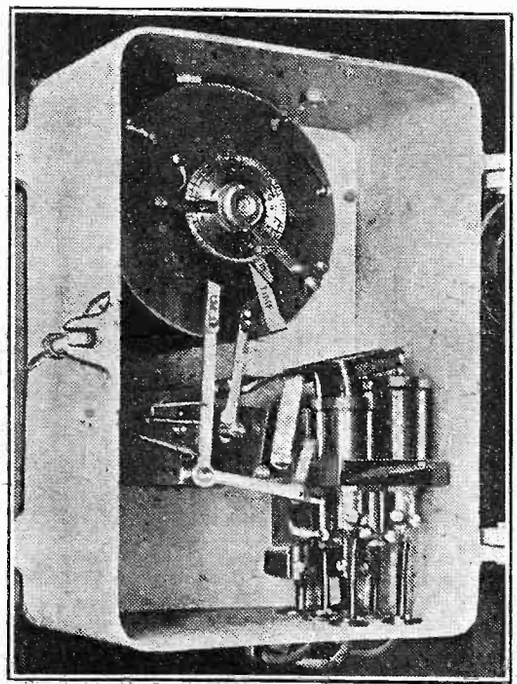
A Fortune Thrown Away.

This is what happened to the famous de Forest patent covering the first three-electrode valve. De Forest, it will be remembered, improved the original two-electrode Fleming valve by inserting a third electrode or grid between the plate and filament. Later on this proved to be a vitally important step in the development of the valve, but in 1910, when the first £5 renewal fee fell due, no one was using it, and so de Forest let his patent lapse.

Had he kept it alive it would have been one of the master patents in the wireless industry, drawing a royalty from every three-electrode valve made and sold to the public. It has been estimated that de Forest threw away over a million pounds when he failed to pay that modest fee.

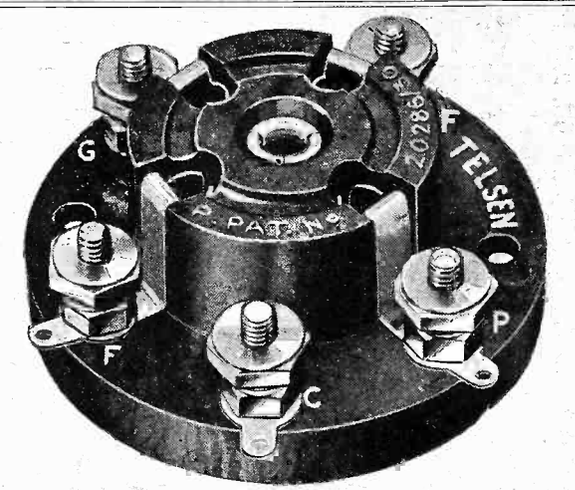
(*Continued on page* 298.)

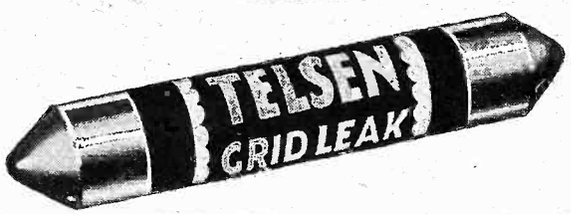
WHAT'S ALL THIS?

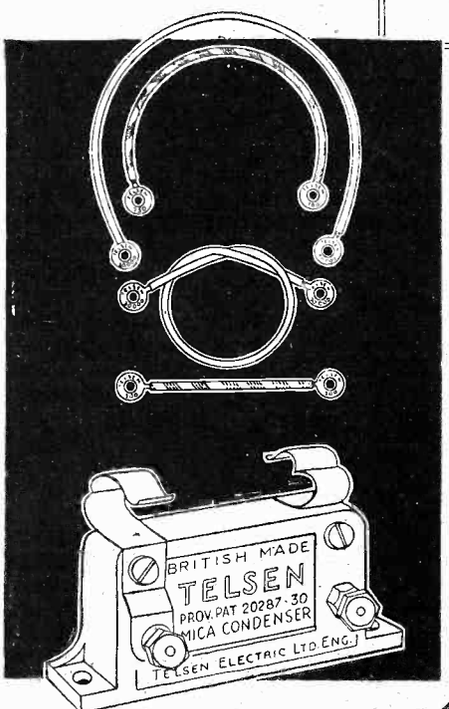


An ingenious clock which automatically switches on the required programme according to time.

TYPICAL OF TELSEN VALUE







TELSEN SPAGHETTI FLEXIBLE RESISTANCES

These are made in a range of values from 300—200,000 ohms with a maximum current varying from 42 m/a. to 1¼ m/a. The terminal tags are firmly fixed to the wire and clearly marked with their respective resistance values; they are impregnated with special insulating compound which renders them proof against corrosion.

Telsen Spaghetti Flexible Resistances, from 6d.

TELSEN FIXED MICA CONDENSERS
(Prov. Pat. No. 20287/30)

Telsen Fixed Mica Condensers are made in capacities from ·0001 microfarad to ·002 microfarad. They can be mounted upright or flat, and the ·0003-microfarad Telsen fixed mica condenser is supplied complete with patent grid leak clips to facilitate series or parallel connections. All Telsen fixed mica condensers are tested at 500 volts.

Telsen Fixed Mica Condensers, Price 6d.

TELSEN VALVE HOLDERS
(Prov. Pat. No. 20286/30)

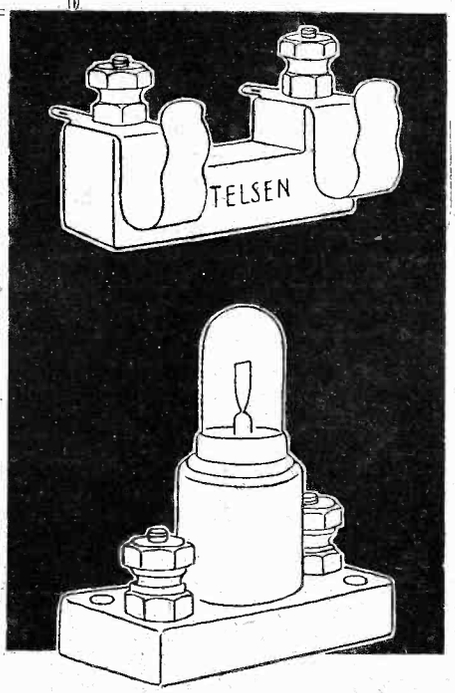
The Telsen four and five-pin valve holders embody patent metal spring contacts, which are designed to provide the most efficient contact with split and non-split valve legs, and are extended in one piece to form soldering tags. Low capacity and self-locating.

Telsen 4-pin Valve Holder .. .. Price 6d.
Telsen 5-pin Valve Holder .. .. Price 8d.

TELSEN GRID-LEAKS

Telsen Grid-leaks are absolutely silent and non-microphonic, and practically unbreakable. They cannot be burnt out, and are unaffected by atmospheric changes. Telsen Grid-leaks are not wire wound and therefore there are no capacity effects. Their value is not affected by variation in the applied voltage. Made in capacities ranging from ¼–5 megohms.

Telsen Grid-leak .. .. Price 9d.



TELSEN

ALL-BRITISH RADIO COMPONENTS

Send for the "Telsen Radio Catalogue" and book of "All-Telsen Circuits" to The Telsen Electric Co., Ltd., Aston, Birmingham.

TELSEN GRID-LEAK HOLDER

The Telsen Grid-leak Holder will hold firmly any standard size or type of grid leak. Ample clearance is provided between the terminal screw leads and the baseboard (underneath), preventing any surface leakage upsetting the value of the grid-leak. The terminals and fixing holes are accessible without removing the grid-leak.

Telsen Grid-leak Holder, Price 6d.

TELSEN FUSE HOLDER

This is a neat and inexpensive device which should be incorporated in every set as a precaution against burnt-out valves.

The Telsen Fuse Holder firmly grips the standard radio fuse, giving a perfect contact.

Telsen Radio Fuse Holder, Price 6d.

TELSEN SCREENS

Price .. .. .. 2/- and 2/6

CVS—58

FAMOUS RADIO INVENTIONS

(Continued from page 296.)

As a matter of fact, the story of the long rivalry between Fleming and de Forest over the discovery and development of the thermionic valve is one of the romances of patent law. Fleming filed his first valve patent in America, a few weeks later than de Forest, but when the question of priority came to be fought out, the American Courts decided that the de Forest valve was not a true thermionic valve, as we now know it, but depended for its action upon heat applied to the gas contained inside the bulb, whereas the Fleming valve utilised the electron stream emitted from a heated filament.

This interpretation was, of course, a victory for Professor Fleming (as he then was), and made his patent "master" over all subsequent valve improvements, whether made by de Forest or others.

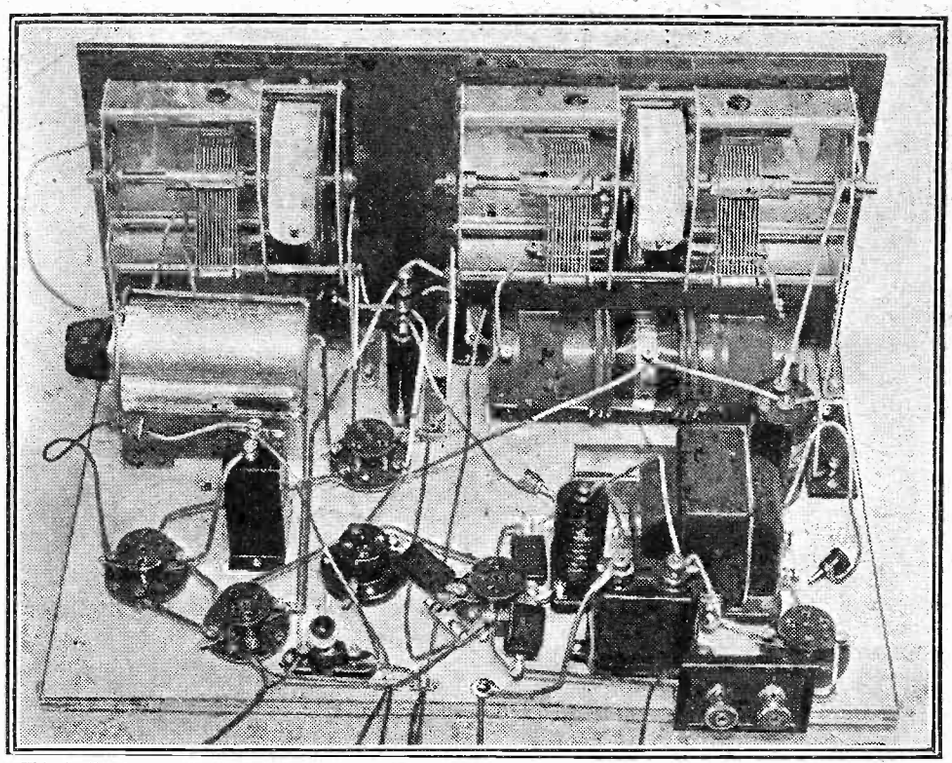
A Generous Action.

Occasionally an inventor, instead of patenting a discovery, will give the benefit of it freely to the public without fee or royalty. Professor D. P. Hughes' lecture on the first microphone, before the Royal Society in 1878, is a case in point. By describing the microphone openly in this fashion, he sacrificed all patent rights on what would undoubtedly have proved a most valuable invention.

Among the older and now defunct "pioneer" wireless patents one may mention the well-known "four-sevens" patent of 1900, which covered the use of loose-coupling between the aerial and the input circuit. This improvement might be described as the first step in the long search for selectivity.

There were also a series of early valve patents owned by the Marconi Company which were upset a few years ago as the result of prolonged and costly litigation by the Mullard Valve Co. This famous valve action was fought out first in the High Court, then in the Court of Appeal, and lastly in the House of Lords, before the question of infringement or not could be finally settled.

SOME OF THE MANY INVENTIONS IN RADIO



This is the famous "P.W." "Super-Quad," and, like other modern sets, it simply bristles with brainy ideas that have been applied to radio reception.

WIRING YOUR SET

The whole business simply explained.

TO obtain neatness, wiring-up a set is always well worth a little trouble. It can be made quite a pleasure if you follow the right methods. Some prefer to start by cutting the wire up into short lengths, but this is not necessary and wastes a lot of good wire.

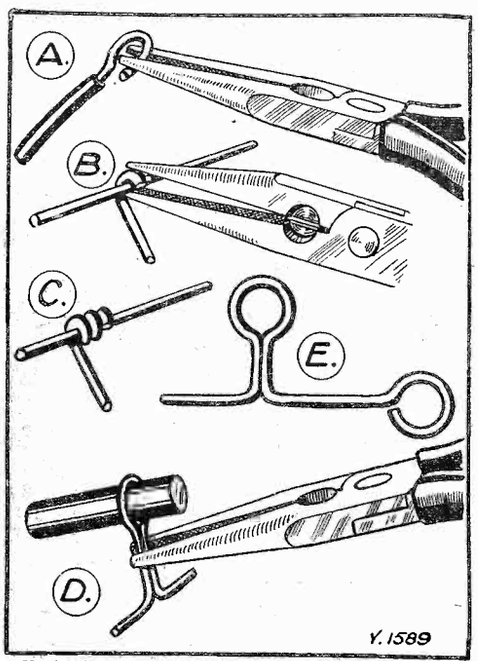
Take your coil of wire and open it out to about 12 in. Place the extreme end in the vice and stretch the length out with the pliers. Decide on your first connection, and, having put a neat turn on the end of your wire, as shown at "A" in sketch, slip this over the terminal and shape the wire up to the next connection, finishing up by cutting off the coil and putting on the turn.

If you have need for a junction, and do not want to solder up the wires until you have given the set a trial, a good method of joining the wire is shown at "B." Grip the wires as shown and turn one round the other—the finished joint is shown at "C"—as if the work has been carried out correctly if will give a firm joint which can be soldered later if desired.

Sometimes it is necessary to run one wire so as to link up several points, such as the valves. A good way of doing this is illustrated at "D," where a small former is used to shape up the wire. In "E" we see the result—one loop goes over one terminal and the other goes to the next, and so on.

In every case always start by making a loop on the end of the wire, then running it to the next point, putting in the bends neatly as you proceed.

HOW TO PLY YOUR PLIERS



Neat joints and wiring are SO easy if you go about them in the right way. It is explained on this page.

SOME RADIO WRINKLES

Filing, Charging, etc.

Do not file ebonite with a fine file unless it has been dusted first with French chalk.

* * *

If you charge your L.T. battery whilst it is inside the cabinet the effect of spraying on the leads may be overcome by using long lead connectors smeared lightly with vaseline to hold the connecting wires well away from the accumulator itself.

* * *

A common cause of "hum" is the earth lead becoming broken underground.

* * *

If you derive your high tension from D.C. mains, and you feel a tingle when you touch your loud speaker there is a defect in the installation, and you should switch off until it is put right.

* * *

It is not necessary to have a separate short-wave set for short-wave reception, but a special short-wave adaptor can be plugged into the ordinary set. (This idea, which is now extremely popular in America, and, indeed, all over the world, was first tried out in the "P.W." laboratory.)

* * *

For short-wave reception special coils are used, which generally have from two to ten turns.

Ready Radio TESTED KITS

B.P. 3

THE NEW "B.P." THREE

	£	s.	d.
1 Ebonite Panel, 18 in. × 7 in., drilled to specification		5	6
1 **"LANDOR"** Cabinet to specification with 10-in. baseboard	1	5	0
1 Lewcos Band Pass Coil		12	0
1 Lotus ·0005 Double Gang Condenser with Disc Drive	1	5	0
2 ReadiRad ·00075 Brookmans condenser		3	6
1 A.E.D. volume control 500,000 ohms		8	6
1 ReadiRad on-off switch		0	10
3 Junit valve holders		2	0
1 R.I. General Purpose L.F. transformer, ratio 7-1		10	6
1 ReadiRad Standard H.F. choke		4	6
1 R.I. General Purpose L.F. choke		12	6
1 T.C.C. ·0003 fixed condenser, type 34		1	6
2 T.C.C. ·01 fixed condensers flat, "S" type (non-inductive)		5	0
2 T.C.C. 2-mfd. fixed condensers, type 50		7	8
1 ReadiRad 2-meg. grid leak and holder		1	4
1 Lewcos 100,000-ohm spaghetti resistance		1	6
1 25,000-ohm spaghetti resistance		1	6
1 ReadiRad H.T. fuse and holder		1	3
1 ReadiRad radio gram. snap switch		2	9
1 Terminal strip, 18 in. × 2 in., drilled to specification		1	6
11 Belling-Lee indicating terminals, type "B"		5	6
1 Packet Jiffilinx for wiring		2	6
7 Belling-Lee wander plugs		1	2
2 Belling-Lee spade terminals		0	4
3 Mullard valves to specification, PM2DX, PM1LF, PM2	1	7	6
Screws, Flex, etc.		0	8
TOTAL (Including Valves and Cabinet)	£8	11	6

If you do not need the complete kit of parts, you can purchase any component you require separately.

KIT "A" - £5:19:0
(Less Valves and Cabinet)
or 12 equal monthly instalments of 11/-

KIT "B" - £7: 6:6
(With Valves Less Cabinet)
or 12 equal monthly instalments of 13/6

KIT "C" - £8:11:6
(With Valves and Cabinet)
or 12 equal monthly instalments of 15/9

COMPLETELY ASSEMBLED RECEIVER Aerial Tested, Royalties paid £10.1.6 or 12 monthly instalments of 18/6.

INSTAMATIC OUTPUT

If you require an INSTAMAT instead of the choke-condenser output circuit add 11/2 to the cash price of Kits A, B or C or 1/- to the Hire Purchase Terms. If you require an INSTAMAT MAJOR add £1 : 1 : 2 to the cash price of Kits A, B or C or 2/- to the Hire Purchase Terms.

See page 300

Cash or Easy Payments

Hear the B.P.3 demonstrated at our showrooms, 159, Borough High Street, S.E.1.

Immediate Dispatch

See also pages 293, 300, 303, 305.

ORDER FORM
To READY RADIO, LTD., Eastnor House, Blackheath, S.E.3.

CASH ORDER. Please despatch to me at once the goods specified for which I enclose payment in full of £.....

C.O.D. ORDER. Please despatch to me at once goods specified for which I will pay in full the sum of £.....

EASY PAYMENT ORDER. £.....
Please despatch my Easy Payment Order for the goods specified for which I enclose first deposit of

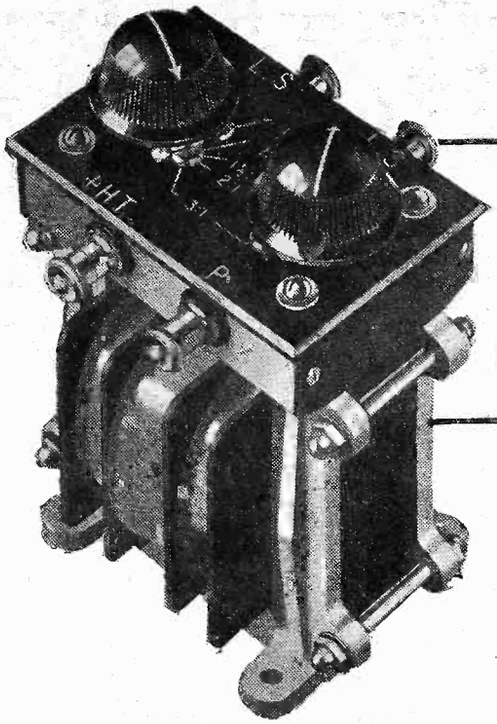
Name.....

Address.....

.....

Kit. Required.....

P.W. 10/10/31



MAKE SURE OF QUALITY

B.P.3

INSTAMAT

OUTPUT TRANSFORMER

(*guaranteed for 5 years*)

For all types except moving-coil loud-speakers. Five different ratios all clearly marked, 1 : 2, 1 : 1, 1½ : 1, 2 : 1, 3 : 1.

PRICE 27/6

INSTAMAT MAJOR

For low resistance moving-coil speakers. Six ratios: 10 : 1 up to 25 : 1.

PRICE 37/6

The B.P.3 is capable of giving exceptionally good quality, and you will probably use a good loud-speaker with it. *But do they match?* Accurate matching between output valve and loud-speaker is essential for good quality reproduction. The easiest, quickest and most certain way of obtaining accurate matching is to use an INSTAMAT with which you can switch instantly from one ratio to another until you obtain the one which matches your valve with loud-speaker perfectly.

The INSTAMAT is an Output Transformer of the very highest grade. It is exceptionally robust in construction and will carry heavy current without over-loading. It is connected between output valve and loud-speaker and different ratios are obtained simply by turning the switches.

For the B.P.3 Output Circuit

Instead of the choke-condenser output circuit incorporated in the B.P.3, you are recommended to use an INSTAMAT Output Transformer. In addition to obtaining all the benefits of a correctly designed output stage you will also be able to match your output valve and speaker instantly and perfectly.

If you require an INSTAMAT Output Transformer instead of the choke-condenser output circuit, see page 299.

For full lists of parts and order form see page 299.

EASTNOR HOUSE, BLACKHEATH, S.E.3

Telephone : Lee Green 5678. *Telegrams : Readirad, Sedisi.*

Showrooms: 159 Borough High Street, London Bridge, S.E.1. *Telephone : Hop 3000.*

CAPT. ECKERSLEY'S QUERY CORNER

Under the above title, week by week our Chief Radio Consultant comments upon radio queries submitted by "P.W." readers.

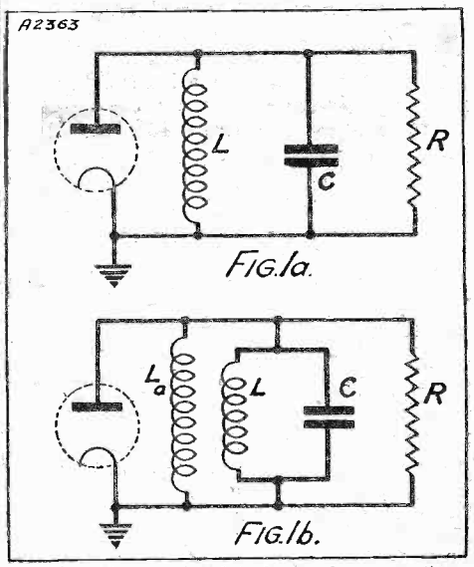
Don't address your questions direct to Capt. Eckersley, a selection of those received by the Query Department in the ordinary way will be answered by him.

A Question of Stability.

N. V. (Brixton).—"My receiver, which incorporates a stage of screened-grid H.F. amplification, was originally designed to use the tuned-anode coupling between the detector and H.F. stages.

"Slight H.F. instability was experienced, and I tried the effect of using the tuned-grid coupling, feeding the H.T. to the S.G. valve anode through an H.F. choke and placing a ·001 fixed condenser between the latter point and the grid end of the detector-stage coil.

WAS IT DAMPING?



The 1b circuit proved to be much more satisfactory than 1a, and Capt. Eckersley suggests that the shunted choke was responsible.

"The receiver is now quite stable and the amplification does not appear to have suffered. Can you tell me why this should be the case?"

It is a little difficult to answer your question categorically. When one finds greater stability in one circuit than another one usually suspects that the more stable circuit has a greater damping introduced somewhere.

If you draw a "schematic," as I have done, of your two circuits, you will find that Fig. 1a represents the first arrangement (leaving out the H.T., blocking condensers, etc., and considering the whole thing from the point of view of high frequency), while Fig. 1b represents the second arrangement.

You will see that in Fig. 1a the circuit L.C. is in parallel, in effect, with the resistance R, and with the valve.

In the case of Fig. 1b, the circuit L.C. is in parallel with a resistance and a choke.

It is probable that because you have shunted the circuit L.C. in Fig. 1b by the impedance of the choke additional to the resistance you had in Fig. 1a, this has introduced an extra damping and so the circuit is more stable. This would not greatly effect the amplification because the introduction of the choke would only slightly diminish sensitivity, but nevertheless enough to prevent instability.

How Alternating Currents Flow.

W. J. R. (Bexhill).—"Having seen in a text-book that alternating currents flow first in one direction and then in the reverse direction, I find it difficult to understand the exact manner in which the current flows. Does the current flow straight along the wire, as the normal illustration shows, or from one side of the wire to the other as the polarity changes?"

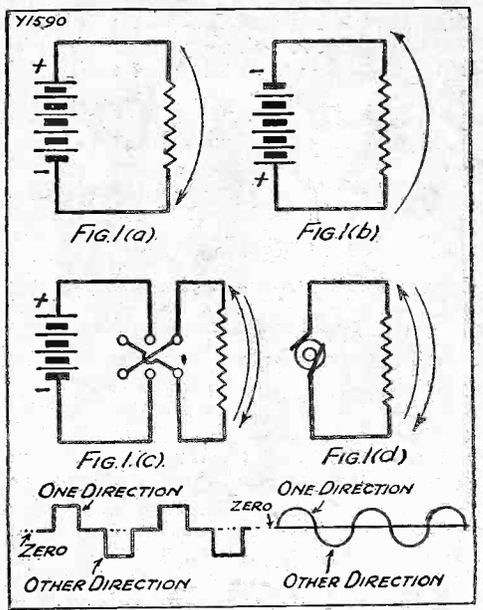
I don't quite understand your question, but surely the matter is very simple. Please see my diagram.

In Fig. 1a, let us say for the sake of convenience, that a current flows through the resistance R from plus to minus. Now if I reverse the battery, as shown in Fig. 1b, the current flows in the other direction through the resistance, as indicated by the arrow.

If I were to arrange, as shown in Fig. 1c, a double-pole change-over switch, cross connected as shown, then the current could be made to flow first in one direction through the resistance and then, by throwing over the double-pole switch, in the other direction, and you would have a sort of alternating current (with a rather bad wave form!).

I have drawn below Fig. 1c the direction and intensity of the current if the switch is thrown over. An alternator does not reverse the current abruptly but gradually, and in Fig. 1 (d) you will see, below the drawing of the alternator and the resistance, the shape and direction of the current-time curve, called a sine curve. I hope the matter is now perfectly clear to you.

WHAT IS A.C.?



Read the easy-to-follow explanation of alternating current given to a Bexhill reader.

Shifting the Mains Unit.

B. R. (Tooting).—"I used to be troubled with a loud hum when using my S.G. detector and pentode receiver with an A.C. eliminator. The eliminator was normally kept close to the L.F. stage, but on moving the unit to the opposite (H.F.) end of the receiver, the hum ceased and programmes were received with a background of absolute silence.

"Why did the position of the H.T. unit show such a marked difference in results?"

Probably merely because the H.T. transformer's magnetic field leakage coupled with the iron-cored choke (or transformer) in the pentode anode (or any other transformer and choke in the L.F. circuits). It was a pure induction effect of 50-cycle circuits in the receiver L.F. circuits, and when you moved the H.T. unit away from the L.F. circuits the inductive effect was eliminated.

Naturally you can't induce 50-cycle effects into *high*-frequency circuits designed to respond to million-cycle effects, and so putting your eliminator near the H.F. end gave you that "background of absolute silence."

ONLY IN "P.W."

can you read Captain Eckersley's replies to listeners' own problems.

AND REMEMBER—

Captain Eckersley's technical articles appear only in the "Big Three,"

"POPULAR WIRELESS,"

"MODERN WIRELESS," AND

"WIRELESS CONSTRUCTOR."

POZNAN—A LITTLE STATION WITH A BIG RANGE

Our Special Correspondent here describes a visit to Poznan, the short-wave transmitter of Poland, which has been heard all over the world, and he tells of an interesting conversation with the station director.

I HAVE met Mr. Okoniewski!

Mr. Okoniewski, I must tell you, is a very important personage in Poland, for he is the Director of the Poznan broadcasting and short-wave stations; and as little Poland is very proud of these links with the outside world, it is also very proud of Mr. Okoniewski!

Through a liaison with a Dutch broadcasting concern, arrangements were made for me to meet this Poznan official, and I spent an interesting afternoon at the short-wave station.

Poznan also boasts of a medium-wave broadcasting station working on about 350 metres, and no doubt some of you have this down on your logs, but as its power is only of the order of less than two kilowatts, and as it is rather a poor spot in the medium waves for British listeners, it is not generally heard well.

The short-wave Poznan is quite a different proposition, of course, and its short-wave transmissions have been heard over practically the whole of Europe, in many parts of America, and further afield.

Mr. Okoniewski told me this with pride, and then put me in the care of one of the station staff, who explained the working to me.

"The station has been going for two years," he said.

"There were twenty-four months of constant experiment before the present good results were obtained, and until we could guarantee a regular transmission schedule.

When to Tune.

"As readers may not know the exact regular working times of the station you had better make a note of these, which are reduced to British summer time. On Tuesdays we work for three hours, from a quarter to eight till a quarter to eleven at night, and on Thursdays from 7.30 in the evening till 2 o'clock in the morning.

A Home-Made Transmitter.

"During the early days of the station we were not so fortunate in having facilities to give a regular weekly schedule like this. At the beginning of 1928 we started plans for the formation of a short-wave transmitter to link up Poland with the rest of the world, but owing to the difficulty of raising funds it was not until January, 1929, that we first managed to get tests put out on two wave-lengths, one just below 30 metres and the other just above.

"The power was very low because we had not then sufficient apparatus. During the following three months a new generator was obtained and shortly we were transmitting with a power of about half a kilowatt.

It does not sound very much, but then, as you probably know, low-power short-wave transmissions are often the most efficient. Well, in 1930 the new building was taken over and new gear was installed. Since then we have worked regularly according to the schedule I have just given."

I found that the short-wave gear is in the main broadcasting station building, and has been built entirely by the engineers at the station. All credit to them for the highly successful results!

The engineers in the station shops have made a good job of the constructional work, and the transmitter itself is a fine piece of woodwork and copper shielding. A wooden cabinet is used—some 5 ft. to 6 ft. high—to prevent stray currents being set up, as might be the case were a metal frame used.

As shielding is of vital importance in a short-wave transmitter, just as it is in your short-wave receiver, copper screens have been placed at critical points and these are earthed.

The transmitter is crystal controlled, which accounts for the fact that Poznan is always exactly on its wave-length. I was rather interested in the special way in which the crystal is used for controlling the first stage.

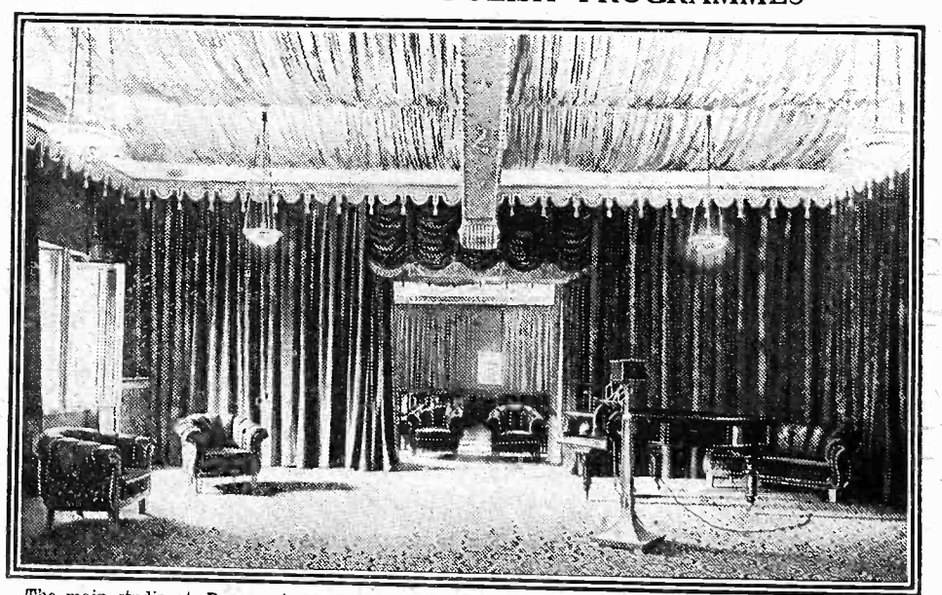
Quartz Control.

It appears that an ordinary push-pull circuit is used with large power valves in the first stage of the transmitter, and the quartz crystal is simply placed in the common grid circuit of the two valves.

Following this push-pull stage is the first frequency doubler, and here, again, two valves are used. This idea of

(*Continued on page* 304.)

"PEEPING IN" TO POLISH PROGRAMMES



The main studio at Poznan is so arranged that an audience can watch the artistes broadcasting although the audience is not actually in the studio itself. Between "turns" the curtain can be drawn if desired, as at a theatre.

ALL Ready Radio kits are tested & passed before despatch

Every receiver described in "Popular Wireless" is assembled by Ready Radio Experts with chosen components and is tested and passed before despatch under the supervision of Mr. G. P. Kendall. Every purchaser of a Ready Radio Kit is consequently able to build a receiver identical in performance and appearance with the original model.

Below are listed some of the Kits of receivers which have proved particularly popular.

"POP-VOX" FOUR

KIT "A" - - £6. 3.0
or 12 monthly instalments of 11/3

KIT "B" - - £8.10.6
or 12 monthly instalments of 15/9

KIT "C" - - £9.18.6
or 12 monthly instalments of 18/3

"COMET" THREE

KIT "A" - - £4. 5.0
or 12 monthly instalments of 7/9

KIT "B" - - £5.12.6
or 12 monthly instalments of 10/4

KIT "C" - - £7. 2.6
or 12 monthly instalments of 13/-

"P.V." PLUS

KIT "A" - - £4. 5.6
or 12 monthly instalments of 8/-

KIT "B" - - £6. 4.6
or 12 monthly instalments of 11/6

KIT "C" - - £7. 9.6
or 12 monthly instalments of 13/9

"P.V." STAR

KIT "A" - - £5.18.6
or 12 monthly instalments of 11/-

KIT "B" - - £7.17.6
or 12 monthly instalments of 14/6

KIT "C" - - £9. 5.0
or 12 monthly instalments of 17/-

KIT A—Full set of components except valves and cabinet.
KIT B—Full set of components with valves less cabinet.
KIT C—Full set of components with valves and cabinet.

Immediate Dispatch

Ready Radio hold colossal stocks of all makes of Components, Receivers, Loud-Speakers, Mains Units and other radio accessories. Everything for radio can be obtained from Ready Radio.

Order form on page 299.

Ready Radio G.P.Kendall

For full details of the "B.P.3" see pages 290, 293, 299.

POZNAN—A LITTLE STATION WITH A BIG RANGE.

(*Continued from page* 302.)

having push-pull stages in transmitters seems to be catching on. I have seen it at one or two other stations not built by British engineers, who, for some reason, prefer single stages.

The second frequency doubler at Poznan is a single stage, and the final valve which links up with the aerial and the tuning arrangement is a 1½ kw. "tube."

I admit that a power of only 1½ kw.—about one-fiftieth of that put out by Brookmans Park—does not sound very impressive, but if you could see the reception log of Poznan you would realise how wonderfully these short waves of about 30 metres—Poznan works on 31·35 metres—reach out, although the power is modest.

250 Volts Grid Bias.

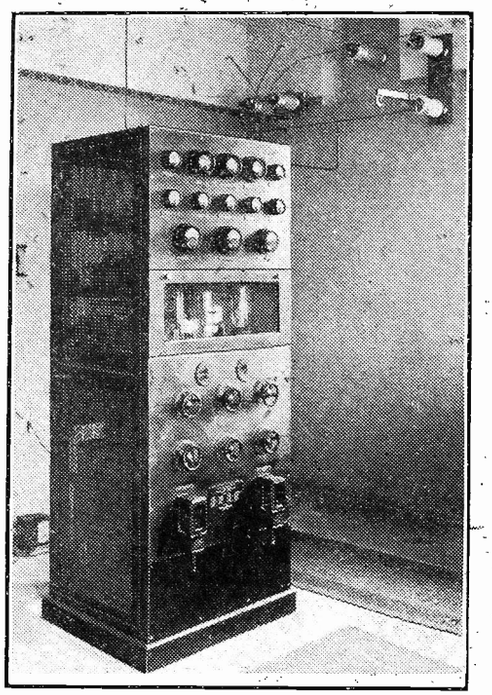
The side tone reception I heard indicated that the quality is good, although, frankly, this is hardly what one would expect from the type of modulation circuit used. It is what is known as grid modulation, and is the system used by many British amateurs.

It is generally reckoned to give good percentage modulation, although the quality is not excellent, but there was certainly no fault to find with the Poznan transmissions, as many short-wave enthusiasts in England can testify.

I asked how it was that the power output had been doubled, for although it is now just over a kilowatt, it was, until last year, only just over half that.

I was taken into the control-room of the main broadcasting station and shown the generators for the short-wave plant. There are two 2,000-volt H.T. generators which are now connected in series, giving 4,000 volts, and which have enabled the power thus to be put up There is a separate little generator which, they told me, gives the grid bias at 250 volts.

CRYSTAL CONTROLLED



The Poznan Short-Wave transmitter is crystal controlled and specially screened. It doesn't look a very big instrument with which to cover the world, does it? But an effective short-waver can achieve astonishing ranges with comparatively low power.

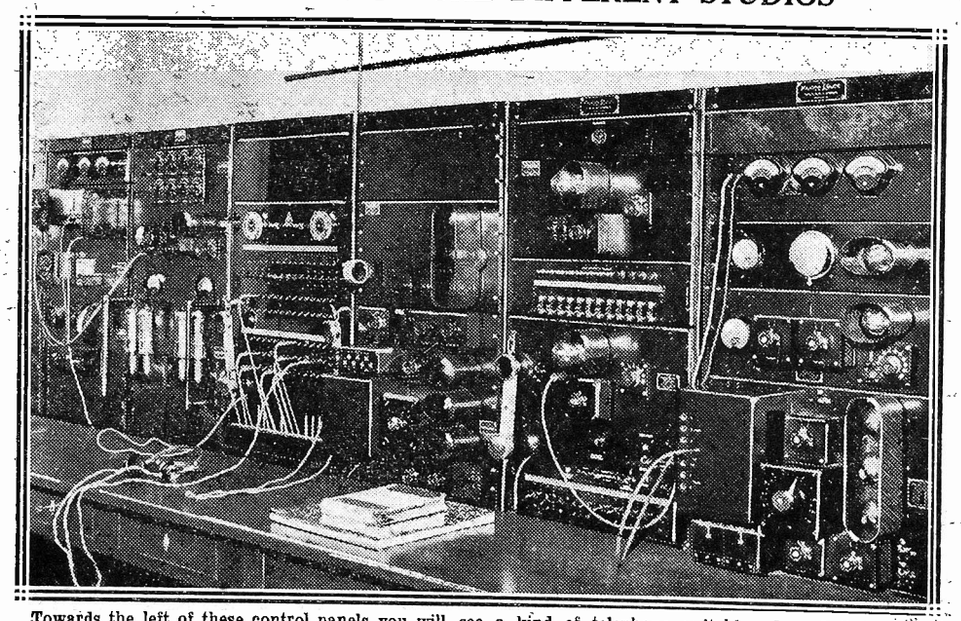
The control gear for the short-waver is also in the control-room of the medium-wave station. There is rather a long landline from the studio to the control, so on the desk is a little 10-watt speech amplifier—a single L.F. valve-job—which boosts up the speech input.

Up-to-date Aerials.

As at most short-wave stations, the aerial has been somewhat of a trouble because short-wave aerial theory is constantly varying and the Poznan engineers have tried to keep always up to date.

Out in the grounds I found that there was a short aerial known as the half-wave type. Now that arrangements have been made to use the broadcasting station masts for the short-wave aerial, the engineers are copying one of the Koenigswusterhausen short-wave aerials and are hoping to get still better results.

PLUGGING-IN TO THE DIFFERENT STUDIOS



Towards the left of these control panels you will see a kind of telephone switchboard, and it is with this that the engineer connects the Poznan transmitter to any one of a number of studios and landlines.

A HANDY RESISTANCE.

ALMOST useful resistance for many purposes can be made out of an ordinary lead pencil, which should preferably be of the 2H grade.

Sharpen the pencil at both ends, and then at each end make an electrical connection by wrapping the lead points with several turns of fine bare wire. Afterwards, a layer of silver paper may be placed over the turns of bare wire, and then, over the tinfoil layer, a few turns of heavier wire may be wound on and retained permanently and securely in position by means of a spot or two of liquid glue.

A pencil got up in this manner has a resistance of something like 300 ohms—the harder the pencil, of course, the higher being the resistance.

USEFUL FOR TESTING

You can use it as a safeguarding resistance, as explained in the article.

In testing out delicate instruments, voltmeters, ammeters, and so on, it is a very handy little device.

Attached to an H.T. battery unit, also, it will act as a safeguarding resistance, enabling the current for the valves to flow freely, but absorbing the heavy flow of current which would take place in the event of any accidental short-circuiting of the H.T. system. For this purpose, the pencil-resistance could be permanently secured in place within the H.T. battery box.

AN UNUSUAL FAULT—

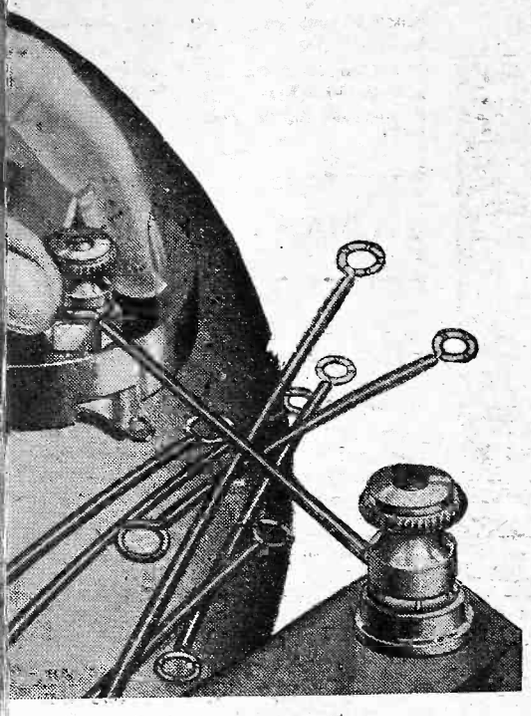
which would have interested Miss Muffit!

A FEW evenings ago the signals from my fairly powerful mains set began slowly but very surely to fade away, until after about five minutes only a whisper remained.

As the outfit was a radio-gram, whose "innards" were not readily accessible, I determined, after assuring myself that it was not a station "fade," to examine externals first.

Result—a double-pole, double-throw porcelain switch, used for earthing the aerial, had attracted the attention of a large spider, which, when I appeared on the scene, was busy spinning its web across two of the springs, thus forming a reasonably effective "short."

The spider was despatched, the web removed, and all was well again. A.B.



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Wire your set with Jiffilinx. You will be delighted with the ease and rapidity as well as the neat appearance of the finished job. What is more you will be sure of perfect contact throughout.

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Each packet contains 40 Jiffilinx in various lengths—ample to wire a large set. Jiffilinx can be used over and over again. Changes in wiring can be made instantly and errors corrected without wastage.

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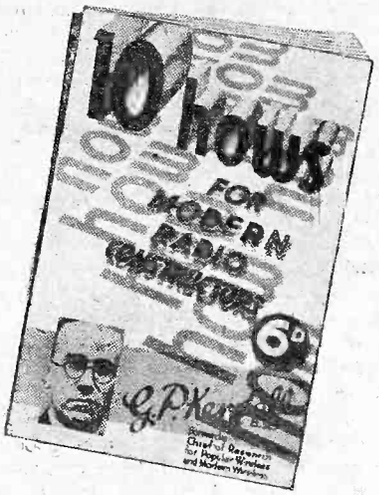

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(*Cross out items not required.*)

Name.....

Address.....

..... P.W. 10/10/31.

BROADCASTING IN IRELAND

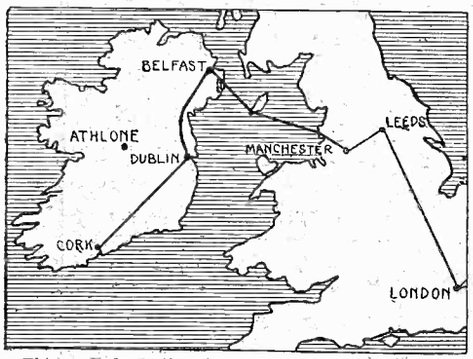
1. AN 80-KW. STATION FOR THE IRISH FREE STATE.

Following his recent tour of B.B.C. stations in the North for "Popular Wireless," Mr. Leslie W. A. Baily visited Ireland, and he has written three extremely interesting articles on broadcasting in the Free State and in Ulster. The first appears below.

ON the site of the old Dublin General Post Office, which was sacked in the 1916 rebellion, a mammoth new building is rising. Here all the administrative activities of the Department of Posts and Telegraphs (which is the Irish Free State's equivalent to our Post Office) are being centralised, and in the part which is now finished I found the studios and offices of the Dublin broadcasting station.

The fact that (except for the transmitter) the broadcasting station has its being under the roof of the General Post Office was the first indication of the Civil Service status of broadcasting in the Irish Free State. Others soon followed.

FRIENDLY LINKS



This map shows the proposed location of the Irish high-power station at Athlone. It also indicates the land-line route used when Irish stations relay a B.B.C. programme.

The officials, who are all Post Office servants, were eager to show me round the station, but when I asked questions about Policy they referred me to Dublin Castle.

A Question of Policy.

This is perhaps the most striking of all the differences between the Free State's system of broadcasting and that of Great Britain. The B.B.C. has complete responsibility for broadcasting; but in the Irish Free State the job of broadcasting officials is simply to organise the daily programmes. Questions of policy are not their business.

And so it was to Dublin Castle, the seat of Government, that I went to find out on what general lines the Free State is running its broadcasting. I interviewed the Assistant Secretary to the Department of Posts and Telegraphs, Mr. B. de Brit.

"State control is proving satisfactory, and is not likely to be changed," said Mr. de Brit. "Our system is that a sum of money is voted by the Dail, our Parliament, for the broadcasting service.

Paying for the Programmes.

"The vote for 1931–32 was £78,784, which included certain estimated expenditure on the proposed high-power station.

"Revenue for broadcasting is obtained from three sources. First, receiving licences. Over 26,500 have now been issued. Each costs ten shillings, and the entire revenue from this source goes to broadcasting, less a charge taken by the Post Office to cover the cost of collection.

"The second source is a tax on wireless apparatus imported into the Free State. In 1930–31 this brought in £35,000. The third source is the revenue from sponsored programmes.

"I would emphasise," added Mr. de Brit, "that our sponsored programmes are still experimental. We ran them occasionally between last October and March, when they produced a revenue of £510, plus the saving to us in having these programmes paid for by outside advertisers.

Revenue from Advertisements.

"We started them again on September 1st, and we shall run them through the winter. Their future will depend upon developments with the high-power station."

While he was unwilling to express an opinion on them, Mr. de Brit said emphatically that sponsored programmes have not been a failure. There have been no complaints from the public about them.

"And what about the high-powered station?" I asked.

"Everything is ready," replied Mr. de Brit. "The Marconi Company is well advanced with the construction of the 80-kw. transmitter, at its Chelmsford works. The building plans are completed.

"A site at Athlone is considered suitable from a technical point of view, but there has been some delay in its acquisition. A final decision will be taken very shortly. Building operations will then commence immediately."

"How long," I enquired, "will it be after that before the station is in service?"

"Including time taken for tests, at least eight to ten months, and possibly twelve," was the reply.

The New Station.

The studios will remain in Dublin when this giant station is opened in the centre of Ireland. The Free State's present transmitters at Dublin and Cork have a power of only 1·5 kw. each, and their range is accordingly limited.

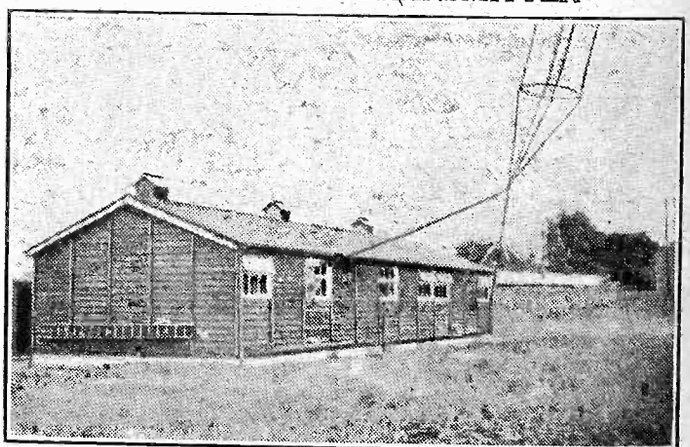
Large areas of the Free State are beyond the range of Free State programmes. It is the aim of the high-power station to cover the whole of the Free State.

Its transmissions will undoubtedly be heard in England at great strength. I was told by many people in Ireland that the B.B.C.'s North Regional station (which has a power of slightly *less* than that to be used at Athlone) is a very strong signal over there. North Regional and Daventry National are popular programmes with Irish listeners.

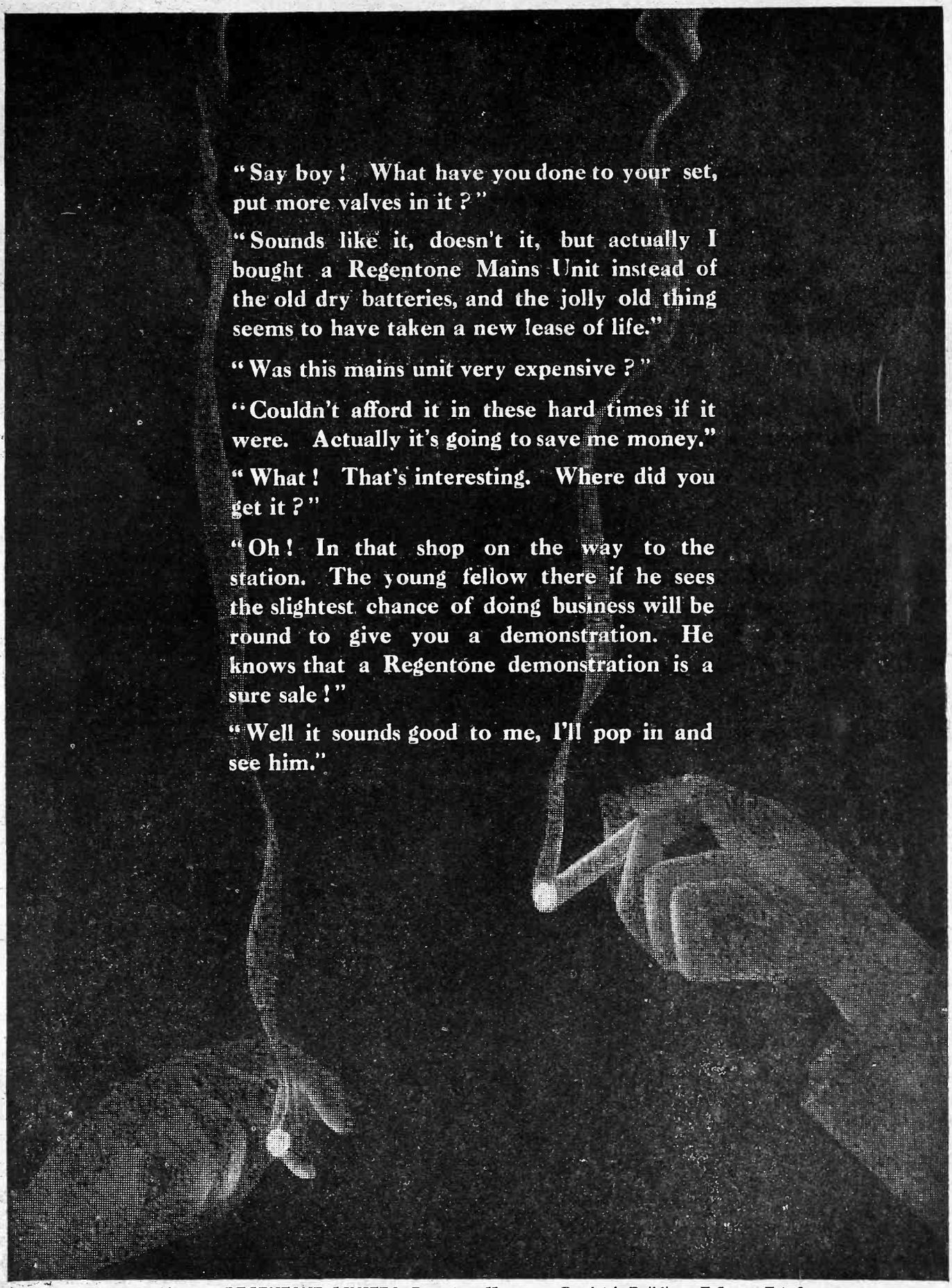
Mr. de Brit informed me that the future of the Dublin and Cork transmitters cannot be foreseen, but I gather that it is probable

(*Continued on page* 318.)

THE DUBLIN TRANSMITTER



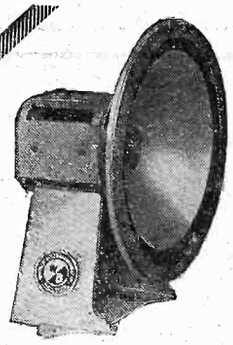
The building which houses the 1½-kw. transmitter used by the Dublin station, which, by the way, broadcasts on a wave-length of 413 metres.

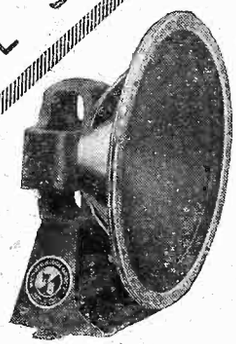


Write for Free Art Booklet to:—REGENTONE, LIMITED, Regentone House, 21, Bartlett's Buildings, E.C.4. Tel. Central 8745 (5 lines).

Irish Free State Distributors: Kelly & Shiel, Ltd., 47 Fleet Street, Dublin.

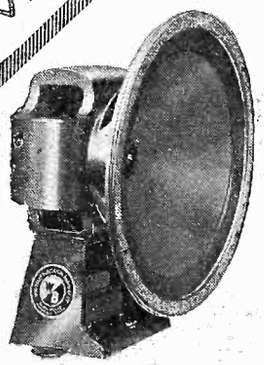
NEW PERMANENT MAGNET MOVING COIL SPEAKERS





P.M.3. Entirely new model at astonishing price. Gives true moving coil reproduction from any receiver capable of working an ordinary cone speaker. Weight of Cobalt Steel Magnet 5 lbs. Chassis only - - - **45/-** Three-ratio output Transformer extra 7/6.

Give your set the speaker it deserves—a modern moving coil speaker. Give it the most practical form of moving coil reproduction--PERMANENT MAGNET. *Give it "W.B."* "W.B." are pioneers in this field. These three new models are the most reliable and efficient PERMANENT MAGNET Moving Coil Speakers that radio has known. *Write for Art Booklet "Speaking of Speakers"—* FREE.



P.M.2. Identical with P.M.1 except that weight of Sheffield-made Cobalt Steel Magnet is 6 lbs. Has sold in thousands this summer. Chassis only. £3.10.0. Three-ratio output Transformer extra 15/-.

P.M.1. The original, but with new chassis. Extremely sensitive. No hum, boom or resonance. Massive Darwin Cobalt Steel Magnet weighs 11½ lbs. Chassis only £5.5.0. Three-ratio output Transformer extra 15/-

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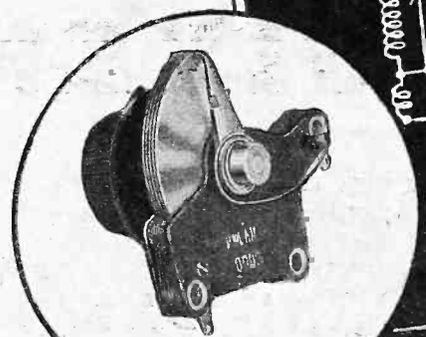

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A solid dielectric specially designed for use as Reaction or Tuning condenser. Perfectaction. Bonded rotor vanes. Finely built. Price includes knob.

·0003, ·00015, ·0001, ·00005 .. .. .. **2/6**
·0005 .. .. .. **2/9**
REACTION No. 4 CONDENSER, ·0001, ·00015, ·00025 **3/9**

DIFFERENTIAL CONDENSER

Direct Drive. Constructed of highest quality materials. Smooth action gives very accurate control. Insulated spindle. Supplied with knob.

·0001, ·00015, ·0003, **3/-**

Slow Motion Type in same capacities as above **6/6**

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Polar Works, Old Swan, LIVERPOOL.

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The Editor will be pleased to consider articles and photographs dealing with all subjects appertaining to wireless work. The Editor cannot accept responsibility for manuscripts or photos. Every care will be taken to return MSS. not accepted for publication. A stamped and addressed envelope must be sent with every article. All inquiries concerning advertising rates, etc., to be addressed to the Sole Agents, Messrs. John H. Lile, Ltd., 4, Ludgate Circus, London, E.C.4.

The constructional articles which appear from time to time in this journal are the outcome of research and experimental work carried out with a view to improving the technique of wireless reception. As much of the information given in the columns of this paper concerns the most recent developments in the radio world, some of the arrangements and specialities described may be the subject of Letters Patent, and the amateur and the trader would be well advised to obtain permission of the patentees to use the patents before doing so

QUESTIONS AND ANSWERS

MAXIMUM STRENGTH OF A SHORT-WAVER.

Q. S. T. (Coventry).—"I propose to make a short-wave set solely and simply for the kick of the long-distance reception. Being able to read the Morse code at twenty-five words a minute, I am out particularly for American amateurs.

"Would it be an advantage to use a 7 to 1 ratio L.F. transformer as giving a greater step-up instead of the usual 3½ to 1, in order to get greater amplification?"

Certainly it would be advantageous, and even for the reception of American broadcasting you probably would not find that the transformer introduced noticeable extra distortion, even if the set was not designed for a high-ratio instrument.

BACK NUMBERS OF "P.W."

Back numbers of "P.W." are obtainable from the Amalgamated Press, Ltd., Back No. Dept., Bear Alley, Farringdon Street, London, E.C.4, price 4d. per copy post free.

DROPPING THE VOLTS BY A RESISTANCE.

R. D. (Sussex).—"I have 200 volts available, but wish to drop it down to about 150 volts. What is the resistance required for this?"

For the reason to be given further on you will have to calculate this out for yourself. It is very easy to do by means of Ohm's Law.

One way of stating Ohm's Law is to say that $R = \frac{V}{I}$. We can call the resistance R, the volts to be absorbed by that resistance V, and the current (to be passed by the resistance) I.

You will now see that in order to solve the equation in your case it is imperative to know the current to be passed. This you do not mention.

This current, of course, is the anode current which must flow through the "dropping" resistance, and is easily ascertained either by measurement, or by calculation from the manufacturer's literature on the subject.

Suppose, for instance, that you find the resistance (R) must pass a current (I) of 1 milliamp, then the equation is easily solved because the required resistance (R) will be equal to $\frac{50}{.001}$ amps.

The 50 volts are, of course, those to be absorbed by the resistance and the .001 is the 1 milliamp expressed in amperes. It will be seen that the answer to this is 50,000, and this is approximately the number of ohms required in this instance.

Other values may be worked out in exactly the same way.

(*Continued on page* 312.)

YOUR BIT TOWARDS ECONOMY

Have you ever thought how difficult it is for a newsagent to order just the right number of copies of any particular paper each week? You can make his task much easier if you place a regular order with him. You will not only help him to order correctly and avoid waste but will make sure of getting your copy regularly each week.

A Set can never be any better than its Transformer

No matter how carefully the receiver may be planned; no matter how expensive the components; it is not possible to obtain better reproduction than that permitted by the audio frequency transformer.

This is one of several reasons why the expert, when designing a set for quality reproduction, specifies Ferranti as a matter of course.

There is no better Transformer than Ferranti

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AF4. Ratio 1 to 3½ 17/6
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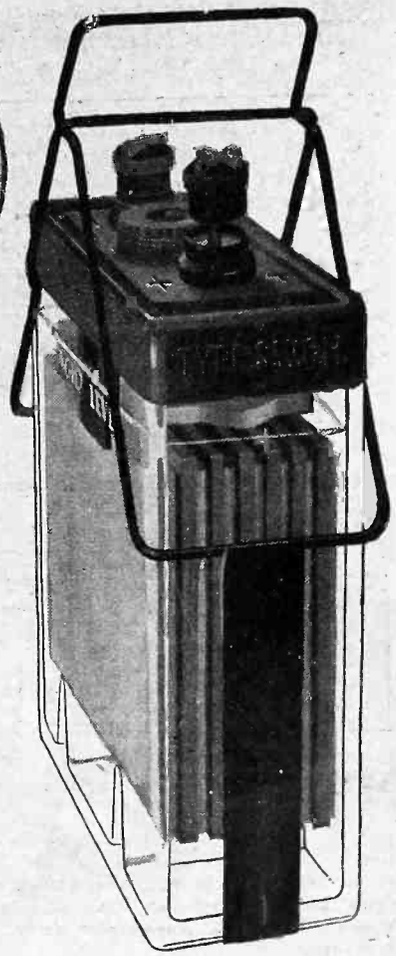
THE FULLER LIFE PRESERVER does lengthen battery life



Enlarged view of LIFE PRESERVER

Immediately you discharge a battery below a certain point you shorten its life. How are you to tell when this point is reached? It is simple with the Fuller Life Preserver. When the red ball sinks you should charge your battery. Fuller Batteries have more points of superiority than any other. They are dry charged, and have Fuller micro-porous plates to ensure long life, patent double grease-cup terminals to guard against acid corrosion, red and blue collars and embossed polarity signs on the nuts to prevent incorrect connection. Patented free carrier. Prices lower than ever. Standard plate types available in glass (S.W.G.H.), in celluloid (S.W.X.H.), or in ebonite (S.W.E.H.) containers.

2 VOLT
STANDARD PLATE TYPES SWGH—SWXH —or SWEH

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20	...	8/3
30	...	10/3
40	...	12/3
50	...	14/3
60	...	16/3

†Actual at 20 hour rate.

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Given an undistorted input the reproduction of speech and music is as near the original performance as has yet been attained by any type of speaker. Sensitive enough to operate from a two valve receiver; powerful enough to handle the output from large power amplifiers.

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Compare the R. & A. 100 with any other P.M. Moving Coil Speaker at any price, and you will realise there is none to equal it for sheer value. Ask your dealer to demonstrate and do not be put off with costly or inferior substitutes. If any difficulty write us. Descriptive leaflet sent free on request.

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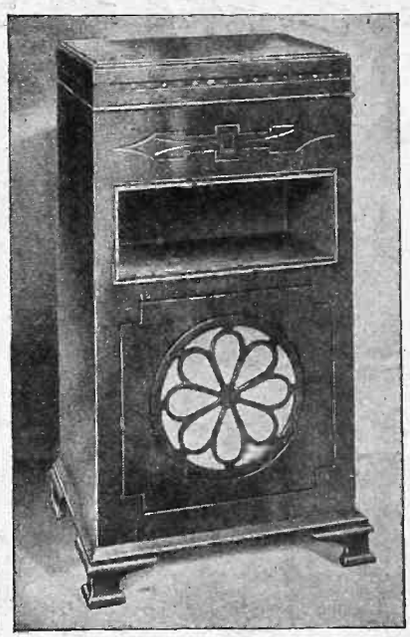
A FIRST-CLASS RADIO-GRAM CABINET



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'Phone: HOL. 8202.
Works: S. Croydon.

RADIOTORIAL QUESTIONS AND ANSWERS

(Continued from page 310.)

CONTRADYNE COILS.

T. G. S. (Bristol).—24 D.S.C. (60 turns) should be used for all Contradyne coils unless some other gauge of wire is specially stated.

THE "POP-VOX" FOUR.

E. P. H.—"I see that the above set was described in 'P.W.' last week. I have been waiting for it for some time, but find that in accordance with recent practice it has 'Extenser' tuning.

"At present I do not wish to go to the expense of buying Extensers, but should like to incorporate them afterwards, and I hope, therefore, that at some time you will give instructions for wiring it with ordinary condensers and wave-change switches, for those who would like to construct the set on those lines."

It is not at all difficult to use ordinary tuning condensers and wave-change switches for this circuit. But some little care is necessary in the arranging and spacing of the leads to the switches, or otherwise instability or reduced strength may be the result.

One great advantage of the use of Extensers is that wave-change wiring is automatically shortened and simplified, the actual change-over being made in the tuning circuit by the self-change contacts on the Extenser itself.

If wave-change switches are to be used instead, mount them under the respective tuning condensers and try to keep the wiring well spaced and yet direct.

The switch under the first Extenser may be an ordinary 3-point wave-change switch. The other switch (to be mounted under the Extenser in the centre of the panel) must be of the four-contact wave-change type, or else must have a metal plunger to which a flex lead can be taken, to provide a fourth contact, in the manner so often described in "P.W."

The fitting and wiring is really quite straightforward, and in the case of the first switch (under the aerial condenser) can be described in just a few words.

As far as the condenser is concerned, the fixed and moving vanes can be fixed exactly as at present. In addition, the lead joining X on the P.J.2 unit to the ·001 compression condenser must be joined to one contact on the wave-change switch.

A second contact on that switch must be joined to the wire that joins Y on the P.J.2 to 2 on the long-wave coil.

Finally a third contact on that switch would be connected to the moving vanes of the Extenser. And that is all.

When the switch is "on" all the contacts will be joined together and the tuning will be on ordinary wave-lengths. When the switch is "off" the condenser will tune over long waves.

In the case of the second stage there are four contacts to be joined—three switch points as before, and a fourth which may be either a flex lead to the metal plunger, or the fourth contact on a four-contact switch.

One contact goes to the junction between X on P.J.3 and the tapping on the long-wave coil.

Another contact goes to the junction of Y and 2. A third contact goes to the junction of Z and 3. And finally a fourth contact (for the flex if used) goes to the moving vanes of the second tuning condenser.

That completes the alterations.

THE "SUPER-QUAD" WITH EXTENSER.

R. W. B. (Teddington).—"I would like to make the 'Super-Quad,' but am disappointed to see there is no Extenser in it. Could this be arranged instead of ordinary tuning and switching?"

The advantages of the Extenser can be incorporated in a "Super-Quad" circuit, and indeed a full description of such a set—very similar otherwise to the "Super-Quad" in "P.W." dated August 22nd—appears in the October enlarged number of "Modern Wireless." It is called "The 'M.W.' Super-Quad," and a full-sized blue-print is given away with every copy of the October "M.W."

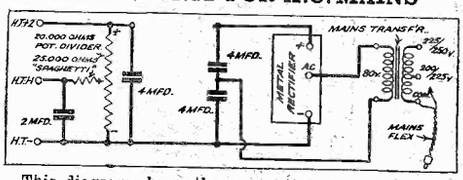
FINDING A FAULT.

P. H. H. (London, S.W.5).—"I never believe in looking for trouble, but I realise how much my set means to me, and I should hate to be without wireless now. Although my 'Pop-Vox' is going good (touch wood!), if anything

(Continued on page 314.)

MISSING LINKS, No. 19

AN H.T. UNIT FOR A.C. MAINS



This diagram shows the connections for obtaining H.T. from A.C. mains, using a metal rectifier. But one of the "components" has purposely been omitted. Can you fill it in correctly?

(Look out for the answering diagram next week.)

"HULLO! WHAT'S WRONG WITH THE SET?"

Perhaps the switching doesn't work properly? Or some mysterious noise has appeared and is spoiling your radio reception?—or one of the batteries seems to run down much faster than formerly?

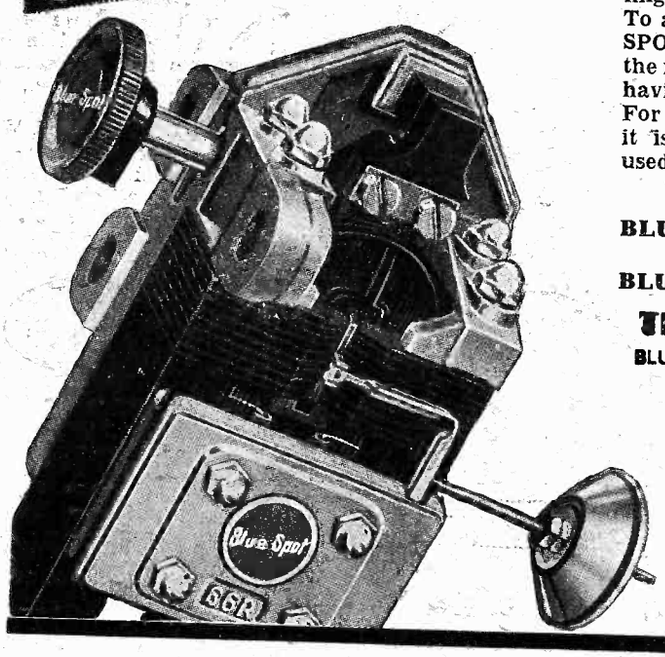
Whatever your radio problem may be, remember that the Technical Query Department is thoroughly equipped to assist our readers, and offers an unrivalled service.

Full details, including scale of charges, can be obtained direct from the Technical Query Dept., POPULAR WIRELESS, The Fleetway House, Farringdon Street, London, E.C.4.

A postcard will do. On receipt of this an Application Form will be sent to you post free immediately. This application will place you under no obligation whatever, but, having the form, you will know exactly what information we require to have before us in order to solve your problems.

LONDON READERS, PLEASE NOTE: Inquiries should **NOT** be made by 'phone or in person at Fleetway House or Tallis House.

SO GENTLE SO POWERFUL



The last whisper of a muted violin, the swelling crescendo of a mighty organ are reproduced with equal exactitude. To achieve such perfection requires tremendous flexibility. BLUE SPOT 66R is flexible to the n'th degree. There is no vibration in the musical range that it cannot handle with ease. Even with sets having an enormous output distortion and rattle are entirely absent. For genuinely magnificent performance and superb reproduction it is impossible to better BLUE SPOT 66R, especially if it is used, as it ought to be, in conjunction with a BLUE SPOT Chassis.

Your dealer will demonstrate BLUE SPOT with pleasure.

BLUE SPOT UNITS: 66K..25/-; 66P..27/6; 66R..35/-; 100U (with chassis)..39/6.

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THE BRITISH BLUE SPOT COMPANY LTD.

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Write for Catalogue P.W. 11 which gives full details of Blue Spot Units.

Blue Spot

Registered Trade Mark

How to get MORE VOLUME and better quality reproduction WITHOUT PAYING MORE FOR IT!

WHEN you replace your power or super-power valve with a Lissen Power Pentode you increase the amplification of the last stage of your receiver to an enormous degree. For instance, the amplification factor of an ordinary power valve is seldom more than 10—while that of the Lissen Power Pentode is never less than 90! Think of the difference that makes to your set—how it converts a whispering foreign station to fine, full loudspeaker strength, and makes the "local" give you a torrent of pure sound.

GETTING PENTODE OUTPUT FROM BATTERY SETS

No need to alter your receiver at all. Simply replace your power valve with a Lissen Power Pentode. *The same battery drives this powerful valve*—no increase in current consumption takes place at all. That is why this valve is called the LISSEN *ECONOMY* POWER PENTODE—it gives you more volume for the same money!

The valve to ask for is the Lissen P.T.225 — the

LISSEN ECONOMY POWER PENTODE 12/6

OTHER TYPES AND PRICES:

H.L.210-**5/6** H.210-**5/6** L.210-**5/6** P.220-**7/3** P.X.240-**8/-**
S.G.215-**12/6**. 4-volt and 6-volt types also available.

LISSEN LIMITED, WORPLE ROAD, ISLEWORTH, MIDDLESEX.

RADIOTORIAL QUESTIONS AND ANSWERS

(*Continued from page* 312.)

went wrong with it I should not know in the least how to find where a fault lay.

"I suppose there is a proper method? If results suddenly got weak, for instance, what would be the correct process for rapidly discovering the source of the failing?"

Even the most complex set will quickly yield up its secret if it is tested stage by stage.

Whatever complications may be involved in a valve circuit, it always consists of an output from a tuning coil and condenser, which is applied across the grid and filament of the first valve. The plate circuit of this valve has an output which is handed to the next valve's input (i.e. between its grid and filament), and this valve, in turn, has a plate output.

This output, also, is applied to the next valve in the chain of amplification, and finally the loudspeaker results appear either directly in the plate of the last valve or in the output filter circuit associated with this. Once these points of input and output are recognised, it is quite a matter to check the performance of the various valves, etc., by listening in turn to the various stages.

As an instance, suppose your "Pop-Vox" started to give weak results, the first thing you could try would be to test the loudspeaker itself by the substitution of another one; or, at a pinch, by listening for a moment with 'phones.

ONE SECTION THUS PROVED O.K.

Having thus assured yourself that the poor results were in the set, and not caused by the loudspeaker, you could use this latter, or the 'phones, as a testing instrument to determine where the fault lay. If, for instance, there is some fault in the output circuit itself, it would immediately be shown up by connecting the loudspeaker terminals in place of the filter circuit's output choke.

Normally, the output choke hands over the programme to the loudspeaker circuit, so if you found, on connecting the loudspeaker in place of the output choke, that results were normal, you would know that it was somewhere *after* that point that the fault lay—namely, in the loudspeaker filter circuit itself.

But if results were found to be just as poor at the output choke as before, you can exonerate the loudspeaker connections, the filter condenser, etc.

To test the preceding stage, replace the output choke connections, but undo the primary of the low-frequency transformer (the terminals marked H.T. + and A).

Connect the loudspeaker leads in the place of the primary itself, switch on again, and note results. If there is a sudden improvement in comparison with the last test, you may be sure either that your low-frequency transformer itself is wrong or some of its associated apparatus, such as the grid-bias tapping (G.B. — 2), or that the last valve itself is not working properly.

A STAGE AT A TIME.

Do not forget, however, that in "checking back" in the circuit in this way results progressively get weaker as you cut out the various stages of amplification. For you naturally could not expect that the loudspeaker in place of the low-frequency primary would give results as *loud* as you are accustomed to.

Nevertheless, a bad fault would be shown up clearly, because if the last valve or transformer were wrong the results obtained by the loudspeaker connected as described would be normal in quality, and much better than when it was in its usual position, but with a faulty component or valve in front of it.

If, however, very poor and faulty results were still to be heard when the low-frequency transformer and last valve had been cut out of circuit, you could carry the test a step further and discover what is happening in the detector.

For this purpose you really need the pair of 'phones, rather than a loudspeaker, because the latter is not sensitive enough to give a satisfactory test, though it could be used as a last resort. With telephones, however, you have the exact equivalent of a one-valve set when the telephones are connected in place of the 100,000-ohm resistance in the plate circuit.

The set should then behave exactly as an ordinary one-valver. Reaction and all the effects normally associated with the detector should be good, and it should be possible to tune in a dozen or more foreign stations quite easily and at good volume if the set is O.K. up to this point.

If, however, it is still faulty, the process of elimination, stage by stage, can be carried still a step further. You could cut out the selector coil, for instance, by connecting the aerial direct to the A terminal on the medium-wave coil.

Should it happen that this immediately improved matters, the probability is that you have found the fault, and that the selector coil itself is faulty. Note, also, whether switching over to the long waves improves matters, in which case the fault, of course will lie in one of the short-wave coils.

The first valve itself may be substituted by the second L.F. valve, just to determine whether it is working properly, and if the latter gives much better results you would at once have proved that the fault lay in the detector valve itself.

By tackling the job systematically in this way, it is possible easily to trace and locate the circuit in which the fault lies, and then, by substitution of the components as far as possible, to discover which is the offender.

Just at first, when you are not familiar with the various circuits, and of what they comprise, it may sound confusing, but it is on this principle of stage-by-stage investigation that the expert is able to simplify the search for a fault in even the most complex receiver.

"P.W." PANELS.—No. 40—WAVE-BANDS.

Groups of adjacent wave lengths allotted to any purpose (such as broadcasting) are known as wave-bands.

* * *

Europe has two main wave-bands for broadcasting.

* * *

The long-wave broadcasting band includes all wave lengths from 2,000 to just below 1,000 metres.

* * *

The "medium," or ordinary wave-band (sometimes wrongly called the "short" wave-band to distinguish it from the long wave-band), extends from just below 200 metres to about 600 metres, where it more or less begins to merge with the long waves.

"FREE G.B."

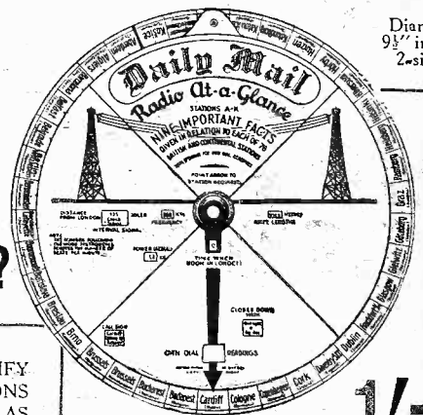
"TOMMY" (Battersea, S.W.).—"Please give the number and date of the 'P.W.'

(*Continued on page* 316.)

QUALITY AND QUANTITY MAKE Player's Please

THE FULL VALUE CIGARETTE

HAVE YOU GOT YOUR DAILY MAIL RADIO CHART?



Diameter 9½" inches. 2-sided.

- HOW TO IDENTIFY FOREIGN STATIONS
- AND GET THEM AS
- YOU WANT THEM.

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ANSWERS NINE OF THE **MOST FREQUENTLY ASKED QUESTIONS** CONCERNING EACH OF THE **76 BRITISH & CONTINENTAL STATIONS.**

A BLANK WINDOW IS PROVIDED FOR MAKING A **PERMANENT RECORD OF ALL YOUR OWN DIAL READINGS.**

EVERYBODY'S USING IT!

GET YOURS TO-DAY.

"The cleverest thing of its kind ever devised."

AT ALL RADIO STORES, STATIONERS, BOOKSELLERS, ETC., OR WRITE DIRECT TO FRANK PITCHFORD & CO. LTD., WELL ST., LONDON, E.C.1

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CRITICAL
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Capt. P. P.
Eckersley

—world-famous as one of the pioneers of broadcasting with the Marconi Co. and the B.B.C.—is now Wireless Editor of *The Daily Mail*. His brilliant and outspoken article every Wednesday is one outstanding feature of the day-to-day service for the listener provided by The

DAILY
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Tests Everything!
VALVES
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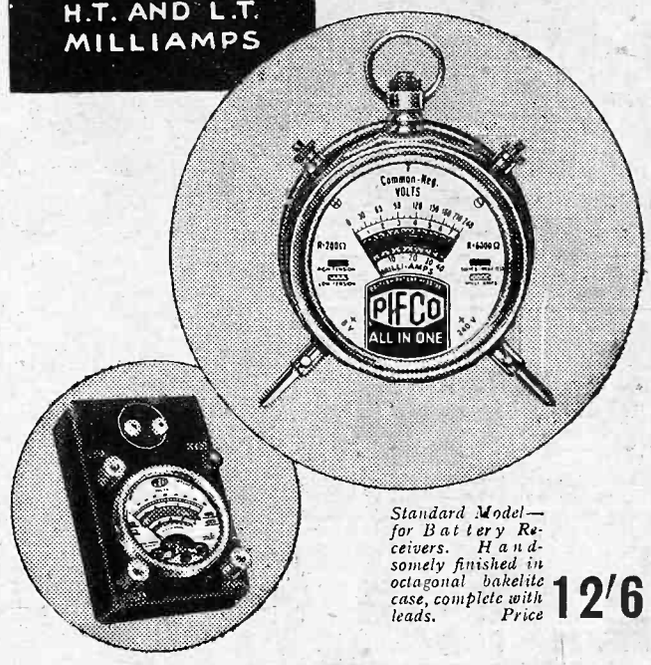
H.T. AND L.T.
MILLIAMPS

AS INDISPENSABLE AS A CLOCK



Standard Model—for Battery Receivers. Handsomely finished in octagonal bakelite case, complete with leads. Price 12/6

De Luxe Model, 125,000 ohms Resistance, for Electric Receivers, Mains Units, and Battery-operated Sets. In maroon, Bakelite case, complete with cables. Price

£2:2:0

The innermost problems of your radio can be easily diagnosed—with an "All-in-One" Radiometer. This wonderful little instrument enables you to keep a constant check on the conditions of every part of the set.

Electric Current, Valves, Batteries, Circuits, Components—everything can be kept under perfect supervision, and the slightest variation in performance instantly traced to its source.

The Sherlock Holmes of Radio.

The "All-in-One" Radiometer will save its first cost over and over again by safeguarding your set and making you independent of expensive expert assistance.

Obtainable at all Stores and good class Radio Dealers. Booklet free from Patentees: PIFCO LTD., HIGH ST., MANCHESTER.

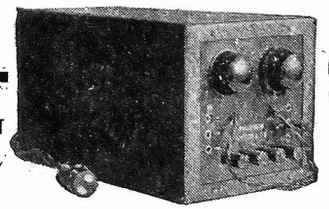
PIFCO ALL IN ONE RADIOMETER

P.2A

GIVE YOUR OLD BATTERY SET a New Lease of Life!

By fitting—

9/- DEPOSIT



9/- PER MONTH

The Philipson SAFETY ALL-POWER UNIT

(*Patent No. 353,357 Under Licence.*)

WESTINGHOUSE RECTIFIERS.

H.T.—3 tappings — 60/75v., 0/120v., 130v., at 20 m.a.

L.T.—2v., 4v. and 6v.

G.B.—1½v., 4½v. and 10v.

Price: **£4.17.6**

The set itself may be quite good, but it can never give first-class results while subject to a voltage that is never constant and is always decreasing! And then look at all the trouble and expense of new batteries every so often!

Write for details or see us at STAND 132, Manchester.

Made by the makers of "**The Safety All Electric Band-Pass 3.**"

PHILIPSON & CO., LTD. Est. over 50 years.

ASTLEY BRIDGE, BOLTON.

'Phone: 2038. *'Grams: Safety, Bolton.*

RADIOTORIAL QUESTIONS AND ANSWERS

(*Continued from page* 314.)

which had an article on 'Free G.B.,' with small diagram showing connections and decoupling values."

The article was entitled "The £ s. d. of Free G.B.," and it appeared in "P.W." No. 484, September 12th, 1931. (Back numbers of "P.W." which are still in print, but unobtainable locally, can be purchased from The Amalgamated Press, Ltd., Back Number Dept., Bear Alley, Farringdon Street, London, E.C.4, price 4d. per copy, post free.

CONVERTING THE "COMET" TO P.J. COILS.

S. W. E. (Brighton).—"In all, I got over seventy stations on the 'Comet,' most of these being obtained while I lived in Hounslow. Last March I moved to Brighton, and with a rather poor aerial (the best I can do) results were not so good.

"There was interference from ships with the weaker foreigners at top and bottom of the dial, and for this reason I paid more attention to long waves than formerly.

"Reception on long waves had never seemed so good as the medium waves (200-600 metres), and Radio Paris and Daventry were the only strong stations on long waves. Your department's suggestions re aerial were, unfortunately, impossible to carry out, but I found some improvement from the 'Inter-wave' wiring, with resistance across the ·002.

"I am still not satisfied, however, and should like to try the new P.V. coils instead of the 'P.W.' dual-range coil, if this can be done easily.

"What are the connections necessary to put in the later type of coil?"

It would be quite easy to make the change over, and we suggest that you use a P.J.1 coil for medium waves, and a coil quoit for the long waves.

(Details of windings for the P.J.1 were given in "P.W." No. 475, and a suitable long-wave coil quoit, with reaction, in Radiotorial, "P.W." No. 485, page 88.)

The original dual-wave coil and also the ·002 coupling condenser (with its resistance, if used) must be removed from the set.

The P.J.1 must be mounted in place of the original coil and the coil quoit must be placed on the base-board near where the ·002 was formerly located.

The new connections will then be as follows:

Leaving the aerial terminal connected to one side of the ·001, the other side of this will go to A on P.J.1. The X terminal on P.J.1 will go to one contact on the switch and to one tapping on the long-wave coil quoit; i.e. 30th or 60th turn from the "earth" connection.

"Earth" on the long-wave coil quoit will go to the moving vanes of the ·0005-mfd. tuning condenser, to another contact on the wave-change switch, to the "F_2" side of the differential reaction condenser, and to the set's earth terminal (which is joined to the 2-mfd. condenser, G.B.+, filaments, etc.).

Now "G" on the P.J.1 goes to the fixed vanes of the ·0005-mfd. condenser and the vacant side of the grid condenser (·0003, which was formerly joined to G on the old coil).

Y on the P.J.1 goes to "2" on the long-wave coil quoit and to the third contact on the switch.

The remaining connections concern reaction. First, R on the P.J.1 will go to the other fixed vanes of the differential; that is, to F_1. Finally, Z on the P.J.1 is connected to 3 on the long-wave coil quoit.

How the Switching Works.

The great point to remember is that when the switch is in one position, for the medium waves, all three spring contacts and metal plunger are *joined together*.

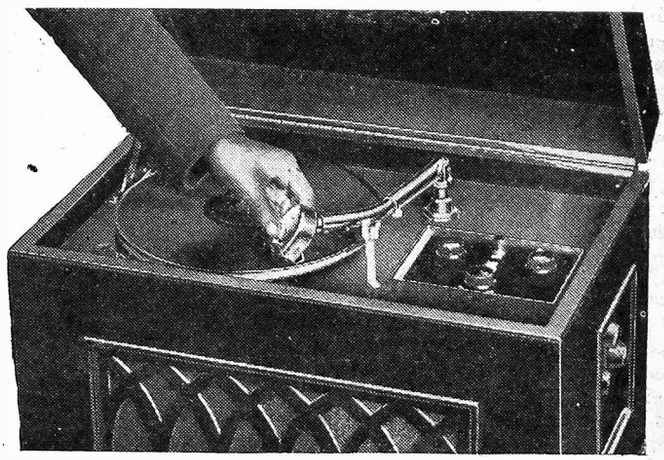
In the switch's other position (long waves) all the springs are disconnected from each other and from the metal plunger.

That completes the change-over, but two other points are worthy of mention. Firstly, the whole of the switch connections can be saved by using an Extenser, instead of an ordinary tuning condenser. In this case the three connections now going to the wave-change switch would go instead to the self-changer contacts on the Extenser.

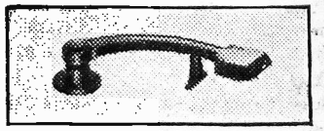
Secondly, if the set is ever used near a powerful local station it would be advisable to do away with the ·001 selectivity condenser (connected to the aerial terminal) and to use a Selector coil instead. (Its A terminal would go to the set's A terminal and its B and C terminals should be joined together and taken to the "A" of the P.J.1.) This would give additional strength as well as greater selectivity.

RADIO-GRAM ENTHUSIASTS!

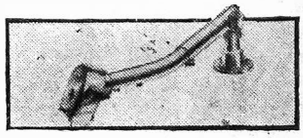
Here's the way to the best possible reproduction



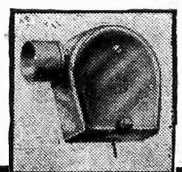
A well designed amplifier, a good moving coil speaker and—a B.T.H. Pick-up and Tone Arm. These are the ingredients for the finest reproduction of records. The recipe is recognised by leading Radiogram experts. And there's no need now to forego your B.T.H. Pick-up on the score of cost. The new B.T.H. "Minor" is a product of the same engineering principles that have made the "Senior" Model the standard of excellence where Pick-ups are concerned. **Ask your dealer for a demonstration.**



"Minor" B.T.H. Pick-up and Tone Arm Price complete **27/6**



"Senior" B.T.H. Pick-up and Tone Arm. Price **45/-**



"Senior" B.T.H. Pick-up only with adaptors. Price **27/6**

B.T.H. PICK-UP and Tone Arms

THE EDISON SWAN ELECTRIC CO., LTD.

155 Charing Cross Road, London, W.C.2

W165

MIRROR OF THE B.B.C.

(*Continued from page 268.*)

There is perhaps quite a number of other ople who know life in the underworld on th sides of the Atlantic as well as does r. Wallace, but there is certainly no one ho can describe it more vividly and more tertainingly than this man whose own rangely exciting career would in itself ake such a story that simply could not lp being a " best seller."

Perhaps one day we shall be told more of s life from the time he began to earn his ving selling newspapers in the streets, and ldiered as a private in the R.A.M.C. before became a war correspondent in South rica and brought off " scoops," including e first news of peace.

udeville Features.

Since then he has successively been ovelist, dramatist, film producer, racing xpert and criminologist, and everybody taking it for granted that, should he oose, he will become quite as outstanding nong those who face the microphone as is in everything else he tackles.

Repetition of names of vaudeville tistes is apt to get monotonous, so I will t mention those of famous radio stars ho are taking part in the programmes for ational and Regional listeners on ednesday and Saturday, October 14th nd 17th, respectively.

National listeners also get some vaudeville n Monday, October 12th. Another light rogramme is down for Tuesday, October 8th (National), and October 15th (Regional), hen Gordon McConnel will produce a vised version of the late Clifford Seyler's vue, " Peep-bo-hemia," which has been repared by Leonard Henry and John erwent.

Another forthcoming production is an peretta by Holt Marvell and George osford called " Good Night Vienna," which, cidentally, is one of the first specially ritten radio shows to be filmed. I under- and that Mr. Holt Marvell will shortly ssist Herbert Wilcox in the filming of it at he Elstree studios.

porting Broadcasts.

Now that running commentaries on ssociation football matches have been anned by the powers that be, listeners are eginning to notice the absence of broad- ast descriptions on outdoor sporting vents.

Quite likely we shall hear one or two ommentaries on speedway meetings before hristmas, while another sport, which so ar has received no attention from the icrophone, gets a look in on Saturday, ctober 17th, when Mr. W. J. Howcroft ill describe the Water Polo International atch between England and France which kes place at the Marshall Street Baths, ondon. The broadcast will also include a ommentary on the English 220 yards vimming championship.

An England and France sporting event so comes into the programmes on the revious Saturday, when Miss Eleanor E. elme, the well-known golfer, gives an ye-witness account of the match between dies representing their respective countries.

Real novelty and originality is displayed the idea of broadcasting a Somerset Harvest Home" to West Regional steners on Friday, October 23rd.

New Times Sales Co

We can supply any accessory advertised in "Popular Wireless" on EASY TERMS. Send US your next order. We guarantee you every satisfaction.

SECURE THE NEWEST RADIO TO-DAY ON REALLY EASY TERMS

MANUFACTURERS' 1932 KITS

COSSOR 234 EMPIRE MELODY MAKER
Screened-Grid, Detector and Power. With valves and cabinet **10/-**
CASH PRICE £6 15s. 0d. WITH ORDER
Balance in **11** *monthly payments of* **12/6.** Finished Instrument. Royalties Paid, **£7 10s. 0d.** Cash, or **£2** deposit and **11** monthly payments of **11/-.**

MULLARD 3, 1932 TYPE
Screened-Grid, Detector and Pentode. With valves less cabinet **11/11**
CASH PRICE £6 10s. 0d.. WITH ORDER
Balance in **11** *monthly payments of* **11/11.** Finished Instrument, with Valves and Cabinet. Royalties Paid. **£7 17s. 6d.** Cash, or **£2** deposit and **11** monthly payments of **11/9.**

OSRAM NEW MUSIC MAGNET 4
2 Screened-Grid, Detector and Power. With valves and cabinet **19/8**
CASH PRICE £10 15s. 0d. WITH ORDER
Balance in **11** *monthly payments of* **19/8.** Finished Instrument. Royalties paid, **£11 15s. 0d.** Cash or **£2** deposit and **11** monthly payments of **19/6.**

V.3 RADIO FOR THE MILLION
Screened-Grid, Detector and Power, with valves less cabinet **10/9**
CASH PRICE £5 17s. 6d. WITH ORDER
Balance in **11** *monthly payments of* **10/9.** Finished Instrument, with valves and cabinet. Royalties Paid, **£7 8s. 6d.** Cash, or **£2** deposit and **11** monthly payments of **10/10.**

SIX-SIXTY CHASSIKIT. Battery Model. Complete three gang band-pass tuning. S.G., Detector and Pentode. Cash Price with valves less cabinet .. **£6 17s. 6d.** Balance in **11** monthly payments of **12/7.** With **12/7** order

SIX-SIXTY CHASSIKIT. (A.C. Model) Complete as above with A.C. Mains Valves. Cash Price with valves less cabinet **£7 6s. 6d.** Balance in **11** monthly payments of **13/5.** With **13/5** order

ELIMINATORS

EKCO K.18 COMBINED H.T. ELIMINATOR AND L.T. TRICKLE CHARGER. Delivers 18 m/a. and suitable for 1- to 5-valve sets. S.G., 50/80v., 120/150. Charges at ·25 amp. at 2, 4 or 6 volts. Cash price **£4 12s. 6d.** Balance in **11** monthly payments of **8/6.** With **8/6** order

ATLAS A.C. ELIMINATOR TYPE A.C.244. 3 Tappings, S.G., Detector and Power. Output 120 volts at 20 m/a. Cash price **£2 19s. 6d.** Balance in **11** monthly payments of **5/6.** With **5/6** order

EKCO A.C.25 H.T. ELIMINATOR. Send Tappings—S.G. 50/80 volts, 100/150 volts at 25 m/a. Cash **£3 17s. 6d.** Balance in **11** monthly payments of **7/1.** Send **7/1** only

HEAYBERD H.T. UNIT "D" MINOR. Output 120v. at 20 m/a. Tapped at 80v., 100v. and 120v. Cash price **£2 17s. 6d.** Balance in **11** monthly payments of **5/4.** With **5/4** order

EXIDE 120-volt TYPE W.H., H.T. ACCUMULATOR, in crates. Cash price **£4 13s. 0d.** Balance in **11** monthly payments of **8/6.** With **8/6** order

NEW TIMES SALES PERMANENT MAGNET MOVING-COIL SPEAKER. In handsome oak french polished cabinet, with specially designed Epoch chassis, giving glorious tone and volume. With multi-ratio transformer. Cash Price **£3 15s. 0d.** Balance in **11** monthly payments of **6/11.** With **6/11** order

AMPLION MOVING-COIL SPEAKER, TYPE M.C.6. Permanent magnet, with output transformer. Complete. Cash price **£3 7s. 6d.** Balance in **11** monthly payments of **6/2.** With **6/2** order

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R & A "100" MOVING-COIL REPRODUCER. With tapped Input Transformer. Cash price **£2 17s. 6d.** Balance in **11** monthly payments of **5/4.** With **5/4** order

ORMOND PERMANENT MAGNET MOVING-COIL CHASSIS (No. 464), With tapped input transformer. Cash price **£3 5s. 0d.** Balance in **11** monthly payments of **6/-.** With **6/-** order

CELESTION PERMANENT MAGNET MOVING-COIL SPEAKER. Type RPM8. 8 in. Reinforced Diaphragm, excluding input transformer. Cash price **£3 10s. 0d.** Balance in **11** monthly payments of **6/5.** With **6/5** order

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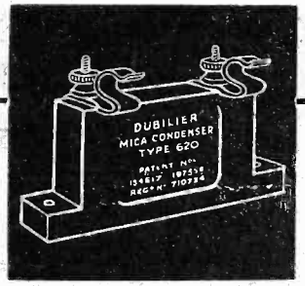

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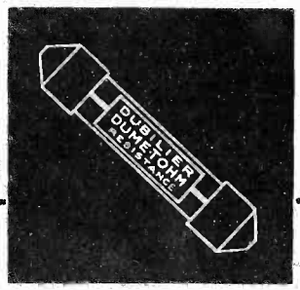

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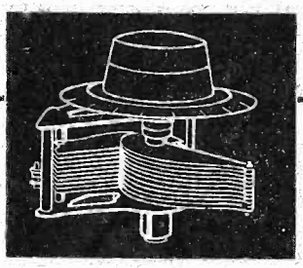

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STANDS 64 & 78

DUBILIER CONDENSER CO. (1925) LTD., Ducon Works, Victoria Road, N. Acton, London, W.3

BROADCASTING IN IRELAND.

(Continued from page 306.)

that they will close down when the high-power station is in service. In that event the new trasnmitter would take over the Dublin wave-length, 413 metres.

The estimated cost of the new station is over £70,000. It is expected that there will be a large increase in licence holders after the station has opened.

One Programme Only.

This will not be a dual-programme station, like the B.B.C. high-power stations. The Free State is content to give its listeners one programme only, the Cork transmitter acting as a relay of the Dublin programme, and the hours of transmission are short compared with those of the B.B.C. The Free State service has not nearly so much income as the B.B.C., and one must cut one's coat according to the cloth.

Mr. de Brit showed me the details of the broadcasting estimates for the present year, and I noticed that the cost of programmes is estimated at just over £15,000.

NEXT WEEK

ANOTHER
SIXPENNY BOOK
FREE!

ORDER YOUR COPY OF NEXT WEEK'S 'P.W.' NOW!

Compare with this the half million or so that the B.B.C. spends annually on programmes alone!

Dublin and Cork sometimes relay B.B.C. programmes by landline connection with Belfast. I found that there are particularly happy relationships between the authorities in Dublin and the B.B.C. officials at Belfast.

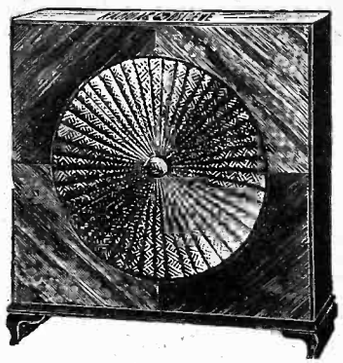
Relayed by Belfast.

The Belfast station, in return, takes occasional relays from Dublin. Sports commentaries are often relayed, and a popular item is the crack Number One Band of the Free State Army, under its German conductor, Colonel Fritz Brase, who is Director of the Army School of Music.

Artists from Southern Ireland have visited the Belfast studio by arrangement with the Dublin station, but the most notable example of the collaboration between the two stations is the relay of "Cathleen in Houlihan," from the stage of the Abbey Theatre, Dublin, on St. Patrick's Day, 1930, broadcast Nationally. The Abbey Players now pay regular visits to the Belfast station.

Next week I shall describe the interesting equipment of the Dublin studios, transmitter, and control-room, which differs in many respects from B.B.C. practice.

In Messrs. Belling and Lee's advert. in our Sept. 12th issue, the price of their type "R" terminal is given as 6d. This should, of course, have been 3d. Actually 6d. is the price of the type "B" terminal.



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AMATEUR TRANSMITTERS IN CONFERENCE

By W. L. S.

I WRITE these few notes after having spent one of the most pleasant week-ends I can remember. I refer to the Sixth Annual Convention of the R.S.G.B., at which more amateur transmitters meet together than at any other time throughout the year.

The convention, immediately after the show, is now an established tradition, and the usual attendance at the closing dinner is about 130. Here, and here only, can one meet in the flesh all the provincial station-owners with whom one has talked over the air for years.

Still a "Ham" at Heart.

An honoured guest at the dinner was Capt. P. P. Eckersley, who is, perhaps, the most famous "ham" in the British Isles. Perhaps I should say "was" (for the days of Writtle seem far off now), but in his speech he made it plain that he was still an amateur at heart, and would always view the amateur movement with the friendliest feelings.

The reception with which his remarks met left no doubt about the feelings of the old-stagers who started in the Writtle days, or the youngsters who had never had the privilege of hearing the famous station.

"For whom," Capt. Eckersley characteristically added, "I feel very, very sorry. I really was *very* good!"

The keynote of the whole affair, appropriately, was friendship, and it is this friendship, applied on an international basis, which is the best argument in the world for amateur transmission.

The Prime Minister remarked, during a recent speech, that "if the Nations of the world could see each other and talk to each other, war would be out of the question." Is there any more complete means of allowing the nations to talk to each other than that afforded by radio? And particularly, I might say, by amateur short-wave transmission.

Linking up the Empire.

Here is the surest argument that can be put forward when the time comes, at Madrid next year, for the amateurs to justify their existence.

The world is linked up by means of an organised chain of short-wave stations, and messages from almost any part of the Empire may be shot to London through recognised "Link Stations."

These and many other points may not be known to the "layman," but their development has, of course, been going on for some years. There are now upwards of 30,000 amateur transmitters in the world, grouped into societies in most countries, and such is the fellowship among them, that any amateur going abroad would automatically have free entry to the homes of all his friends, though he might be meeting them for the first time!

Perhaps we may hope for an International Convention—a kind of Jamboree—at which all countries may meet and show their strength.

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—Is electrical leakage robbing you of money—and the Power your set needs?

ELECTRICAL cell to cell leakage has been definitely eliminated. Smooth top H.T. Accumulators with their 10-volt single glass cell provide direct electrical connection between terminals. Thus power leaks away, causing serious waste.

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Extra large capacity (5,500 Milliamps) per 10 volt unit

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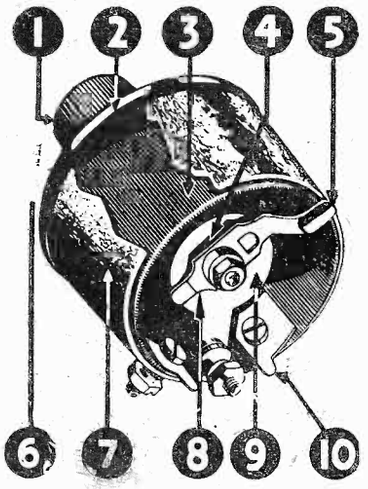

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This is the first resistance of its kind.

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N.B.—The resistance is WIRE, NOT compound with wire contacts. It is specially wound on a tapered former.
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Imperial Works, High Street, Edgware.
Telephone: Edgware 0323 (M.C.42)

FOR THE LISTENER

(*Continued from page* 268.)

bread which you see everywhere abroad; almost long enough for a walking-stick—the staff of life! So that was all right. We munched the sausage, mumbled the bread, and turned on the wireless.

What a comfort the wireless is! I thought of patients in hospitals, of blind folk, of lonely and stranded people. Nobody need be lonely any more. A modern Robinson Crusoe would have his portable set with him on his desert island—the one thing, after his own skin, which he would save from the wreck!

It was a boon to us last night. I shouldn't have minded if we had run into an hour of Chamber Music! As it was, we found ourselves listening to a very pleasant concert, with a small orchestra playing things like the "1812" Overture, and somebody singing Schubert's songs.

A Gay Night!

It may have been from Toulouse, or one of the Swiss stations, or even our old friend Mühlacker. I reflected on the blessings of music. It is good to "count your blessings" when you are stranded on the roadside and due to spend a night in the open! Particularly, what a blessing it is that music speaks no language, and therefore can be understood in all languages.

The Ninth Symphony may come from Berlin, or Vienna, or London, or Timbuctoo, and it is still the Ninth Symphony. If Polish music were rendered in Polish, or even if Scotch music (if any!) were rendered in Scotch—good lord!

Then we searched the air for some dance music. We hadn't to search far. The whole of Europe seemed to be having a gay night.

It was really rather extraordinary. Every turn of the dial brought us new signals; some weak, some strong. Now somebody was chattering in a voice like a pair of scissors; now some robust tenor was lifting the roof off; now a military band was marching to Georgia; now a burst of thunderous applause; now a soprano was dropping her notes like pearls.

My Radio Dream.

The whole of the continent seemed to be under a cloud from which music, instead of August rain, was falling; and people everywhere were catching it in their loud-speakers, like buckets!

Then the world "closed down." We wrapped ourselves up in rugs. We nodded. We slept.

As at all such times, my sins come home to roost in dreams. I had nightmares. I have criticised the programmes now for some years, and now it was their turn!

I dreamt that Sir John Reith came furiously upon me with a big stick. Then I was alone in a little boat, and Broadcasting House, like a huge ocean liner, bore down on me and cut me in half.

It was a thick night for me. At length the dawn broke. And our luck was still in.

About half-past six this morning, a tradesman with a small van came along the road. There is a decent-sized town about three miles ahead of us. The man took my companion with him to find a mechanic there and bring him to the rescue.

The car is roaring. Forward, for England!

ELECTRADIX BARGAINS

HEADPHONES. 8,000 ohm. Double Sullivan, **4/3** pair. 120 ohm Sullivan, **3/6** pair. Brown's do., **10/-**. 2,000 Singles, field D.111, **1/-**. Phone Bobbins, wound, **6d.** pair. Speaker do., **6d.** pair. House Phones, **10/-** pair of Stations. Twin cable, 4/26, 25 ft. for **1/-**, 4-way, 22g, 100 ft., **1/3.**

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METERS. A.C. Hot Wire to ½ amp., **5/-**; to 1½ amps., **5/-**. Thermojunction M.C., 2½ in. panel Turner, 1½ amps. or 6 amps. or 12 amps, **30/-** each. B.T.H., 50 m.A. M.I. 2 in. dia., **8/6.** Fine Electrostatic 500-v. to 2,000-v. 2½ in. panel, **40/-**. Switchboard 6½ in. dial Volt and Ammeters: M.I., **12/6** to **27/6**, Bridges and Galvo, **45/-**. D.C. Weston, Tur. and E.E. 20-0-20 amps., 2½ in. panel, **25/-**; 0-100 m.A. do., **25/-**; Record Circscale, 3-0-3-v., **25/-**; Evershed do., **25/-**; G.P.O. Volt-Milliammeters, **45/-**; Elliott Multi E.108, **37/6.** Silvertown Galvos, **5/-**. Magnetometers for Gauss Law, **12/6.** Compass for Frame Aerial, **2/-**; Wavemeters, **25/-**; Meggers, **£8 10s.** Pole Indicators, **3/6.** Naval Telescopes fitted Mov. Coil Range Needle, **25/-**. Pocket Parabolic 10 in. Mirrors, **15/-**.

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TECHNICAL NOTES

Some diverse and informative jottings about interesting aspects of radio reception.

By Dr. J. H. T. ROBERTS, F. Inst.P.

SOME time ago I mentioned the Ferranti double condenser arrangement for preventing tuneable hum and, as this is a matter which is of interest to a large number of constructors, I would like to pass on some further information which has come to hand.

Preventing Tuneable Hum.

The Ferranti patent covering the use of a double condenser, or two single condensers, for the prevention of tuneable hum usually relates to condensers having a capacity of, say, ·1 microfarad on each side; if a much larger condenser, say 1 microfarad, is used on each side, there is an appreciable load on the transformer, which may thereby become overloaded, and current through the condenser may be excessive.

This is a very important point with regard to condensers connected with the supply current, and it is one which is not always recognised; for example, I have actually known cases where smoothing condensers have been connected across mains transformers in such a way that the transformer has been carrying as much as 50 per cent overload.

Combination of Capacities.

The principal object of the condenser in question is that it provides in a convenient and compact form a combination of capacities from ·5 microfarad to 2 microfarads, and it may, therefore, be used in places where 1 microfarad is adequate for smoothing purposes.

It may also be used in connection with resistance condenser feed to transformers, as in this way the various effects of using ·5 microfarad, 1 microfarad, and 2 microfarads may be found; the smaller the capacity the greater, as a rule, the increase in amplification in the lower registers.

Vexed Question.

A good deal of argument has been spent from time to time on the question of full-wave and half-wave rectification, whether the half-wave rectification is less efficient and more wasteful than the other.

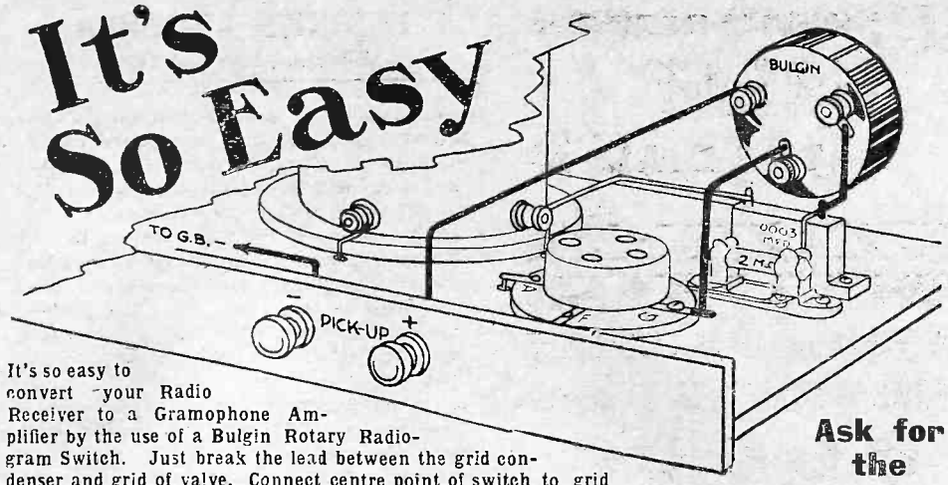
This point was much debated in the early days of crystal receivers, but nowadays the controversy centres almost entirely on the question of rectification for mains units and such-like purposes.

At first sight you might think that a half-wave rectifier, inasmuch as it rectifies only one-half of each wave, must necessarily waste the other half. Another prevalent idea is that a full-wave rectifier must give twice the output of a single-wave rectifier. These ideas are almost entirely erroneous.

It is true that the current from a half-wave rectifier is, so to speak, more intermittent and therefore more difficult to

(*Continued on next page.*)

It's So Easy



It's so easy to convert your Radio Receiver to a Gramophone Amplifier by the use of a Bulgin Rotary Radiogram Switch. Just break the lead between the grid condenser and grid of valve. Connect centre point of switch to grid connection of valve holder. Then connect one outer switch terminal to grid condenser and the other to the pick-up terminal. The pick-up terminal goes to --1½ volts on the G.B. Battery.

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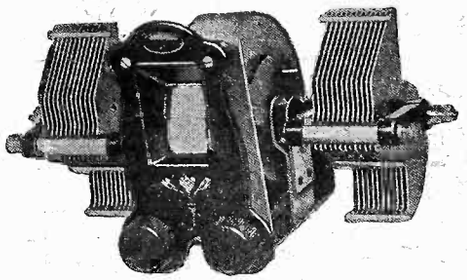
ON THE DIAL
clearly shows the position of the stators



FORMO
ARTHUR PREEN & Co LTD.

DUAL GANG

It has been so arranged that the two Condensers are completely insulated one from the other. If the frame of the Drum Dial is connected to earth, it makes a perfect metallic screen between the two Condensers.
The position of the stators can easily be seen as there is a hidden pointer behind the celluloid drum which throws a shadow on to the drum. Price 18/6

TRIPLE GANG (Completely Screened)

The left-hand knob controls the stators of the two left-hand Condensers and the position of the stators is indicated on the celluloid drum by a shadow thrown from a hidden pointer. The two left-hand Condensers are provided with small balancing condensers for balancing the stray capacities in the circuit of the Band-Pass. Price 30/-
If with rotor and stator of right-hand condenser insulated from the wiring. Price 31/6

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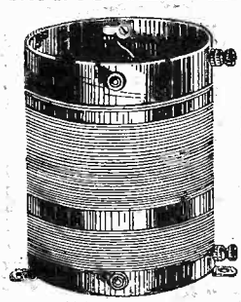
and the full range of FORMO CONDENSERS can be seen on Stand 81 MANCHESTER SHOW

"POP-VOX"



These Coils are accurately made to the specification of "Popular Wireless." The windings are carefully and accurately made on a strong, reliable former. Use FORMO coils and be certain of best results.
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DUAL RANGE - 12/6
P.J. COILS - 2/- & 2/9

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Complete Catalogue from:
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Crown Works, Southampton.

SEE ALSO PAGE 258

TECHNICAL NOTES

(Continued from previous page.)

smooth-out than the current rectified by a full-wave rectifier. It is also true that to a very slight extent a half-wave rectifier is more wasteful than a full-wave one.

Little to Choose.

But on the general question as to a choice between these two types of rectification—apart from what I have just mentioned—there is really very little in it. It is perhaps convenient to compare the rectifying system to the engine of a motor-car.

You might say that an engine with four cylinders (or one cylinder for that matter) would give less power than an engine with six or eight cylinders, but actually the power delivered has little or nothing to do with the number of cylinders, and depends upon other considerations entirely.

In the same way, a full-wave rectifier can be designed to give any desired power output and a half-wave rectifier can be designed to give any desired output.

If a full-wave rectifier is converted into a half-wave rectifier by the suppression of half of each wave, then, of course, you would definitely reduce the power output to approximately half. But that is not the way to look at the matter.

A Question of Design.

Anyway, without going into further details, you needn't worry a bit if the mains unit, or any other device which you may use, employs half-wave rectification. You may be sure that the design of the instrument has been worked out to give the desired power upon the half-wave principle and that the smoothing arrangements are also to correspond. It does not matter to you in the least whether the rectification is single-wave or double-wave, so long as the other factors are made to correspond.

Adaptable Frames.

A frame aerial is apparently such a simple thing to make that a good many people overlook the fact that, by attention to a few little details, the efficiency of the frame aerial may be greatly increased.

For instance, where the frame is arranged for medium wave-lengths and also for long waves, as it generally is, it may be that when the long-wave part is cut out by means of a switch, it will have an adverse effect upon the tuning of the medium-wave winding, because the wave-length of the long-wave part may happen to be within the medium-wave range.

The effect of this will undoubtedly be to weaken the signals at this point and to render the tuning very poor. Furthermore, if reaction is used in connection with the frame you will find that at about this particular point you cannot make it oscillate.

Alternatively, if the long-wave winding and the medium-wave winding are placed in parallel with one another, it is quite possible that the results obtained will not be anything like as good as those when the long-wave part of the frame is cut out.

These are points which require careful attention if you want to get a frame which is really efficient for picking up signal energy; bear in mind that you want to gain everything you possibly can at the pick-up stage, because this makes a direct difference to the

(Continued on next page.)

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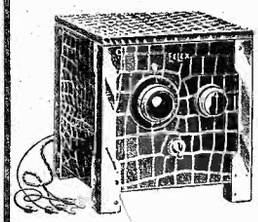

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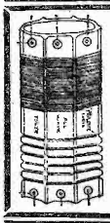

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SUNDAY GRAPHIC

TECHNICAL NOTES

(Continued from previous page.)

amount of amplification required and to the volume ultimately produced.

Comparing Frame Aerials.

If you are going to use the frame for only one particular purpose, say for medium waves only, it is much better to design and make it specifically for that purpose and not to introduce alternative wave-length ranges which will only have the effect of diminishing its efficiency.

Personally, I always think it better to make two or three different frames and to test these out in actual practice. They are very easily rigged up in a temporary fashion, and then you can tell which is going to give you the best results far better than by a lot of doubtful calculations.

"Peak" Tests.

You hear a good deal of talk about "peak-frequencies" or resonances in loudspeakers, but you never really understand what these mean until you make a series of accurate tests by means of some form of oscillator which will give you a complete range of oscillations and of adjustable amplitude.

I was making some tests of this kind recently on a number of loudspeakers, and was surprised to find what a large number of resonance points could be detected. These, of course, varied in sharpness, and some were much more pronounced than others.

They arise from a variety of causes, some mechanical, some electrical, but they are there nevertheless, and if you had been able to hear the results of these tests you would have realised at once why so much research has been devoted, and is still being devoted, to the quest of the perfect loudspeaker.

In some cases an instrument will respond particularly to the higher frequencies—this is altogether apart from the occurrence of isolated peak frequencies—whilst in other cases the low notes come in for greater amplification.

Matching Set and Speaker.

For reasons of this kind it is a very good plan to find out which part of the register is most amplified by your receiver and also which part is most generously reproduced by the loudspeaker.

Obviously, if you have a receiver which is favouring the higher frequencies and a loudspeaker which is doing the same, you are going to get pronounced distortion in the reproduction.

Much good can often be done by setting off the deficiencies of the loudspeaker against those of the set using, for example, a speaker which favours the higher ones.

But obviously all this is impossible unless you know something definite about the characteristics both of the speaker and of the receiver. A good many listeners use one loudspeaker for, say, dance music, and another for vocal selections. This is a perfectly good plan, and the same principle may with advantage be extended still further, as I have indicated above.

Position of Choke.

By the way, reverting to the question of smoothing high-tension supply, which I mentioned earlier in these Notes there is

(Continued on next page.)

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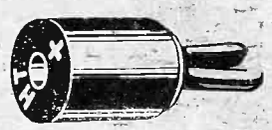
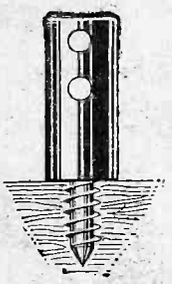
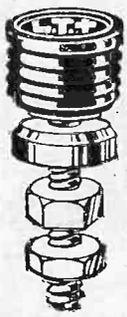


"VICEGRIP" WANDER PLUG 1½d.



INDOOR AERIAL INSULATOR 2d.



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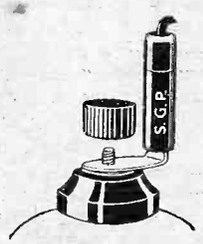

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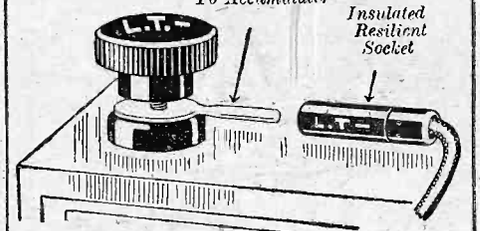

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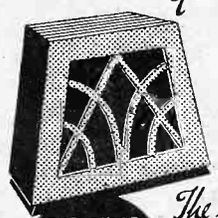

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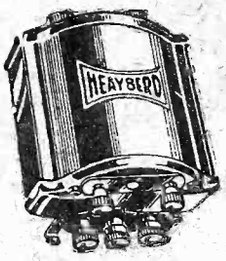

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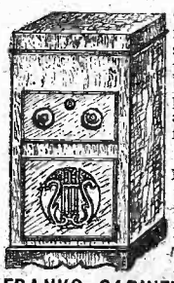

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TECHNICAL NOTES

(Continued from previous page.)

a point which often crops up which is sometimes very useful to know—and that is that if you are making up your own unit, and you are limited as to cost and can only go in for one smoothing choke, you will find that this is more effective in one position than in another.

It is not always possible to say in which of the two supply leads the choke should be inserted, but in many cases there is a very definite difference on transferring the choke from the one lead to the other.

Therefore, before deciding where to fix the choke permanently you should try it first in one lead and then in the other. Of course, there are some cases in which you really want a choke in *each* lead; in quite a number of cases, however, I have found that you get all you want by a single choke in one lead. But, as I say, it is important to find out which lead gives the best results.

TECHNICAL TWISTERS

No. 82

FREQUENCY AND WAVELENGTH

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The speed of all electro-magnetic waves is approximately . . . . . miles per second.

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* * *

If, therefore, one million waves are leaving a transmitting aerial in one second, each wave would be . . . metres in length.

* * *

When the wave-length of a station is known, the frequency of its carrier-wave can always be ascertained by dividing the wave-length into . . . . . .

Last week's missing words (in order) were: Four, Two Grids, Control, Outer, Screen.

A Needle Hint.

I wonder how many of you have experienced a little trouble I had the other day, when putting a needle into the holder of a gramophone soundbox. When screwed up, the needle persisted in wobbling, and it turned out that it was only being gripped by two opposite points—the point where the screw touched it and the point directly opposite.

I suppose, theoretically, all gramophone needles are held the same way, and it is only due to deformation or some accidental circumstance that they are held securely at all. Wouldn't it be much better if the side of the needle-holder opposite to the screw were cut away, so that the needle would be resting against two points, separated by a distance of a few millimetres, at one side, the screw bearing on the needle at the other side at a point intermediate between the other two points?

In this way a very secure grip would be obtained, and the arrangement would conform to the elementary principles of the "geometrical clamp."

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S.G.215	20/0
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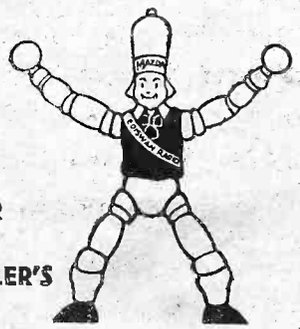

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Characteristics:

Filament Voltage - - 2.0 volts Anode Current (Max) - 12 mA
Filament Current - - 0.2 amps. Screen Voltage (Max) - 150 volts
Anode Voltage (Max) - 150 volts Mutual Conductance - 2.5 mA/V
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PRICE 20/-

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