

OUR SECOND DOUBLE SHOW NUMBER—92 PAGES

MAKING A B.B.C. SPEAKER BAFFLE

Amateur Wireless

Usual Price 3^d

and
Radiovision

Vol. XXI. No. 533

Saturday, August 27, 1932

HOW TO BUILD THE MOST UP-TO-DATE SET YET!

Percy Harris's

ADVANCE FOUR



**FULL
DETAILS**

153

REMEMBER THIS NUMBER

it's the

LEWCOS

REGD.

STAND NUMBER

on the Mezzanine Floor

AT OLYMPIA

Make a special point of seeing the large model of the new Lewcos Potentiometer on view at our stand.

LEWCOS POTENTIOMETER



PRICE ONLY 3/-

The several advantages of this component over other makes will be demonstrated on request. Only Lewcos could produce a component of such conspicuous superiority at such a low price.

Among the well-known makes of Lewcos Wires, for use in Radio construction the following group is increasingly popular.

1 LEWCOS SPAGHETTI RESISTANCES. Manufactured in Resistance Ohms ranging from 300 to 1,000 at 9d. each; 2,000 to 10,000 at 1s. each; and 15,000 to 100,000 at 1s. 6d. each.

2 GLAZITE COLOURED CONNECTING WIRE. Available in 10 ft. coils. 18 SWG, 6d. per coil. 20 SWG, 4d. per coil, and in the following colours: Red, Blue, Green, Yellow, Black, White. BEWARE OF IMITATIONS!

Be sure to visit us,

and see for yourself the World's finest array of Modern Radio Components & Wires

The acknowledged pre-eminence of LEWCOS Radio Products, as used by innumerable amateur constructors and manufacturers of receivers, was first achieved by using only the finest raw materials and the skill of trained craftsmen. By the continuous use of these two elements, backed by scientific research, LEWCOS still lead the way to better reception and present at the Exhibition the proof of this statement.

LEWCOS RADIO PRODUCTS FOR BETTER RECEPTION
THE LONDON ELECTRIC WIRE COMPANY AND SMITHS LIMITED
CHURCH ROAD, LEXTON, LONDON, E.10

WE ARE EXHIBITING AT



AUGUST 19-27

STAND No. 153

Don't Forget to Say That You Saw it in "A.W."

**Put in 1/4d. worth
of Power**



**Take out 1/-
worth of H.T.**

EKCO H.T. UNITS					
Model	Current Output	Voltage Tappings	Price	EASY PAYMENTS	
				Initial Payment	11 Monthly Payments of
A.C. 12	12 m/A	S.G.; 80; 120/150	£2.15.0	6/6	5/-
A.C. 18	18 m/A	S.G.*; 50/80*; 120/150	£3. 7.6	7/9	6/2
A.C. 25	25 m/A	S.G.*; 50/80*; 120/150	£3.17.6	8/9	7/1
A.C. 15/25	15 or 25 m/A	S.G.*; 50/80*; 120/150	£1.19.6	6/-	3/8
Combined H.T. & L.T. Charger Units (for A.C. Mains)					
Model	Current & Voltage	L.T. Output (for charging accumulators)	Price	EASY PAYMENTS	
				Initial Payment	11 Monthly Payments of
K. 12	Current Output and Voltage Tappings same as Model A.C.12, A.C.18 and A.C.25.	1/2 amp. at 2, 4 or 6 volts	£3.19.6	9/-	7/3
K. 18		1/2 amp. at 2, 4 or 6 volts	£4.12.6	10/3	8/5
K. 25		1/2 amp. at 2, 4 or 6 volts	£5. 7.6	11/9	9/10

Tappings marked * are adjustable.

An H.T. battery can only give you a farthingworth of H.T. for a farthing. An EKCO Unit will give you fifty times as much—over a shillingworth!

A 3-valve set needs on an average four batteries a year costing approximately fifty shillings. An EKCO Unit runs your set for one shilling a year—one fiftieth of the cost!

There is an EKCO Unit for every type of radio set or portable, and all are obtainable by Easy Payments. Choose the Unit suitable for your set from the table above, or post coupon for full details.

Based on 1000 hours' use of an average 3-valve set.

Olympia Stand No. 65.



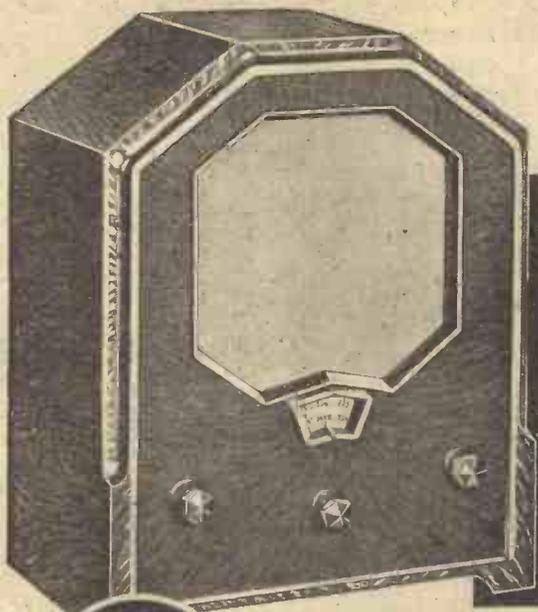
To: E. K. Cole, Ltd., Dept K.17, Ekco Works, Southend-on-Sea.

Please send me full details of Ekco Power Units, Consolettes and Radio-Grams.

Name

Address

Please Mention "A.W." When Corresponding with Advertisers



S.E.C. Radio

SUPREMACY
IN RADIO

A REVOLUTION IN
HOME CONSTRUCTORS' KITS—

ENTIRELY
SELF-CONTAINED—
NEW AND IMPROVED
RADIO TECHNIQUE

Osram

THIRTY-THREE

MUSIC MAGNET

The new OSRAM "THIRTY-THREE" MUSIC MAGNET is a great advance on any kit set you have yet seen. It is full of improvements in technique, design, appearance, performance and construction—entirely self-

contained, with built-in loud speaker of latest design and room is provided for batteries and accumulator.

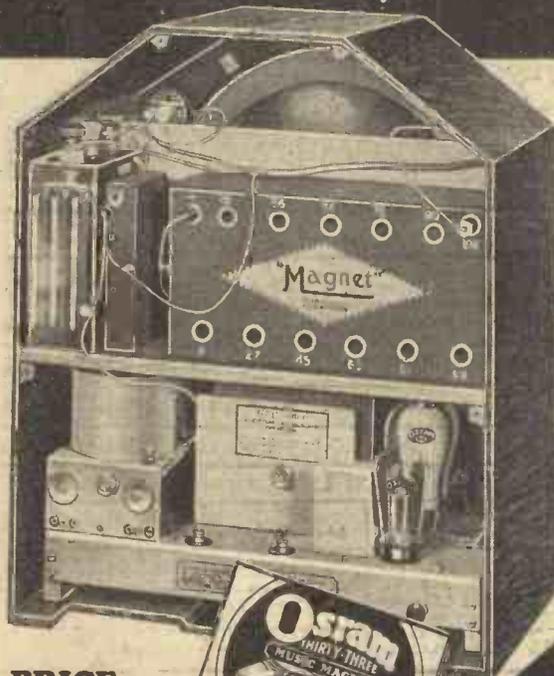
A wide range of stations can be tuned in with the greatest ease at full loud speaker strength. Tuning is effected with one knob only.

SPECIAL FEATURES

- 1 A complete table model receiver with built-in loud speaker.
- 2 Batteries housed inside cabinet—no external battery connections.
- 3 Two metallised OSRAM screen-grid valves and latest type OSRAM power output valve.
- 4 Screen-grid detector gives great sensitivity.
- 5 Tuning by one knob only.
- 6 New magnetic loud speaker chassis with floating cone ensures highest quality reproduction.
- 7 Unit assemblies make home construction the essence of simplicity.
- 8 Latest OSRAM valves (battery type) with the Wembley filament.
- 9 Handsome one-piece cabinet in moulded Bakelite—walnut graining.

POST COUPON TO-DAY

for the full-size Constructor's Instruction Chart. The clear instructions given in this chart will convince you that this is the world's best circuit and assembly kit. SEND FOR A COPY TO-DAY.



PRICE

9 GNS.

Including cabinet, built-in loud speaker and OSRAM valves.

HIRE PURCHASE
Deposit £1 and 12 monthly payments of 15/-

Made in England
Sold by all Wireless Dealers.



COUPON
Please send me the OSRAM "THIRTY-THREE" MUSIC MAGNET INSTRUCTION CHART
Name _____ Address _____
The General Electric Co. Ltd.,
Magnet House,
Kingsway,
London,
W.C.2.

A SIMPLE STEP FROM CHART TO SET

Cut out and paste on Postcard, or envelope in unsealed envelope. Halfpenny postage in either case.

Advt. of The General Electric Co. Ltd., Magnet House, Kingsway, London, W.C.2.

Don't Forget to Say That You Saw it in "A.W."

SEE WHAT THE PRESS SAYS ABOUT..

PERTRIX

"EVENING STANDARD" — JULY 1, 1932
 . . . When taken off discharge for recuperation it showed good recuperative quality . . . Voltage distribution throughout was very even . . . After test the Battery was broken open . . . the zincs were in good condition . . . No apparent sign of bursting or corrosion

"WIRELESS TRADER" — JULY 9, 1932
 . . . a watt hour capacity of 1.73 for a cell of this size under the condition of test is very good, particularly in view of the fact that the price of the battery is very low. The Pertrix is very well made and can be recommended as very good value for money

"POPULAR WIRELESS" — MAY 21, 1932
 A GOOD BATTERY This new Pertrix HT Battery is passing its P.W. tests in an admirable manner. Batteries are first class. Pertrix used many Pertrix Batteries in our Research Dept., and so far not one has ever let us down . . . very good value for money

"THE BROADCASTER" — MAY 28, 1932
 . . . The zincs were found to be in perfect condition . . . The battery is excellently designed while the ingredients are well graded and mixed . . . the battery should give a consistent performance We can recommend it as an attractive proposition at the reasonable price.

"AMATEUR WIRELESS" — JUNE 18, 1932
 Very competitive price . . . attractive performance . . . Really very good for so cheap a battery . . . Well in excess of our arbitrary standard. They are well up to Pertrix Standard.

"MUSIC SELLER" — JUNE, 1932
 . . . The battery has good staying power . . . it has been carefully designed to provide that extra output which makes for Sales Records. . . . The battery is well constructed and high class materials have been used The zincs were found to be quite free from corrosion . . . It represents very good value for money and has the Music Seller O.K.

DRY BATTERIES & ACCUMULATORS

Advt. of Britannia Batteries Ltd., 233, Shaftesbury Avenue, London, W.C.2. Telephone: Temple Bar 7971 (5 lines)
 BRANCHES: Manchester, Bristol, Glasgow, Dublin, etc. Works: REDDITCH (Worcs).

Mention of "Amateur Wireless" to Advertisers will Ensure Prompt Attention

INSIST ON
"PROVED PERFORMANCE"
WHEN BUYING GRID LEAKS & RESISTANCES

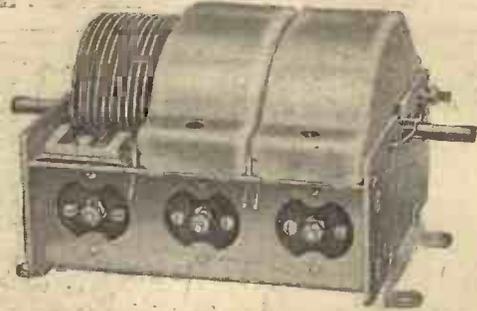
Though they are the smallest components in a Wireless Set, grid leaks and resistances are as vital as the largest part. It pays, therefore, to exercise the same care in their selection—the performance of your Set depends on their performance. You run no risks when you choose the new Dubilier Grid Leaks and the now well-known Dubilier Metallized Resistances. Millions are now in use. They have been proved by critical technicians to be unmatched in their performance—and absolutely reliable. Yet they cost no more than components of less repute. You can buy the new Dubilier Grid Leak for only 1/-, while the Dubilier Metallized Resistances cost only 1/- per watt.

DUBILIER
METALLIZED RESISTANCES AND GRID LEAKS



DUBILIER CONDENSER CO. (1925) LTD.
 Ducon Works,
 Victoria Road,
 North Acton,
 London, W.3

POLAIR 
CONDENSERS



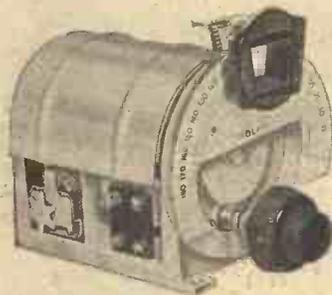
"STAR" GANG CONDENSER again emphasises the superiority of 'Polar' **ACCURATE SPACING** of vanes obtained by precision machine assembly. This entirely eliminates the possibility of error in spacing. **MATCHING ACCURATE** to within 1/2 of 1 per cent., plus or minus, 1 mmfd. **ALL-STEEL FRAME** and rigid construction ensures that this accuracy will never vary. **STRONG SPRING JOURNAL BEARINGS** give absolute freedom from shake or end play. **TRIMMERS** conveniently operated from top.

- 3 X .0005 25/6
- Super-het. type 27/6
- 4 X .0005 34/-

All prices include covers.

- POLAR DISC DRIVE 5/-
- POLAR DRUM DRIVE 7/6

From the "Wireless Trader" test report: "... remarkable accuracy in matching has been obtained. This is undoubtedly one of the best gang condensers on the market ..."



THE "UNIKNOB"

The most outstanding feature of this popular two-gang is the solid di-electric trimmer of 85 mmfd. variation. This is in parallel with the front section of the condenser, but is controlled by a small knob situated concentrically with tuning knob. This greatly simplifies the final tuning adjustment necessary to secure maximum signal strength. **Minimum trimmer on rear section. Slow motion disc drive. Lampholder supplied.**

2 by .0005

19/6

Price includes cover.

STAND 129 OLYMPIA

POLAIR
CONDENSERS

CATALOGUE OF FULL RANGE, FREE

Correspondence in all languages.

French representative: W. A. Swift, 6, Rue Deguerry, Paris XI.



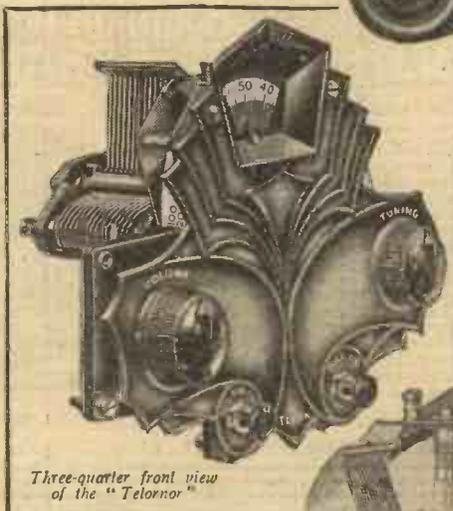
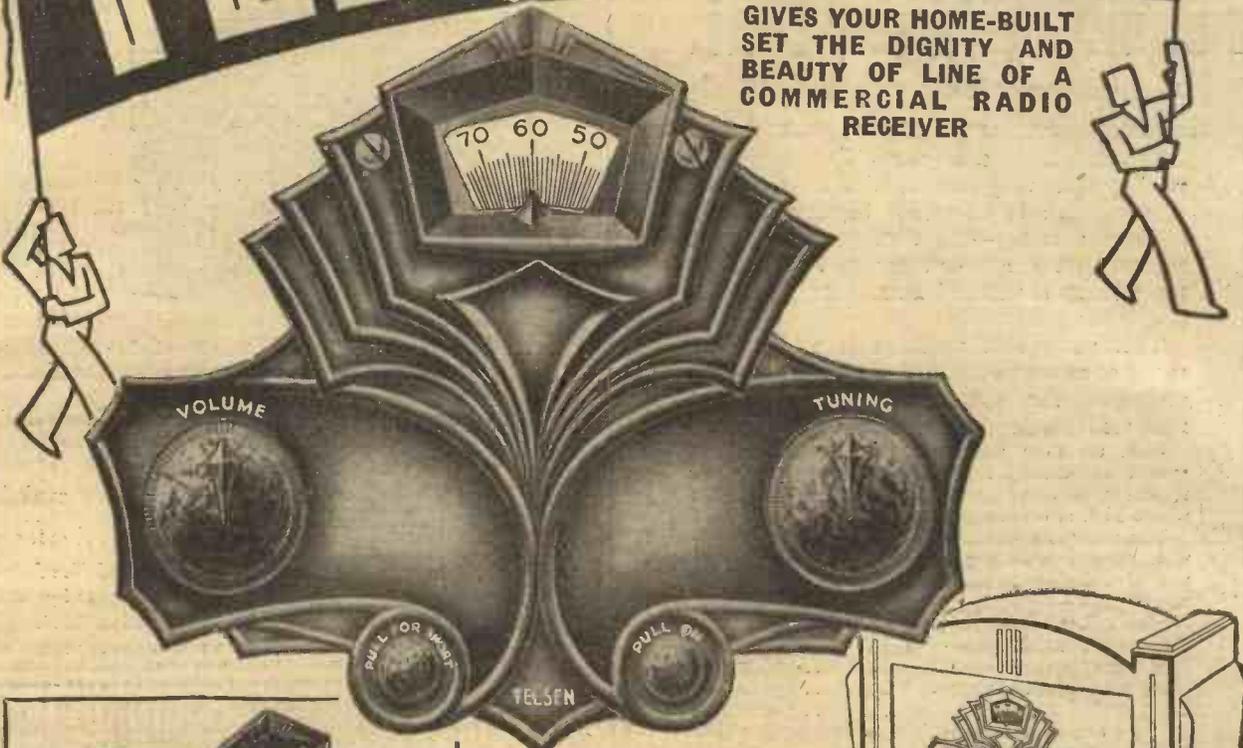
Wingrove & Rogers, Ltd., 188-9, Strand, London, W.C.2

You will Help Yourself and Help Us By Mentioning "A.W." to Advertisers

TELSEN

TELORNOR

GIVES YOUR HOME-BUILT SET THE DIGNITY AND BEAUTY OF LINE OF A COMMERCIAL RADIO RECEIVER



Three-quarter front view of the "Telornor"



Back view of the "Telornor" showing how the components can be mounted.

GIVE your home-built set the dignity of an expensive commercial radio receiver with the new Telsen "TELORNOR." It makes better sets easy to build! The handsome silver oxidised escutcheon plate, embodying an illuminated variable ratio, slow motion Disc Drive, adds immensely to the "good looks" of your set and permits, with the minimum of trouble, a very effective grouping of your Volume, Tuning, Push-Pull and On-Off controls. Ask your dealer to show you a "TELORNOR." It will make your set a set to be proud of—in appearance as well as in performance.

No. W. 206

7'6

TELSEN

RADIO COMPONENTS

GOOD RADIO IS A JOY FOREVER
ANNOUNCEMENT OF THE TELSEN ELECTRIC CO., LTD., ASTON, BIRMINGHAM

Advertisers Appreciate Mention of "A.W." with Your Order

ACCURACY GUARANTEED TO 1 m.m.f. or $\frac{1}{2}$ per cent. (whichever is the greater)

British Radiophone ganged Condensers are used by discerning amateurs and Set designers in preference to all others because of their extreme accuracy—the trimmers being first adjusted, we guarantee accuracy between any two sections to within 1 m.m.f. or $\frac{1}{2}\%$ whichever is the greater.

This unequalled precision is achieved by virtue of sound mechanical construction which maintains the electrical characteristics at fixed values under the most exacting conditions.

Built up from sheet steel and treated with a special anti-corrosive medium, the cases resist all tendency to distort or rust—an important factor where high and lasting accuracy is concerned.

The rotor bearings are designed so that any endwise movement of the spindles is effectively prevented and smooth silent action is ensured during rotation.

The values of British Radiophone Ganged Condensers are as follows:—

Minimum Capacity	26 m.m.f.
Total variation of trimmers	50 m.m.f.
Total variation in capacity	510 m.m.f.

The maximum capacity is therefore greater than 500 m.m.f. according to the amount of minimum capacity introduced, ensuring knife-edge selectivity.

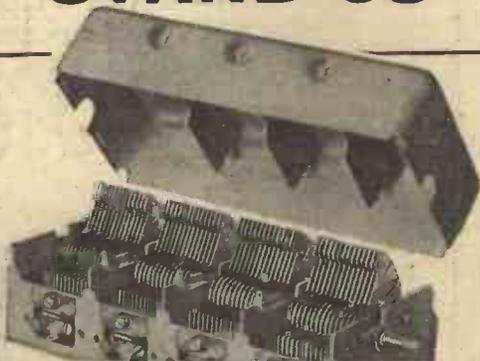
PRICES :

- 2-Gang Condenser, 15/-; *Dustproof Metal Cover*, 2/6
- 3-Gang Condenser, 25/-; *Dustproof Metal Cover*, 3/-
- 4-Gang Condenser, 30/-; *Dustproof Metal Cover*, 3/6
- Drum Drive, 8/6.

Oxidised silver escutcheon and drive assembly, complete with pilot lamp attachment, 5/-.

Write for details.

RADIOLYMPIA STAND 93

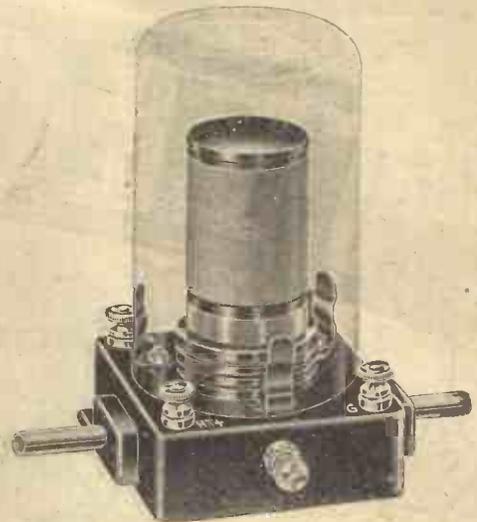


RADIOPHONE GANGED CONDENSERS

THE BRITISH RADIOPHONE LTD., Aldwych House, Aldwych, W.C.2.

Mention of "Amateur Wireless" to Advertisers will Ensure Prompt Attention

PUT POWER IN YOUR SET!



These new British General Dual-Wave Coils enable you to achieve remarkable results in regard to both power and selectivity.

The ordinary cheap receiver, with these coils incorporated, can be converted into a strikingly effective modern set.

Full details and wiring diagrams supplied.

Price 9/6, Aerial and anode models (suitable for ganging).

From all dealers or direct from the manufacturers.



British General Manufacturing Co., Ltd., Brodley Works, London, S.E.4.



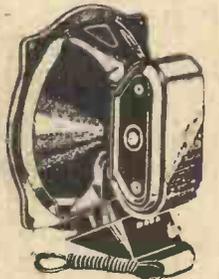
FOR THIS SPLENDID NEW 1933 "BLUE SPOT" SPEAKER

N&W 1933 PERMANENT MAGNET SPEAKER No. 99PM.

The new "Blue Spot" Speaker 100U is ideal for the amateur constructor. Mounted to chassis and needs no matching transformer. Send 2/6 for 7 days' trial. If satisfied, further 2/6, then 8 monthly payments of 5/-.



The chassis is an outstanding example of first-class workmanship and the unit, with its heavy permanent magnet containing a high percentage of cobalt, is wonderfully sensitive. From any set this new "Blue Spot" Speaker will reproduce every detail of speech or music to perfection. Send only 2/6 deposit for 7 days' trial. If satisfied, pay further 3/6 at once, then 8 monthly payments of 7/6 (Cash in 7 days, 59/6). For further details of this speaker see the "Blue Spot" advertisement on cover 3 of this issue.



F. J. HERAUD LTD., DEPT. A.W.9, NUMBER ONE, EDMONTON, LONDON, N.18 and at Tottenham, Walthamstow, and Enfield Wash. Estab. 33 years.



HERE IT IS

EXACTLY WHAT YOU REQUIRE FOR SHORT WAVES

British Made

THE RELIABLE BECOL EBONITE FORMER which has stood the TEST OF TIME and tested before despatch. Prices LOW.

EFFICIENCY COUNTS!!!

LOOK FOR TRADE-MARK. SOLE MAKERS

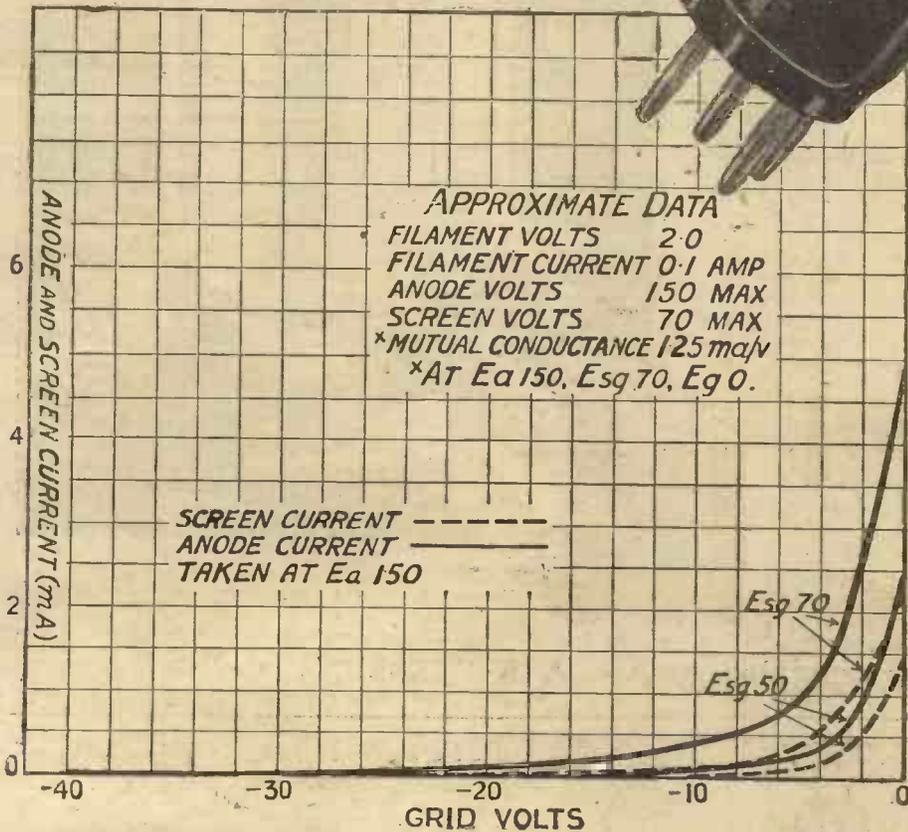
THE BRITISH EBONITE CO., LTD. HANWELL, W.7

And Now MARCONI

A new Variable-MU Valve for Battery Receivers V.S.2

VS2 is the latest link in the long chain of Marconi developments in valve technique. It combines the high mutual conductance of 1.25 MA per volt with the typical advantages of the Variable-Mu valve, providing long range, improved selectivity and quality of reproduction and, if desired, a smooth and entirely distortionless control of volume.

If your receiver was designed for an ordinary S.G. valve, Marconi VS2 will give a far better all-round performance. If you are building a new set incorporate VS2 and the necessary grid bias circuit from the start and obtain the perfect volume control Price which only a Variable-Mu valve will give. 16/6



THE MARCONI 2-VOLT RANGE

- *VS2 Variable-Mu Screen Grid 16'6
- *S22 Screen Grid (Single stages) 16'6
- *S21 Screen Grid (Multi stages) 16'6
- *H2 High Magnification . . . 7'-
- *HL2 Medium Magnification . . 7'-
- HL210 Medium Magnification . . 7'-
- LP2 Power 8'9
- P2 Super Power 12'-
- PT2 Pentode 17'6
- DG2 Double Grid 20'-

* Available metallized if desired

MARCONI VALVES

THE MARCONIPHONE COMPANY LTD. 210-212 TOTTENHAM COURT ROAD, LONDON, W.1

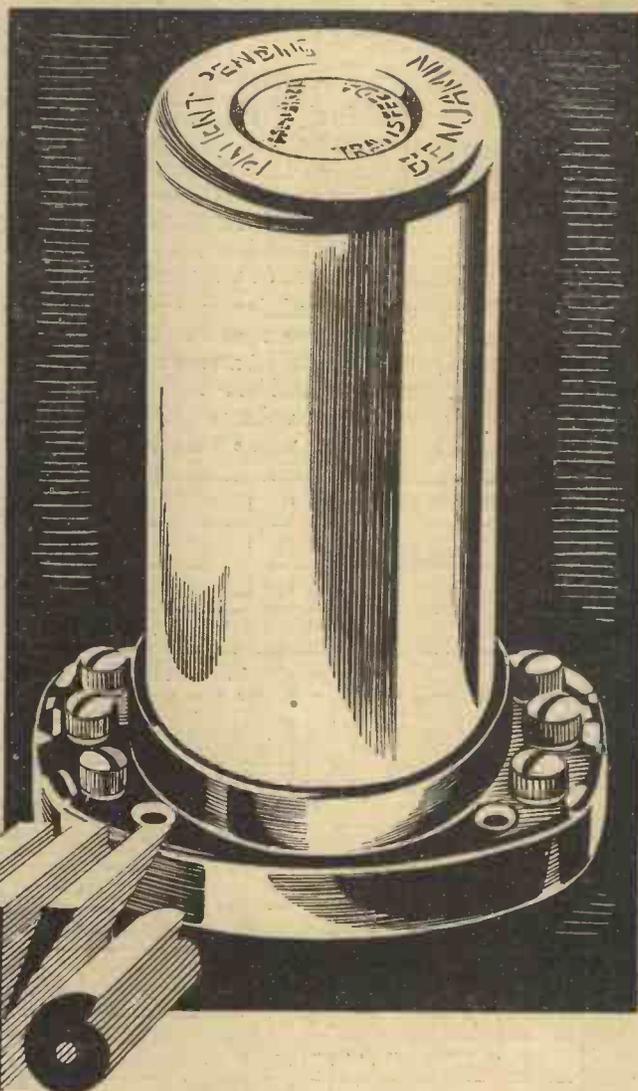
Mention of "Amateur Wireless" to Advertisers will Ensure Prompt Attention

Say "TRANSFEEDA"

Wherever a low-frequency transformer is in use in your present set, or indicated in the set you are thinking of building, put in a BENJAMIN TRANSFEEDA and take advantage of this latest development in low-frequency amplification.

All prominent set-designers are now specifying resistance-fed transformer units and the great majority have preferred the BENJAMIN TRANSFEEDA on account of its outstanding superiority in design and performance.

Follow their lead and ensure for your set the purity and volume of reproduction that only the Transfeeda can give. See the TRANSFEEDA at STAND 40, or let us forward you List 1292 which describes it fully and gives circuits and diagrams.



**STAND
40**

BENJAMIN

THE BENJAMIN ELECTRIC, LTD.,
TARIFF ROAD, TOTTENHAM, N.17.



Note these reduced prices

CLEARERTONE



~~2/6~~ 1/6d

PUSH-PULL SWITCH



~~1/3d~~ 9d

VIBROLDER



~~1/6d~~ 10d

FIVE-PIN



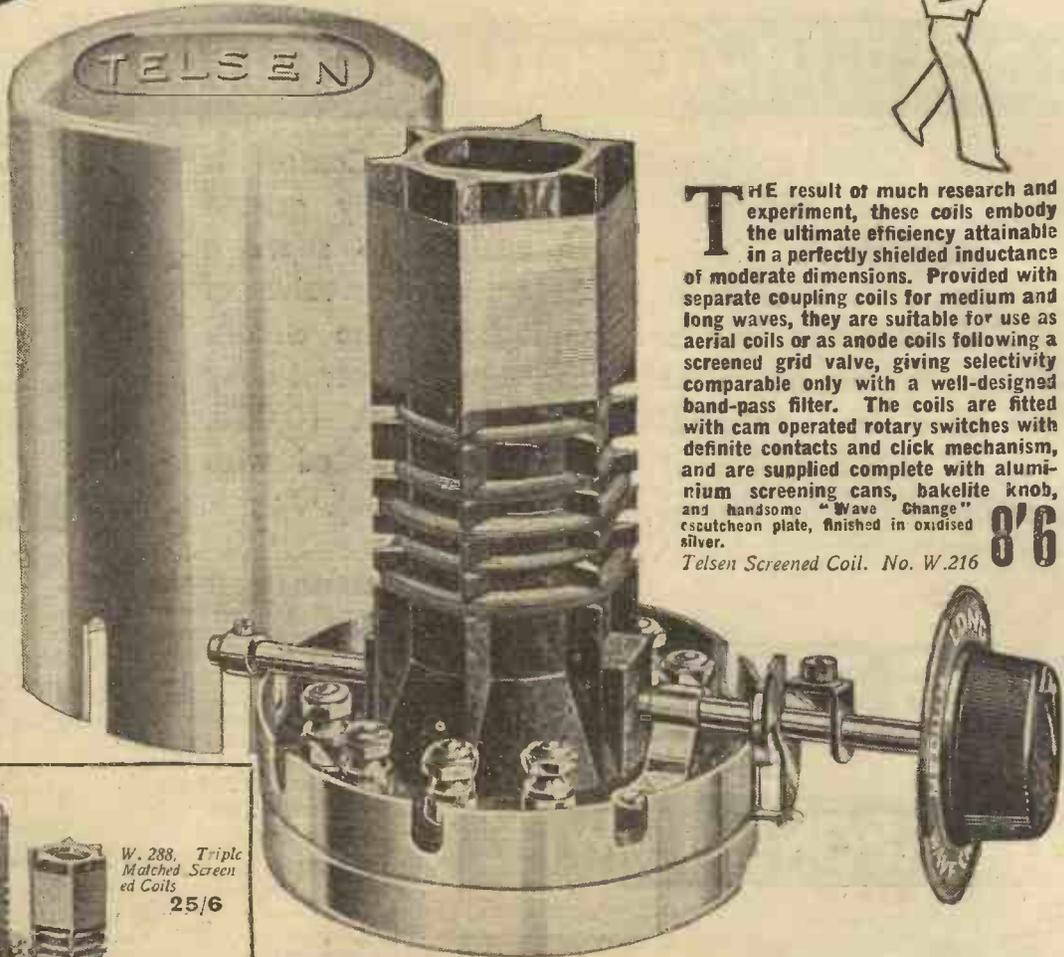
~~1/9d~~ 1/3d

Advertisers Appreciate Mention of "A.W." with Your Order

TELSEN SCREENED TUNING COILS

TELSEN COIL SWITCH KNOB ASSEMBLY

Specially designed for use with the Telsen Screened Tuning Coils. The extension on the knob spindle fits over the switch rod supplied with the Coils, a firm coupling to the rod being ensured by tightening the small screw provided. The assembly is suitable for mounting to any standard thickness of panel, and includes a neat disc escutcheon. The knob is of the push-on type in Black Bakelite. **1/-**



THE result of much research and experiment, these coils embody the ultimate efficiency attainable in a perfectly shielded inductance of moderate dimensions. Provided with separate coupling coils for medium and long waves, they are suitable for use as aerial coils or as anode coils following a screened grid valve, giving selectivity comparable only with a well-designed band-pass filter. The coils are fitted with cam operated rotary switches with definite contacts and click mechanism, and are supplied complete with aluminium screening cans, bakelite knob, and handsome "Wave Change" escutcheon plate, finished in oxidised silver. **8/6**

Telsen Screened Coil. No. W.216



TELSEN COIL SWITCH COUPLING ASSEMBLY

When it is desired to mount two or more of the Telsen Screened Coils in a line parallel to the panel, and to control the wave-change switching by a single knob on the panel, this switch coupling assembly will be found indispensable. The link arms of the coupler are fitted over the switch rods of the coils, and adjusting slots are provided in the link bar to allow for the spacing of the coils varying from 3 in. to 6 in. The whole assembly has a neat nickel-plated finish, is perfectly smooth and positive in action, and free from backlash. **6d.**
No. W.217

TELSEN

RADIO COMPONENTS

GOOD RADIO IS A JOY FOREVER

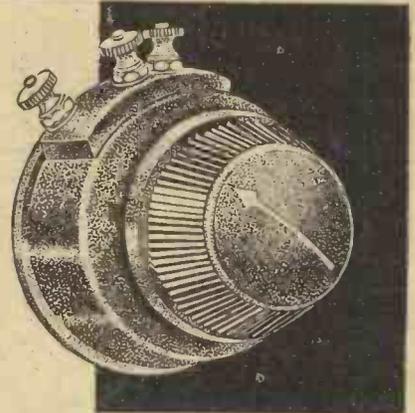
ANNOUNCEMENT OF THE TELSEN ELECTRIC CO. LTD., ASTON BIRMINGHAM

Please Mention "A.W." When Corresponding with Advertisers

RADIO
IGRANIC
DEVICES

LOGARITHMIC VOLUME CONTROL

The IGRANIC Logarithmic Volume Control is wire wound and fitted with a specially graded resistance track. It has been evolved to afford a uniform control of volume where a valve or valves of the Variable Mu type are employed in the circuit. The graded resistance makes the volume control obey the same law as the valve. Sizes: 5,000, 10,000, 50,000 ohms, and they can also be supplied with combined switch. Price 5/6 (with switch 7/6).



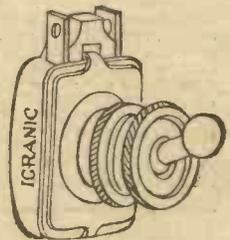
IGRANIC
COMPONENTS WILL
BE THE MAKING
OF YOUR SET.

OLYMPIA STAND 36

Advt. of the Igran Electric Co., Ltd. 149 Queen Victoria Street, London, E.C.1

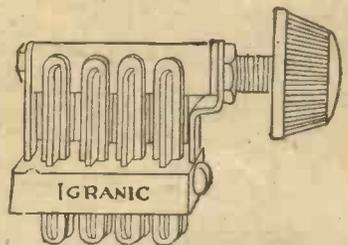
IGRANIC MIDGET RADIO SWITCH

A neat compact component specially suitable for switching filament current "on" and "off." Moulded bakelite with heavily plated metal front—one hole fixing. 1 amp at 250 volts. 3 amps at 125 volts. Prices, with terminals, 1s. 8d., with soldering tags, 1s. 6d.



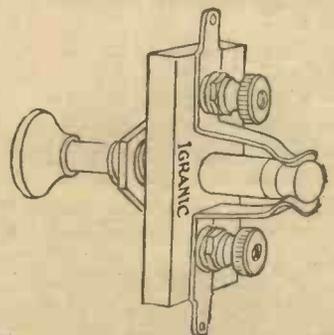
IGRANIC ANTI-CAPACITY SWITCH

For use in all circuits where self capacity in a switch must be reduced to a minimum. Excellent springs ensure positive contact. Well spaced soldering tags. Semi-rotary movement. One hole fixing.
2 way Change-over switch 1/9
3 " " " 2/-
4 " " " 2/6



IGRANIC PUSH-PULL SWITCH

Smooth action and positive contacts. Terminals and soldering tags on ebonite strip. All metal parts nickel plated, reducing resistance to a minimum. One hole fixing. Price 9d.



FOR EVERY SET — there's a PILOT AUTHOR KIT

CASH — C.O.D. — or H.P.

EXACT TO SPECIFICATION



ADVANCE FOUR

DEMAND A PILOT
AUTHOR KIT . . .

Backed by Peto-Scott,
Founders of Construc-
tion Kits in 1919, with
13 years continuous
World-wide Service
to the Radio Public.

DOMINATING FEATURES . . .

- Complete down to the last screw and piece of wire.
- Panels and Terminal Strips ready drilled to specification.
- Chosen and first specified by the Technical Editor and actually as used by the Author in each case.
- Officially approved by an established technical authority you can trust implicitly.
- Enables Author's sets to be duplicated in every respect.
- Backed by Peto Scott with 13 years' Radio experience and a world-wide reputation.

... VITAL TO
100% SUCCESS

IMPORTANT

Part Kits, miscellaneous components or accessories are available under our own Easy Way H.P. System. Send us a list of your wants. We will quote you by return without any obligation.

EVERYTHING RADIO
CASH — C.O.D. — H.P.

HERE ARE THE PARTS THE AUTHOR USED

1 Peto Scott ply-wood baseboard, 22 in. by 10 in.	1	9
1 Red Triangle ready drilled ebonite panel, 22 in. by 7 in. by 4 in.	9	0
1 Keystone piece aluminium foil, 21½ in. by 9½ in.	2	0
1 J.B. .0005-mfd. variable double-gang condenser unit and dial	£1	7 6
1 J.B. .0005-mfd. variable single-gang condenser unit and dial	17	6
1 Colvern Triple Coil unit and special "Advance Four" extension rod, 1 KGO; 1, KGC; 1, KGR	1	8 6
1 Telsen pre-set condenser, .0001-mfd.	1	6
3 Dubilier 1-mfd. fixed condensers, type 9200	8	3
2 Telsen 2-mfd. fixed condensers	6	0
2 Dubilier .01-mfd. fixed condensers, type 670	4	0
1 Lissen .0001-mfd. fixed condenser	1	0
1 Dubilier .0001-mfd. fixed condenser, type 670	1	0
4 Telsen valve holders	2	0
1 Varley L.F. choke (Nichoke II)	10	6
1 Tunewell 50,000-ohm variable potentiometer	5	6
1 Wearite four-pole rotary changeover switch	4	6
5 Sovereign terminal blocks	2	6
10 Belling & Lee marked terminals	2	1
2 Microfuses: 1, 50 m/A.; 1, 100 m/A.	1	0
2 Wearite 800-ohm decoupling resistances	3	0
3 Wearite 1,000-ohm decoupling resistances	6	0
1 Lewcos 30,000-ohm spaghetti resistance	1	6
1 Lissen disc type high-frequency chokes	4	0
1 Sovereign vario choke	3	8
1 Lissen L.F. transformer Tone-control and special potentiometer	1	2 6
4 Belling-Lee plugs, marked: G.B.—1, G.B.—2, G.B.—3, G.B.—4	8	
1 Lissen 3-megohm grid leak	1	0
1 Ready Rad grid-leak holder	6	
Tuned copper wire and sleeving	2	0
2 Belling-Lee screen-grid valve anode connectors	8	

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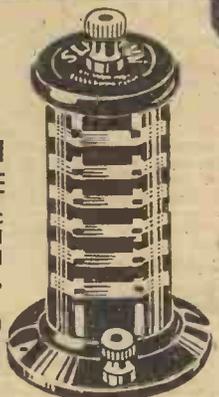
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NEWS & GOSSIP OF THE WEEK

THE SEASON STARTS

NOW that Olympia is in full swing and the new season's products have been revealed the new radio season is fully launched. Go to Olympia if you possibly can as you will then be able to inspect all the latest lines. If this is not possible, then use **AMATEUR WIRELESS'S** full account of the new sets and parts as your guide to the new season's productions. If you go to Olympia then please pay **AMATEUR WIRELESS** a visit—Stand 7.

DROITWICH SITE FIXED

TWO and a half miles north-east of Droitwich is the village of Wychbold. It is on high ground. There is a population of 1,117 souls—at the time of writing. There is a Post and Telegraph Office. Near by is a country seat. Can you guess what is coming? Nothing less than the new super-power long-wave B.B.C. station. True to tradition, the B.B.C. has chosen, for its site for Daventry's successor, a

village with a tongue-twisting name. Lloyd James and the Pronunciation Committee may rest in peace, though, for the new station will be known as Droitwich.

AT THE MADRID CONFERENCE

Hopes of the Broadcasting Authorities

SIR Charles Carpendale, Noel Ashbridge, and Mr. L. H. Hayes will leave, on September 1, for the Madrid Conference. The date of the Conference has been put forward to September 3. Our B.B.C. representatives will also attend as members of the International Broadcasting Union. Their views should therefore carry weight with the gathering. It will be a hard fight for wavelengths. And a long fight, too. There are 610 pages of propositions, and 15 supplements almost as long as the propositions. Talk will go on and on, right up to December, so they suggest.

ABOUT WAVELENGTHS

IN addition to discussing the possibility of handing over to European broadcasters two or three long wavelengths now used by other services, Madrid will have to concern itself with the allocation of the ultra-short waves below 10 metres. It will be interesting to see how far down the allocation will go. Whatever the decisions of the Madrid Conference may be, it is thought highly probable that in January, 1933, a conference of the Post-Office administrations of Europe will be called to alter the Prague Plan to fit the new arrangements.

LOOKING AHEAD!

TALKING of the wavelength situation, there seems to be a growing feeling that when Droitwich gets going with its 120 kilowatts with a long-wave National transmission the existing and projected medium-wave Nationals will be quite unnecessary. There is every possibility that London and North National, at least, will eventually be closed down, and the wavelengths so released used to meet the demands of Welsh Wales and the North of Scotland. Nor must we overlook the eventual wavelength needs of television, when that infant science gets out of its experimental stage.

WEST REGIONAL NOTE

JUST back from a visit to Bristol, the Chief Engineer of the B.B.C. is optimistic about the premises he has been looking over for the erection of a large orchestral studio to meet the programme needs of the West Regional station, now in course of construction. Next spring—Watchet!

POPULAR BERTINI

ACCORDING to a Blackpool correspondent, we Southerners do not realise the immense popularity of Bertini and his band, now being relayed once a week by the B.B.C. while most of the West End bands are on holiday. Normally the Tower Ballroom, from which the broadcasts are made, closes at 10.30 p.m., but on radio nights it keeps open until midnight.



Local interest is growing in the new West Regional station at Washford Cross, and as you can see from this photograph the building is nearing completion.

"YOUR HOME RADIOGRAM" - a fine cheap battery-driven radio-gram - NEXT WEEK

NEWS & GOSSIP OF THE WEEK —Continued

TELEVISION MAKE-UP

ADVICE on how to make up for television broadcasting was recently offered to artistes by the famous "Willie" Clarkson, who was invited to Portland Place to help the televised subjects to "get over" the new medium. His advice was: "Heavy," which presumably means that the grease paint will be laid on with a trowel. Stout efforts to make the most of the present state of television detail are being made by the B.B.C. productions people. The latest idea is to put over a shadow play on the "Mickey Mouse" idea. Dancers, cartoonists, and old-time comedienne will also figure in future broadcasts.

NEW "O.B." AMPLIFIER

THOSE indefatigable lads of the "O.B." department of the B.B.C. were seen by our hawk-eyed correspondent the other day transporting a coffin like box across to Queen's Hall. Asked what was in the box an engineer said: "Sh! It's a mains amplifier, and if it works we shall be able to do away with some of our accumulator amplifiers."

ULTRA-SHORT WAVES

SOME bright genius has suggested that as the ultra-short waves are free from atmospheric interference and do not fade, they might easily be used instead of land-lines between B.B.C. stations, or, at least, between O.B. points and the nearest stations. Something may be done about this, but owing to the frequent interference caused by man-made atmospherics—particularly from car magnetos—such ultra-short wave links would hardly be more than stand-bys for the existing land-lines. What a saving it might mean if interference could be eliminated!

TYRANNY OF THE TIME TABLE

CHANGES in the time table of regular broadcasts will be made in the late

autumn to get away from the present deadly monotony characterising the make-up of the B.B.C. programmes. Much the same material will be broadcast, only in a different and variable sequence.

THIS ENGLAND!

LISTEN to a very pretty tale, wherein one Government Department actually helps another to keep this green and pleasant land fit for non-advertisers to live in. Some firm wanted to hire a land-line to Paris to put over a sponsored programme for the benefit of English listeners. *The P.O. refused.* There is obviously an understanding between the B.B.C. and the P.O. to thwart would-be sponsors in every way. Yet there is a certain piquancy in the situation, for we do not hear of organisations hiring the transatlantic 'phone from the P.O. and studios from the B.B.C. to send talks and so on to America? And are not such programmes capable of being heard on short-wave sets by English listeners? It's all very confusing.

PROVINCIAL STUDIOS

AS we mentioned weeks ago, the Glasgow studios are being entirely redesigned, the walls being treated with the latest acoustic material. Cardiff, not to be outdone, is fitting up a double-decker studio in preparation for West Regional. Leeds will have its new studio in action by October. Sheffield studio is also to be renovated.

JACK PAYNE AGAIN

THOSE who sigh for the good old days of Jack Payne will be glad to hear that the ex-B.B.C. dance band leader has another broadcast "date" for October. By the way, Jack has made a film called *Say It With Music* at the Elstree studios of British and Dominion. The film lasts 1 hour 20 minutes and should be worth seeing—and hearing—when it is eventually released.

NATIONAL CHORUS—THE FACTS

WE are able to deny the recent rumour that the B.B.C. National Chorus was about to turn professional. The truth is that in the autumn Dr. Boulton will take over the conducting of the Chorus, and Stanford Robinson, who has until now been the conductor of the Chorus, will devote his time to the production of light musical broadcasts.

TO SEE—AND HEAR!—OURSELVES

DID you by chance notice that extraordinary interruption in the broadcast of the play "To See Ourselves?" What happened was that a member of the B.B.C. staff, showing some friends round the studios, walked past the red light in one of the Effects studios and started to explain how the various effects were done. His explanation, to the horror of the producer at the "D.C." panel, was broadcast for quite half a minute!

NIGHTLY EPILOGUES!

ASINGULAR victory for the highbrow element at Portland Place would seem to be indicated in the proposal to broadcast some form of epilogue every night, in addition to the religious epilogue on Sundays. The idea is a 3- or 4-minute concoction of music and poetry, to be broadcast by some soulful announcer at the end of the usual programmes. Do we really want this sort of thing?

B.B.C. RESEARCH DEVELOPMENTS

OWING to the amount of work now handled by the B.B.C. Research Department at Clapham it has been found necessary to find additional premises. An old house in Nightingale Lane has therefore been taken over.

VENTILATING NUMBER 10

AS the B.B.C. has received intimations from the L.C.C. that the Wharf Studio near Waterloo Bridge is not likely to be wanted for at least six months it has been decided to make one or two much-needed improvements. The biggest task will be the installation of modern ventilating plants.



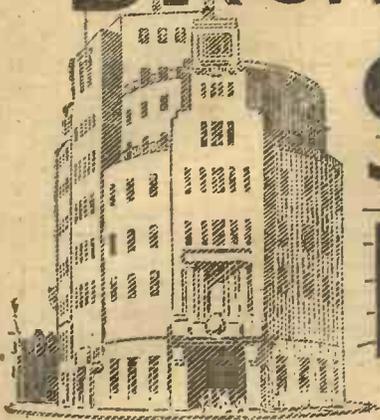
Newcastle police are getting busy with portable sets which have an operative range of ten miles from the (Left), the transmitter at the Newcastle (right), a street patrol busy with one of

able sets which police Headquarters, main police station and the portable receivers



BROADCASTING HOUSE

SPEAKER BAFFLE



Full constructional details of a new type of baffle first introduced into this country by the B.B.C. to enable natural bass-note reproduction to be obtained with a convenient size of box instead of a large and unwieldy baffle board

WHEN Broadcasting House was opened some months ago we were greatly interested in the type of loud-speakers installed in various studios. The quality of the bass-note reproduction was especially good, in spite of the comparatively small

an appreciable improvement in the bass-note output. The early experiments merely emphasised the known fact that for maximum response of the low frequencies a massive baffle, not at all suitable for either the home or the broadcasting studios, seemed to be a first essential.

Fortunately, it was later found that a box of moderate size could be made to give just as good results as a large flat baffle. As a B.B.C. wag put it, a baffling problem was eventually solved! If a box is made up with the front 18 in. square and not less than 10 in. deep, with the back open, it is found that the distance a sound wave has to travel from the back of the diaphragm to the front is

that the box baffle *simply as a box* cannot be considered satisfactory. It must be treated, as B.B.C. engineers found, to avoid certain inherent disadvantages. Owing to the natural resonance of the air confined in the box the output would be greatly emphasised around the 150-cycle mark. As many moving-coils already have a marked resonance around this frequency the result would be an unpleasant "boom" in the reproduction.

Preventing Boom

As a matter of fact this boominess is all too common in certain cabinet moving-coil loud-speakers. The effect is to make music irritatingly resonant, and speech cannot be endured for a very long period. As the B.B.C. engineers have found, the boom of the box can be cured by treating the inside of the box with some form of sound absorbing material.

The most useful material so far discovered is known as rock or slag wool, a commercial by-product marketed for use in heat insulation. This rock or slag wool is composed of a mass of vitreous fibres. If carefully packed into the back of the box it will eliminate all trace of boom.

As the actual construction of the box baffle is not very easy to put into words,



This sectional view shows clearly the construction of the baffle

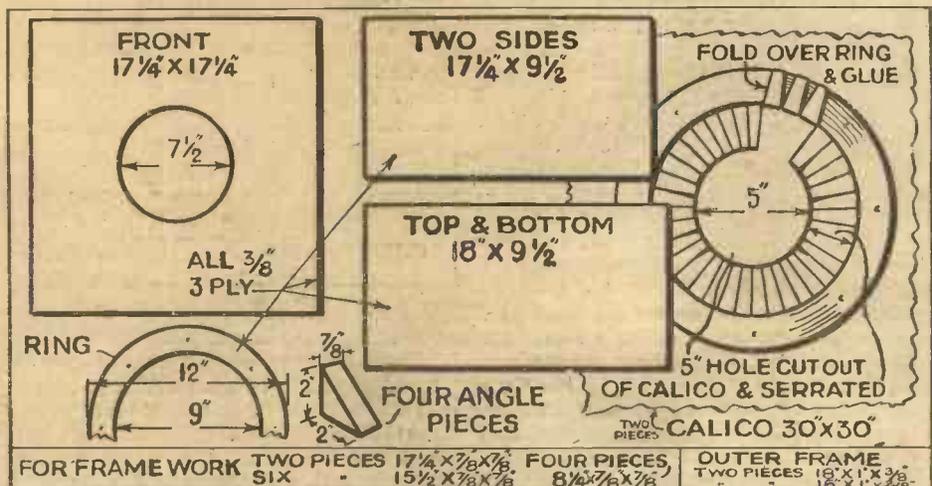
size of the cabinets containing the loud-speakers. There was a full and natural bass-note response devoid of all trace of that "boominess" one usually finds in small cabinet-type reproducers.

We found that the B.B.C. was making use of an idea not generally adopted in amateur circles. The idea is the box baffle, around which we have now designed the loud-speaker cabinet shown by the illustrations.

It is, of course, widely known that for good low-note response from a moving-coil a large baffle is essential. The small 2-foot baffle boards sometimes used in the home cannot effectively reproduce anything so low as 50 cycles, even supposing these frequencies could be dealt with by the loud-speaker itself.

The B.B.C. engineers carried out extensive experiments to see how this deficiency of the small and convenient sized baffle might be overcome. Many interesting and useful facts came to light. With suitable wood it was found that increases in the size of the baffle up to 5 feet square made

the same as for a flat baffle of 4 ft. square. Such a box has obvious advantages in ordinary domestic use compared with the large flat baffle, but it must be emphasised

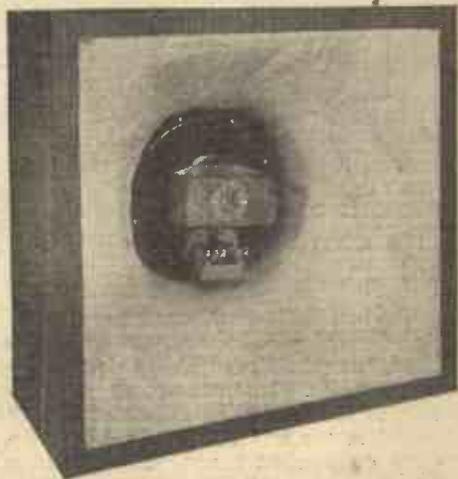


Here are the dimensioned pieces of wood required

A BAFFLE THAT WILL IMPROVE THE TONE OF YOUR SPEAKER (Continued from preceding page)

we strongly advise intending constructors to make a careful study of the illustrations. The basis of the design is a box 18 in. square by 10 in. deep. Strengthening pieces are fitted at each corner. There is no back.

In the model photographed a centre hole of $7\frac{1}{2}$ in. diameter is cut in the front of the box. This should suit the average moving-coil chassis on the market, but before embarking on the cutting of the



A rear view of the baffle showing one of the new Rola speakers fitted

hole the diameter of an existing speaker should, of course, be checked up.

With the Weedon kit made by the Weedon Link Power Radio Company, of 185 Earham Grove, Forest Gate, E.7, or that made by F. McNeill & Co., Ltd., 16 Lamb's Passage, Bunhill Row, E.C.1, everything for the construction of the box baffle illustrated is supplied at an inclusive price. If the wool is required separately it can be obtained from the same firms.

The best type of ply wood, as used in this kit, is pine $\frac{3}{8}$ in. thick, with a thick centre lamination that will take nails without splintering.

Packing the Slag Wool

To take the slag wool a lining of linen has to be made, as shown by the illustrations. The fixing of this lining is best carried out according to the following procedure. First take the wooden ring supplied with the kit; this is used to fasten the linen to the front of the cabinet, by means of tacks and glue.

In the model described this wooden ring has an inside diameter of 9 in., the width of the ring being $1\frac{1}{4}$ in. The exact size of the ring depends on the size of the loud-speaker, but the idea is to make the ring of such a size that the linen wall will just clear the edge of the speaker when this is finally mounted behind the front of the box.

With a double thickness of the material a 30 in. square is cut out and then a hole is cut out of the centre of this linen square, the diameter of this hole being $2\frac{1}{2}$ in. less than the internal diameter of the wooden ring.

From the hole at the centre cut slits to a depth of about 2 in. every $1\frac{1}{2}$ in. round the entire circumference. Then lay

the material face down on the table and glue and tack the slit section of the linen to the wooden ring in such a way that the inside edge of the material coincides with the outside edge of the wooden ring.

The next procedure is to tack and glue the ring, with its attached material, to the back of the box, so that the linen wall eventually forms a sort of tunnel with the opening coinciding with the hole in the front taking the loud-speaker chassis.

Then comes the packing of the slag wool into the linen. To do this we strongly recommend the constructor to use leather gloves; otherwise the fibres may make the hands rather sore. The packing of the wool should be carefully done, so that it is fairly tightly shaped into the material in such a way that the linen slopes gently to the back of the box. This can be seen quite clearly by the illustration.

At this stage the material has to be fixed to the back of the box to keep the wool in position. Firstly, though, the material should be tacked to the batten provided with the kit. The batten can then be fixed to the back of the box, thus drawing the linen tightly into position and holding the wool in position inside the linen.

A finishing piece is then tacked to the back of the box to make a neat job of the assembly. Lastly the whole box structure is covered with leatherette. The loud-speaker chassis can then be mounted in position behind the hole provided in the front of the box.

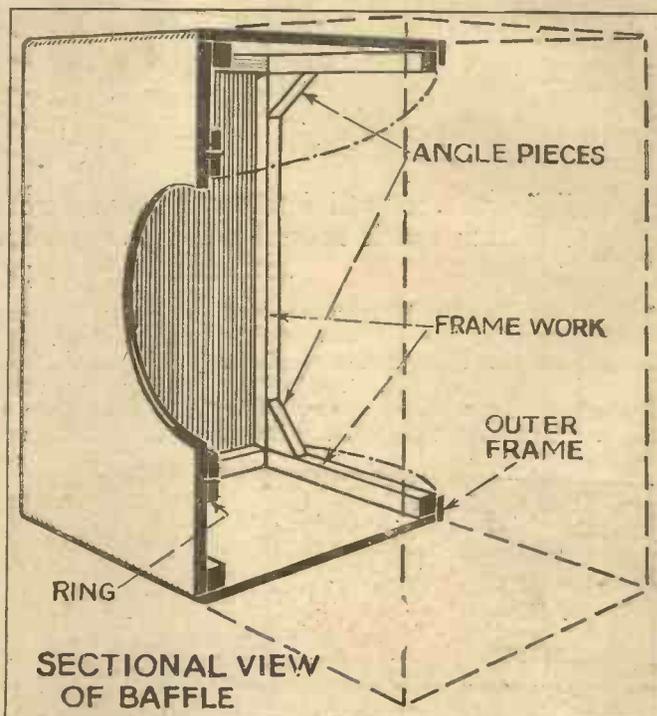
The completed assembly will give excellent reproduction of low notes without any trace of boom. It is well worth making up this box baffle, and the better the moving-coil the more marked will be the improvement over ordinary small flat baffles or resonant cabinets.

SEE THIS SPEAKER BAFFLE on the "A.W." STAND

A vaudeville programme will be broadcast from the Birmingham studios for Midland listeners on September 5 with "Those Three" in syncopated vocalism and Compton Long in a new skit, "Some Rural Rides." Popular musical comedy songs will be given by Evelyn Over and Janet Joye will give some imitations.

THE SYMPHONY CONCERTS

The Promenade Concert season is only a few weeks old, but already plans for the season of Symphony Concerts which starts on October 19 are well advanced. Artistes already engaged are: Backhaus, Harriet Cohen, Cortot, Myra Hess, Huberman, Lamond, Harold Samuel, Schnabel, Adolf Busch, Casals, Arthur Catterall, Mischa Elman, Albert Sammons, Muriel Brunskill, Elena Gerhardt, Elisabeth Schumann,



A perspective sketch showing the assembly of the woodwork

Elsie Suddaby, Arthur Cranmer, Roy Henderson, Dennis Noble, and Walter Widdop. The B.B.C. Symphony Orchestra, led by Arthur Catterall, will play at each concert, and Adrian Boult will conduct rather more than half of each series. Sir Henry Wood, Sir Landon Ronald, and Ernest Ansermet will also conduct during the season and one or two eminent composers, including Sir Edward Elgar and Arnold Schonberg, will appear in the role of conductor to direct performances of their own works.

LIVELY BROADCAST POLITICS

ON Fridays in the new autumn talks arrangements, it is proposed to devote the time to politics. Some lively broadcasts seem certain, for such names as Winston Churchill, James Maxton, and Lord Lloyd have already been mentioned in connection with the series. We understand that the present intention is to let such prominent men of affairs broadcast statements of the facts and to follow up these broadcasts by debates on the statements made the week before. It all sounds terribly controversial!

The Horwich R.M.I. Band and the Bury Athenaeum Musical Circle will broadcast from Manchester on August 28.

COMPONENTS THAT WILL MAKE A DIFFERENCE



In this up-to-the-minute article ALAN HUNTER outlines the circuit applications of some of the season's components.

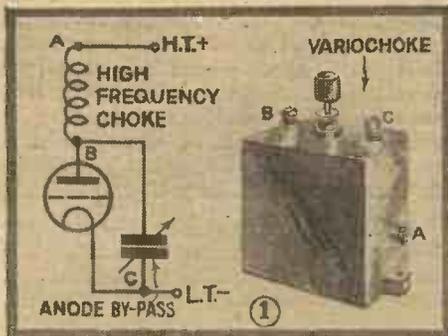
K EEN amateurs are always on the lookout for new gadgets to fit into their sets. Several of the latest components are sure to attract widespread interest among amateurs, especially those for low-frequency coupling. In addition to tone-correcting gadgets for the low-frequency side of the reception there are one or two novel gadgets likely to find favour on the high-frequency side.

appeal to me are: high-frequency stopping in the low-frequency stage; high-frequency filter in the second detector anode circuit of a super-het type of set; differential reaction control; and high-frequency stopping in a short-wave set.

As will soon occur to the amateur, this vario-choke could also be used very conveniently as a normal choke and anode by-pass condenser in the average detector circuit, the amount of high-frequency by-passing being adjusted so as not to cut the high notes in the audible scale. (See Fig. 1).

reduced to what practically amounts to one-knob control.

The lever at the base of the dial has three positions for medium and long waves and battery-off connections. The diagram Fig 2 is the simplest way of explaining the contacts on this Lissen Gang Control, which should find a ready application in



The Vario-Choke combines a high-frequency choke with a variable pre-set type of condenser. Here on the left is shown a simple application, high-frequency current at the detector being by-passed to earth

In this article I will limit myself to the more adaptable components featured at the Radio Exhibition, but I should like to make it quite clear that my selection is by no means exhaustive.

A New Choke

Shall we make a start with something new in high-frequency chokes? This is the Sovereign Vario-Choke. As its name implies, this is really a gadget providing us with a variable choking effect. There is a surprisingly large number of applications for it.

The Vario-Choke has the adaptability that always comes from sheer simplicity. It consists of an efficient high-frequency choke connected to a pre-set type of variable condenser, these two components being mounted in a neat bakelite moulding, with three terminals brought out for external circuit connections.

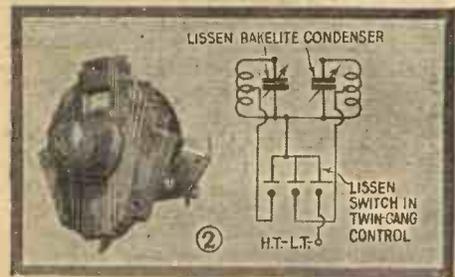
One terminal provides a common connection for one side of the choke and one side of the condenser, while the other two terminals are for the "free" ends of the choke and condenser.

Six applications of this device are suggested by the makers, and there are others. Included among the applications that

Novel Control Ideas

In many other directions we shall find that two or more existing components have been combined to produce a "unit" component that can be put to a great variety of uses in the amateur's home-built set. Take, for example, the new Lissen Twin Gang control, which is more than a two-gang tuning condenser, since under the one dial it incorporates coil and battery switching.

The two condenser units consist of .0005-microfarad bakelite dielectric units, each provided with fixed and moving plated terminals, though the moving spindle connection is common to both. The condensers can be operated together, and then the upper or super-imposed knob can be worked as a final trimmer. This is the best compromise between ease of control and efficiency—in fact with the trimmer adjustment there is virtually no loss of efficiency, even though the tuning is



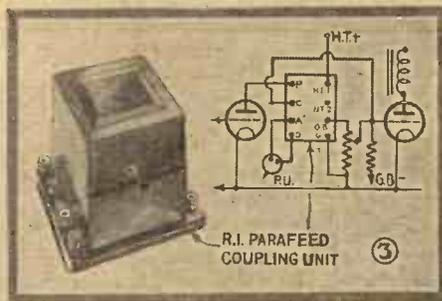
Combined in the Lissen Twin Gang control are two bakelite dielectric variable condensers and switching for coils and power supply. In this diagram the simplicity of the connections is made clear

sets designed for simple yet efficient control.

L.F. Coupling Improvements

Among low-frequency components there is obviously scope, in these days of decoupling and parallel feed, for combinations of small parts into what I am terming "unit" components. We have a very good example of a low-frequency unit component in the new R.I. Parafeed coupling unit, designed to simplify the many applications of the original and highly successful Parafeed low-frequency transformer. It will be recalled that this is specially designed for the parallel-feed method, whereby the direct anode current is diverted from the primary winding of the transformer by means of an anode resistance. The low-frequency voltages are passed on to the transformer through a coupling condenser, the value of which is carefully chosen to give the right frequency response.

When the original Parafeed transformer was introduced in the spring of last year amateurs had a great time trying out different values of coupling condensers and resistances, but since that time parallel feed has become established on so firm a basis, being standardised by many of the leading set makers, that the experimental phase is past, and we now have to consider the numerous applications of the method in modern set building.



The R.I. Parafeed unit is typical of the new range of low-frequency couplings combining transformer coupling condenser and resistances in a single moulded case. A novel application of the Parafeed unit is shown here, the transformer used as a pick-up isolating device and the remaining components used to provide resistance capacity coupling

NOVEL COMPONENTS AT THE SHOW THAT WILL IMPROVE YOUR SET (Continued from preceding page)

The Parafeed unit consists of the standard Parafeed low-frequency transformer, which has the very high primary inductance of 100 henries, two resistances, and a coupling condenser, all housed in a bakelite moulding with eight terminal connections.

No less than ten different ways of using the Parafeed unit are detailed by the makers. As in the original transformer, this unit enables alternative ratios of 2, 3, and 4 to 1 to be obtained, thereby permitting the stage gain to be adjusted to suit the output valve.

In addition to the usual resistance-capacity coupling connections for this transformer being made available in one compact unit, the new combination component can be used for pick-up work, the connections for which are shown by the Fig. 3 diagram.

Here it will be seen that the resistances and condenser of the unit are used for resistance-capacity coupling, while the Parafeed transformer is used as a pick-up isolating transformer. This is only one of the several unexpected applications of the Parafeed unit, which, I think, will be very popular during the coming season.

Just one further point that will be of special interest to readers who have studied Mr. Percy Harris's remarks on low-frequency stability. In the Parafeed unit is a complete metal screen, with provision for earthing. This is yet another proof of the careful design that has gone into the production of the new component.

Selectivity and Quality

While on the subject of low-frequency couplings I must draw attention to the new Varley Rectatone transformer, which is really one of the most advanced productions of the season.

As most readers will know by this time, there is a distinct tendency to readjust ideas on the question of good quality selectivity. Everyone knows that the demands for great selectivity and good quality are to a large extent antagonistic. Until band-pass tuning came along really high degrees of selectivity could be obtained only at the expense of the quality, the sharpness of the tuning resulting in loss of high notes due to side-band cutting,

Tone Compensation

Band-passing is still, in the view of many engineers, the best practical compromise between selectivity and quality, but there is such a great increase in the general cry for sharp tuning, owing to the rapidly increasing congestion of the ether, that some of the quality is being wilfully sacrificed at the tuning end of the set in order to obtain real separation between the adjacent high-power stations.

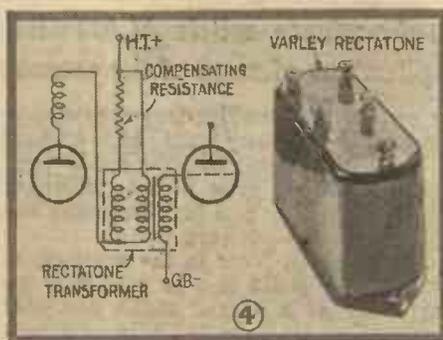


Fig. 4. One of the most outstanding advances in low-frequency coupling is the tone compensating transformer; the Varley Rectatone is shown here as a coupling between a detector and output valve, the only extra component being a resistance, which may be fixed or variable

This sacrifice of quality is not allowed to affect the final output, because the low-frequency stage is "doctored." The loss of high notes resulting from excessively sharp tuning is made good by what is now generally referred to as tone compensation.

There are various ways and means of increasing the high-note output, but it would be difficult to think of anything easier than the method made possible by the introduction of the new Varley Rectatone transformer. This new transformer,

which is illustrated in picture and circuit by Fig. 4, compensates for high-note losses by deliberately accentuating frequencies above 1,000 cycles, reaching a maximum rise in the characteristic at 4,500 cycles, which is now accepted as the most practicable cut-off point for both radio and gramophone reproduction.

The amount of tone compensation needed depends entirely on the amount of high-note loss, which in turn depends on how selective the tuning circuits are made to give station separation. It is obvious that the various reception conditions met with in the course of an evening at the set necessitate a variable form of tone control.

This is readily provided in the new Rectatone transformer. As will be seen from the circuit diagram, there is a variable resistance connected in series with the primary winding of the transformer. A 5,000-ohm resistance will cover the whole range of tone compensation required, but to avoid excessive amplification of the very high frequencies a 2,000-ohm fixed resistance can be connected in series with the variable.

If a fixed amount of tone compensation is wanted, a 2,000-ohm fixed resistance should be used for high-note emphasis, with 3,000 ohms for normal reproduction and 4,000 ohms for low-note emphasis.

A Component of Many Uses

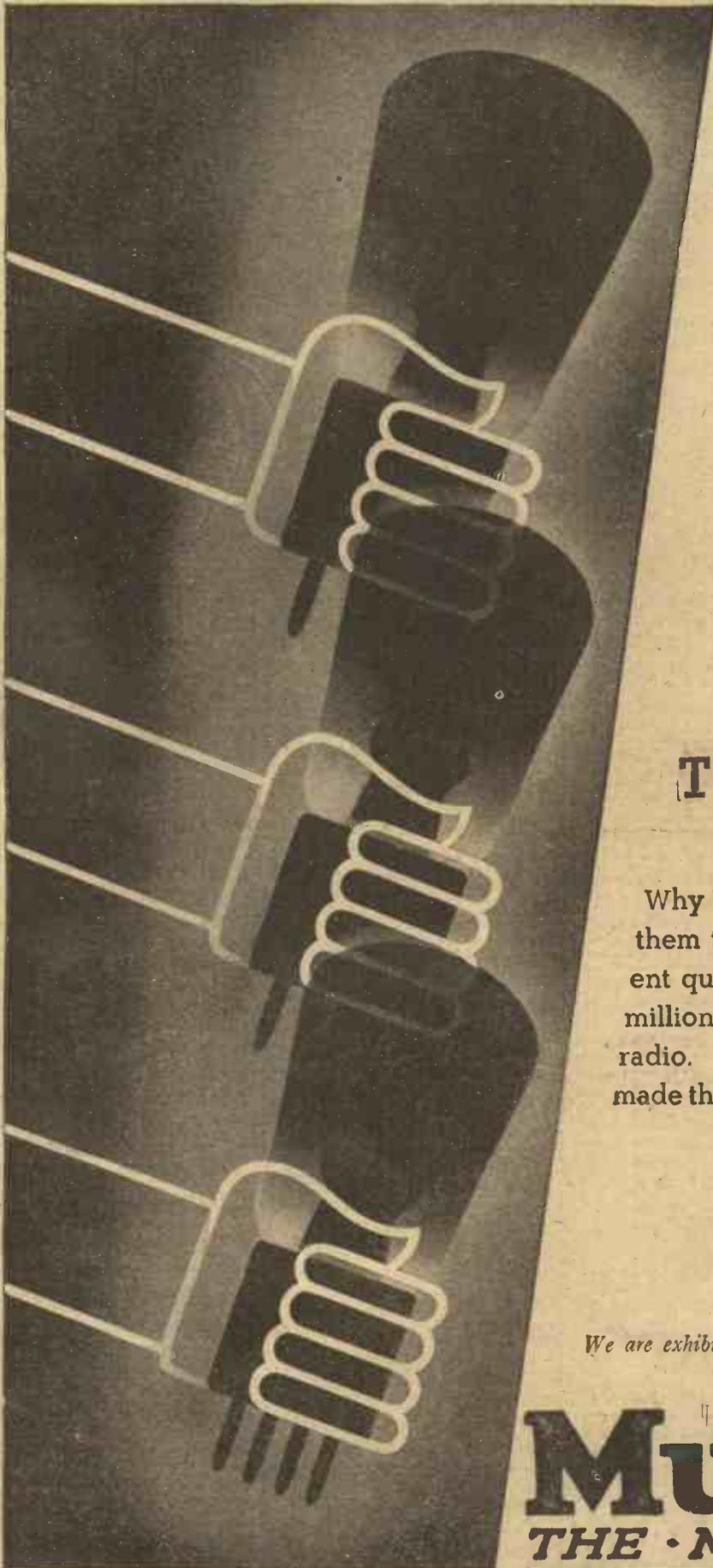
As the makers point out, this new transformer has a variety of uses in addition to the more revolutionary idea of tone compensation of highly selective circuits. It is suggested, for example, that this transformer would be very useful in gramophone reproduction, where lack of brilliance, due to the characteristic of the pick-up, could readily be remedied. And with loud-speakers somewhat weak in the higher register this new component would again help to balance up the tone. By leaving out the compensating resistance the Rectatone is a good straightforward low-frequency transformer, giving straight-line-frequency response for sets that are neither skimping nor emphasising any part of the audible frequency scale.

NEXT WEEK

Your "Home Radio-Gram." Constructional details of an inexpensive battery-driven radio-gramophone.

PERSONALITIES IN THE WEEK'S PROGRAMMES





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The valves specified for the Short Wave Three described in this issue are:

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1 P.M.1 LF

1 P.M. 2A

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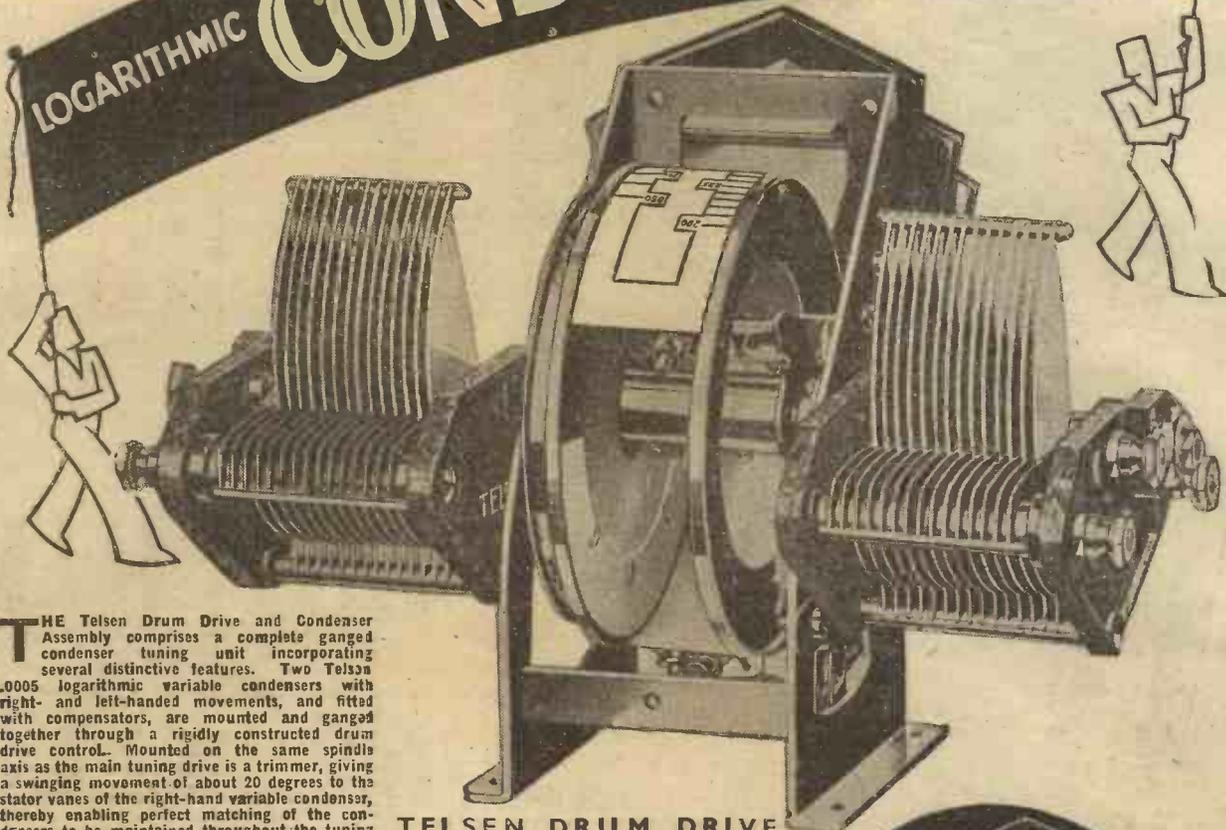
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Don't Forget to Say That You Saw it in "A.W."

TELSEN LOGARITHMIC CONDENSERS and DRUM-DRIVE

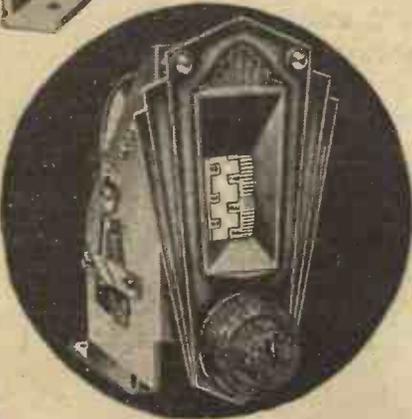


THE Telsen Drum Drive and Condenser Assembly comprises a complete ganged condenser tuning unit incorporating several distinctive features. Two Telsca .0005 logarithmic variable condensers with right- and left-handed movements, and fitted with compensators, are mounted and ganged together through a rigidly constructed drum drive control. Mounted on the same spindle axis as the main tuning drive is a trimmer, giving a swinging movement of about 20 degrees to the stator vanes of the right-hand variable condenser, thereby enabling perfect matching of the condensers to be maintained throughout the tuning range. Two scales are supplied with the unit, one marked in wavelengths and one in graduations from 0-100. The scale is illuminated and has the additional advantage of being easily removable when it is desired to fit one of special calibration. The escutcheon is handsomely finished in oxidised silver, and knobs of the push-on type are fitted. Provision is made for panel and baseboard mounting, and a double-ended spanner is supplied free with the unit for fitting the variable condensers. Full instructions for mounting are included with every unit. No. W.262. Price

17/6

TELSEN DRUM DRIVE

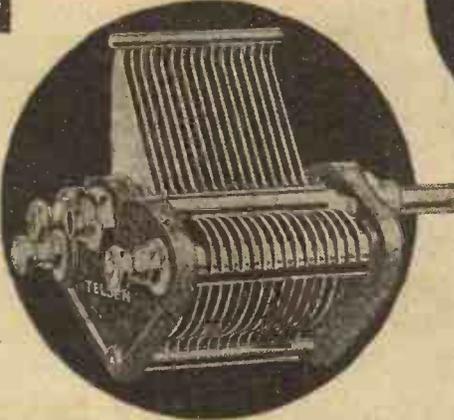
Follows standard practice generally, but embodies several detail refinements, among which may be instanced the cord drive, arranged to reduce wear to a minimum and to prevent over-run, and the rocking stator trimmer, which gives a variation of 20°, and visual indication of setting. For use with Telsen screened coils, an extra scale, marked in wavelengths, is supplied free of charge. Illustration shows escutcheon, handsomely finished in oxidised silver. No. W.255. **8/6**



TELSEN LOGARITHMIC CONDENSERS

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- No. 131 Cap .00035, 4/6
- No. 132 Cap .0005, 4/6
- No. 260 (Left-hand movement with trimmer) Cap .0005, 5/-
- No. 261 (Right-hand movement with trimmer) Cap .0005, 5/-



TELSEN
RADIO COMPONENTS

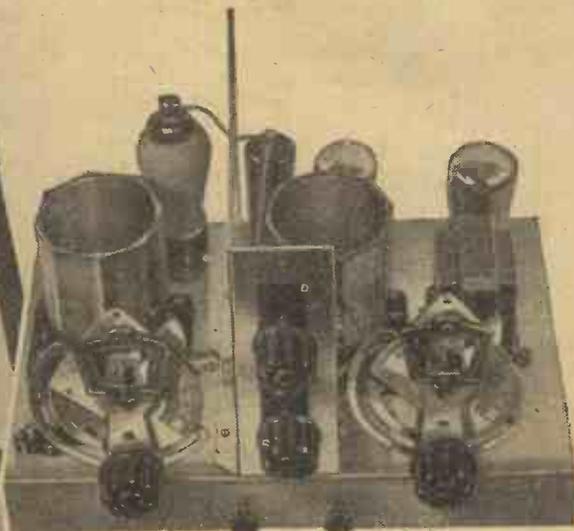
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A.W. 1A

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On Low Wavelength!

WHAT'S YOUR CHOICE?

NOW that you have had a look round the Exhibition (or, if you haven't, you have read all about it in *AMATEUR WIRELESS*), what do you think is the most striking development in wireless this year? To me it seems that there is only one answer to the question, and that is tone control, which has made its appearance in a good many forms. In some cases there is a fixed compensating device; in others there is a special tone-control circuit or circuits; in others, again, low-frequency intervalve transformers in association with variable resistances do the trick.

Tone control became more and more necessary as selectivity was pushed farther and farther towards its limit. In "straight" sets selectivity is obtained partly by band-pass methods and partly, as a rule, by the use of reaction. In some sets special arrangements are used to enable a much greater degree of reaction coupling to be employed than was possible some years ago. In the super-het we have a combination of band-pass methods and of sharply tuned I.F. stages. The result in all cases is the same: there is a distinct tendency for the high notes to be lost, particularly if you are using knife-edge tuning for long-distance work. I remember some time ago listening to an American station with a smallish set which relied very largely upon reaction. To obtain any kind of volume it was necessary to work close to the oscillation point, and the result was interesting. When a band was playing absolutely nothing but the bass could be heard. You will find much the same effect if you try to work up a little distant station, such as one of the distant relays, to full loud-speaker volume.

WHAT HAPPENS

WHAT takes place in such circumstances is not a complete cutting out of the sidebands, but a big reduction of the response of the set to those corresponding to frequencies more than about an octave or an octave and a half above the middle C. The deep note sidebands, on the other hand, are not attenuated at all; so that the bass is brought out at full power. The result: the bass swamps the treble, though the latter is there all the time. By tone correction the bass is kept within bounds and the treble comes back. I find particularly interesting the various tone-correcting transformers, for these can be used in almost any existing set.

It is a revelation to make a little experiment on the following lines. With an ordinary three-valve set of the S.G., detector, and power-valve type, rig up a four-pole change-over switch so that you can put either an ordinary transformer or one of the compensating kind into circuit between the detector and the output valve.

Tune in a Continental station of moderate strength and work it up to full volume with reaction. Use, first of all, the tone-control transformer and turn its knob until you get reproduction of really pleasing quality. Now quickly switch over to the plain transformer, and you will be astonished at the difference.

REALLY WORTH WHILE

AFTER trying several of these transformers I am convinced that they constitute one of the biggest advances that wireless has made for a long while. One of my chief reasons for saying so is that they enable us to remove the only real snag in long-distance listening. With a good set containing plenty of H.F. the nearer and more powerful Continentals can be brought in at something very close to local-station quality, even without a tone-correcting circuit. We don't have to use much reaction for them and, owing to their very power, they have sufficient spread to prevent any important attenuation of their sidebands. But the smaller fry and the more distant big stations have suffered, and most of us have realised that it was difficult to make the reproduction of their programmes anything better than barely worth listening to. Tone control gives us the means of making poor reproduction good and good reproduction better still.

ON THE SHORT WAVES

THERE is a good deal of short-wave apparatus at Olympia, though not quite so much as I expected to see, for I am quite sure that when the Empire short-wave station comes into operation, towards the end of the year, there will be a tremendous boom in this side of wireless reception. There are a few sets which will work on long, medium, and short waves, and these are very handy. Personally, I rather favour the super-heterodyne adaptor type of short-wave gadget. If you have one or, better still, two stages of H.F. amplification in your "broadcast" set, one of these adaptors is a first-rate thing to have. You simply stick it on in front of the set, switch over to the long waves, and tune what were the high-frequency valves to a good high wavelength. The arrangement then becomes a superheterodyne very easy to work and giving remarkably good results.

If you don't possess a set with H.F. stages there are excellent little adaptors fitted with a plug which goes into the

detector valve holder of the set. All tuning is then done with the condensers of the adaptor, which are of much smaller capacity than those normally used in the ordinary receiving set. There is so much to hear on the short waves that it is well worth while having either a special short-wave set or an adaptor which will enable an ordinary set to be used for this kind of reception.

THE MIDDLE WAVES

ON the medium waveband all sorts of stations are reappearing after their summer period of temporary silence, whilst those that have remained through the season of longer days and shorter nights as rather small voices are now quickly gaining in strength. Another very encouraging sign is that a whole lot of stations whose reception became patchy during the summer time are now coming back as regulars. By patchy reception I mean that you may hear certain stations well on two or three nights during the week and on the others either not hear them at all or only just be able to pick them up. Notable come-backs are those of Budapest, Vienna, Katowice, Berlin Witzleben, Sotens, Breslau, Gothenburg, and Leipzig. On the whole, the Continent is doing us wireless folk pretty well just now.

TIT FOR TAT

BUT equally we are doing the Continent pretty well, though in a rather different way. One of the problems facing the authorities just now is that of programme borrowing. It appears that quite a few little stations which cannot afford to spend much on their programmes have installed first-rate receiving apparatus and have made the necessary arrangements for relaying. As evening comes along the operator makes a tour over the wavebands to find which stations are coming in best. He selects one whose programme seems attractive and then proceeds to push this out from his own aerial. Since the British programmes are, on the whole, amongst the best and the quality obtainable from our stations is remarkably good, it is only natural that our transmissions should frequently be chosen for this somewhat doubtful compliment. If progress continues at its present rate, particularly in the matter of short-wave wireless, the time may come when a station in any part of the world will be able to send out fine programmes without possessing so much as a studio.

PIEZO-ELECTRIC SPEAKERS

ISEE that one of the latest American sets—a six-valver listed as a midget—is fitted with a piezo-electric speaker instead of the standard moving-coil instrument. The actual "drive" is a crystal of Rochelle salt which

Blueprints for Set Builders

Home-constructors should note that full-size blueprints of the "Advance Four" and the "World-range Short-wave 3" are available at the Blueprint Dept. of *AMATEUR WIRELESS*, 58-61 Fetter Lane, E.C.4. The prices are 1s. 6d. and 1s. each respectively, post free.

On Your Wavelength! (continued)

alternately expands and contracts under the influence of the applied L.F. currents and so impulses a diaphragm. The new instrument is said to give very satisfactory results considering its light weight and exceptionally compact construction, though I should hardly expect it to compete with the moving-coil on the lower notes. In one sense, the crystal-operated speaker provides an interesting alternative to existing instruments and, like the electrostatic type, may prove particularly useful in connection with the new fashion for dual-speaker sets. At the same time, it can scarcely claim to be an entirely new development, as piezo-electric microphones and telephone were both known—at least, in the experimental stage—long before the days of broadcasting.

"FIXING" THE TUNING CONDENSERS

A PROPOS of midget sets and the general tendency to restrict even super-het receivers to the smallest possible size, designers find themselves up against some peculiar problems, particularly in connection with microphonic feed-back. It stands to reason that when one fits a powerful moving-coil speaker in the same small casing as the valves and tuning-components there is bound to be a possibility of trouble, due to the effect of the mechanical vibrations set up by the speaker. So far as the valves are concerned, microphonic reaction can be prevented by a suitable design of the valve electrodes. But it is found that the tuning-condensers are also liable to be affected, slight vibrations in the vanes and in the ganging spindle giving rise to small variations of tuning which may be sufficient to spoil reception. To eliminate this source of disturbance the chassis is mounted on soft rubber blocks and the condenser spindle and vanes are braced wherever possible by means of special partitions which hold them firmly against flexural movement.

A METER PROBLEM

THE other day I wanted to run a little gadget off my car, and I found on the dashboard two sockets which I assumed would be connected to the battery. In order to make quite sure, I thought I would connect a meter across these two points. The only meter I had handy at the time was a little pocket testing meter reading up to 6 volts, but I decided to use this, since I only wanted an indication that the circuit was live. Actually, of course, I expected the pointer to go right off the scale; and when I tried it, it did so.

Unfortunately, it read in the wrong direction, as a meter nearly always does when you first connect it up. I therefore reversed the connections and found that it still read in the wrong direction. Reversing the connections back again the meter now read correctly. In fact, to cut a long story short, I could make the meter read in

which ever direction I liked, irrespective of which way I connected the terminals.

Now, it was incredible that the battery in my car should be changing its polarity every two seconds, and I began to wonder whether these two terminals really were connected across the battery or whether they were taken in some curious manner to the cutout, thus giving me the apparent reversal of the voltage. Even that did not seem to me to meet the case, and I was very puzzled to understand what was happening.

DON'T BE MISLED

I HAD a sudden brainwave, however, and got hold of a better meter, capable of reading up to 30 volts and of the moving-coil type. When I connected this across the terminals I obtained the proper reading of 12 volts; the reading was also quite steady, one of the terminals being minus and the other plus the whole time. I then began to remember some curious effects I had experienced before with moving-iron meters. This little pocket testing meter, of course, was of the moving-iron type, and the application of a very strong force to the moving mechanism is just as likely to send it in the wrong direction as in the right.

The movement is only a very lightly pivoted piece of soft iron and it is so balanced as to be just ready to get off the mark. Consequently, a really strong force will sometimes set it off the mark in the wrong direction.

A QUESTION OF SPEED

TO obtain the best reproduction from modern records with a radiogram, it is essential that the speed of the turntable shall be exactly right. Most records demand a speed of seventy-eight revolutions a minute, though some require a little more and some a little less. The best speed, in any case, is nearly always indicated on the label of the record; if it isn't, you can take it that seventy-eight will be right. But remember that this means the speed of rotation when the pick-up is travelling over the record. I have often seen people count the turntable revolutions with the pick-up placed on its little rest. The motor is thus running light and the speed

may be considerably in excess of that obtained under the load of the pick-up. Here is a simple way of making sure that the turntable speed is what it should be. On to the label on a record stick a little piece of white paper. Place the record on the turntable, start up, and bring the pick-up into action. Sight between the front edge of the pick-up and the centre pin of the turntable and count one every time that the piece of white paper passes in front of your eye. Get a friend to act as timekeeper and ask him to stop you at fifteen seconds. If the speed is correct you should have made a count of nineteen (a quarter of seventy-eight is $19\frac{1}{2}$) just before the fifteenth second is reached. It is as well to check over once or twice, and you can finish by counting for a full half-minute, in which case thirty-nine revolutions should be registered.

A "PORTABLE" TIP

A GOOD many people, I find, don't quite know how to turn a portable, or any other set containing a built-in frame, or even the frame by itself, in such a way as to obtain the maximum signal strength. Most of them do it purely by hit-and-miss methods, simply making movements until the strength appears to be at its best. The car is notoriously deceptive when it comes to deciding whether a signal, already fairly loud, is or is not just a little bit louder with this adjustment or that. Here is a very much better way. Having tuned in a station, rotate the apparatus until you find a position where strength is at its minimum. This is not, as a rule, at all difficult and, except in the case of a very strong transmission, you are likely to be able to discover a position in which almost or entire silence occurs. Having done this, point your first finger straight at the middle of the cabinet of the set or of the frame. Now turn until the edge of the cabinet or the windings of the frame are directly opposite the pointing finger. In this way you make certain of ensuring that the apparatus is correctly orientated.

ADDING ONE ON

IN spite of my frequent advice to readers to the contrary, I have just been adding a valve to one of my own sets. But I haven't really broken my own rule, for I didn't try to increase the number of amplifying stages; my additional valve was required because I converted the output stage to push-pull. I am very glad that I did, for the results have exceeded my expectations. I don't think that any battery output valve used in single harness can give the results that you obtain from push-pull. You don't get any more noise, but it's much nicer noise. Should you want to improve the quality of an existing set, I can recommend this scheme to you as one that is worth thinking about.

THERMION.

A CONSTRUCTIONAL NUMBER NEXT WEEK

Next week's issue of "A.W." will feature TWO fine sets: The "IDEAL REGIONAL TWO" and "YOUR HOME RADIOGRAM."

WHY NOT USE A SHORT-WAVER?

BUILD THE



WORLD-RANGER SHORT-WAVE 3

Nobody who is interested in short-wave reception can afford to miss the constructional description of a fine three-valver specially designed for reception below 100 metres. An introduction to this new short-wave outfit was given in last week's issue.

THE "World-Ranger Short-wave 3," first details of which were given in last week's issue of "A.W.," is a simple job to build although it is so efficient. The layout is well spaced, components are not cramped together so that wiring is difficult and the special inverted chassis method of construction adopted results in a tidy "professional"-looking set.

The first job is to check up the parts with the components list and to see that you have parts of the correct electrical values. The first specified parts in the components list are those used in the actual set described and illustrated by the accompanying photograph.

The set is described as having an inverted chassis and the photograph above will show you just what this means. The baseboard is a box-like formation carrying the grid-bias battery beneath it and much of the straightforward wiring. The terminal strip carrying the loud-speaker, aerial, and earth terminals, forms the back of this box formation.

On top of the baseboard box are the main parts, such as valve holders, decoupling condensers, low-frequency transformer, H.F. choke, series aerial condenser, potentiometer and the rest. The tuning condenser, reaction condenser and coil are carried on the panel. This latter component is mounted in rather an unusual position on account of the wave-change switching. The coil is fitted flush against the three-position switch which controls the various sections of the coil to cover the three separate wavebands between 12 and 85 metres.

The reaction condenser is actually beneath the baseboard box, although it is mounted on the panel and part of the plywood of the actual baseboard is cut away to clear the vanes.

The first constructional job to be done is the making up of the baseboard box and the drilling of the panel and terminal strips. A full-size blueprint of the set is available, price one shilling, post free, from the Blueprint Department, AMATEUR WIRELESS, 58-61 Fetter Lane, London, E.C.4.

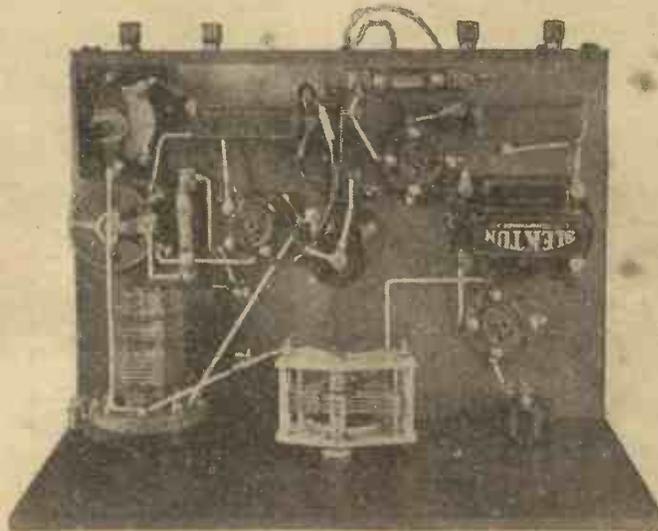
This shows all the wiring and gives the exact layout of the parts on the panel, and the baseboard box; it also shows the wiring beneath the baseboard, so that it is a great aid when you come to the constructional work.

The accompanying panel shows all the parts needed to build up the "World-Ranger Short-wave 3."

Now the panel can be drilled for the two condensers, the coil switch and the on-off switch. There must also be six holes for

woodscrews which secure the panel to the baseboard box.

Using stout ply wood, make up the baseboard. The three pieces of wood can be nailed, or better still, screwed together and the long terminal strip which can be drilled, (Continued on page 394)



This plan view shows that the construction is simple and that few components are required

COMPONENTS REQUIRED FOR THE "WORLD-RANGER 3"

Ebonite panel, 12 in. by 8 in. (Peto Scott, Becol, Goltone).
 .002-mfd. variable condenser (British Radiophone, Utility, Goltone, Ormond, Stratton, Formo).
 On-off switch (Bulgin, rotary, Lissen, British Radiophone, Becker, Igranic, Graham Farish, Sovereign, Claude Lyons, Telsen, W.B.).
 Triple-range short-wave coil with switch (Lissen).
 Three valve holders (Telsen, Lissen, W.B., Lotus, Stratton, Wearite).
 Two 1-mfd. fixed condensers (Telsen, Dubilier, Lissen, T.C.C., Goltone, Ferranti, Wilburn).
 .002-mfd. fixed condenser (Lissen, Telsen, Dubilier, Goltone, T.C.C., Ormond).
 .006-mfd. fixed condenser (Lissen, Telsen, Dubilier, T.C.C., Ormond).
 2-megohm grid leak (Dubilier, Lissen, Telsen, Sovereign).
 3-megohm grid leak (Dubilier, Lissen, Telsen, Sovereign).
 Two grid-leak holders (Readi-Rad, Lissen, Goltone).
 Neutralising condenser (Peto-Scott, J.B., Igranic).
 400-ohm baseboard-mounting potentiometer (Lissen, Igranic, Sovereign).
 Two spaghetti resistances, 20,000-ohm and 40,000-ohm (Lewcos, Lissen, Telsen, Bulgin, Graham Farish, Goltone).
 Low-frequency transformer (Slektun, Lissen, Verley, Telsen, Atlas, Lotus, R.I., Goltone).
 Short-wave high-frequency choke (Slektun, Lissen, Stratton, Igranic, Goltone, Lewcos, Wearite).
 .0003-mfd. reaction condenser (Peto Scott, Polar, J.B., Utility, Lissen, Telsen).
 Five wander plugs, marked: H.T.—, H.T.—, G.B.—, G.B.—, G.B.—2 (Clix, Belling-Lee, Eelex, Goltone).
 Four terminals, marked: A, E, L.S.—, L.S.— (Clix, Belling-Lee, Eelex, Bulgin, Goltone).
 Two spade terminals, marked: L.T.—, L.T.— (Clix, Belling-Lee, Eelex).
 Ebonite strip, 12 in. by 2 in. by 1/4 in. (Peto Scott).
 Wood for baseboard assembly as per blueprint.
 Pair of grid-bias clips (Bulgin).
 Connecting wire (Glazite, Lacoline).
 Two yards of thin flex (Lewcoflex, Goltone).

ACCESSORIES

Cabinet (Peto Scott).
 120-volt H.T. battery (Lissen, Drydex, Ever Ready, Siemens, Fuller, C.A.V.).
 9-volt G.B. battery (Lissen, Drydex, Ever Ready, Siemens, Fuller, C.A.V.).
 2-volt accumulator (Lissen, Exide, Drydex, Ever Ready, Siemens, Fuller, C.A.V.).
 H.T. unit (Lissen, Ekco, Regentons, Atlas, Heayherd).
 Loud-speaker (R. & A., British Rola, W.B., Epoch)

SEE THIS SET ON THE "A.W." STAND (No. 7) AT THE EXHIBITION

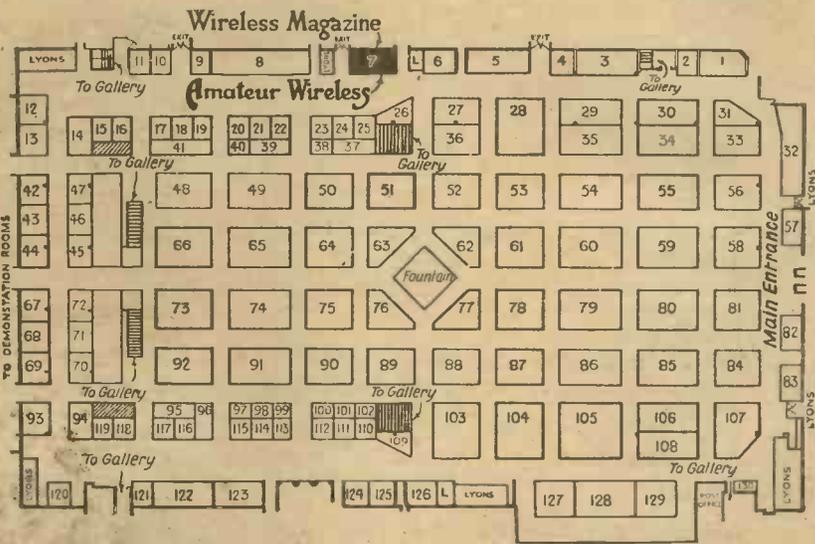
Radiolympia

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A CONCISE GUIDE

FRIDAY, AUGUST 19, to
SATURDAY, AUGUST 27

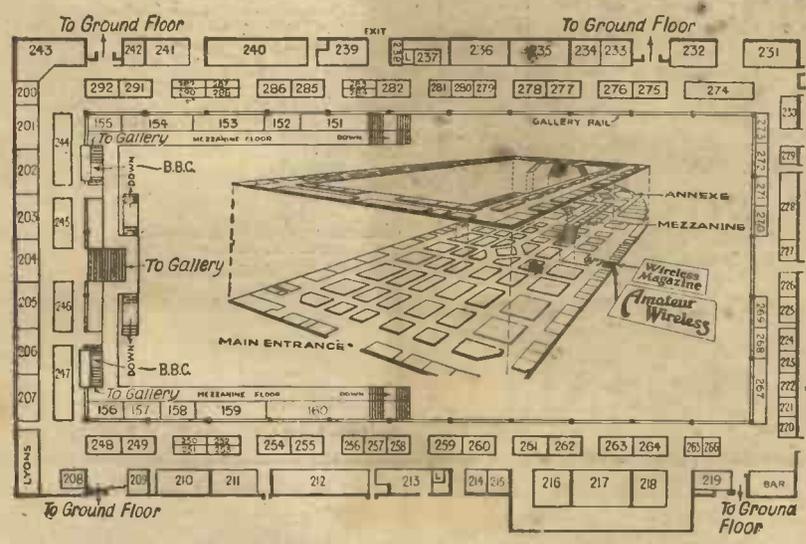
Name	Stand No.	Name	Stand No.
Ad-A-Grams	113	Dew & Co., Ltd., A. J.	217
Adey Portable, Ltd.	259	Dibben & Sons, Ltd., Wm.	77
Alliance Radio, Ltd.	19	Dubilier Condenser Co. (1925) Ltd.	84
Amalgamated Press, Ltd.	8	Dulcetto Polyphon, Ltd.	235
Amph'n (1932) Ltd.	63	Dyson & Co. (Works) Ltd.	67
Apollo Gramophone Co., Ltd.	214		
Automatic Coil Winder & Electrical Equipment Co., Ltd.	203		
Baker, A.	83	Farle Engineering Co., Ltd.	33
Balcombe, Ltd., A. J.	128	Eastick & Sons, J. J.	239
Bell Piano Co., Ltd.	3	East London Rubber Co.	211
Belling & Lee, Ltd.	154	"Econasign" Co., Ltd.	239
Benjamin Electric, Ltd.	138	Edison Bell, Ltd.	27
Benn Brothers, Ltd.	281	Edison Swan Electric Co., Ltd.	75, 239
Bernard Jones Publications, Ltd.	7	Electrical Devices Co.	47
Birl & Sons, Ltd., S. S.	158	Electrical & Radio Products, Ltd.	33
Bowyer-Lowe & A. E. D., Ltd.	156	Electro-dynamic Construction Co., Ltd.	157
Brider & Co., E. O.	280	Electrical and General Distributors, Ltd.	278A
Briannia Batteries, Ltd.	138	Enstien, Ltd.	212
Brit'ish Acoustic Films, Ltd.	119	Epoch Radio Mfg. Co., Ltd.	41
British Blue Spot Co., Ltd.	35	Erie Resistor, Ltd.	6
British Broadcasting Corporation, Ltd.	155A	Ever Ready Co. (G.B.) Ltd.	61
British Ebonite Co., Ltd.	2		
British General Mfr. Co., Ltd.	23	Fandels, Ltd.	231
British Gullinair Products, Ltd.	23	Fay Home Recorders, Ltd.	255
British G. W. Z. Co., Ltd.	282	Ferranti, Ltd.	73
British Hard Rubber Co., Ltd.	223	Film Industries, Ltd.	261
British Ideal Patents Ltd.	72	Five Point Products	252
British N.S.F. Co., Ltd.	18	Finchers (Wholesale) Ltd.	241
British Pix Co., Ltd.	49	Formo Co.	103
British Radiophones, Ltd.	83	Fox Publications, Ltd.	278
British Reels Co., Ltd.	43	Fraser Radio, Ltd.	253
British Thomson-Houston Co., Ltd.	119	Fuller Accumulator Co. (1926) Ltd.	73
"Broadcaster"	6	Fulton, Ltd.	203
Brown Brothers, Ltd.	240		
Brownie Wireless Co. of Gt. Britain, Ltd.	62	Gambrell Radio, Ltd.	21
Bulfin & Co., Ltd., A. F.	151	Garrard Engineering & Mfg. Co., Ltd.	122
Burgoyne Wireless (1830) Ltd.	98	General Electric Co., Ltd.	105, 109
Burns, Ltd.	46	Gilbert & Co., Ltd., C.	232
Burton, C. F. & H.	1	Gothic Electrical Supplies, Ltd.	201
Bush Radio, Ltd.	110	Graham Farish, Ltd.	61
		Gramophone Co., Ltd.	65
		Grispo Co.	223
		Grosvenor Electric Batteries, Ltd.	42
		Gutta Percha Co. (Telegraph Construction & Maintenance Co., Ltd.)	257
Cadisch & Sons, R.	213		
Carrington Manufacturing Co., Ltd.	123	Hacker, H., & Sons	37
Celestion, Ltd.	127	Halford Radio, Ltd.	117
Cellegrove Co.	293	Hambing, A. W., Ltd.	224
Chloride Electrical Storage Co., Ltd.	61	Hampton Radio, Ltd.	12
Churchmans, Ltd.	288	Harlie Brothers (Edmonton), Ltd.	31
Citel Products, Ltd.	285	Harwell, Ltd.	281A
City Accumulator Co.	243	Haynes Radio	17
Clarion Radio Valve Co.	130	Haysheri, F. C., & Co.	13
Clarke & Co. (N.C) Ltd., H.	91	Hellesens, Ltd.	221
Clmax Radio Electric Ltd.	81	Henderson Wireless & Electric Service	215
Cole, Ltd., E. K.	25, 65	Henley's Telegraph Works Co., W. T., Ltd.	18
Columbia Graphophone Co., Ltd.	86	Hillman Brothers	219
Colvina, Ltd.	245	Hobday Brothers, Ltd.	243
Concordia Electric Wire Co., Ltd.	203	Hulton, Ltd.	271
Consolidated Radio Co., Ltd.	34	Hustler Simpson & Webb, Ltd.	39
Cosor, Ltd.	69		
		Istranic Electric Co., Ltd.	33
Dallas & Sons, Ltd., J.	202	Ilife & Sons, Ltd.	5
Danipad Rubber Co., Ltd.	113	Itonia, Ltd.	218
Darwins, Ltd.	70		
Dayzite, Ltd.	203		
De La Rue & Co., Ltd., T.	227		



PLAN OF THE STANDS ON THE GROUND FLOOR EMPIRE HALL

Any Exhibitor can be located by reference to the list and the plans. A complete Guide to the Exhibition was published in last week's issue.

Name	Stand No.	Name	Stand No.
Jackson-Bell Distributors, Ltd.	11	Ratcliff (Metals), J. F., Ltd.	269
Jackson Brothers	204	Ready Radio, Ltd.	106
Jewel Pen Co., Ltd.	87	Redfern's Rubber Works, Ltd.	124
Johnson Talking Machine Co., Ltd.	228	Regent Radio Supply Co.	51
Junit Mfg. Co., Ltd.	39	Reproducers & Amplifiers, Ltd.	69
		Roberts, John	272
Kalsky (Aldgate), S., Ltd.	236	Rotor Electric, Ltd.	238
Kenwell Radio, Ltd.	121		
Keith Prowse & Co., Ltd.	292	Select Gramophones, Ltd.	219
Koister-Brandes, Ltd.	54	Selfridge & Co., Ltd.	274
		Siemens Electric Lamps & Supplies, Ltd.	88
Lampugh, S. A., Ltd.	99		
Lancashire Dynamo & Crypto, Ltd.	111	Six-Sixty Radio Co., Ltd.	52
Lawson & Raphael	270	Siektan Products	235
Lectro Linx, Ltd.	233	Smith & Sons, B. (Motor Accessories) Ltd.	22
L.E.S. Distributors, Ltd.	233	Smurthwaite, F. W.	139
Lisen, Ltd.	69	Sovereign Products, Ltd.	152
Loke, R. T., Ltd.	211	Spencer Radio, Ltd.	14
Loxley Radio Co., Ltd.	223	Stafford Sinclair	277A
London Electric Wire Co. & Smith, Ltd.	153	Standard Battery Co.	26
Lotus Radio, Ltd.	64	Standard Telephones & Cables, Ltd.	107
		Stratton & Co., Ltd.	28
M.P.A. Wireless (1930) Ltd.	95	Sun Electrical Co., Ltd.	231
Magnavox (G.B.) Ltd.	94	Swift Levick & Sons, Ltd.	112
Mans Radio Gramophones, Ltd.	102	Stanbic, Ltd.	256
Manufacturers Accessories Co. (1926) Ltd.	237	Siam Electrical Instrument Co., Ltd.	289
Marconiphone, Ltd.	74	Shapland & Pether, Ltd.	287
McMichael, L., Ltd.	56	Smith, Arthur, (Radio), Ltd.	251
Montagne Radio Inventions & Development Co. Ltd.	49	Sylves, Ltd.	269
Milhard Radio Valve Co., Ltd.	79, 248		
Musphy Radio, Ltd.	28	Tannoy Products	44
		Telegraph Condenser Co., Ltd.	33
N. Stone Accumulator Co., Ltd.	244	Telsen Electric Co., Ltd.	66
National Radio Service Co.	200	Terrystone Radio Products, Co., Ltd.	269
Newnes, George, Ltd.	114	Thompson Diamond & Butcher	207
New London Electron Works, Ltd.	43	Trade Chronicles, Ltd.	10
		Truwell Radio, Ltd.	96
Olham & Son, Ltd.	85	Ultra Electric, Ltd.	73
Ormond Engineering Co., Ltd.	87	Union, Ltd.	259
Osborn, Chas. A.	32	Univolt Electric, Ltd.	115
Overscas Trading Corporation	291	United Radio Manufacturers, Ltd.	155
		Umello, Ltd.	125
Percuss, E. & Mee, Ltd.	238		
Peritric, Wilson & Co.	159	Vandervell, C. A., Ltd.	246
Peto Scott & Co., Ltd.	247	Varely (Oliver Pell Control, Ltd.)	163
Pezans, Ltd.	94		
Phillips Lamps, Ltd.	104	Wairtel Wireless Co., Ltd.	23
Portadown Radio, Ltd.	56	Westinghouse Brake & Saxby Signal Co., Ltd.	83
Powerline Products	229	Whiteley Electrical Radio Co., Ltd.	108
Prestley & Ford, Ltd.	213	Wilkins & Rogers, Ltd.	118
Primus Manufacturing Co.	15	Wingrove & Rogers, Ltd.	129
Eye Radio, Ltd.	80	Wireless League	285
Philomel Radio Equipment	279	Wireless Retailers Association of G.B.	286
Practical Radio Publishing Co.	254	"Wireless Trader"	9
		Wright & Wearie, Ltd.	82
R. C. Radio Electric, Ltd.	222	Whiteley, Wm., Ltd.	267
Radiolab, Ltd.	277	Wego Condenser Co., Ltd.	284
Radio Gramophone Development Co., Ltd.	92		
Radio Instruments, Ltd.	90	Yagerphone, Ltd.	238
Radio Society of Great Britain	242	Zetavox Radio & Television, Ltd.	103



PLAN OF THE STANDS IN MEZZANINE AND GALLERY, AND (INSET) GENERAL VIEW

SEE THE "ADVANCE FOUR" AND THE SPEAKER BAFFLE ON THE "A.W." STAND

“HIS MASTER’S VOICE”

at Olympia, STAND NO 55

(GRAND HALL)

In addition to the four new instruments illustrated, “His Master’s Voice” will show at Olympia the following range of models for the new season:—

	PRICE
MODEL 501 <i>Transportable Radiogram</i>	25 guineas
MODEL 435 <i>De Luxe Radio Four</i>	17 guineas
MODEL 174 <i>Super-Power Speaker</i>	£7. 10. 0
MODEL LS7 <i>Universal Speaker</i>	£4. 15. 0
MODEL 116 <i>Record Player</i>	7 guineas
MODEL 117 <i>Auto-Record Player</i>	12 guineas
MODEL 553 <i>Auto-Electrogram</i>	42 guineas

Current models which have proved so enormously popular during the past season, and which have established a new standard in the reproduction of broadcast and recorded music, will also be continued.

Visit the “His Master’s Voice” Stand—see and hear these instruments . . . examine the many improvements in the range. And whatever else you do, you must see the pre-release showing of the most wonderful industrial ‘talkie’ yet made. Demonstration Room D18. Free tickets will be obtainable at Stand No. 55.



*Superhet
Ten Auto-
radiogram.
30 gns.
Model 532.*



*Superhet
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The Gramophone Co. Ltd., London, W.1.



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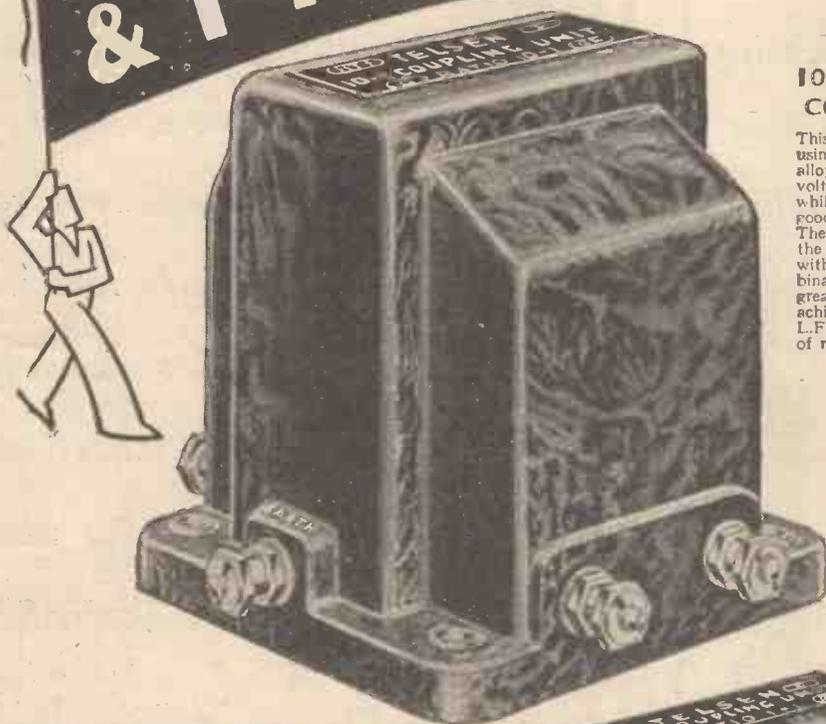
EXTRA QUALITY WITHOUT EXTRA COST

Adv. of The General Electric Co., Ltd., Magnet House, Kingsway, London, W.C.2

Mention of "Amateur Wireless" to Advertisers will Ensure Prompt Attention

TELSEN

10-1 COUPLING UNIT & 1-1 COUPLING UNIT



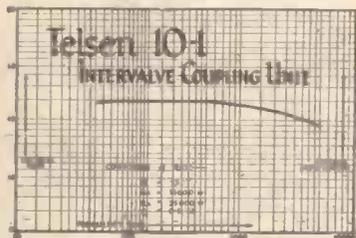
TELSEN 10-1 INTERVALVE COUPLING UNIT

This is a filter-fed transformer using a high permeability nickel alloy core, which enables a 10-1 voltage step-up to be attained while preserving an exceptionally good frequency characteristic. The response is compensated in the higher frequencies for use with a pentode valve, this combination giving an amplification greater than anything previously achieved, equal to two ordinary L.F. stages, but with better quality of reproduction.

No. W.215



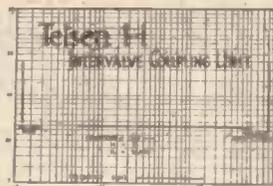
12/6



TELSEN 1-1 INTERVALVE COUPLING UNIT

This is a modern development of the one-time deservedly popular R.C. unit. It incorporates a low pass filter feed in its anode circuit, thus effectively preventing "motor-boating," "threshold howl," and other forms of instability arising out of common couplings in eliminator and battery circuits. Used with an H.L. type valve it will give an amplification of about 20 and a perfect frequency response, at the same time consuming negligible H.T. current. No. W.214

7/6



TELSEN

RADIO COMPONENTS

GOOD RADIO IS A JOY FOREVER

ANNOUNCEMENT OF THE TELSEN ELECTRIC CO. LTD., ASTON, BIRMINGHAM.

You will Help Yourself and Help Us by Mentioning "A.W." to Advertisers

Unanimous Press Praise!

NEW Ekco 3-valve Consolette M.23

The selectivity of the M.23 is remarkable. Long Wave selectivity extremely good. Quality is really pleasing. Tone clear and full. Speech clear and natural. Tone very pleasingly balanced. Full loud-speaker strength of foreigners during broad daylight. Good selection of Continental Stations.

*Local and distant trans-
with ease and facility.
accurate indeed. High
Very easy to control.
desirable points to be*



*missions can be received
Wavelength scales very
quality construction.
Embodies all the most
expected in a 3-valve Set.*

The above are not our words. They are very brief extracts from Test Reports which have appeared in *The Wireless Trader, The Broadcaster, Amateur Wireless, etc.* The complete reports are full of enthusiasm for this wonderful new set. As one of the papers says "This set gives a performance that is incredible and for a distinctly moderate outlay — a notable set."



EKCO CONSOLETTA M.23
Three-valve circuit (Screened Grid, Detector and Pentode). Complete with built-in moving-coil speaker, in figured walnut bakelite cabinet. Illuminated dial. Connections for pick-up.

PRICE 17 GUINEAS
or 12 monthly payments of
32/9

OLYMPIA STAND No. 65.

To: E. K. Cole, Ltd., Dept. K.16,
Ekco Works, Southend-on-Sea.

Please send me full details
of Ekco All-Electric Radio.

Name.....
Address.....
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.....

A CHEAP ELECTRIC SOLDERING BIT

YOU CAN MAKE IT YOURSELF!



Here are instructions for making an electric soldering iron which will do all the soldering work encountered in set construction

AN electric soldering iron is a great convenience to any amateur constructor. The one here described can easily be made out of "junk" for little or no cost, and will be found very efficient.

The materials required are as follows:—

- 3 in. of $\frac{3}{8}$ -in. diameter copper rod,
- 6 in. of $\frac{3}{8}$ -in. diameter silver steel rod,
- 2 yds. of asbestos string,
- 2½ in. of $\frac{3}{4}$ -in. diameter fibre tube,
- 6 yds. of 20 S.W.G. iron wire,
- 18 yds. of 42 S.W.G. enamelled Eureka resistance wire,
- 7 sheets of thin ruby mica,
- 3½ in. by 2½ in.
- A tool handle,
- 2 yds. of 3-amp. workshop flex, and either a lamp adapter or a two-pin plug.

Preparing the Bit

The bit can first of all be prepared. One end of the copper rod is shaped to a suitable point, while the other is drilled and tapped 2 B.A. About $\frac{3}{4}$ -in. from the tip a $\frac{1}{8}$ -in. hole is drilled through the centre.

The silver steel rod is now annealed, screwed 2 B.A. for a distance of $\frac{1}{2}$ -in. and screwed firmly into the copper bit. The other end of the rod is filed up square, and pointed.

Although the size and shape of the handle is not important, the end which fits to the iron must be turned down for a distance of 1¼ in. until the fibre tube will just slide over it. A recess is now cut in the centre of this turned portion to a depth of $\frac{3}{8}$ -in.

Two $\frac{3}{8}$ -in. holes at opposite sides of this recess are now drilled slantwise towards the centre of the handle. A larger hole, about $\frac{1}{4}$ -in. is also drilled from the end of the handle to meet these two holes. It is countersunk as shown in the drawing, at the foot of this page, to prevent wear on the flex.

A hole can now be drilled in the handle to take the pointed steel rod, and the latter driven in firmly.

The heating element has now to be wound. If a lathe is available it will be a

the position shown in the drawing. This should be tied temporarily with cotton, which can be removed as the wire is wound on.

The actual length of the heater winding is 45 feet, but more wire than this should be measured off, as it is necessary to strengthen the leading-out wires. To do this, remove the enamel from the Eureka wire for a distance of 2 feet on each end, double it back on itself twice, and twist it up. Fine emery cloth will be found best for removing the enamel.

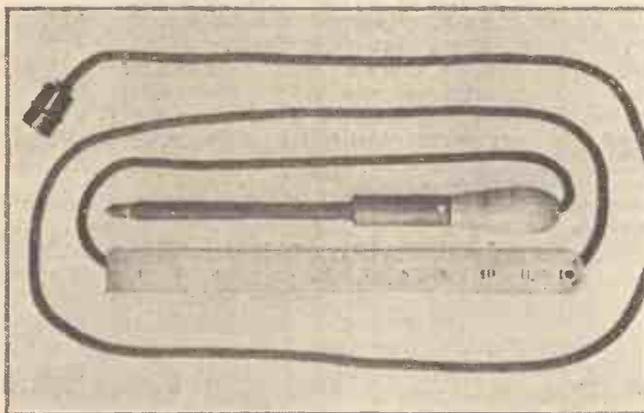
The ends of the winding are anchored by binding the leading-out wires close to the coil with a few turns of the Eureka wire.

When the winding is completed, another sheet of mica is wrapped round the coil, and the two leading-out wires brought up to the handle on opposite sides of the asbestos packing. It will be advisable to fix these wires in place with a few ties of cotton, to prevent them shifting, and possibly becoming short-circuited while finishing the job.

The remaining four sheets of mica are now placed round the iron as shown in the drawing. It will be seen that they extend to within $\frac{1}{2}$ -in. of the handle. These mica sheets can now be tied in

place with a few turns of cotton before winding on the iron wire protective covering. There is no need to remove this cotton.

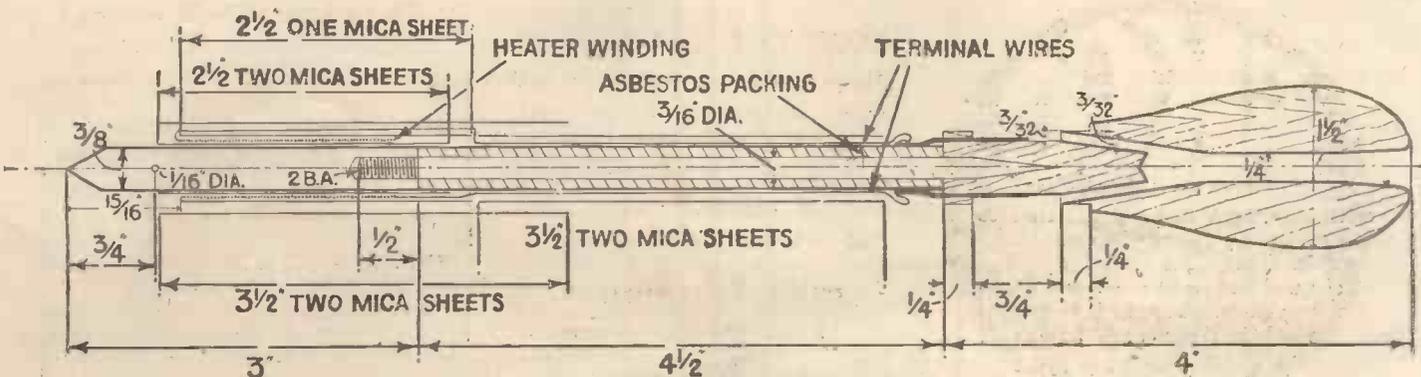
The wires from the heating element are joined to two short lengths of stout copper
(Continued at foot of next page)



The complete iron with a scale showing the size

help, but this is no more essential here than for the previous job.

String asbestos is first wound round the steel shaft until it is packed out to the diameter of the copper bit. Next, two sheets of mica are wrapped round the bit in



This sectional drawing will make the construction of the iron quite clear

Some Notes on Present-

day Short-wave Conditions

Around the Short-wave Dial

By M.
BARNETT

ALTHOUGH the Show at "Radio-lympia" more or less commences the radio season, as far as the business end is concerned at any rate, a "season" practically does not exist for the short-wave amateur. Short-wave listening is as good as ever during the summer months and in fact, in some cases, even better than during the winter months. Although the short waves are noted for their unreliability they are at least useful during all the seasons, bearing in mind, of course, that their usefulness varies in accordance with the clock and the wavelength.

Excepting when conditions are abnormally bad, there are always numerous programmes to be picked up on the short waves and you certainly can get a number of thrills which rarely come over on the long waves. In particular, I would like to make these remarks to those (if any) who have not yet sampled the short waves. Build a short-wave receiver or adaptor and sample some of the fare provided below 100 metres. Important international events are often relayed by the short-wave stations and you can generally pick these up even on the occasions when the local medium-wave

station is not relaying them. The question of expense of a short-wave outfit in addition to the regular broadcast receiver need not present much of a problem at the present time. A short wave adaptor can be built up for literally a few shillings—you can make one up for certainly not more than 30s. using good quality components—and the extra battery consumption is only slight.

No Special Aerial

Once again I would like to refer to the fact that it is not generally necessary to put up a special type of aerial for short-wave reception (unless, perhaps, it is to be used solely for short-wave reception) and that an ordinary aerial as used for normal broadcast reception will, if it is a good one, give perfectly satisfactory reception. Also, no particular type of earth connection is really necessary so long as it is a reasonably efficient one, which functions satisfactorily on the long and medium waves.

Of course, there are exceptions to these ideas and if you prefer to put up a system for maximum results on short waves, there are various ways of setting about it. At any rate, beware of any moving parts

which would cause a "scratchy" reception such as might be caused if the aerial were placed near a pipe or gutter, etc., which was loose. I came across an instance of this type some time ago but never really got to the bottom of it. A radio receiver was in use in an upstairs room and the earth connection was also made to a water pipe which happened to pass through the same room. The problem was, however, why did a loud scratching noise result when anybody walked across the floor of a certain room on the floor below? I never found out the actual cause and a quicker way of getting over the trouble appeared to be to fix up a fresh earth connection by burying something else instead of a water pipe! However, it is practically certain that this must have been caused by some loose pipe or other which vibrated or knocked against some other metal object when a person walked over the floor above.

Montgomery Fyffe is appearing before the microphone again in one of the Sunday afternoon broadcast concerts which have been a feature of programmes in Scotland,

"A CHEAP ELECTRIC SOLDERING BIT"

(Continued from preceding page)

wire, which are laid in two slots cut in the handle facing the flex holes. These wires should be bound in place with fine twine. When soldering the heater wires to these tags it is as well to leave small loops to

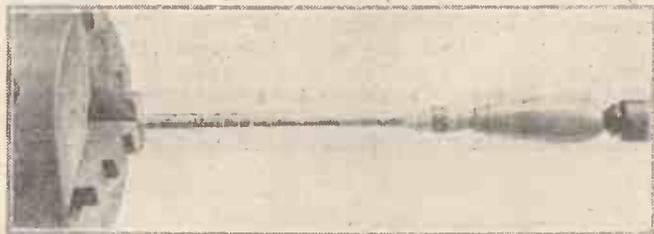
of the handle, where it is secured by twisting the ends together.

After suitably binding the ends of the flex, it is passed down the hole in the handle, and the ends soldered to the copper tags. A binding of twine over these connections will prevent any strain on the flex from causing damage.

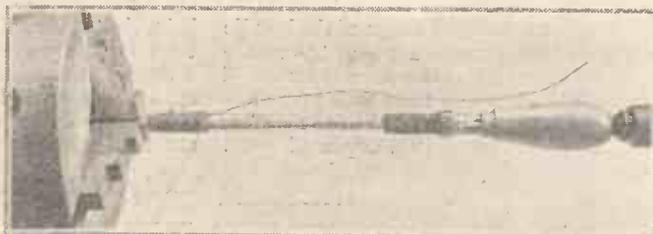
The lamp adapter, or two-pin plug, is

little flux. The iron only takes about three minutes to heat up, and rarely if ever, will it be necessary to re-tin the face, as it does not become burnt like one which is heated in a fire or by gas.

Running costs will be low even if it is worked from a lighting circuit, as the consumption is only about 50 watts.



The heater winding completed, and outer mica sheets bound in place with cotton. Note terminal loops on heater wires



The iron protecting wire being wound on. Note insulation tape over terminal tags

prevent straining them in subsequent operations.

Now carefully tape up these two connections with insulation tape, taking care to overlap the mica by about $\frac{1}{2}$ -inch.

For mechanical protection the whole heating element and wires are bound up with the iron wire. The end is passed through the hole in the bit, and laid along the shaft towards the handle.

The wire is then wound closely and tightly all up the iron to within $\frac{1}{2}$ -in.

fitted to the other end of the flex, and finally the fibre ferrule is slipped into place on the handle and secured by a small wood screw.

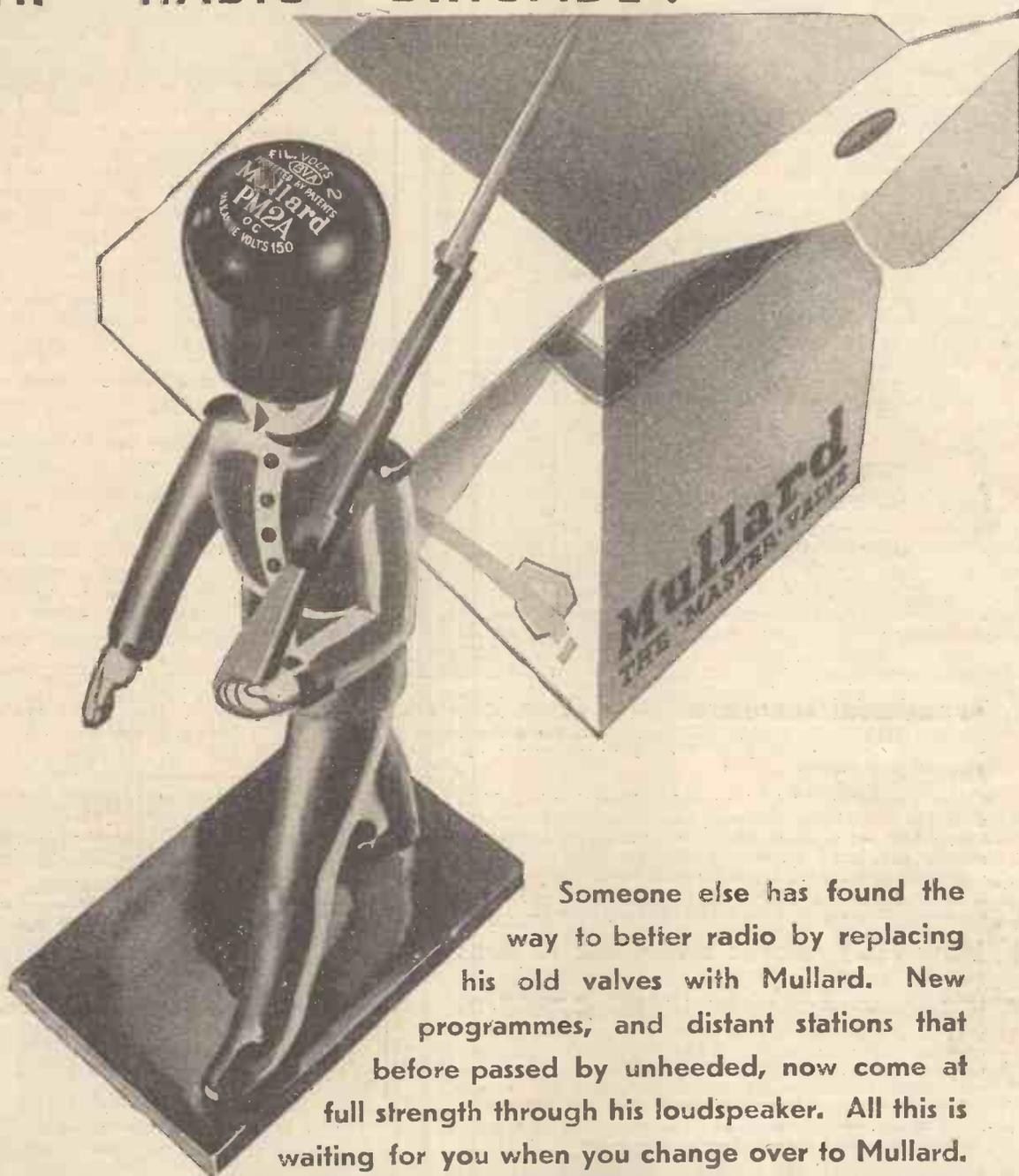
The iron can now be tested. The enamel insulation will burn off as soon as the current is switched on, but it is only required to space the turns during construction.

As soon as the bit is hot, it should be tinned by cleaning with a fine file or emery cloth, and applying the solder with a

Although the iron is designed to work from 200 to 220 volts (A.C. or D.C.) it can safely be used on voltages up to 250 providing care is taken to prevent it overheating.

If it is never to be used on a lower voltage than 230 it will be advisable to increase the length of the bit by $\frac{1}{2}$ -in., and wind on 56 feet of resistance wire instead of 45 feet. The first three sheets of mica will, in this case, be wrapped round the same as the outer ones.

SOMEONE ELSE HAS JOINED THE
BETTER RADIO BRIGADE!



Someone else has found the way to better radio by replacing his old valves with Mullard. New programmes, and distant stations that before passed by unheeded, now come at full strength through his loudspeaker. All this is waiting for you when you change over to Mullard.

Mullard
THE · MASTER · VALVE

We are exhibiting on Stand No. 79 at the National Radio Exhibition at Olympia.

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A Sensational
Radio
Discovery

**PERMANENT-EFFICIENT
EVER-DAMP EARTHING**

TO EARTH
TERMINAL
OF SET



See
how it
works



**Rejuvenates
the heart of your receiver**

Get the maximum power and purity from your receiver—stop crackling and minimise oscillation by fitting the most efficient earthing system ever invented—the new FILT percolative Chemical Earth. **FAULTY EARTHING CAUSES MORE RECEPTION TROUBLES THAN ANY OTHER SINGLE DEFECT OF A SET.** When you use FILT you know that your earth is SOUND.

**Wonderful New Percolative Chemical
makes even dry soil permanently
conductive**

The active portion of FILT is a wonderful new chemical which, when buried in the earth at once begins to spread and percolate, attracting moisture and forming a highly conductive network of channels spreading outwards and downwards to a depth of several feet. In ANY soil, in ANY weather, FILT makes a perfect, permanently damp earth of the highest efficiency, ensuring the best results from any kind of receiver.

How FILT works and what it does

Anybody can fix a FILT successfully: Merely bury the copper container, half filled with FILT chemical, about a foot below ground. The penetrating action begins at once, and very soon a PERMANENT, highly conductive network of chemical moisture is formed which makes your earthing system as effective as it can be. Your reception will improve, your set will be more selective, easier to control, less liable to oscillate or crackle, giving you the *best* all the time. Get a FILT to-day.

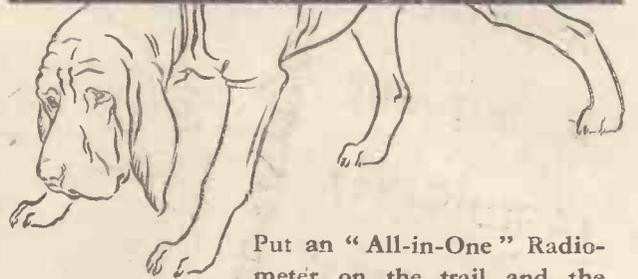
GRAHAM FARISH (pat.app.for) **FILT** PERCOLATIVE CHEMICAL EARTH

Obtain FILT from your nearest radio dealer or order it direct (post free) from the sole manufacturers:

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203 Mason's Hill, Bromley, Kent

2/6
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**TRACK RADIO
TROUBLES EASILY**



Put an "All-in-One" Radiometer on the trail and the

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There is no other instrument in the world like the "All-in-One" Radiometer. It works with an accuracy that must be seen to be fully appreciated. Every single component of any radio set can be tested swiftly and surely.

Ask to see it at any Radio Dealer's or Electrician's. If in any difficulty, write direct to PIFCO, Ltd., High Street, Manchester.

Standard Model "All-in-One" Radio Meter for Battery Sets only, as shown here. Price **12/6**

De Luxe Model, for Battery Sets, Electric Receivers, and Mains Units. Price

£2.2.0



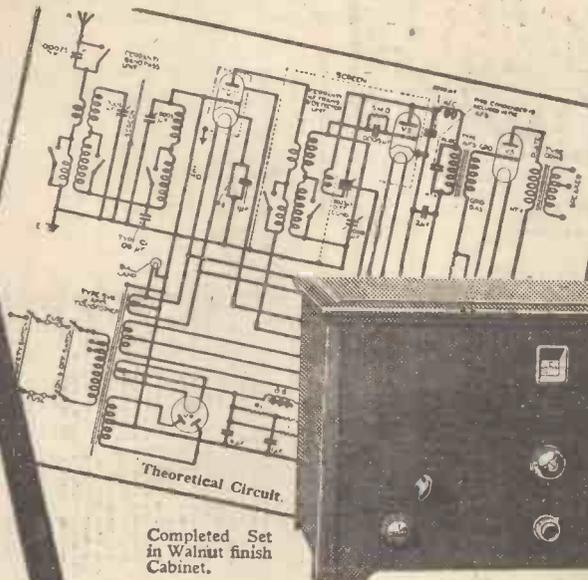
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ALL IN ONE
RADIOMETER

You will Help Yourself and Help Us by Mentioning "A.W." to Advertisers

It is impossible to buy any completely manufactured set (at or about the same price) which can give anything like the **PERFORMANCE** of these

The Quality of reproduction is superb.

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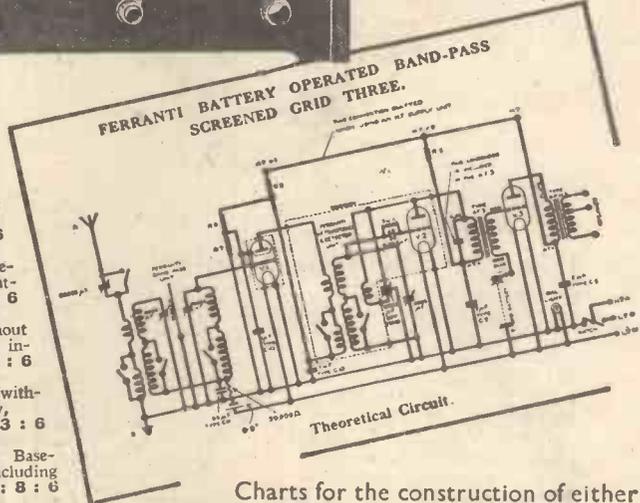


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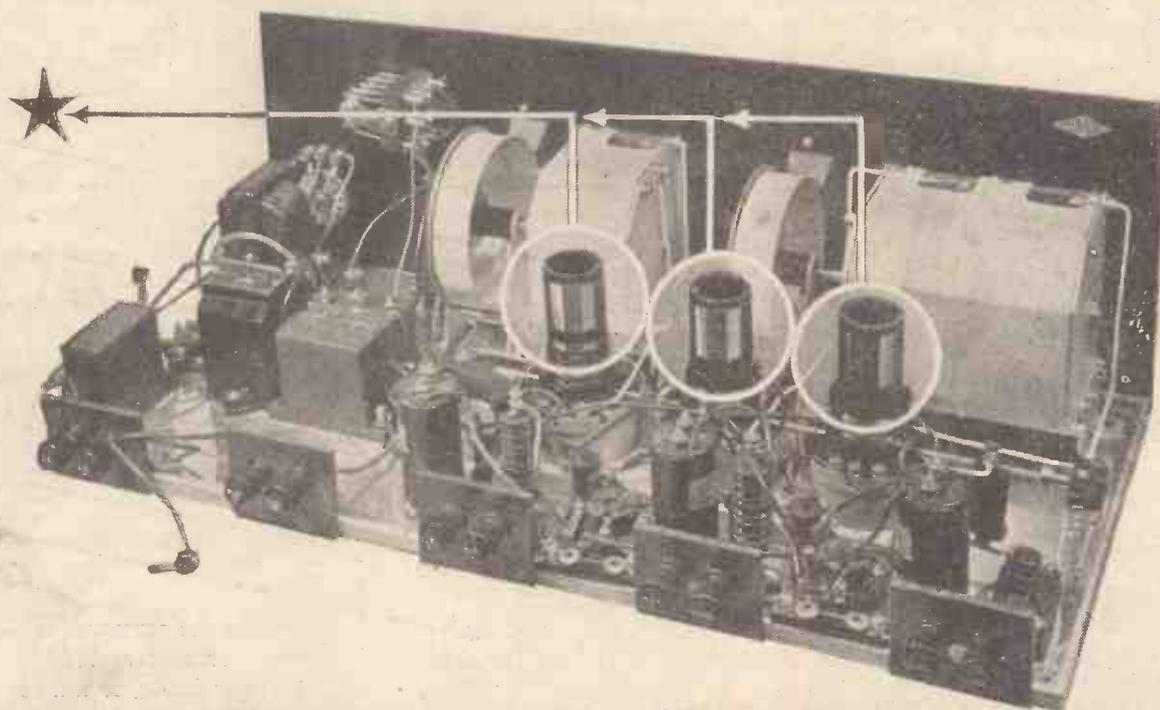
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"This season's sets represent the culmination of all that designers have realised in improvement during the last twelve months."

"An astonishing thing is that even portables with a super-het circuit have been produced. They are light in weight."

WHY THE NEW SETS ARE BETTER

KENNETH ULLYETT describes vital improvements that have been made in sets for the new season and shows why operation is easier and results far superior

"I AM rather wondering if, after all, I won't keep my present set this season" said a friend of mine, when we had started on an examination of the new 1933 models.

Enquiry elicited the fact that he was afraid to change because startling improvements appeared to have been made in the new sets, and radical alterations in circuit specifications.

"For instance," he explained, "quite half of the sets at Olympia this year are super-hets, and I remember the troubles a friend of mine used to have in working his super-het three or four years ago. I don't relish the complication."

If this man's attitude towards the new sets is typical then set manufacturers will have to spend a great deal more money telling the public how *really* simple the new sets are! But, seriously, it shouldn't be necessary for those who have studied set design during the past year to realise that

this season's sets represent the culmination of all the improvements during the last twelve months.

Leaving generalities, let us get down to facts about the new season's circuits and see why they are better. Bandpass three-valvers held the field last year. One normal screened grid stage, with link-coupled bandpassing, leaky grid or power detection and pentode output, was the popular combination. Even this was a surprising advance over previous sets, as the bandpassing made a wonderful improvement in selectivity, and the pentode stage gave an output previously impossible without push-pull.

Last Year's Snags

The difficulties in some sets were numerous. Poor long-wave performance, irregular ganging on both bands, and the difficulty of keeping the ganging constant at both ends of the condenser scale, rather offset the other band-pass advantages.

There were sets with perfect ganging, of course, but there were an equal number which had this fault.

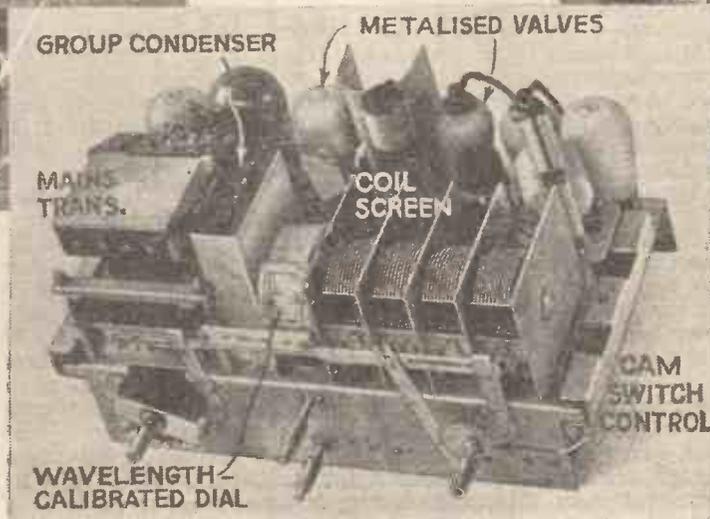
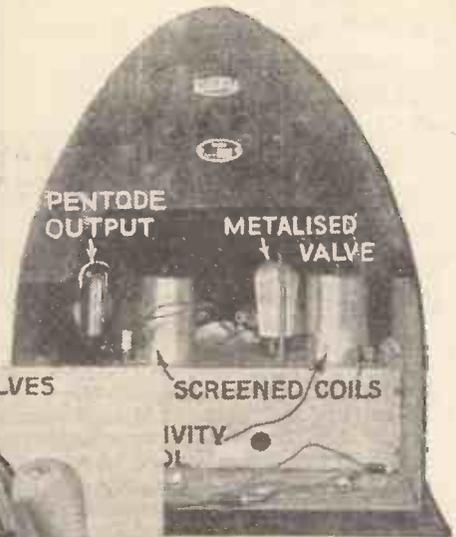
The power output was satisfactory, but it was realised that the natural tone and reproduction on some foreign stations made them useless from a programme point of view. It was not possible to control the volume effectively and tone control

was used only in one or two sets which "A.W." produced for home construction and was rarely seen in commercial outfits.

There was, last year, a step forward in the simplification of control, but quite a number of sets had separate knobs for on-off switching, wavechanging and gram-radio switching.

So many improvements have been made to this basic-type of popular circuit since last season that it is difficult to recognise it. Variable-mu valves are used in place of the standard screened-grid types and many sets have grown up by one stage since last year and have two variable-mu stages. The advantage in ease of control and simple volume regulation has to be experienced to be believed. The theoretical circuit diagram looks a great deal more complicated, but that is the set manufacturers' pigeon, and you have no need to worry about the

(Continued at foot of next page)



GOOD FEATURES OF—

These three photographs show popular sets for the new season, Columbia (above), Marconiphone chassis (centre) and Lissen (right). Features which make for better performance are pentode output, cam-controlled ganged switches, controllable selectivity and adequate screening, while

—THE NEW SETS

tone control, wave-length-calibrated dials, provision for mains aerial, easily-removable chassis and integral moving-coil speakers in console-type sets are all features which appeal to set-users

WHAT IT IS FOR

THE VARIABLE-MU SCREEN-GRID VALVE

ONE of the most general changes this year is from the ordinary type of screen-grid valve to the modified type known as the variable-mu.

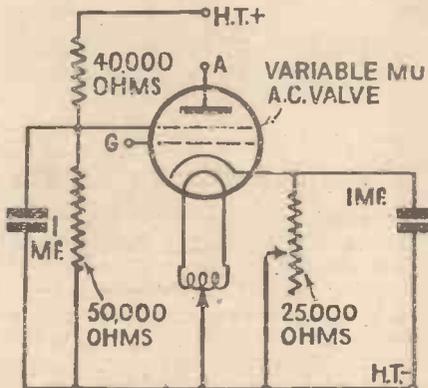
The great feature of the variable-mu valve is that the sensitivity may be controlled without introducing distortion. This advantage is of particular value in mains sets and in a lesser degree it applies to battery sets.

The effect of reducing the sensitivity of the ordinary type of screen-grid valve, as by reducing the screening voltage, is to introduce a certain amount of distortion due to partial rectification. With the modified construction of the grid adopted in the variable-mu the sensitivity is not altered by adjusting the screening voltage, but by altering the negative bias on the control grid.

The variable-mu has a constant screen voltage adjustment and a variable negative bias on the normal or control grid. When a strong signal, such as the local, is tuned in, the grid bias is increased by a considerable amount. This has the effect of reducing the "slope"—effective amplification—of the valve, which is still working on a straight characteristic and is therefore free from rectification distortion.

When weaker signals are wanted the grid bias is reduced and then the valve acts more like a normal type of screen-grid valve, giving considerable ampli-

fication. There are other less obvious advantages of the variable-mu, but here it will be sufficient to emphasise the fact that good control of sensitivity, and



The main essentials for using a variable-mu valve of the indirectly heated type. Note the variable cathode resistance for applying variable negative bias

hence of volume, is obtainable without distortion.

To make use of the variable-mu is very simple. Particularly is this so with the mains type of valve. The diagram shows how the negative bias is obtained. A variable resistance of, say, 25,000 ohms is inserted in the cathode

lead of the valve, that is, between the cathode and high-tension negative.

As the value of this resistance is increased so the voltage drop across it is increased, and so, therefore, is the negative bias. There is a progressive increase in potential from the high-tension negative end of the variable resistance up to the cathode end, so the cathode is made positive with respect to the control grid that eventually goes to high-tension negative. This comes to the same thing as making the control grid negative with respect to the cathode but it must be remembered that grid-bias volts so gained are lost in equal amount for the high-tension supply.

As already mentioned, a fixed screen voltage has to be applied to the variable-mu valve. Suggested values are shown by the diagram. Two fixed resistances are connected in series across the high-tension supply, one 40,000 ohms and the other, between the screen-grid and high-tension negative, 50,000 ohms. At the junction between the two resistances a lead is taken to the screen-grid, this point corresponding to the fixed slider position of a potentiometer.

Again for stability of working it is necessary to shunt the screen resistance by a fixed condenser. This can be the same value as for the cathode resistance, namely, .1 microfarad.

HOTSPOT.

"WHY THE NEW SETS ARE BETTER"

(Continued from preceding page)

extra wiring needed for the bias on the variable-mus. The result, as far as the ordinary set user is concerned, is that the H.F. volume control, outside the cabinet really is useful in sorting any one station from out of the ether motley.

Better Detectors

Power grid detection is now in favour and the standard low-frequency arrangement is transformer coupling to pentode output. Very many sets have tone control and although it means, generally, one extra knob on the set front, it is well worth having. All those distant stations which you could not bring in at pleasurable strength and tone on last year's sets can now be given programme value and brought in at good speaker strength because by just turning the tone control you can not only render the reproduction more pleasant but you can frequently rid the station of heterodyning. In some cases, a special tone control transformer coupling is used and in other sets a high value variable-condenser is simply shunted across the secondary of the L.F. transformer to the pentode stage.

All the big sets, especially the mains driven ones, have ganged switches, covering on, off, medium waves, long waves and gramophone. This was the case with many of last year's sets, but a little improvement

has been made in "condensering" the ganged switch to make it silent. A very famous set last year sounded like a thunder clap every time the switch was moved from medium to long waves and back again!

And now for the super-hets which are the cause of so much discussion. An astonishing thing is that even portables with a super-het circuit have been produced. They are light in weight and the H.T. consumption of the average super-het portable is about 10-milliamperes—the same amount of current taken by some of last year's three-valvers! These super-hets are not to be compared with the wasteful I.F. amplifiers we had three or four years ago. The average six-valve super-het to-day has bandpass intermediate frequency coupling, and some of the sets have variable-mu valves in the intermediate frequency stages.

Easy Maintenance

Most of the sets have the chassis removable in one unit, so that repair is just as easy as with an old-fashioned detector and transformer-coupled "three." The average six-valver has a pre-detector H.F. stage, separate oscillator, first detector, one intermediate-frequency stage, second detector and transformer coupling with pentode output. In an arrangement of this kind it is general for the first detector to be transformer-coupled by a bandpass I.F. transformer to the intermediate stage. Two intermediate stages are used in seven-valve

super-hets of which there are quite a number at Olympia.

The bandpassing of the I.F. stages results in really extraordinary selectivity, something of the kind previously unknown with commercial transportables. You need not fear that the tuning is tricky, for wavelength calibrated dials are now almost universal and in the mains sets are illuminated.

Metalised Valves

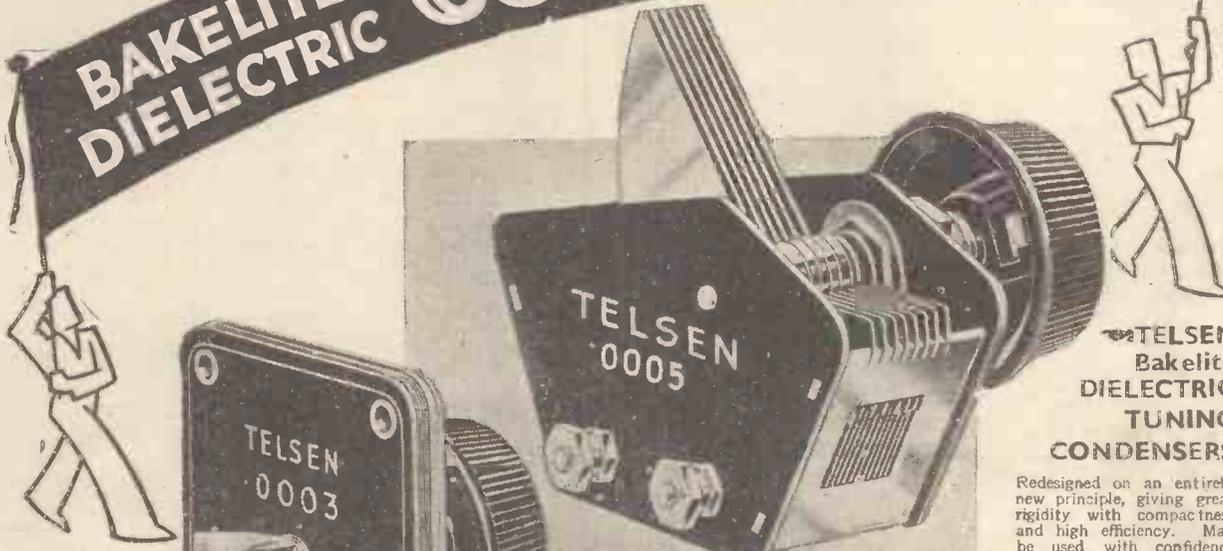
Details which concern the set manufacturers, but which result in freedom from trouble and better performance are cable wiring, silver-gold contacts of the telephone type for multiple switches, metalised valves in the screened grid and detector stages and the use of group condensers for decoupling and mains smoothing.

Easy maintenance is assured by all metal chassis with bolt-on parts and screens which can easily be replaced and removed for inspection. Easy control is assured by the group chassis method of construction, whereby volume controls and reaction condensers are ganged, and wavechange on-off and radio-gram switches are operated by the one knob.

Undoubtedly the sets for the new season are easy to work and give vastly improved results; the average set user probably does not appreciate what great strides have been made and how much better the new super-hets and the new variable-mu bandpass outfits are than the sets which graced Olympia last year.

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2 1/6



TELSEN REACTION CONDENSERS

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" .00015 " W.189
" .0001 " W.190

2 1/4

" .00075 " W.191
" .0005 " W.192

2 1/6

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The degree of compensation is variable and may be suited to the particular tuned circuits in use or employed to correct deficiencies due to the loud-speaker or to the acoustics of the room. RECTATONE is thus the ideal L.F. coupling for all selective sets—particularly useful for those using a pick-up or for radio-gramophones, since the tone control so valuable on radio, can be cut out on "gramophone" where it is usually unnecessary.

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AT A "PROM" REHEARSAL

Whitaker-Wilson describes how Sir Henry Wood prepares for the evening's broadcast

THE Promenade Concerts are among the most carefully prepared items in the present programmes. Nothing "just happens" at Queen's Hall. Everything is thoroughly rehearsed. Yet there is very little in the whole season's programmes every member of the orchestra has not played before.

It was, even so, a little surprising to me to find Sir Henry so determined to run a comb through nearly every bar of Tchaikovsky's ever-popular *Pathetic Symphony*. Probably you heard it and thought, as I did, that it was a fine rendering. You would not have been surprised that it "went" well, had you been in Queen's Hall in the morning.

In the Gallery

I found Sir Henry in the top gallery, not at his conducting desk. Charles Woodhouse, the leader of the Proms, was conducting for him. Sir Henry was seated fairly close to the orchestra at the left-hand side of the hall. In front of him was a miniature score, a blue pencil, and a bell. The bell is a great idea. He can stop the orchestra however loud they may be playing. The first time he used this bell Eugene Cruft, the leader of the double-basses, convulsed the orchestra by saying "Hot water for No. 10 please," but now everyone is used to being stopped by it. No one minds in the least.

Sir Henry has long since lost count of how many times he has conducted the *Pathetic*; I myself have heard it fifty times in the last twenty years. With many of the players it must have been the same. Surely if they could play anything it must have been that symphony. You would have thought it impossible to go for so much detail; but Sir Henry's methods are thorough. We sat together and shared the score. At the slightest uncertainty in any part the bell was rung and Sir Henry had something to suggest. This he did in a word or two and Woodhouse directed the orchestra to begin two or three bars back.

Great Music!

"It is still great music," said Sir Henry. I said I thought it always would be. "Yes," he agreed, tapping his left side. "It comes from the heart, that's why. What a melody to write," he added, a few moments later, as the beautiful second subject began. "One of the finest mel— oh! no, I don't like that." (Bell.) "Too

heavy . . . play it tenderly . . . tenderly . . . all right, four bars back . . . That's better."

When he had raked the first movement to pieces, as though it were a new work never played before, he passed on to the famous Five-Four movement. So often have I heard this taken too lightly. Evidently Sir Henry was thinking the same thing, for he said: "Not too lightly nor brilliantly. This movement is not comic relief. You are still playing the *Pathetic Symphony*." The result was a tone of sadness in the 'cellos I noticed particularly during the evening broadcast.

"I prefer doing it this way," he said later. "Much better than conducting. I can sit quietly and watch everything." "Provided," I said, "your deputy knows his business." Sir Henry became animated at once. "I agree. If I had a youngster, or even a stranger with experience, I should always have to regulate the speed. Woodhouse knows these works inside out, and he knows the pace I take them. This method of rehearsing is only possible with someone like him. Couldn't be done otherwise. . . . Well, this seems to be going satisfactorily." (Bell.) "All right. Thank you—splendid! The last movement, please!" And so it went on.

Every Morning

The rehearsals for the Proms are held every morning from ten till one. They begin at ten and end on the stroke of one. Fifteen minutes break is allowed in the middle of the morning—no more, no less. During the interval Sir Henry was busy with band-parts but he came into the ante-room for a few minutes. Woodhouse and Catterall also came in, the latter because he was due to play the Tchaikovsky violin concerto.

The fifteen minutes up, Sir Henry took

the baton and the rehearsal began again. In a concerto the important person is the soloist. Sir Henry told Catterall to ask for anything he wanted in the way of variation of tempo and the like. Thus the soloist was left free, as he should be, to suit his own ideas.

The volume of the orchestra in Queen's Hall, empty, is far finer than full. The crowded "Prom" takes much of the sound. The march in the *Pathetic Symphony* always sounds big at any concert at which it is played; in the empty hall it was terrific. Accustomed to seeing the orchestra in evening dress, their appearance seemed strange to me, the ladies wearing the lightest of summer frocks, the men with their coats off and sleeves rolled up



Sir Henry Wood, who has made the "Proms" famous

in some instances. Sir Henry was also in his shirt-sleeves.

Sir Henry has his pet aversions, naturally. One is a clock. He cannot bear to have one within his vision when conducting. He has had them veiled in halls where he has been conducting before now. Another is a red frock when part of the audience sits at the back of the orchestra, as allowed when the National Chorus is not there. So if you go to a Prom and should chance to sit in the orchestra where he can see you do not wear red or other very bright colour. He will not say anything if you do, but he will think it.

DO YOU KNOW—

THAT when plywood is used for a panel, terminals on it can be insulated by having a hole large enough to clear the shank without touching, and by putting thin ebonite washers, one on each side of the plywood?

THAT with five-pin holders it is advisable to go over the connections occasionally, because it is much more difficult to get a good contact with five pins than four?

OUR LISTENING POST

By JAY COOTE

A FEW nights ago I noticed that Radio Normand (Fécamp) was again coming in at fair loud-speaker strength, although subject to bad fading; what surprised me more, however, was its wavelength, which was only just short of the new channel taken up by Flensburg, namely, the old Cologne wavelength. Fécamp with its 10 kilowatts is in an unpleasant position of the waveband, inasmuch as it is constantly interfered with by French coastal stations and local shipping. Of course, on its present wavelength it blots out Cork completely.

Another transmitter which suffers from a restless disposition is Palermo, which during the past few weeks has been alternating between 545 metres and 525 metres, where I last heard it. The presence of Riga on the latter wavelength is not now being felt, but it is doubtful whether the Italian will be able to remain there long. Mutual interference between foreign broadcasters has considerably increased lately, and is likely to be even more noticeable in a month or so. I understand that in the near future we may only expect two different programmes from the ten Italian transmitters, as the revenue generally derived from licence-holders, etc., by the E.I.A.R. will no longer allow a number of separate entertainments from the individual studios. As soon as possible the stations are to be amalgamated into two groups (Northern and Southern), each with a separate programme, and thus to most Italian listeners an alternative entertainment will still be available.

Hylton at Ostend

In these notes I referred recently to Jack Hylton's visit to the Ostend Kursaal; you may pick up broadcasts of other English dance bands now touring the Continent during the holiday months.

Ambrose and his Blue Lyres have played at the Scheveningen Kurhaus and were relayed by Hilversum. Amsterdam, Brussels, Oslo, Stockholm, Copenhagen, Berlin, Vienna, and Prague are happy hunting grounds for English dance bands and the reception accorded to them is always a hearty one. A run around the dials nightly at this time of the year frequently leads to the capture of an interesting surprise item.

New Rennes Station

One of the first high-power stations to be built in France under the General Ferrie scheme is that of Rennes. Work is to be started without delay on a site which has been selected at Thourie. As soon as a beginning has been made, the French Post Office Engineers will turn their attention to the construction of transmitters at Nice and at Revalor, near Marseilles; Montpellier will then, later, be dismantled. According to a rumour current in Paris, rather than build another high-power station in the capital, the French State authorities would not be averse to taking over Radio Paris as a going concern, and if a price can be agreed upon this new transmitter may change hands. Should the negotiations fail, however, a new Paris PTT station will be erected at Villebon-sur-Yvette at some little distance from the capital.

Radio Agen, which was destroyed some three years ago by floods, appears to have resurrected as French listeners report hearing tests from a new transmitter giving this call on 455 metres. They have been picked up on Saturdays between 10 a.m. and 12.30 p.m., and again between 3 and 6.30 p.m.

Notwithstanding a plentiful crop of atmospherics in the later hours of the night, fairly

good reception is now being made of some of the transatlantic broadcasts on medium wavelengths. LR3 and LR4 (Buenos Aires) continue to come in at fair strength, and such stations as WABC, New York (Columbia); WGY, Schenectady (N.B.C.); WJZ, Boundbrook; and WBZ, Springfield, can also be heard.

Try for America

It would be worth your while to make a search for WHAS, Louisville (366 metres); WCCO, Minneapolis (370.4 metres); and WCAU, Philadelphia (256 metres), as these stations have now considerably increased their energy. Up to the present the National Broadcasting Company with its network of 86 transmitters totalled an output of 824.6 kilowatts, but as eight amongst them have been authorised to broadcast at higher power when the reconstruction has been carried out the total energy radiated by the N.B.C. will reach 1,122 kilowatts, or roughly an average of 13 kilowatts per transmitter.

As the conditions are at present, it is already possible to log a number of U.S.A. and South American stations in the broadcast band between 2 and 4 a.m. on most nights.

THE SPEAKER LOSES HIGH TENSION!

IT is quite possible that the grid bias may have to be increased a little if you fit a choke capacity output circuit to your set instead of connecting the speaker directly in the anode circuit.

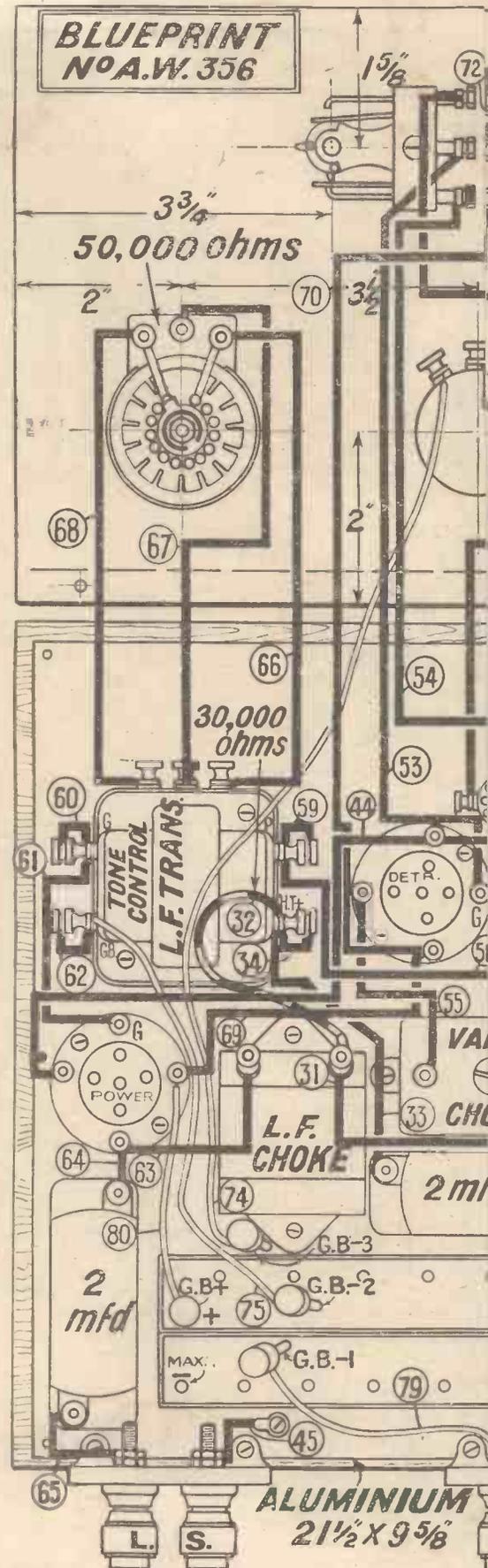
This is because the resistance of the winding of the choke is less than that of the loud-speaker. If your last valve passes 10 milliamperes when the speaker is joined in its anode circuit and the resistance is 1,500 ohms, the voltage lost in the speaker is 15.

A choke would have a much lower resistance, such as 400 ohms, and with a current of 10 milliamperes the voltage lost is only 4. The difference is 11 volts and the effect is practically as though the high-tension had been increased by this amount. Actually the voltage of the anode of the valve has increased by 11 volts and it might be necessary to increase the grid bias because of this increase.

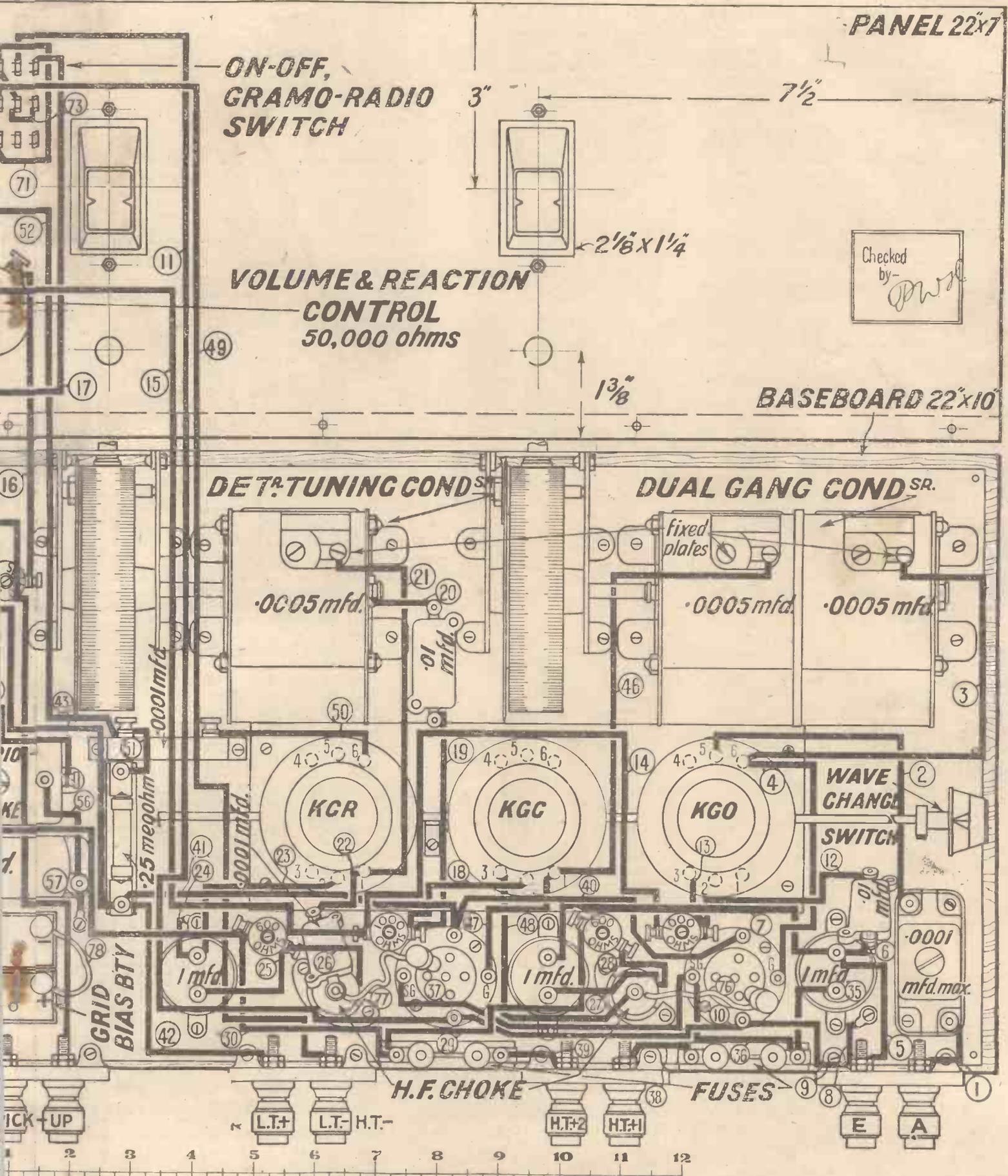
If the power valve passes a much heavier current the difference of the voltages lost will, of course, be greater. A good choke ought to have a fairly low resistance.

Do not make the mistake of assuming that if the resistance is high the inductance also is high. A choke to deal with a small current might well have a high resistance and a large working inductance. But a choke for the output stage of a set should have the necessary inductance under the working conditions and the resistance should be reasonably low, such as 400 ohms.

The sixth talk in the series entitled "Scotland Out of Doors," will be heard on August 31, and is on the general subject of mountaineering in Scotland. Miss Janet Adam Smith will give some hints as to where the best kind of climbing can be got.



THIS IS THE SCALE



LAYOUT AND WIRING GUIDE FOR THE "ADVANCE FOUR" DESCRIBED ON PAGES 362-364

1/- Constructional Chart every detail of con-

The LISSEN SKYSCRAPER 3

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Why be satisfied with whispering foreign stations when you can BUILD WITH YOUR HANDS this LISSEN SKYSCRAPER that will bring in loudly and clearly distant stations in a profusion that will add largely to your enjoyment of radio?

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& ECONOMY POWER PENTODE**

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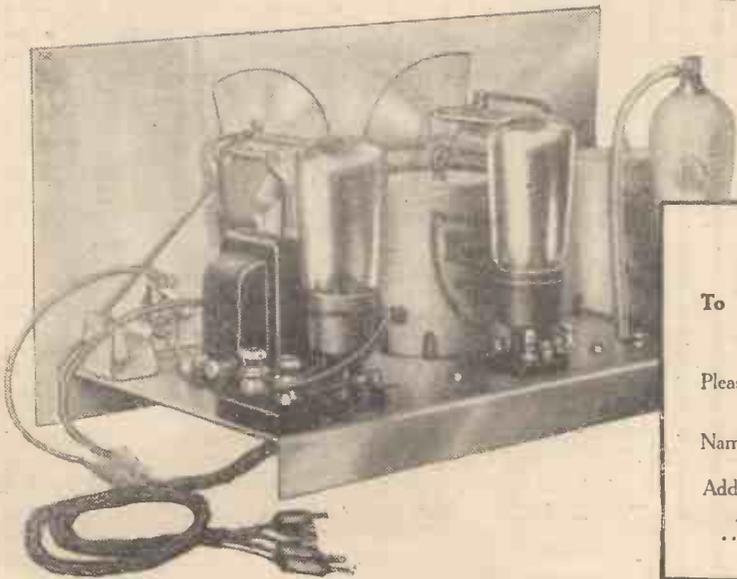
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A weekly review of new components and tests of apparatus conducted by J. H. Reyner, B.Sc., A.M.I.E.E.

LISSEN SHORT-WAVE COIL

AN interesting component which we have recently received for test is the Lissen triple-range short-wave coil. This coil has been designed to cover the wave-band from 12 to 85 metres, and is thus suitable for receiving practically every short-wave station operating at the present time. This wave range is accomplished in three steps from 12 to 25 metres,



The new Lissen triple-range short-wave coil

19 to 43 metres, and 38 to 85 metres. Two single-pole wave-change switches are required or the special Lissen wave-change switch can be employed. This latter fits on to the base of the coil, the whole forming a unit to be mounted on the back of the panel of the receiver.

The coil is wound on a moulded bakelite former having six ribs. The three sections of the winding are spaced from one another, and each is provided with a separate reaction winding. The special wave-change switch is also built up on a moulded bakelite base and is provided with a knurled operating knob.

On test the coil appeared to operate quite satisfactorily and the wave-range covered conformed satisfactorily to the makers' rating.

It is important to notice that if the complete range is to be obtained, the wiring must be carefully carried out, the leads between the tuning condenser and the coil being kept as short as possible.

The coil without the switch retails at 4s. 6d., the switch being 3s. 6d. extra. The coil certainly merits consideration when a short-wave receiver of any kind is being constructed.

PIFCO DE LUXE METER

A VERY nicely made multi-range measuring instrument which we have recently tested is the Pifco De Luxe All-in-one Radiometer. This instrument is arranged for voltage, current, and con-

tinuity tests. Ranges of 0-6 and 0-250 volts and 0-40 milliamperes are provided, while for the continuity test a small 3-volt battery is housed in the back of the meter casing, which is of moulded bakelite and finished a mottled red and brown colour.

The instrument is of the moving-coil type, requiring only 2 milliamperes to give a full-scale deflection. Separate terminals are provided for the voltage and current tests, while in order to extend the current range to 40 milliamperes, a special spade tag is used for current tests which causes a shunt to be placed across the meter. This must be removed, of course, for voltage tests.

For testing the continuity of valve



A useful Pifco testing meter

heaters or filaments, a valve socket is formed in the casing of the meter. The valve to be tested is inserted, when a reading will be obtained if the heater circuit is intact. For other continuity tests two test prods are provided, the appropriate ends of which are inserted in the filament sockets of the valve holder.

On test we found the instrument to have a high accuracy. On the 6-volt range the instrument actually indicated 6.1 volts on a true voltage of 6. On the 250-volt range an indication of 250 volts was obtained when the true voltage was 251. On the milliampere range the meter appeared to be dead accurate, while the continuity and valve tests were carried out with ease and rapidity.

The meter is sold complete with test prods and booklet of instructions for use, which also contains interesting suggestions as to the various other uses to which the meter may be put.

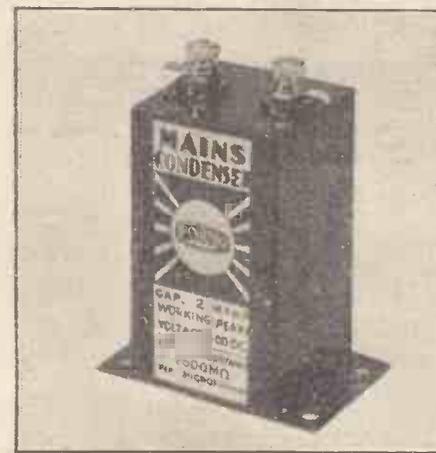
FORMO MAINS CONDENSERS

IN addition to their well-known variable condensers, the Formo people have a comprehensive range of the paper type. Condensers having capacities varying from 1 to 8 microfarads can be obtained in metal cases, while in bakelite cases they may be obtained having values from .1 up to 2 microfarads.

We tested this week a 2-microfarad metal case type. The containing can measures approximately $1\frac{1}{4}$ in. square by approximately 3 in. overall height. It is arranged for baseboard mounting, the necessary flanges being formed at the bottom of the condenser. This series of condensers is rated for a maximum voltage of 400 volts D.C. and the insulation resistance is said to be 2,500 megohms per microfarad.

On test we found the condenser to be quite satisfactory, the actual measured capacity being 1.96 microfarad. The insulation resistance was too high to be measured by ordinary methods, both before and after a prolonged run on the full working voltage.

These condensers retail at prices varying



One of the range of Formo mains condensers

from 2s. 6d. to 10s. 6d. for the metal-cased type, and 1s. 6d. to 3s. for the bakelite-case type, and they can be well recommended.

"Back from the Holidays" is the title of an orchestral programme which will be given by the Western Studio Orchestra from the Cardiff studio on August 26, and on August 27 a light orchestral programme from the studio entitled "King Carnival" introduces the relay from the Grove Park Pavilion, Weston-super-mare, of Ronald Frankau and his Frankau-Optimists.

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1. A rigid one-piece chassis.
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5. Easily adjustable trimmers to each stage, mounted inside the chassis and operated by external starwheels.
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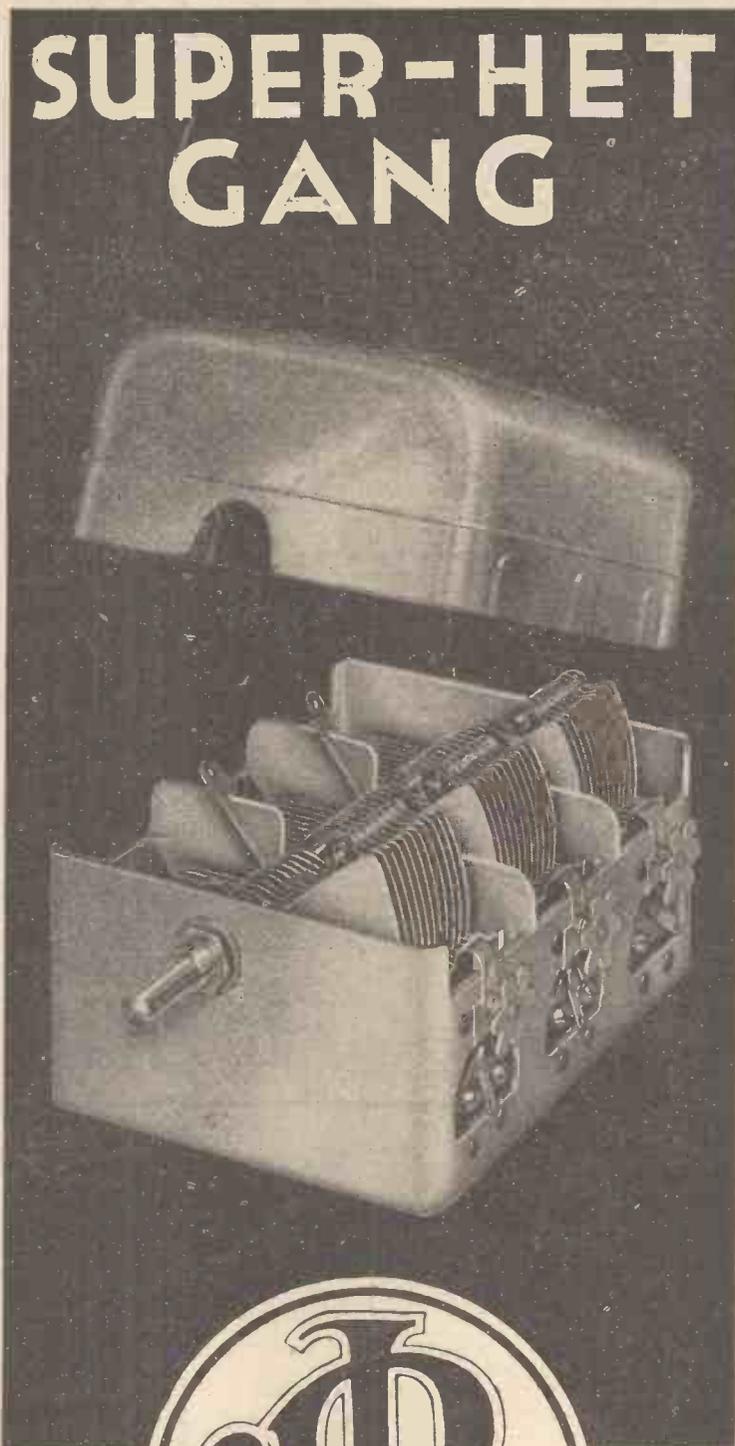
These are some of the points that contribute to the extreme accuracy of these new J.B. Gangs for superhets. Precision has always been a feature of J.B., but in these new Gangs *each stage is matched to within 1/2 per cent. + half a m.m.f.* a standard of accuracy that will meet efficiently the requirements of modern superhet circuits with single-dial control.

The general construction follows that of the J.B. NUGANG, with the exception of one section which has vanes specially shaped to ensure accurate tracking of the oscillator.

Supplied fully-screened, as illustrated, with stout pressed aluminium clip-on lid or "semi-screened" without lid. Prices :—

<u>Fully-screened.</u>	3-Gang	25/6
	4-Gang	33/-
<u>Semi-screened.</u>	3-Gang	23/-
	4-Gang	30/-

Capacity .0005



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WEEKLY HINTS—

CONSTRUCTIONAL



& THEORETICAL

BY

W. JAMES

QUALITY VERSUS VOLUME

HAVE you noticed how the quality seems to vary when the volume is altered from loud to soft? A tone control might enable you to get over this but is not often fitted to present-day sets.

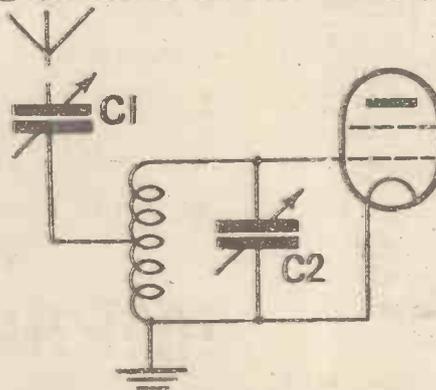
Adjustment of the tuning is also likely to affect the quality. Some sets have a reaction and a volume control. You can then use a fair amount of reaction and cut down the strength to the desired level by adjusting the volume control. The results will sound different from when the set is adjusted with reaction at minimum. This is due to the relative strengths of the bass and treble notes being varied in the set.

Similarly, the tuning of the circuits will affect the results. You might be off tune a little and still be getting plenty of volume. The tone will, however, be different than when the set is fully tuned. It is interesting to try the effect of tuning in various ways. The quality can be varied quite an amount. This is all because the

high notes are strengthened or weakened according to the way in which the circuits are adjusted.

A VERY HANDY CONTROL

SOME sets have an adjustable condenser connected in the aerial wire to the



One of the simplest volume controls—a pre-set condenser!

first tuning circuit as shown in the accompanying sketch.

This is used as a volume control. When the capacity of the condenser is the minimum the input to the set is also the minimum and the volume is cut down. As the capacity is increased by moving the vanes further into the fixed vanes the input to the set is brought up and so the sound output is increased.

Now, this form of control is cheap and works well enough. You alter the tuning, however, sometimes by a serious amount. The alteration in the tuning occurs because the effect of the aerial and earth tuning is varied.

An aerial has capacity. This is acting as though it were across the aerial tuning condenser. But the capacity due to the aerial which is added depends upon the circuit and upon the value of the volume control condenser marked C1 in the sketch.

Therefore the total capacity across the aerial tuning coil changes as the condenser

(Continued on page 372)

THE VARIO-CHOKE SPECIFIED



In addition to the Sovereign Vario-Choke and 5 Terminal blocks (6d. each) being specified, the following Sovereign Components are recommended

ADVANCE FOUR		SHORT-WAVE THREE	
.0001 Preset Condenser	1/3	On-off Switch	7d.
3 1-mfd. Fixed Condensers	6/9	.0002-mfd. Fixed Condenser	10d.
2 2-mfd. Fixed Condensers	5/6	1/2-meg. Grid Leak	9d.
.0001-mfd. Fixed Condenser	10d.	1-meg. Grid Leak	9d.
2-50,000 Potentiometers	9/-	400 Baseboard Potentiometer	1/6
1-30,000-ohm Spaghetti Resistance	1/-	2 Spaghetti Resistances	20,000-ohm 10.1.
1/4-meg. Grid Leak	9d.	40,000-ohm 11-	
		1 L.F. Transformer	5/5

Use Sovereign wherever you can—make your set a Sovereign set.

TO the Sovereign VARIO-CHOKE (Prov. Pat. No. 111/32) goes the credit of advancing screened-grid performance. It is this wonderful component that assures such wonderful results with Mr. Percy W. Harris's "Advance Four." Read the glowing reports given unanimously by the whole of the Radio Press; you will see why and be convinced. The Sovereign VARIO-CHOKE is sold ready for immediate use. Remember, there is NO SUBSTITUTE, ALTERNATIVE, NOR COMPROMISE FOR THIS COMPONENT IN THE "ADVANCE FOUR." YOU CANNOT BUILD THIS SET WITHOUT IT. Your Dealer can supply you.

SOVEREIGN VARIO-CHOKE with circuit diagrams

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[P.M.5] at 27/6 complete with transformer. Fits any W.B. cabinet. Revolutionary value which brings moving-coil reproduction within the reach of everyone

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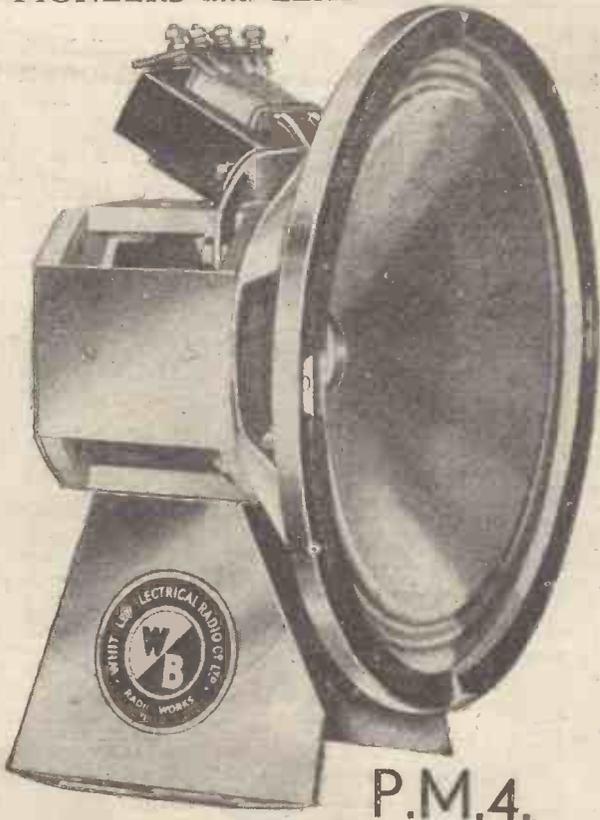
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42' COMPLETE
with three-ratio step-down transformer

These guaranteed speakers give true moving-coil reproduction from any 2-valve or multi-valve set.

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MOVING COIL SPEAKERS



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with their attractive cabinets. Also the new W.B. valveholders and new W.B. switches.

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Advertisers Appreciate Mention of "A.W." with Your Order

"IN MY WIRELESS DEN"

(Continued from page 370)

c_1 is varied. The tuning must then be corrected by adjusting the normal tuning condenser c_2 . You will see that this scheme is not a very desirable one in the case of gang tuning. How are you to tune all circuits if the constants of one of them are altered by operating the volume control?

Such a control cannot, therefore, be used with success in a ganged tuned circuit. If, however, the variation in the capacity load imposed upon the tuning circuit is restricted and the gang tuning condenser has a trimmer actuated from the panel, then the arrangement may be used. Many sets have a wavelength scale and the chances are that the accuracy of the tuning according to the dial reading will be affected by the condenser volume control.

BAD BANDPASSING

A GOOD deal of trouble has been caused by badly matched filter circuits. Bandpass tuning, if properly designed and adjusted, has its good points. But how often one hears of poor signal strength, and even of lack of selectivity, traced to the aerial bandpass tuner.

It is quite essential to get this circuit adjusted properly. If the two circuits are out of tune the signals collected by the aerial will not reach the grid of the first valve at the correct strength. The circuit may be so adjusted that the aerial part is in tune with the station being received. There will then be the maximum signal in the aerial circuit, because it is in tune.

But as the second circuit is out of tune the signals appearing in it will be weak. More amplification than should be necessary will then be needed to magnify the signal, and when the maximum is being used the results will be poor.

If it is the aerial section that is not in tune with the signals the strength in this circuit will be poor, but as the secondary circuit will be in tune this circuit will make the most of the signal. The strength applied to the first valve will, however, be below normal. It is therefore necessary to tune a filter circuit very carefully. Matching instructions have been given on many occasions and with fairly well-made coils and condensers it is easily possible to adjust the circuits to tune accurately over the whole tuning range.

WHERE TO PUT THE LEAK

MOST sets have the grid leak joined between the grid and filament and not across the grid condenser. This is considered the best practice, especially in mains sets.

The leak is, however, across the tuned circuit as well as the grid to filament path of the valve. You can easily test the effect of fitting too low a value of resistance. If you join a .1 megohm leak in the circuit in place of the more usual .5 or 1 megohm you will at once notice that the tuning of the circuit is broader.

The selectivity is not as good as formerly. Further, the sensitivity will be reduced. If different values of resistance are tried the general results obtained will be that as the resistance is reduced so the

selectivity and sensitivity are reduced.

Now the grid-to-filament or cathode path of a valve is in effect a resistance. It is across the tuned circuit and so the selectivity is reduced by the valve. When the tuned circuit is a good one, being made up of a good coil and condenser, the chances are that it will be worth while connecting the grid condenser to a tap on the coil. The tuning will be sharpened by doing this, and it is possible that the signal strength will increase.

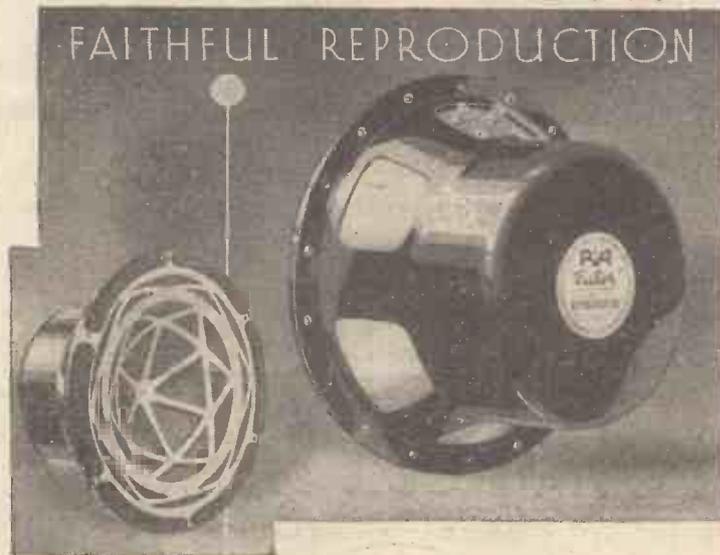
With a badly tuned circuit the effect of the grid leak and the detector generally will be negligible. In many cases, however, it is worth trying joining the grid condenser to a tap on the coil. There may be an appreciable gain, as average manufactured coils are fairly efficient.

A SHIELDING POINT

METAL foil for shielding should be used with care. In some cases foil is satisfactory, but, owing to its high resistance, it is possible that poor results will be obtained.

It is better to use aluminium, say 1/64th of an inch thick. This is not expensive and can be cut easily and bent to shape. Use bolts and nuts when wires must be connected. Clean the surface and fix the bolts firmly. Then the wires can be secured with further nuts.

The special screens to be obtained are often cleaned and given a coat of lacquer. It is necessary to scrape the surface clean at the point where a connection is to be made or the contact will be very poor.



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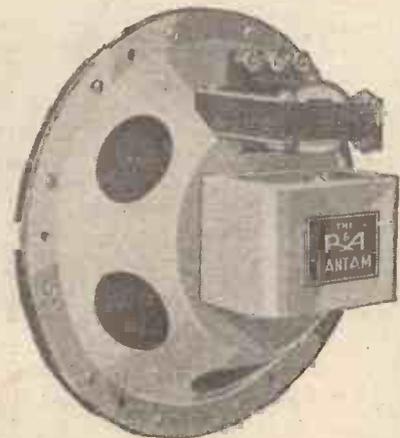
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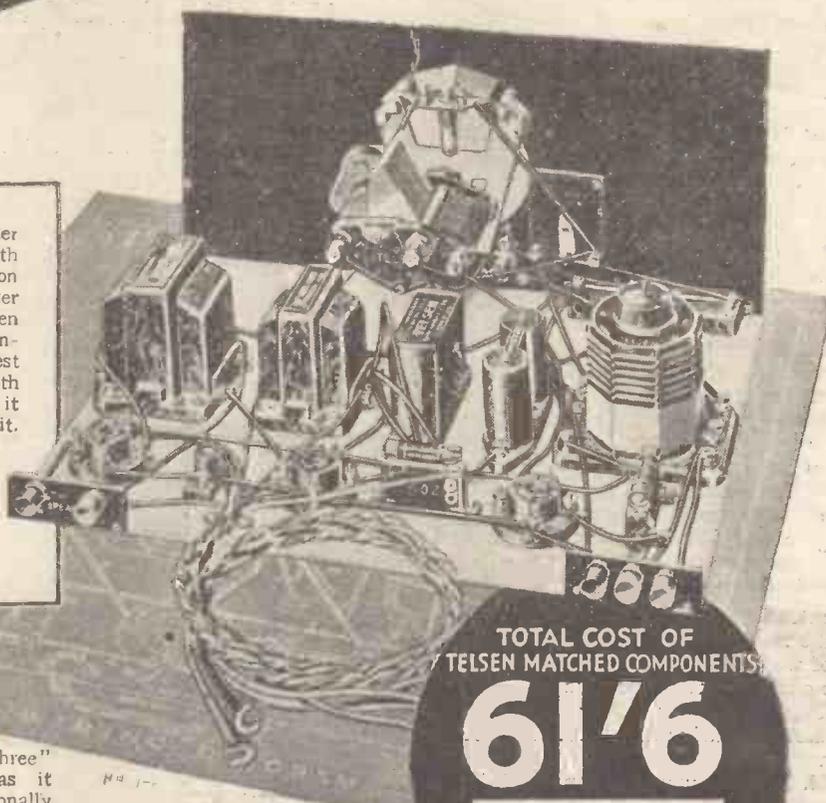
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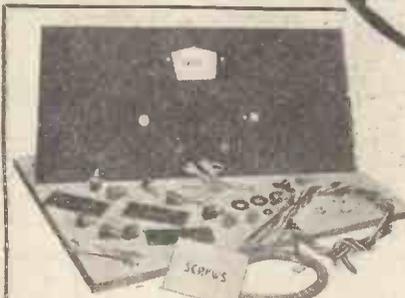
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out of your set in every way. Get a copy
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Of these the "Telsen
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All are supplied neat-
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Included in the Outfit are the following components:

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- A double-ended Spanner for mounting the single-hole fixing components.
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SETS OF DISTINCTION



AERODYNE-----

---A.C. TWO-VALVER

Makers : Hustler, Simpson and Webb, Ltd. Price : 10 guineas

TO that large army of listeners whose main interest is in the good reproduction of the local stations the Aerodyne set I am reporting upon this week will make an immense appeal. There is much to commend in this neat little consolette and I have no hesitation in giving it my full blessings, following a thorough test under domestic conditions in South-west London.

The first thing you notice about the Aerodyne set is the attractive design of the cabinet. Some idea of this aspect of the set can perhaps be gained from the illustration in the heading. Next you must certainly react favourably to the neat layout of the controls. Three knobs and a tuning scale—that's all. Yet nothing has been sacrificed to gain this admirable simplicity.

Easy Control

The centre knob works the tuning condenser, the knob on the left increases the volume of weak stations, and the knob on the right combines the functions of mains and wavelength switching. I am glad to see this knob is clearly marked for its three positions.

So much for the superficial aspect of the Aerodyne. Now take off the back and behold the eminently neat arrangement of the metal chassis and loud-speaker. You note at once the provision of robust socket connections for the aerial and earth leads, for the gramophone pick-up leads, and for the insertion of a mains-aerial plug. Also the accessible position of the mains-voltage panel, with the mains fuses nearby.

At this stage, seeing the chassis with its two mains valves and Westinghouse rectifier so neatly mounted thereon, you begin to wonder what the circuit is all about. Let me tell you. It is one of the latest sets, this with every circuit refinement included to improve the performance.

Briefly, it is a detector and pentode two-valver, "straight" in its outline, but abounding in the refinements that make such a difference to the possibilities of the ordinary sequence of valves.

Circuit Arrangements

The detector, which is a Mullard 904V, works on the leaky-grid system, with low values of grid leak and condenser—1-megohm and .0001-microfarad respectively—to ensure freedom from frequency distortion. This detector has a .0005-microfarad by-pass condenser in the anode

circuit. Instead of a choke in the anode circuit between the anode and the primary of the low-frequency transformer there is a 1,000-ohm resistance.

A simple loose-coupled aerial-tuning circuit precedes the detector, with three alternative aerial coupling connections. These comprise two .0001-microfarad fixed condensers, which can be used in series for the minimum coupling, or one can be used alone, the third connection being direct on to the top of the aperiodic aerial winding.

The normal type of capacity-controlled reaction is adopted, with the reaction moving plates at earth potential.

bias is obtained by the usual method of inserting resistances in the detector and pentode cathode circuits, the former provision being for pick-up work, when of course the detector, becoming a low-frequency amplifier, has to be negatively biased.

Well, there you have the circuit of the Aerodyne A.C. two-valver. And very satisfactory it is, as my tests have shown. The test was done on a 200-volt A.C. supply and the aerial was the usual 60-foot wire as used in all these set tests.

As might be expected, my immediate impression referred to the operation, which really is as simple as anyone could desire. All you have to do is to turn on the mains by setting the righthand knob to medium or long waves, and then, with the volume control at minimum, turn the centre knob until something is heard. You very soon hear one or other of the locals.

On Test

My first signal was London National, which came in at 22 degrees on the horizontal dial. Using the middle aerial connection—the one with the .0001-microfarad series condenser—I found that the National station, which is of course very strongly heard at my distance, was entirely eliminated within 5 degrees on the 100 degree dial. This I consider very good.

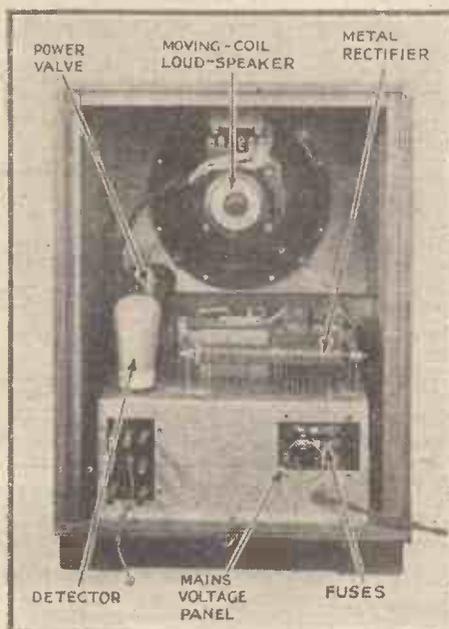
London Regional, which is still stronger, came in at maximum strength at 43 degrees. It was easy to get Midland Regional at 53 degrees clear of the London Regional.

Having satisfied myself that the Aerodyne has more than enough selectivity for the type of set—after all the main idea is to separate the two locals—I listened critically to the quality. It is more than pleasing. The pentode works well in conjunction with the moving-coil. The balance of tone obtained shows that the filter already mentioned has been correctly designed to give just the right amount of correction.

There is no undue emphasis of either bass or treble, but what is equally important there is an even response, without "peaks," in the middle register. Altogether the tone is just what the average listener demands—balanced quality, with rounded character in the music and crispness in speech.

I had a hunt round the dial after dark and had not the slightest difficulty in bringing in a dozen stations on the medium waves. Radio Paris and Hilversum on the long waves were well received—clear of Daventry on the maximum aerial coupling.

SET TESTER

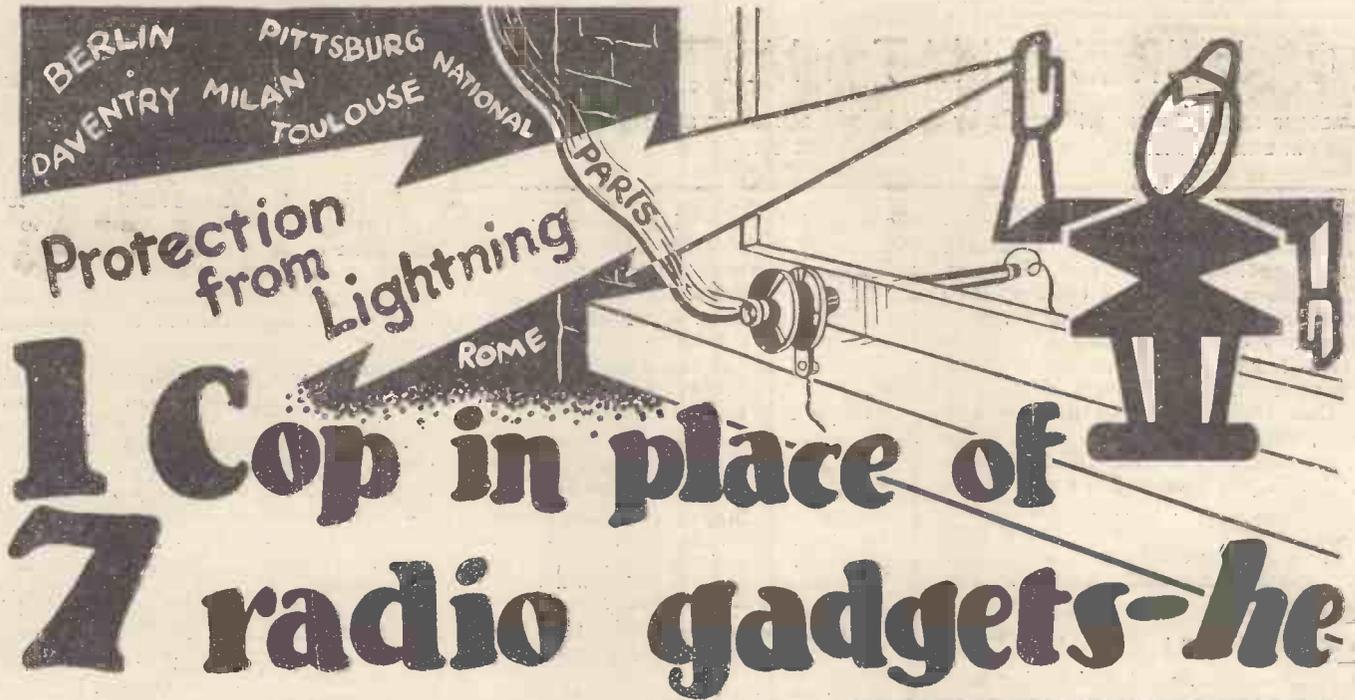


The excellent features of the Aerodyne are apparent from this photograph

There is ample de-coupling in the low-frequency stage, which consists of a Mazda AC/Pen pentode working into a Rola mains-energised moving-coil loud-speaker.

I am interested to see that the pentode is tone-corrected by means of a filter connected across the primary winding of the transformer. This filter, which is designed to reduce the high-note response that would tend to be over-emphasised by the pentode, consists of a .01-microfarad fixed condenser in series with a 20,000-ohm resistance.

The high-tension supply is obtained from the Westinghouse metal rectifier, and there is ample smoothing in this part of the circuit to ensure the minimum of hum. Grid



1 Cop in place of 7 radio gadgets-he

Get this Pressland Aerial Control Cop! Here you have (and all for half a crown) selectivity control to help you pick and choose your programmes . . . protection for you and yours from lightning and £100 policy against damage to your set to back it up . . . volume control at the touch of your finger . . . elimination of atmospheric disturbances which are shunted to earth . . . a good-looking permanent lead-in . . . and an automatic aerial cut-out.

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WIRES THAT MATTER

Amateur set designers will profit by this helpful advice on arranging the parts in a new receiver, and spacing and wiring the component assembly

THE layout and wiring of a newly-designed wireless receiver is, or should be, a matter of some anxiety to the designer. Contrary to a widely held opinion, it is not the circuit itself which gives the most trouble—any competent designer will tell you this—but the materialisation, the best way to apply it. I often think what a pity it is that this fact is not more widely grasped, particularly when I get a letter from a reader, as I did only recently, who says: "Will you please give me a circuit for a 4-valve 2-H.F. set. I have all the necessary parts." Unless he has experience in *originating* designs and not merely *copying* them such a circuit alone is really useless.

Layout and Wiring

The problem of layout and wiring is of increasing importance in these days owing to the steadily rising efficiency of valves and a growing use of high-frequency amplification preceding the detector. So long as we had detectors with two low-frequency stages we had problems enough with low-frequency interaction, not to mention the trouble of high-frequency currents getting

through into the low-frequency, but with good "H.F." the problems of shielding and screening are much more difficult.

When translating a circuit diagram into a practical instrument our first problem is naturally so to arrange the component parts which have to be joined up, that they work efficiently together, while at the same time any controls which have to be

DO YOU KNOW—

THAT an L.T. mains transformer must be chosen to suit the set, because a type giving an amperage greatly in excess of that consumed by the valves will cause the filaments to be over-run?

THAT a scraping noise when tuning on the short waves may be due to a faulty contact with the tuning condenser rotor? Bad contacts which may not be noticeable on the broadcast band show up markedly on the short waves.

THAT a .01-mfd. condenser and a 10,000-ohm resistance across the speaker terminals form a handy tone corrector, cutting off the high notes? A spaghetti resistance can be used.

periodically adjusted must come conveniently to hand. At one end of the set we have a collector of energy so arranged that minute differences of electrical pressure are set up in it by the wireless waves. At the other end of the set we have output terminals delivering audio-frequency energy to the loud-speaker. The collector of energy is the aerial (indoor, outdoor, or frame, it is all the same for this argument), and we want to pick out from this collector the particular wavelength we want, to the exclusion of others, after which we must magnify this signal and convert it into audio-frequency pulsations. Ideally, then, once we have picked out the wavelength we want, no interfering wavelength should be allowed to get into the set.

Stray "Pick-up"

If, for example, we have a set with two stages of high-frequency we have three possible sources of "pick-up," the aerial and first tuning coil, the second tuning coil connected to the second high-frequency valve, and the third tuning coil connected to the detector valve. We will assume that the first coil is very efficient and selective. After magnification the same high-frequency changes are applied to the second coil whereupon a further refinement of selection takes place. Once again we magnify and again a second refinement of selection occurs when we apply the signals to the detector.

Now let us imagine for a moment that the coils are not shielded. Unwanted signals can find their way into the set quite well

(Continued on page 378)

AN OUTSTANDING CONTRIBUTION TO COMPACT SET CONSTRUCTION



The new Formo catalogue illustrates many unique improvements in up-to-date components, all moderately priced. Get your copy to-day.



THE MULTICOUPLER

10/6



THE FORMO 'NIGEN' TRANSFORMER

8/6

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Set construction is simplified by the introduction of a double electrostatic and electromagnetic screen, which permits the Multicoupler to be placed close to an unscreened mains transformer or in the vicinity of H.F. fields without fear of high frequency interference.

The special nickel alloy core is so designed that the primary inductance is not diminished by its economical arrangement. The Multicoupler also incorporates alternative feed resistances and a coupling condenser. With its eight terminals, which provide a wide combination of connections, the Multicoupler is a very useful component at a useful price.

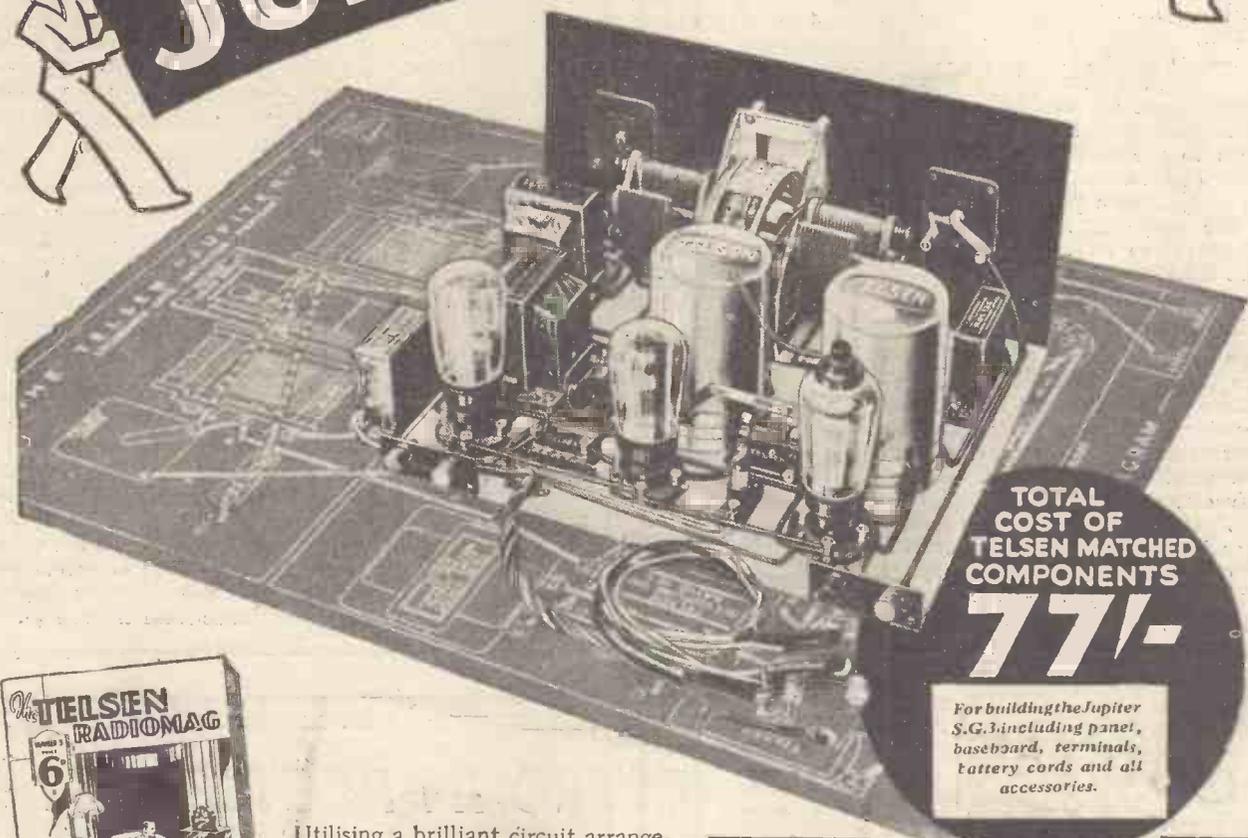
Olympia Stand 100

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DRUM DRIVE CONSTRUCTORS OUTFIT

This Outfit contains all the necessary requirements for the construction of the TELSEN "JUPITER S.G.3" but the constructor will find the Outfit of great value in the building up of any receiver circuit employing the drum-drive condenser assembly. No. 219

3/6

THE OUTFIT CONTAINS THE FOLLOWING:

- 1 Metal panel with attractive crystal-line finish, specially cut and drilled for mounting the Telsen Drum Drive and other panel-mounted components normally required in a ganged condenser receiver.
- 1 Baseboard, 14 in. by 10 in.
- 1 Aerial and earth terminal strip.
- 1 Loudspeaker terminal strip.
- 2 Red terminals complete and mounted in holder.
- 2 Black ditto.
- 7 Wander plugs mounted in holders.
- 2 Spade lags.
- 1 8-way Battery cord.
- 1 Cord slip.
- 2 Large insulating washers.
- 1 Small thick insulating bush.
- 1 Small thin ditto.
- 2 Spacing nuts for the reaction and aerial "series" condensers.
- 2 Spacing nuts for the "on-off" switch.
- 1 Wave-change Escutcheon with two screws and nuts.
- 1 Separator ditto.
- 1 Volume ditto.
- 1 "On-off" escutcheon.
- 2 Height plinths for the matched screened coils.
- 1/2 in. of 3 m.m. sleeving (black).
- 1 1/2 in. ditto (red).
- 20 ft. of 1 1/2 m.m. sleeving (green).
- 21 ft. of 22 S.W.G. tinned copper wire.
- 1 Double-ended spanner for locknuts.
- 1 Four-way spanner.
- Assortment of 1/4 in., 3/8 in., 1/2 in., 5/8 in., and 1 1/8 in. wood screws.

TELSSEN

RADIO COMPONENTS

GOOD RADIO IS A JOY FOREVER

ANNOUNCEMENT OF THE TELSEN ELECTRIC CO LTD ASTON BIRMINGHAM.

"WIRES THAT MATTER"*(Continued from page 376)*

by way of the second coil or even the detector coil, particularly when we are close to a powerful station. It is no use whatever making your first circuit highly selective if there are other ways in. It is just like a turnstile at a football match with a wide-open gate lower down the fence!

I have purposely ignored another important reason for screening, namely interaction of coils, for in the present article I want to deal purely with signal pick-up. If we carefully screen the coils we reduce the possible pick-up from outside signals, but we can still get a good deal if we have long and straying grid leads and lengthy connections to the plates of the valves. Unshielded condensers, too, can easily pick up signals from a powerful local station, so the tendency in sets with big magnification is to have both coils and condensers shielded.

Preventing Interaction

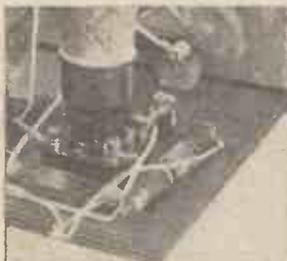
Now the wiring of the set can be divided under the three general headings of filament wiring, radio-frequency wiring, and audio-frequency wiring. If filament wiring is brought together and is bunched, no harm will result—often it is a distinct advantage electrically and mechanically to do this. If radio-frequency and audio-frequency wiring come together there is a big risk of the radio-frequency signals getting right through into the audio-frequency, being magnified there, coming

back from the loud-speaker lead into the aerial and making the whole set oscillate. If two radio-frequency leads from different circuits come together one of two things may happen. The interaction effect between them may give feed-back or a tendency to oscillate or it may do just the reverse by "bucking" as the Americans say, or giving an anti-reaction effect.

Another point which has to be studied is the closeness of a radio-frequency lead to an earth lead. If, for example, the radio-frequency lead is long and runs very close to shielding there may be a very appreciable capacity effect between this wire and the earth shielding sufficient to upset ganging, tuning, and amplification.

SHORT-WAVE LAYOUT

The photograph shows a useful short-wave arrangement of putting an H.F. choke right up close to the coupling con-



denser, so that there is no straggling wiring between these parts at high-frequency potential above earth. Note the metal panel backing the normal ebonite panel.

"PUSH-PUSH" AMPLIFIERS

THE term "push-push" amplifier, as distinct from the better-known push-pull variety, is applied to a pair of valves, arranged back to back, but with the grid-bias adjusted to the cut-off point in each case. The result is that one valve handles or "pushes" the signal input over the whole of the straight-line part of its curve, whilst the other valve remains inactive. Only when the first has reached the "cut-off" point does the second valve come into action. The result is that at any given moment one valve is doing all the work, though at the next moment its place is taken by the second valve. In a push-pull amplifier, on the other hand, both valves operate simultaneously, one pushing and the other pulling. B.

SOMETHING new in the way of gramophone recitals is proposed by Robert Tredinnick, who will be heard again from Midland Regional on August 30, when he puts on his "Recdinradio" entertainment.

One of the most attractive running commentaries is that which comes from the Rydal Sheep Dog Trials in the Vale of Rydal, Westmorland. The date this year is August 25, and the commentator will again be Mr. George Aitchison.

A concert by the Victoria Male Voice Quartet and Albert Taylor, will be broadcast from Belfast on August 30. Albert Taylor will be playing on the organ of the First Presbyterian Church, Rosemary Street, and the Quartet will provide groups of items from the studio.

**INTERESTED IN RECTIFIERS?**

THEN VISIT

STAND 89

RADIO EXHIBITION, OLYMPIA

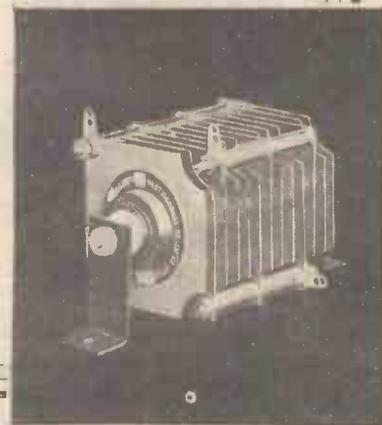
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- RADIO FOR THE MILLION "STATION MASTER 3"** (Model A). With valves and cabinet, for battery use. Cash price, £5/11/- Balance in 11 monthly payments of 10/2. Send **10/2** only.
- "STATION MASTER 3"** (Model B) with valves, speaker, and cabinet for battery use. Cash price, £7/10/- Balance in 11 monthly payments of 14/- Send **10/-** only
- "STATION MASTER 3"** (Model C). All-electric model with valves, cabinet, and moving-coil speaker. Cash price, £14. Balance in 11 monthly payments of 25/8. Send **25/8** only
- OSRAM "THIRTY THREE" MUSIC MAGNET.** Complete kit, comprising all components, including valves, cabinet with self-contained speaker. Cash price, £9/9/- Balance in 11 monthly payments of 17/6. Send **15/-** only
- SLEKTUN "SCOUT."** Chassis model, less Valves and Cabinet. Cash Price, £4/8/6. Balance in 11 monthly payments of 8/1. Send **8/1** only
- LISSEN SKYSCRAPER 3.** Chassis model with (Lissen) S.G., Detector, and Pentode valves. Cash price, £4/9/6. Balance in 11 monthly payments of 8/3. Send **8/3** only
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- TELSEN "AJAX" 3.** Complete kit less valves and cabinet. Cash price, £3/1/6. Balance in 11 monthly payments of 5/8. Send **5/8** only
- TELSEN "JUPITER" S.G.3.** Complete kit less valves and cabinet. Cash price, £3/17/0. Balance in 11 monthly payments of 7/- Send **7/-** only

SPEAKERS

- EPOCH "20C" PERMANENT MAGNET MOVING-COIL SPEAKER** (New Edition). With 3-ratio input transformer. Cash price, £1/15/- Send **6/6** only
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- Balance in 11 monthly payments of 8/3. **EKGO A.C.12. H.T. ELIMINATOR** for A.C. mains tapped S.G., 80 v., 120/150 v. at 12 m/A. Cash price, £2/15/- Send **5/-** only
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THE B.B.C. GETS DOWN TO TELEVISION



This composite photograph shows the arrangements that have been made in the Dance Band studio for the new series of television transmissions

AFTER many delays the B.B.C. should have actually started its television broadcasts on Monday, August 22. Extensive plans have been formulated at the B.B.C. headquarters for a thorough attack, both technically and artistically, on the general problem of television.

During the next few months there should be every inducement for keen listeners to participate in the television broadcasts. As we have already announced, four nights a week will be devoted to television under the new B.B.C. régime.

Simultaneous sound and vision will be sent out Mondays, Tuesdays, Wednesdays and Fridays. The sound signals will come from Midland Regional and the vision signals from London National. This plan is in the nature of a compromise, for if a listener is in the recognised service area of one of the stations he will be outside the service area of the other.

Experience has shown that the Midland Regional can be quite well heard in most of the area covered by the London National station, and with a good set it should not be very difficult for Midland listeners to tune in the London National signals. The arrangement does to some extent favour London area listeners, since it is easier to get Midland Regional in London than it is to get London National in the Midlands. Still, there will be a wide and densely-populated area over which some sort of television service will be available.

The time chosen for these broadcasts is 11 to 11.30 p.m., at which period the two stations involved are normally closed down.

One of the very latest Baird television

transmitters has been installed at Broadcasting House for the new series of experiments. Scanning is done on the mirror drum system, with $12\frac{1}{2}$ images per second. Both close-up and extended-screen transmission will be possible.

The installation and subsequent operation of the television apparatus will be under the control of the Assistant Chief Engineer, Mr. H. Bishop. He will be specially assisted by Mr. D. C. Birkinshaw, another B.B.C. engineer. Later on it is possible that modifications may be made in the transmitter, but this depends entirely on the experimental results obtained during actual broadcasts.

It is of interest to note that the present television transmissions are entirely under the control of B.B.C. men. The Baird people are working independently on short-wave transmissions around the 6-metre band, transmissions being sent out almost daily at odd times from the short-wave aerial at Long Acre, London.

As no special provision was made for television when Broadcasting House was designed—a singular lack of ordinary vision!—the B.B.C. has had to make do with one of its existing studios for the present transmissions. The dance-band studio, known as studio BB, is the one being used.

As a matter of fact, in fairness to the B.B.C., it ought to be mentioned that a television studio does not, in the present state of the science, demand anything more than an ordinary studio of medium size can provide. The only addition to the BB studio when television is in progress is a large white screen, used as a background for the televised subjects.

Another point is that the television apparatus can be conveniently housed in

the listening rooms adjoining most of the studios in the control tower at Broadcasting House. In Studio BB there are two such listening rooms, one under the clock at one end of the studio and the other under the little balcony at the other end. It is the balcony room that is being used just now to house the television transmitter, with the projector scanning device poking through the window into the studio.

New Technique

As many listeners will already know, "Productions" at the B.B.C. is a department ably guided by the genial Val Gielgud, who is to be finally responsible for the development of the television broadcasts from the artistic point of view.

Under Mr. Gielgud is a newcomer to Portland Place, Mr. Robb, late of the Vocalion Company, who will devote considerable time to the arrangement of the television subjects in studio BB.

According to Mr. Gielgud the early broadcasts of television from Broadcasting House will not attempt anything very ambitious. He thinks that caricaturists will specially lend themselves to the new medium, but such subjects as instrumentalists and singers will be frequently projected.

Later on, as the limitations and peculiarities of television broadcasting become known, better use will no doubt be made of the apparatus installed. There is no immediate intention of putting over elaborate song-and-dance shows involving considerable movement and change of scene.

It is something that the B.B.C. has finally got down to this television business. The extensive weekly broadcasts must accelerate the progress not only of the technical side but of the artistic production side. Mr. Bishop and Mr. Gielgud can be relied upon to make the most of the opportunities now offered to them by the recent Baird installation.

A. S. H.

NAVIGATING BY INFRA-RED RAYS

THE photo-sensitive cell or "electric eye" is finding almost as many ingenious applications as the thermionic valve. For instance, in marine navigation it is now possible to make use of infra-red rays for "taking a sight" at the sun in cloudy weather. Even the best of sailors is liable to get a little astray in his bearings if he cannot take a sextant reading of the sun or stars for days on end. Infra-red rays, however, pass through the heaviest clouds in sufficient quantity to enable an "invisible" sun to be accurately located with the new device, which consists of a delicate thermocouple and photo-cell combination, carried on a sextant and connected up to a valve amplifier. The whole arrangement is compact and easily portable, and should play a useful part in long-distance air flights as well as at sea.

B. A. R.

SECURING YOUR FLEX LEADS

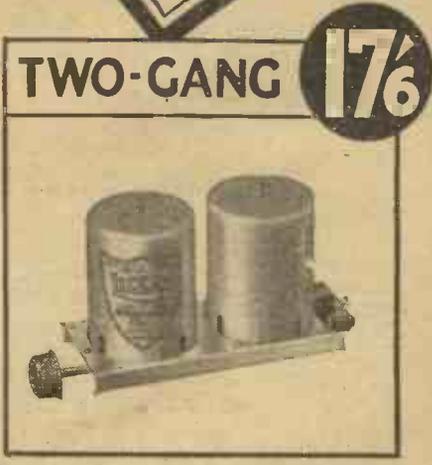
Take flex leads direct from the parts on the baseboard to the batteries, then clamp the flex group so that if the batteries



are moved, none of the wiring will be pulled loose. A useful U-shaped clamp is illustrated.

The Castilian Prize Glee Singers will sing in a Welsh programme from the Cardiff studio on August 25.

LISSEN SHIELDED COILS



Single - Two Gang - Three Gang

A fine basis for the most selective sets of 1933

Lissen Shielded Coils have been produced to meet the demand for a range of coils of universal utility, high efficiency, and matched to unusually close limits. Selectivity is of a very high order, and "break-through" on the longwave band is almost entirely eliminated. Damping losses are exceptionally low, shielding is particularly complete. All the Lissen Shielded Coils are laboratory matched in inductance to within 1 per cent.

No need to keep on buying new coils for every circuit you build—just get a set of these Lissen Coils and you can adapt them to any circuit.

TWO-GANG AND THREE-GANG INCORPORATING WAVE-CHANGE AND FILAMENT SWITCHES.

Wave change switches are an integral part of the Lissen Ganged Coils, the switches being actuated by a knob protruding through the front of the panel.

It is bad design practice to incorporate a switch in single shielded coils. Therefore there is no built-in switch in the Single Lissen Shielded Coil. When single coils are used it is better to allow the designer of the circuit to arrange the switch in a suitable position on the panel so that the coil can also be positioned to suit the circuit.

When the switch is part of the coil it is often difficult to arrange a suitable position for both coil and switch. On the two-gang and three-gang coils it is of course necessary to have the switch built integral with the coil.

In addition to the wave-change switch, each Lissen Shielded Ganged Coil is provided with a further switch position intended for operating the filament circuits, so that all the switching control of the receiver is actuated by one knob.

LISSEN SINGLE DUAL RANGE SHIELDED COIL, **6/6**

TWO-GANG LISSEN SHIELDED COIL, **17/6**

THREE-GANG LISSEN SHIELDED COIL, **26/-**

LISSEN SHIELDED COILS

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Advertisers Appreciate Mention of "A.W." with Your Order



THIS is, without a doubt, a moving-coil season so far as loud-speakers are concerned. The array of inexpensive moving-coils at Radiolympia clearly shows how great has been the swing-over from all other types of reproducer. For years the moving-coil has been acknowledged to be the finest possible type of loud-speaker for the reproduction of the full range of audible frequencies.

It just shows what mass production and faith in the public's buying powers can do; here we are now surrounded with really effective moving coils at prices that are cheap anyway, and when considered in relation to performance are simply wonderful. In a year not very notable for sensations, the moving-coil development stands out as one of the high lights of the Exhibition.

Practically all the commercial sets have some form of moving coil; some battery portables have adopted such speakers. In addition to this wholesale evidence of the supremacy of the moving coil we have a host of chassis available to the amateur constructor.

While there is no question that the moving coil is likely to be the most popular type of loud-speaker in use during the coming season, we ought, in fairness to several excellent firms who know what they are talking about, to remember that such types as the inductor-dynamic, introduced last year, and certain improved forms of balanced-armature moving-iron speakers, still have applications.

The inductor-dynamic, for example, is

now made just as sensitive as the moving-iron, thus overcoming one of the few objections to an otherwise excellent development. The inductor, properly designed, as it is in several makes on show at Radiolympia, gives quite a good bass-note response and appreciable high-note reproduction. Moreover, there is little or no background with this type of loud-speaker, and the reproduction has a "clean" timbre that appeals to some listeners in a way the average moving-coil cannot. That states the case as fairly as possible for the inductor, which has lost ground only because the moving-coil has so greatly advanced in the popular price market.

Similarly with the moving-iron. Ceaseless research goes on, even now, with this simple type of speaker, so that to-day we can get an overall response which would have seemed theoretically impossible a few years ago. The moving-iron still has an application in small portables, where there is neither room to house nor power to work a moving-coil.

This brings us to the interesting point about the new loud-speaker marketing tendency. Nowadays it seems that we buy chassis and use our own discretion about the type of cabinet or baffle. Compared with the great number of moving-coil chassis shown at Olympia there is a very small number of cabinet speakers.

Perhaps this is to be expected, since the amateur will want a chassis for his home-built console or pedestal cabinet, and the manufacturer, who incidentally by his large orders for speakers to include in factory-

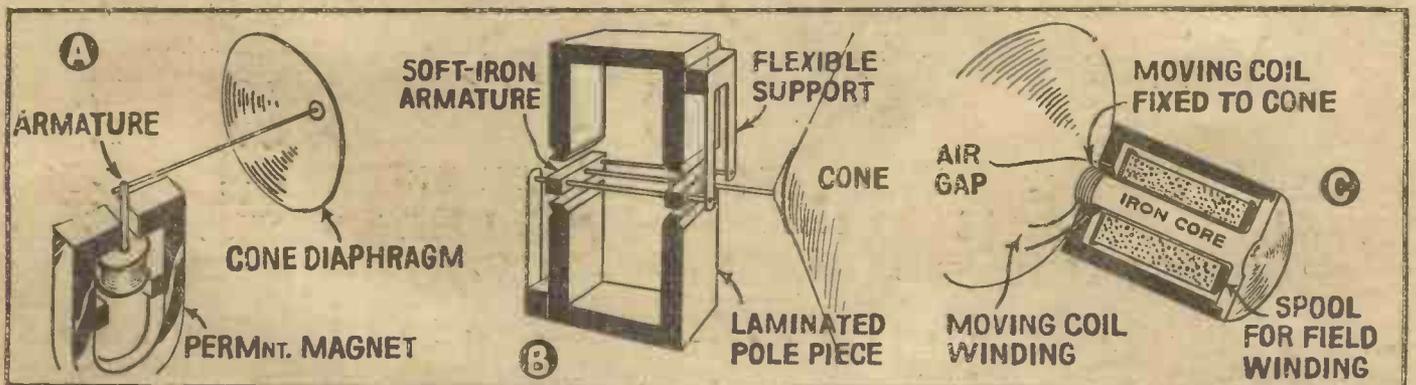
assembled sets has "rationalised" the market, naturally does not want a box round his chassis.

This change in marketing entails a certain amount of discretion on the part of the purchaser. Disappointment may be caused by unsuitable housing for the chassis. Moreover, poor reproduction may be caused by inaccurate matching, caused by inattention to the ratio of the transformer in the chassis.

Most of the chassis have some sort of incorporated output transformer, so that no matter what kind of set may be used, the reproduction can be made good by altering the ratio of the primary to secondary winding. Even the cheap chassis have these matching transformers, some with multi-ratios and others designed specifically for pentodes, small power valves, of moderate impedance, or large power valves of very low impedance.

This question of matching should therefore be fully dealt with when making a purchase of one of the new chassis. Fortunately most makers are alive to the situation, and will willingly quote the type for any given power valve.

On the question of the cabinet or baffle less information is forthcoming. The guiding rule is to use as large a baffle board as possible, not less than 3 ft. square anyway, and preferably larger. If a cabinet is used, care should be taken to see that it has no pronounced resonance. If it has, the objectionable "boom" may be removed, as in the loud-speaker on show at the AMATEUR WIRELESS stand, by carefully packing the cabinet with slag wool.



The three types of loud-speaker shown diagrammatically—A, the moving-iron; B, the inductor; C, the energised moving-coil

The only FULL SIZE Condenser selling at 6^d



The only Condenser selling at 6^d that requires NO SOLDERING into circuit

LISSEN GRID LEAKS 6^d

Now, too, you can get the finest, most reliable grid leaks at half the price you had to pay before. Lissen Fixed Grid Leaks are resistances that never vary; they are absolutely silent in use. Use them in every circuit. All values 6d. each.

NOW ALSO

These are exactly the same Lissen Mica Condensers for which you were paying 1/- each before. They are Leak-proof. They deliver all their stored-up energy. They are guaranteed accurate within 5 per cent. of marked capacity.

And remember—Lissen are the only FULL SIZE Fixed Mica Condensers you can buy for 6d. each, the only condenser selling at 6d. that has standard terminals and requires no soldering into circuit.

LISSEN FIXED MICA CONDENSERS

Up to .002 mfd.

WERE

~~1/-~~ **NOW**

6^d

Over .002 mfd. were 2/- and 1/6, reduced to 1/-

EXACTLY THE SAME LISSEN CONDENSERS AND THE SAME LISSEN GRID LEAKS FOR WHICH YOU PREVIOUSLY PAID 1/-

LISSEN LIMITED, WORPLE ROAD, ISLEWORTH, MIDDLESEX.

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THE B.B.C. AT OLYMPIA

Interesting details of a section of the Show which no visitor should miss

ON the B.B.C. stand is located the apparatus used to supply programmes of music and speech to all loud-speakers operating in the Exhibition. The programmes thus distributed are obtained either from the B.B.C. headquarters at Broadcasting House or from the small studio near the stand.

The programmes originating from Broadcasting House are identical with those being radiated either by the London Regional or the London National transmitter at Brookmans Park. Wireless link, however, is not employed, the apparatus on the stand being connected directly to the amplifier at Broadcasting House through the medium of the G.P.O. telephone lines, special circuits being used for the purpose.

In the small studio on the B.B.C. stand are a microphone and a gramophone with an electrical attachment by means of which a programme of suitable music is distributed when the broadcast transmissions are not available.

With regard to the apparatus on the stand, to the left of the main amplifier unit will be seen a small rack upon which is mounted the input equipment, comprising five stages of resistance-capacity coupled low-frequency amplification. The

output from this rack is fed to the power amplifier, which consists of two stages of push-pull resistance-capacity coupled amplification. The high-tension and low-tension supplies for the latter are derived from the motor-generator set which may be seen on the right-hand side of the stand. This machine delivers about 40 amperes at 17 volts to the filaments of the four large valves employed in the output stage, while approximately 1½ kilowatts at 3,000 volts

SPEAKER UNIT MOUNTING

It is a mistake to mount a speaker unit on a frail support. Wooden battens used in construction behind a speaker baffle-board should be very stout, so that there is no risk of vibration being transferred



through the framework to the cone. The adjusting knob of the unit should clear the back batten and not touch it, for otherwise it may upset the rigid mounting of the unit.

is dissipated at the anodes of these valves. The loud-speakers are fed in parallel, through a number of separate circuits which supply the various parts of the Exhibition.

The Model of Broadcasting House

The model of Broadcasting House, which is on view next to the B.B.C. amplifier equipment, is a sectional scale model of the new B.B.C. headquarters in Portland Place. On one side will be seen the exterior elevation of the building, on Portland Place. On the other, a section through the centre of the building, and a plan of the sub-basement showing the arrangement of the air-conditioning and ventilating equipment.

By studying this model it will be seen how every corner of this elaborate building has been utilised to full advantage.

Many listeners are often mystified as to what happens in the fraction of a second between the sound being picked up by the microphone in the studio and the reproduction of that same sound by their loud-speaker at home.

To try to put this extremely complicated procedure into as simple a form as possible, illustrated charts are on view, which show, both photographically and diagrammatically, the different stages through which the signals picked up by the microphone pass. One deals with "broadcasting," that is, the stages from microphone to transmitting aerial, the other with "reception," the stages between the listener's aerial and loud-speaker. Visitors studying this exhibit should begin at the left-hand side.

B.

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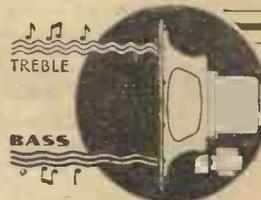
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HOW THE PROBLEM OF SELECTIVITY IS BEING TACKLED

Some Notes on Filtering and Shaping Circuits—By MORTON BARR

CONDITIONS in the ether threaten to force the broadcast listener to adopt fresh standards of selectivity, particularly if the prevailing congestion continues to increase as time goes on. It will be no longer worth while trying to tune in this far-away station or that, when experience shows that the result amounts more often than not to very inferior quality on a background of mush.

Up to the present selectivity and sharp tuning have always gone hand in hand, in the sense that the more stations there are in operation the more highly resonant the receiving circuits must be in order to separate one programme from the other.

It is, however, possible to push this argument too far, because although a sharply tuned input is certainly effective

in shutting out interference, the point comes when the "entrance" to the set is made too narrow to admit the sidebands which carry the higher frequencies and overtones so essential to true reproduction.

There is not much advantage in robbing Peter to pay Paul, and once the struggle for selectivity reaches the point where quality is deliberately thrown overboard, it becomes profitable to look for other ways and means of solving the problem.

Amongst these is the so-called band-pass filter circuit, which may be inserted either between the aerial and the first valve, or as a coupling between the high-frequency stages, or may be used in both positions. Apart from its proved success in meeting the demand for selectivity with quality,

the band-pass circuit represents an interesting development in the art of tuning.

In the first place it may be classed as an anti-resonant circuit, in the sense that its response curve is flat-topped, as shown at A in Fig. 1, in contrast with the corresponding curve B of the sharply-tuned circuit, which has a narrow peak. One passes both the carrier wave and the essential side-bands, whilst the other strips most of the side-bands away.

If it was possible to design a perfectly resonant circuit it would respond only to one definite frequency, i.e. the carrier wave, so that progress in this direction leads to razor-edged selectivity with little or no quality. This conclusion is, however, subject to one important reservation, which is dealt with later.

On the other hand the perfectly designed band-coupling accepts a definite width of frequencies—say five kilocycles on each side of the carrier-wave—and gives an abrupt cut-off outside these limits; so as to cover the whole of the side-bands, whilst at the same time excluding any interfering

(Continued on page 388)

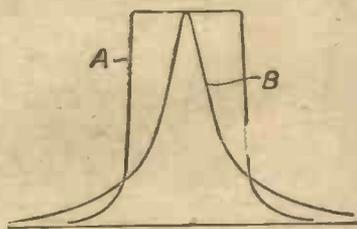


Fig. 1. Tuned circuit and band-pass coupling

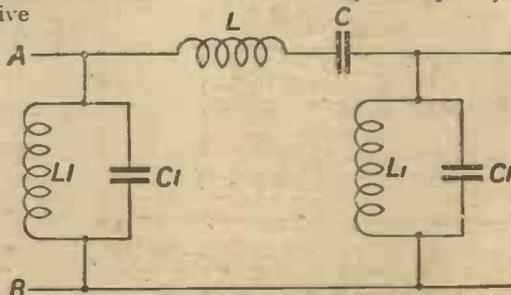


Fig. 2. Original Campbell filter unit

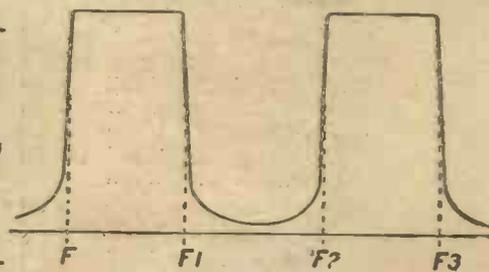


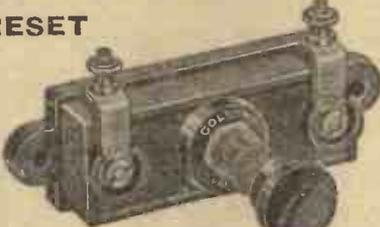
Fig. 3. Typical filter response

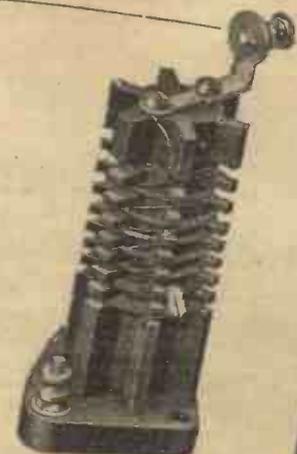
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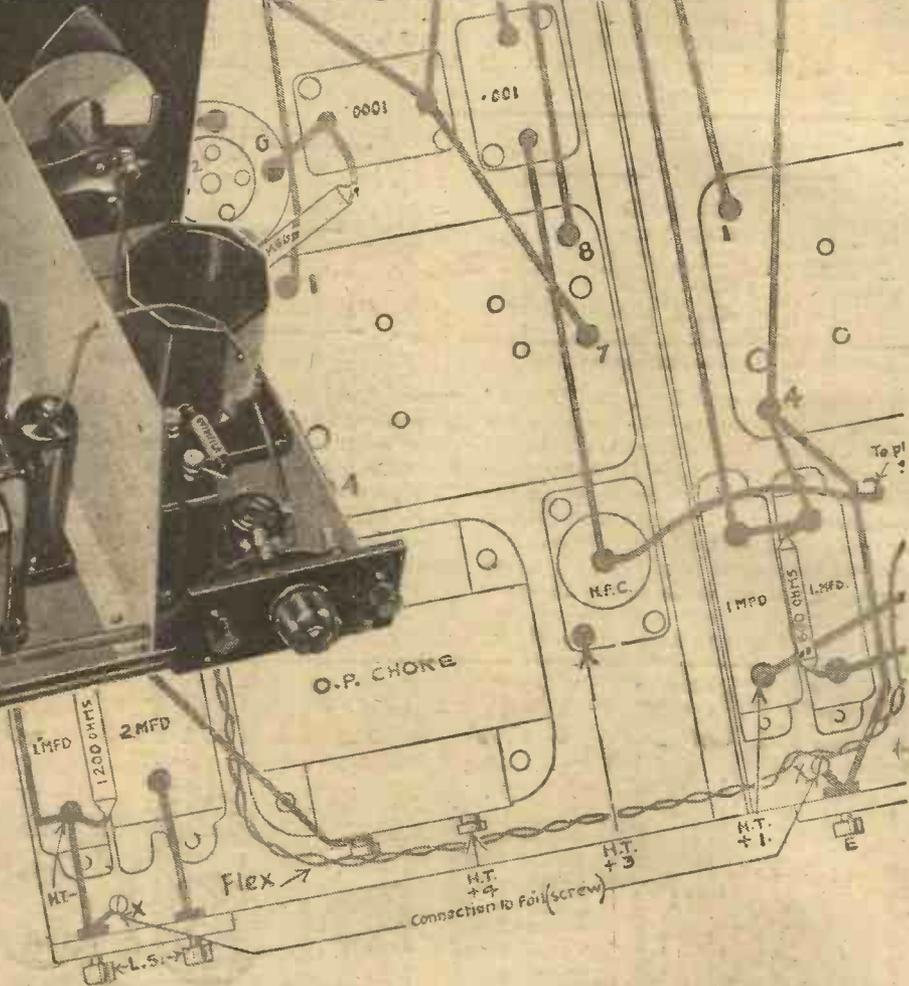
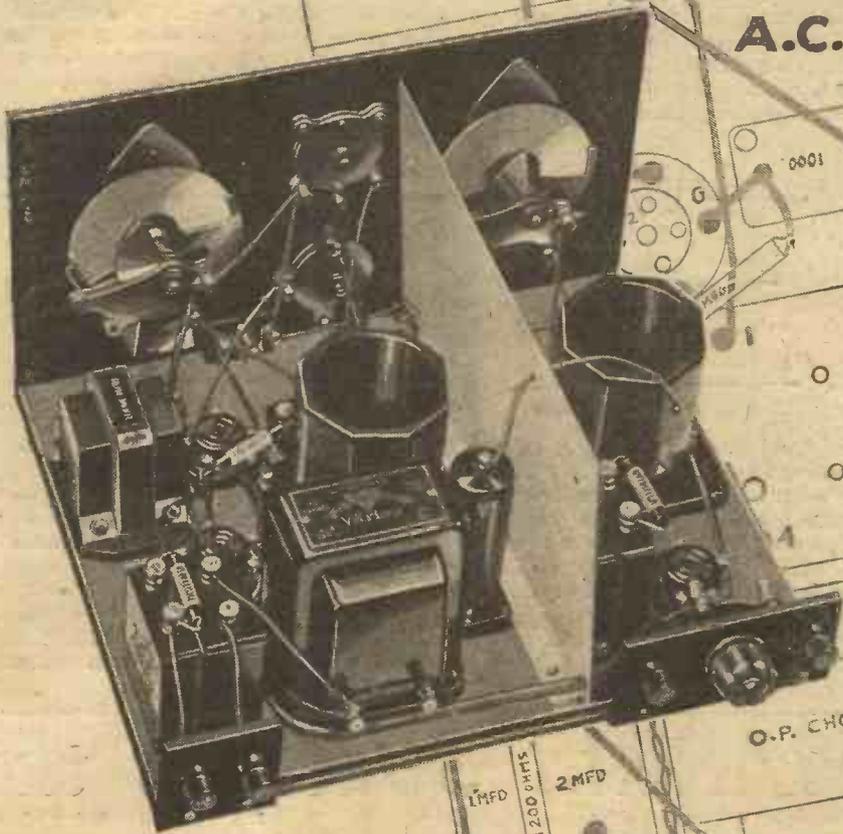
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"HOW THE PROBLEM OF SELECTIVITY IS BEING TACKLED"

(Continued from page 386)

signals. Progress in this direction therefore approaches one ideal of selectivity, namely, reception sufficiently sharp to separate stations operating within ten kilocycles of each other, without any sacrifice in quality.

The band-pass coupling is a development of the generalised filter circuit first produced by G. A. Campbell some twenty years ago. The principle involved is one of growing importance in wireless technique both on the high-frequency side and the low.

On the high-frequency side it is being

It consists of two leads A, B, having inductance L and capacity c in series, and inductances LI and capacities CI in shunt. The unit can be repeated, if necessary, to form an extended network. The larger the number of units used, the greater is the sharpness with which the network will separate one frequency from another.

The form of circuit shown in Fig. 2 will pass the two bands of frequencies, marked F F1, and F2 F3, in Fig. 3, but will extinguish all frequencies outside these limits. By omitting the series inductance L, the two frequency-bands shown in Fig. 3 can be merged into a single band. This gives the

and get a high-pass filter, Fig. 6. This passes high-frequency currents through the condensers c, and drains away low-frequency currents through the inductances LI.

Mention has been made of an alternative scheme for selective reception in which the high-frequency circuits are so sharply tuned that, without some form of correction or compensation, all pretence to quality would be lost. This razor-edge effect may be secured by the use of a piezo-electric gate, or by forcing reaction up to the threshold of self-oscillation.

A glance at Fig. 1 will show that the sharply-tuned response curve B, although it cuts away most of the side-band energy,

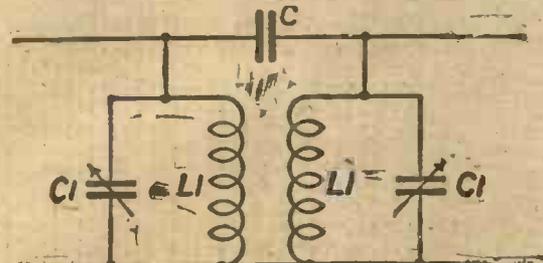


Fig. 4. Typical band-pass circuit

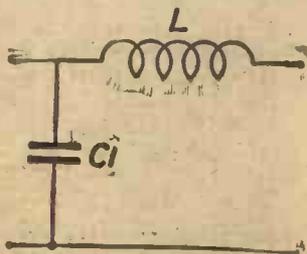


Fig. 5. Low-pass filter

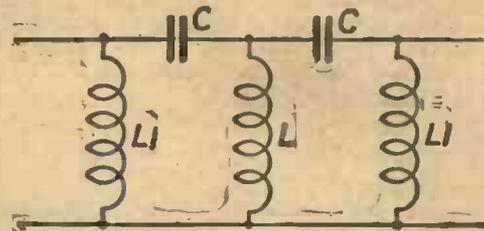


Fig. 6. High-pass filter

used, as already explained, to "shape" incoming signals into a flat-topped curve for subsequent rectification and reproduction; whilst on the low-frequency side the same principle is to be found in the tone-correcting or "shaping" circuits now being used in a certain type of receiver to restore notes that have been cut down below their normal value owing to over-sharp tuning.

The typical filter unit is shown by Fig. 2.

typical band-pass input, Fig. 4, as used in a broadcast receiver.

By omitting the series condenser c and the shunt inductance LI in Fig. 4, the "band-pass" effect is reduced to zero, giving the well-known form of filter or smoothing circuit, Fig. 5, used to remove the ripple frequencies from a mains-supply unit.

By reversing the process and removing the series inductances L and the shunt capacities c, we go to the other extreme

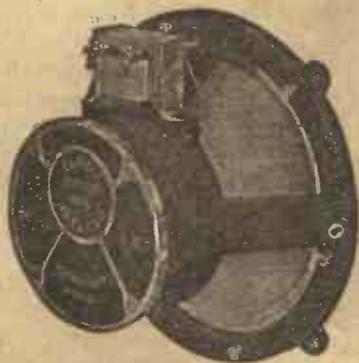
by curtailing the amplitude of all frequencies outside the carrier-wave, does in fact gather in traces of all of them. The falling-off in amplitude becomes more pronounced the greater the distance from the centre.

Since the high musical notes are farthest removed from the carrier, they would in the ordinary way be excluded from the loud-speaker, so giving rise to pronounced gruffness.

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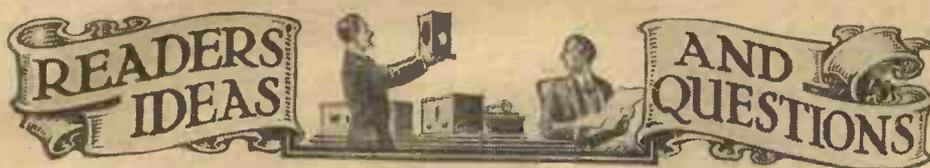
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SIR,—Recently I have experienced quite a peculiar kind of humming noise from my speaker when tuning in at odd times during the day and late at night. The noises sound very much like what I assume to be mains hum, but, as there is no sign of the noises being heard at any point on the tuning dials other than at one particular spot, I cannot bring myself to believe I am actually experiencing mains hum. Has anything happened recently to any transmissions which would account for these peculiar noises?—C. P. (Uxbridge).

The noises you are experiencing are the carrier and modulated waves of the vision-picture transmissions now being radiated by the B.B.C. The transmissions cannot be resolved into intelligent reception of pictures without a special television receiver. Your receiver is, no doubt, tuned to the London National station to pick up these sounds, and if you will tune to Midland Regional you will hear the normal transmissions which are coupled with the television broadcasts.—Ed.

Wire-wound Resistances

SIR,—One of the H.T. positive points on my eliminator failed to work, and after testing by substitution I eventually found that this was due to the failure of the 40,000-ohm resistance. I sent it to the

makers, and they were good enough to send me another resistance free of charge.

In the second instance, a friend's set which I had made gradually deteriorated until it gave only a small volume of sound. I was put on the track of the defect by happening to touch two points in the set with two fingers, when the volume returned. At last I found that the 250,000 wire-wound resistance in the R.C. coupling stage was defective.

While I am writing, may I say how thoroughly I endorse the recent remarks by "Thermion," with regard to home constructors. Personally, I should decline a gift of the best ready-made set. I much prefer to construct my own.—R. W. R. (Rochester).

Tone Controls for Two Speakers

SIR,—I have two speakers in use, one of which I occasionally take into the garden. When these two speakers are used together in the house they appear to give too much high-note response, but work quite well individually. Is there any way in which this effect can be reduced without impairing the general working of both?—G. W. (Hitchin).

The best course to follow is that of connecting a variable resistance of 15,000 ohms in series with a .01-microfarad fixed condenser and

arranging this in parallel with the terminals of one of the speakers. A similar arrangement may be employed across the terminals of each speaker, and by adjusting the variable resistance you will effectively control the pitch of reproduction from each speaker. The speakers must be connected together in series for this arrangement to be effective.—Ed.

A Matter of Bass

SIR,—Commenting on the letter from "G.A. (Argyle)," complaining of insufficient bass, I suggest he concentrates on a first-class transformer as his chief expense. Ferranti AF3 or, better still, Ferranti AF5. There are many others less bulky if he desires. His loudspeaker need not be terribly expensive. A good four-pole cone mounted on an inch-thick box, 4 ft. square, 18 in. deep, open at the back, or alternatively mounted on a 9-ft. square baffle board, should, in conjunction with a real transformer, give him all he requires; top and speech particularly he may find superior to many cheap moving coils.—E. (Wimbledon).

"Home-lover's All-electric Three" Motor-boating

SIR,—I have built the "Home-lover's All-electric Three" and am endeavouring to use a moving-coil speaker in place of the ordinary balanced-armature type you specify. It is in this respect that I believe I have gone wrong, for I get troublesome motor-boating and mains hum. When I put in a cone speaker from another set, my reception is all that one could wish. (Continued on page 392)

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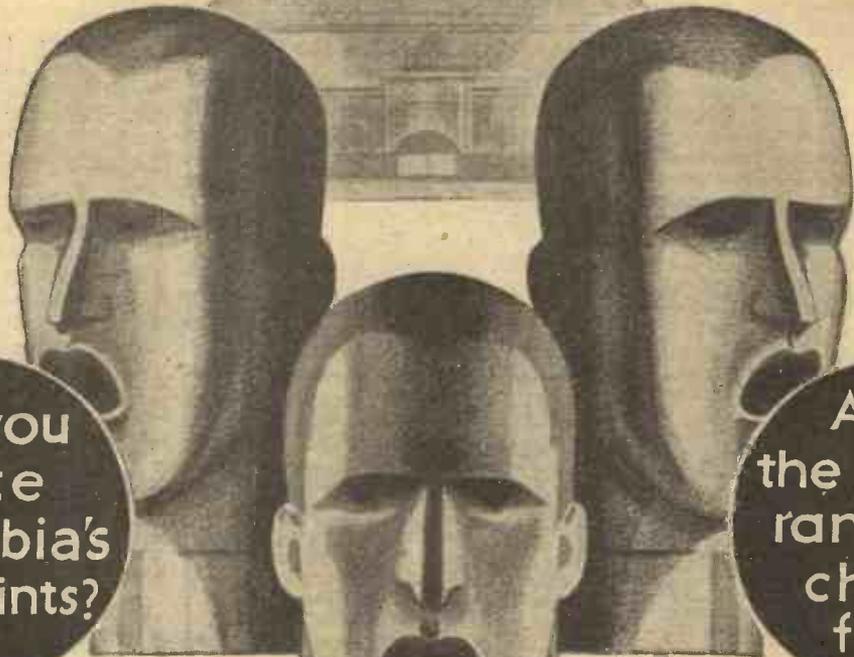
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★ Please arrange a demonstration free and without obligation, of Model in my own home.

★ Cross out if not required.

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A.W. 27 Aug.

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Mention of "Amateur Wireless" to Advertisers will Ensure Prompt Attention

"READERS' IDEAS AND QUESTIONS"

(Continued from page 390)

you, therefore, explain why this trouble should occur and how it can be avoided?—F. W. (Kent).

Your moving-coil speaker, no doubt, has its own input transformer incorporated in its design. The D.C. resistance of the primary winding of this transformer is much less than that of the windings of an ordinary balanced-armature speaker, and consequently there is less voltage drop between the point of H.T. supply and the anode of the power valve. The latter tends to consume somewhat more anode current than is allowed for in the design of the receiver, and mains hum and other troubles result. We recommend you to introduce a power type voltage dropping resistance between the H.T. supply terminal and the H.T. terminal on the speaker transformer. One terminal of a 2-microfarad condenser should then be joined to this terminal of the speaker transformer and the other terminal of the condenser connected direct to the cathode or earth return circuit. A suitable value of power-type dropping resistance will be 2,000 ohms.—Ed.

YOU WILL BE THE JURY!

INCLUDED in the autumn talks are some very bright ideas. For example, on Saturday nights listeners will become a vast jury, deciding "cases" fought out by opposing Counsel before the microphone. After the Judge has done his summing up the verdict will be left to us. Although the cases will, of course, involve fictitious characters they will be based on real-life trials of the past.



ON September 7 a running commentary on the St. Leger, by Mr. R. C. Lyle, will be broadcast from the Town Moor racecourse, Doncaster, in the National programme.

A programme of Russian music, which includes items by prominent Russian composers such as Glazounov and Medtner, will be given by Edna Willoughby, on September 10.

Raymond Lilley will play violin solos in a concert by the Whitby Municipal Orchestra, which will be relayed to the Northern Region from the Spa at Whitby, on August 29.

YOUR SHOW GUIDE

Last week's 116-page issue of "Amateur Wireless," the first special Show Number, contained a complete review of the exhibits at Olympia, and if you are going to the Show you will find the issue an extremely helpful guide and a great time saver. If you cannot go to the Show then use your copy as an index to the new season's products. Visitors to Olympia should note that the "A.W." Stand is No. 7, and that floor plans of the exhibition and a list of exhibitors are given in this week's issue on page 344.

In connection with the Three Choirs Festival, an orchestral concert will be relayed from the Public Hall, Worcester, on September 7 to the Midland Regional, when the London Symphony Orchestra will be conducted by Sir Ivor Atkins. An attractive programme includes William Walton's well-known piece, "Portsmouth Point."

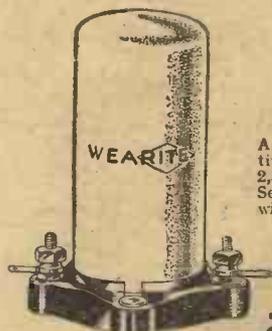
Listeners taking holidays in North Wales should tune in to a talk from Leeds, by Professor W. Sherard Vines, on August 29. Professor Vines will describe some books which would make topical reading for holiday-makers in North Wales.

Non-stop variety will be outdistanced by a John Watt show which is to be broadcast Nationally on September 10. "Crescendo," a vaudeville programme, will not even recognise the meaning of the word stop, for all the items, singers, dance bands, orchestra, organ, pianos, etc., will follow one another at breathless speed from beginning to end of the programme. There will be no announcements and everything will be done from one studio.

Vaudeville for London Regional listeners on September 3 will consist of the following turns: Len Fillis, Elizabeth Pollock, John C. Payne, Abie and Sandy, Esther Coleman, and Melville Gideon.

One of the most popular concert parties whose performances are relayed are "The Bouquets," who appear each evening at the Spa Theatre in Scarborough. Listeners will be glad to know that they are to broadcast again on September 1.

Additions to the comprehensive range of Wearite components

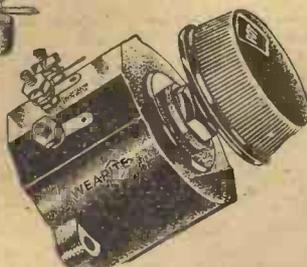


THE H.F.P. H.F. CHOKE

A screened choke, giving effective operation between 15 to 2,500 metres. Price 3/6. See also latest type H.F.P.A. with armoured "pig-tail." Price 4/-

THE Q.V.C. VOLUME CONTROL

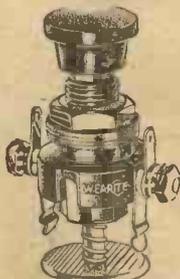
Made in all values from 600 to 100,000 ohms. Up to 50,000 ohms, price 4/6; above 50,000 ohms, price 5/6. Ganging attachment, 1/- extra.



PUSH-PULL SWITCHES

Operate on entirely new principle. "Snap" action, self cleaning.
The G.S.P. Type Price 1/-
An "on-off" switch.
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An efficient wave-change switch.

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A "change-over" switch.



THE R.D. RESISTANCE

A series of scientifically designed decoupling resistances. In all values from 50 ohms to 50,000 ohms. Prices from 1/- to 2/9. Plug-in type, complete with baseboard socket, 3d. extra.



SEE THEM ALL ON STAND 82 OLYMPIA

Here are a few of the new products Wearite are showing at Olympia. The complete range exhibited covers every possible need of the constructor—and behind each individual product is the experience of years spent in the production of components sound in principle and construction. Examine these Wearite parts—and compare the workmanship.

ASK ABOUT THE NEW WEARITE "STICK-ON" VARIABLE SELECTIVITY AERIAL LEAD-IN. PRICE 1/-

NO HOLES! NO TOOLS! FITS ANY WINDOW. SEE IT DEMONSTRATED.

WEARITE COMPONENTS NEEDED FOR THE ADVANCE FOUR

	Price, each
Four 4-pin Valve Holders (S.1)	1/3
Two 50,000-ohm Variable Potentiometers (Q.V.C.)	4/6
One Rotary Switch, 4-pole (1.24)	4/6
Two 600-ohm Decoupling Resistances (D.R.)	1/-
Three 1,000-ohm Decoupling Resistances (D.R.)	1/-
Two H.F. Chokes (H.F.P.)	3/6

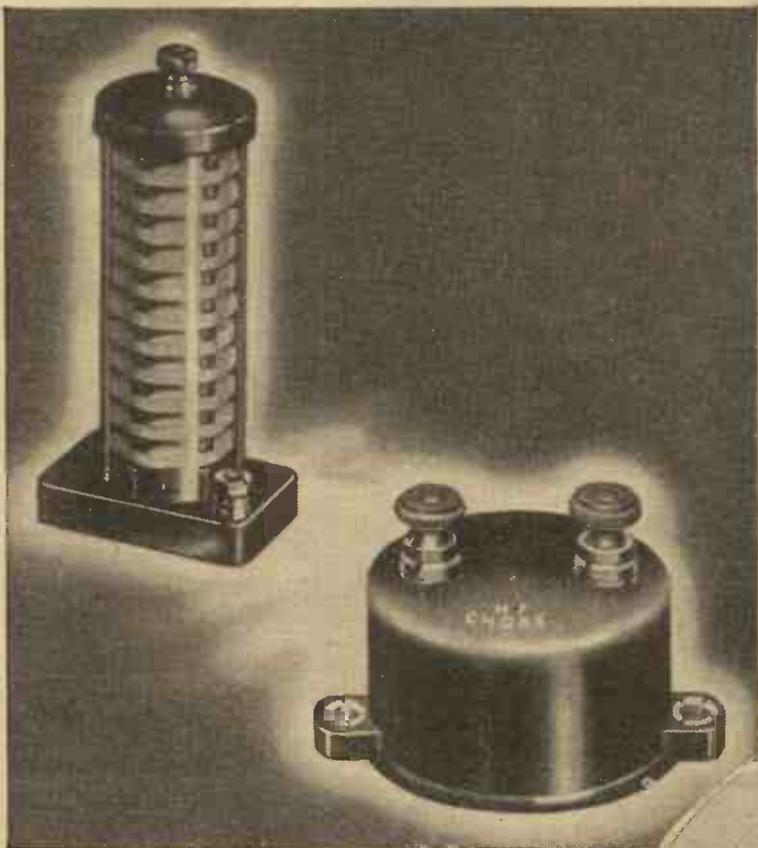
for THE SHORT-WAVE THREE

	Price, each
One "On-Off" Switch*(3 G.S.P.)	1/-
Three 4-pin Valve Holders (S.1)	1/3
One Short-wave Choke (H.F.3)	4/6



WRIGHT & WEARE, LTD., 740 High Road, Tottenham, N.17. Phone: Tottenham 3847/8/9.

New S.G. & H.F. Chokes



S.G. CHOKE

A new H.F. Choke specially designed for screened grid sets, and for use wherever a high efficiency choke is required. Highly efficient sectionalised windings almost entirely air-spaced and completely enclosed in a protective cover. Self capacity, D.C. resistance and losses are exceptionally low for a choke of such high inductance.

Price 5/6

STANDARD H.F. CHOKE

A highly efficient general-purpose choke for use wherever a standard choke is recommended. Specially suitable for reaction purposes.

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The importance of using the correct chokes in modern circuits is fully explained in our new 36-page Book of ten Kendall-Price Circuits, published at 1/-

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Please send me the Kendall-Price Book of ten circuits—free.

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If you wish to have with your free book ten full-sized blueprints, enclose 1/- in stamps with this coupon. A.W. 1c.

READY RADIO

Please Mention "A.W." When Corresponding with Advertisers

"THE WORLD-RANGER SHORT-WAVE 3"

(Continued from page 343)

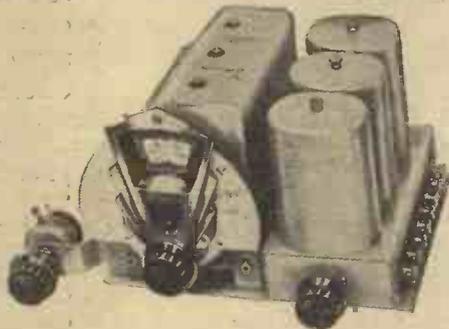
using the blueprint as a guide, forms one of the ends of the box-like formation. Do not, at this stage, mount the box to the panel for otherwise you will find it difficult to mount the reaction condenser and to wire up the triple-range coil. The first step should be to mount the two condensers, coil switch, and on-off switch on the panel. The coil and its associate three-position switch are mounted against the panel and secured by two bolts which pass through panel, switch, and coil. The other components are of the one-hole mounting variety. When you have mounted all these up firmly on the panel you can butt the baseboard box temporarily against it and see where a small part of the ply-wood top must be cut away to clear the fixed vanes of the reaction condenser. When this job has been done the box and panel can be screwed together. The box baseboard is an adequate support for the panel and no other means of strengthening, such as panel brackets, is necessary.

Completing the Wiring

Well now, with the panel components mounted, the main parts can be screwed to the baseboard and the wiring completed. The three valve holders, H.F. choke, potentiometer, series aerial condenser, low-frequency transformer, and decoupling condensers, should all be screwed down. As there is plenty of space to spare on the baseboard, there is no point in delaying the mounting of the parts until some of the

wiring is carried out. There are no special points to note about the spacing and the blueprint gives the layout in a very clear manner, so that you cannot possibly go wrong in the spacing of parts.

The wiring is just as easy. Rigid insulated wire is used for the major connections on the baseboard and the battery flex leads connect direct with their respective components. Wires pass through the baseboard to the coil and to one or two of the smaller parts. Drill these holes from underneath and push the wires up through the baseboard, the ends being later soldered to tags or clamped underneath the terminal heads. Further constructional details and operating notes for the finished set will be given in next week's issue.



One of the new Radiophone Radiopak units described on page 294 last week. The band-pass model is shown. It includes ganged coils, condensers, and all the H.F. components

THE CLARION RANGE

FOUR receivers will comprise the Clarion programme for the coming season, although it is probable that other models will be added later. These range from the popular table consolette to the radio gramophone, which, by the way, is one of the first commercial receivers to incorporate the Garrard automatic record changer. All models are for use on A.C. mains only.

A thoroughly up-to-date four-valve circuit employing two variable-mu screen-grid stages, screen-grid detector, and power pentode output is used, and the moving-coil reproducer, which is built into the four models, is of the energised type. A valve rectifier is used for supplying high-tension current.

Provision is made for the use of a gramophone pick-up and external loud-speaker on the consolette model, which costs eighteen guineas. Several unique features are incorporated in the range, notably the method of tone control which enables the user to accentuate the top notes.

The cabinet work of the four models is very tasteful and conforms to the modern idea of simplicity. There are only three controls on the panel, the main-tuning control is in the centre with a clearly marked scale calibrated in wavelengths, the volume control on the left, and the combined wavechange and on-off switch on the right. No reaction is employed in the design of the set.

A representative of AMATEUR WIRELESS recently attended a demonstration of the British Clarion Company's sets and was impressed with their overall performance.

QUALITY
is the **MOTOR**
POLICY

Superior performance, and a high quality that will make you and your friends gasp with admiration—that is what MoTor has aimed at—and achieved, in the richness of tone, naturalness of speech, and unusual sensitivity of the MoTor Minor moving-coil speaker.

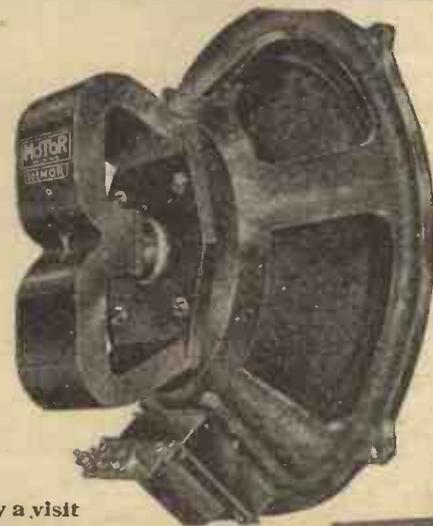
Make quality your policy too—pay a visit to our demonstration showrooms opposite Olympia and hear this and the full range of MoTor speakers under real working conditions. Then you will realise you don't need a new set—you just need a MoTor Minor.

Demonstration Showrooms:
67 HAMMERSMITH RD., W.14.
OPPOSITE EMPIRE HALL

(Open only during Radiolympia)

TEKADE RADIO & ELECTRIC LTD.
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Telephone: Clerkenwell 2426.



BRITISH
MADE

MoToR
MINOR

Permanent Magnet
MOVING COIL

Including transformer and
baffle board

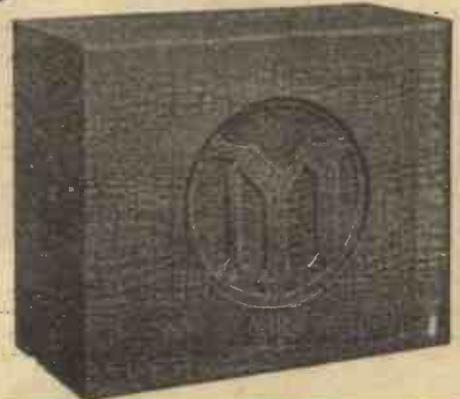
39'6

CHESTER. Handsome walnut
cabinet incorporating MoTor
Minor P.M. Moving Coil
Speaker

65/-

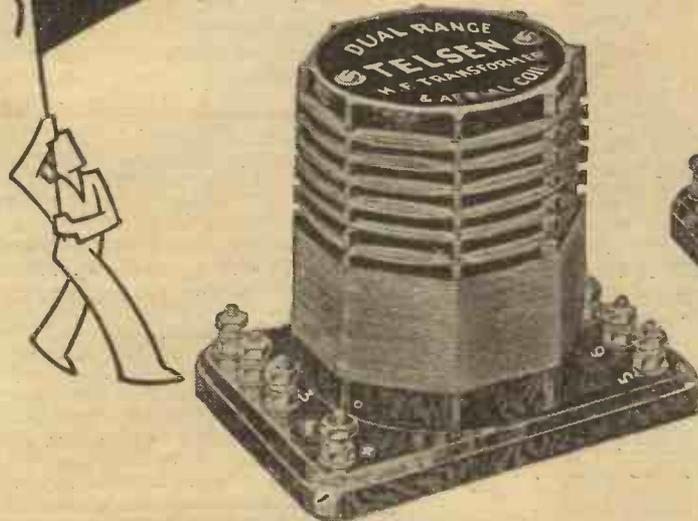
MoTor Minor Unit in attrac-
tive leatherette Baffle Case
as shown below

45/-



In moving coil and balanced
armature type speakers
MoTor is supreme. Write
for fully descriptive pamph-
lets to:

TELSEN DUAL-RANGE AERIAL COILS



THE TELSEN H.F. COIL

May be used for H.F. amplification with Screened Grid Valve, either as an H.F. Transformer or, alternatively, as a tuned grid or tuned anode coil. It also makes a highly efficient Aerial Coil where the adjustable selectivity feature is not required.

No. W.154
5/6



TELSEN DUAL-RANGE AERIAL COIL

Incorporates a variable selectivity device, making the coil suitable for widely varying reception conditions. This adjustment also acts as an excellent volume control, and is equally effective on long and short waves. The wave-band change is effected by means of a three-point switch and a reaction winding is included.

No. W.76
7/6

TELSEN COMBINED DUAL-RANGE SHORT-WAVE COIL UNIT

This unit for the first time brings the construction of short-wave receivers into line with the simplicity of modern practice. When tuned by a Telsens .00025 Condenser, a wave range of 20 to 80 metres can be covered by the operation of a switch, as in ordinary broadcast practice. The unit incorporates windings for aerial, tuning and reaction circuits, all coils being wound with stranded wire. The coil is also suitable for use with sets covering all wave bands with a .0005 Tuning Condenser. In this case the dual-range feature is not employed.

No. W.174
4/6



TELSEN

RADIO COMPONENTS

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ANNOUNCEMENT OF THE TELSEN ELECTRIC CO., LTD., ASTON, BIRMINGHAM

Mention of "Amateur Wireless" to Advertisers will Ensure Prompt Attention

THE LOTUS S.G.4 PORTABLE



Ready for use
the Lotus S.G.4
portable set

ONE of the new Lotus sets is the type S.G. 4 Portable, a remarkably low-priced suit-case type of set, which is equally suitable for indoor and outdoor use.

The circuit is of the straightforward screened-grid detector, L.F., and power type, and the tuning control is extremely simple. The lid of the set carrying the speaker and frame aerial opens, disclosing the control panel. This carries a combined wave-change and on-off switch, and a

reaction volume control. A simple thumb operated tuning control drives the two tuning condensers and the scales are graduated direct in wavelengths, which greatly simplifies station searching.

Owing to the efficient screen-grid coupling the selectivity is of a very high order and National and Regional can easily be separated within one mile of the transmitters.

The components on the set chassis are adequately supported so that the receiver can withstand repeated vibration, and a twelve months' guarantee is an additional protection for the set-user.

The circuit is economical in its H.T. demands and the battery compartment, which is enclosed by a lid held on with four thumbscrews, contains a Drydex power-type battery and an Exide unspillable accumulator. The speaker is a Celestion balanced-armature instrument and the tone is natural without being boomy.

The whole set is enclosed in a grained rexine case, with a flat sprung handle, and is quite light in weight.

The price of the set ready for immediate use is twelve guineas, but it can be obtained on deferred payment terms of 23s. 8d. and eleven monthly payments for the same amount.

Full details can be obtained free on mention of AMATEUR WIRELESS from Lotus Radio, Ltd., Lotus Works, Mill Lane, Liverpool.

The first act of Robert Sherwood's play, *The Road to Rome*, in the Midland Regional programme will be broadcast from the Birmingham Repertory Theatre on September 6.

The weekly Welsh Interlude, on September 7, will be given by Mr. D. G. Evans, who will tell listeners of the Swansea Valley dialect.

Mrs. Dora Herbert Jones will give the Welsh Interlude in the Daventry National and West Regional programme on September 10.

On August 28, North Regional listeners will hear a concert by the Northern Studio Orchestra, directed by John Bridge, with Irene Crowther, pianoforte, as soloist.

"Amateur Wireless and Radiovision." Price Threepence. Published on Thursdays and bearing the date of Saturday immediately following. Post free to any part of the world: 3 months, 4s. 6d.; 6 months, 8s. 9d.; 12 months, 17s. 6d. Postal Orders, Post Office Orders, or Cheques should be made payable to "Bernard Jones Publications, Ltd."

General Correspondence is to be brief and written on one side of the paper only. All sketches and drawings to be on separate sheets. Contributions are always welcome, will be promptly considered, and if used will be paid for. Communications should be addressed, according to their nature, to The Editor, The Advertisement Manager, or The Publisher, "Amateur Wireless," 58-61 Fetter Lane, London, E.C.4.

YOU ONLY NEED TO HEAR KENWELL POWER-PACK

MODEL A.C.U. £8.15.0 H.T. L.T. G.B. AND MOVING COIL SPEAKER

EVERY BATTERY SET CUTS COSTS AND CUSSING WITH THIS COMPLETE MAINS UNIT AND MOVING COIL SPEAKER



"It's a braw Set—ye Ken."—McQuality

Turn your Battery Set into an ALL-MAINS MOVING COIL SET!

Hundreds of Battery Set users who visited our Stand at Radiolympia discovered that the Kenwell Power Pack was just the unit they required to bring their Set up-to-date.

And then—it is so economical in current consumption that its complete cost can be written off out of savings in the first 18 months!

DON'T SCRAP YOUR BATTERY SET

—it has always been a good friend to you. Ask your Dealer to show you how simple it is with the Kenwell Power Pack to plug into the nearest mains socket and put all dry battery troubles behind you for good!

Listen to the magnificent tone of the Moving-Coil Speaker and you will agree it makes your old Set as good as anything at Radiolympia.

Your Dealer can supply—or write now for illustrated folder describing this money-saving and efficient Power Pack.

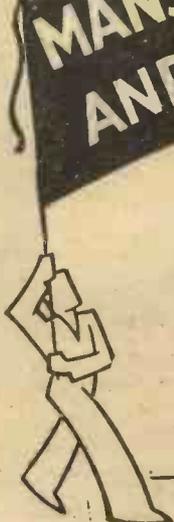
SPECIFICATION OF AC/U MODEL

- H.T. 80 v. and 150 v. (fixed) 0-100 v. (variable) 25 m/a.
- L.T. Trickle Charger at .25 amp.
- G.B. 5 Tappings: 1½, 3, 4½, 9, and 15 v.
- Mains energised moving-coil speaker.
- Price £8 15s. 0d. Other models on request.

KENWELL RADIO, LTD.
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TELSEN MANSBRIDGE AND MICA CONDENSERS



TELSEN MANSBRIDGE TYPE CONDENSERS

These are made by the most advanced processes from the finest materials it is possible to obtain, and subjected during manufacture to a series of stringent tests under laboratory conditions. They are of the true Mansbridge type, self-sealing, non-inductive, and hermetically sealed. They are offered in two types, the capacities from .01 to 2 microfarad in Bakelite cases, and in blocks of 4, 6 and 8 microfarad in metal cases with soldering tags.

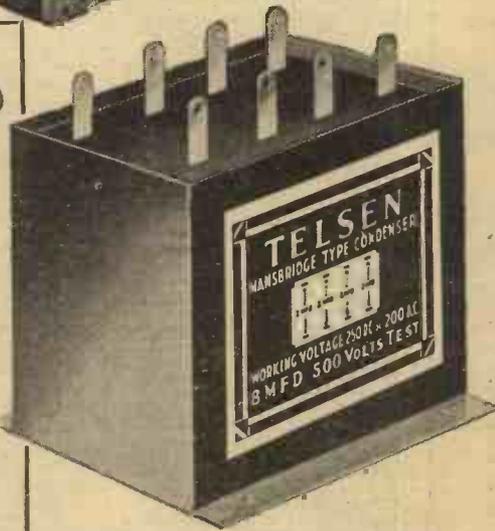
Cap. Mfd.	500 Volt Test No.	Price.	1,000 Volt Test No.	Price.
.01	W.232	1/6	W.239	2/6
.04	W.230	1/9	W.237	2/9
.1	W.231	1/9	W.238	2/9
.25	W.229	2/-	W.236	3/-
.5	W.228	2/3	W.235	3/3
1	W.227	2/3	W.234	3/6
2	W.226	3/-	W.233	5/-



TELSEN TAG CONDENSERS

This type is of extremely compact and sturdy construction. It may be mounted on either insulated or metal panels by utilising the two baseboard screw holes in the neatly designed moulded casing. The tags enable the condenser to be connected to any other component either directly or by soldering. H.F. losses are negligible. The capacity is stamped on the soldering tag.

Capacity.	No.
.0001	W.207
.0002	W.208
.0003	W.209
.0004	W.210
.0005	W.211
.001	W.212
.002	W.213



TELSEN MANSBRIDGE BLOCK CONDENSERS

These are contained in metal cases finished in brown and with fixing holes. As with the other types of Telsen Mansbridge Condensers they are self-sealing, non-inductive and hermetically sealed. Three types, each made having total capacities of 4, 6 and 8 microfarads, each type being divided into 2 microfarad sections, so that several arrangements of capacity may be obtained. Neat and substantial soldering tags are provided for each section.

Cap. Mfd.	500 Volt Test Cat. No.	Price.
4	W.175	5/6
6	W.176	8/-
8	W.177	10/6

1,000 Volt Test Cat. No.	Price.
W.178	9/6
W.179	14/6

TELSEN "MICA" CONDENSERS

The new Telsen "Mica" Condensers represent an important advance in technique: H.F. losses have been practically eliminated even in the larger capacities. In order to distinguish them from the earlier type, now to be discontinued, the new condensers are enclosed in a re-designed case which, while possessing all the adaptability of the previous one as to flat and vertical mounting, is of more attractive appearance. Grid leak clips may, as heretofore, be mounted in series or in shunt, and are supplied at no extra charge with capacities .0001, .0002, and .0003 microfarad.



Cap. Mfd.	No.
.0001	W.240
.0002	W.241
.0003	W.242
.0004	W.243
.0005	W.244
.001	W.245
.002	W.246



.006 W.247 ... 1/3



TELSEN PRE-SET CONDENSERS

Very low minimum capacity, giving a wide range of selectivity adjustment when used in aerial circuit. Substantially made, easily adjusted and provided with locking ring. High insulation and low loss.

Max. Cap. Mfd.	Min. Cap. Mfd.	No.
.002	.00025	W.149
.001	.000052	W.150
.0003	.000016	W.151
.0001	.000005	W.152



TELSEN

RADIO COMPONENTS

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P.P.M. SOUNDEX



27/6

INCLUDING TRANSFORMER

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Wherever a group of men meet at Olympia you will hear them discussing Celestion's latest achievement—the wonderful P.P.M. SOUNDEX—it's the talk of Olympia—everyone agrees that the extraordinary power and tonal quality is really amazing and considering the small size it is beyond belief. If you come to Olympia hear it in the Celestion demonstration room No. 9, or ask your dealer to demonstrate. Insist on the Celestion P.P.M.—it will amaze you.

OLYMPIA
Stand No. 127
Demonstration Room
No. 9

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The Very Soul of Music

Celestion Ltd., London Road, KINGSTON-ON-THAMES. London Showrooms: 108 Victoria Street, S.W.1

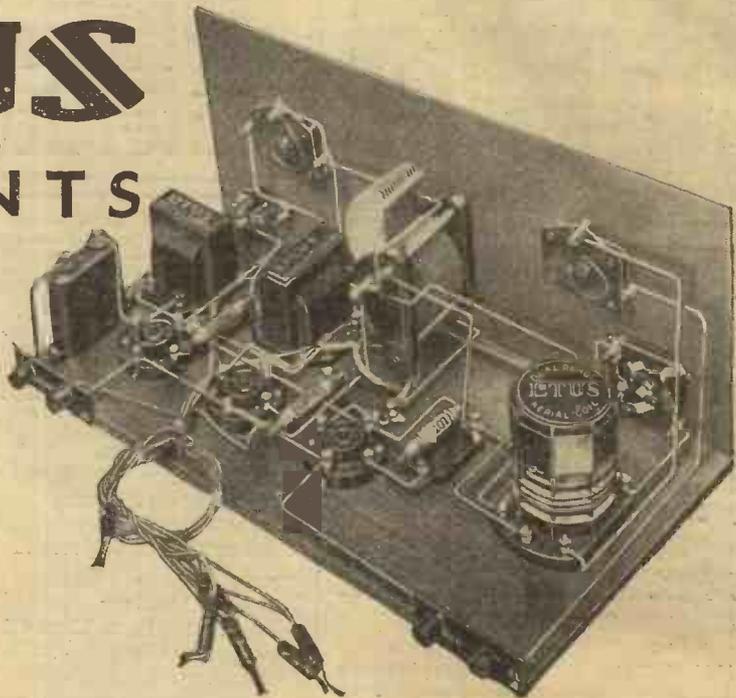
BROADCASTING STATIONS

Broadcasting Stations classified by country and in order of wavelengths. For the purpose of better comparison, the power indicated is that of the carrier wave.

Kilo-Metres	Station and Call Sign	Power (Kw.)	Kilo-Metres	Station and Call Sign	Power (Kw.)	Kilo-Metres	Station and Call Sign	Power (Kw.)
GREAT BRITAIN								
25.53	11,751 Chelmsford (GGSW)	16.0	211.3	1,420 Newcastle	1.0	235.5	1,274 Kristianssand	0.5
214.3	1,400 Aberdeen	1.0	214.3	1,400 Aberdeen	1.0	240	1,249.7 Stavanger	0.5
243.1	1,233.9 Belfast	1.0	243.1	1,233.9 Belfast	1.0	364	824 Bergen	1.0
261.6	1,147 London National	50.0	261.6	1,147 London National	50.0	367.6	816 Fredrikstad	0.7
288.5	1,040 Swansea	0.12	288.5	1,040 Swansea	0.12	493.4	608 Trondheim	1.2
288.5	1,040 Plymouth	0.12	288.5	1,040 Plymouth	0.12	1,083	277 Oslo	60.0
288.5	1,040 Bournemouth	1.0	288.5	1,040 Bournemouth	1.0	POLAND		
288.5	1,040 Scottish National	50.0	288.5	1,040 Scottish National	50.0	214.3	1,400 Warsaw (2)	1.9
301.5	905 North National	50.0	301.5	905 North National	50.0	235	1,283 Lodz	2.2
309.9	908 Cardiff	1.0	309.9	908 Cardiff	1.0	312.8	959 Poznan	1.5
355.9	843 London Regional	50.0	355.9	843 London Regional	50.0	335	896 Cracow	1.9
376.4	797 Scottish Regional	50.0	376.4	797 Scottish Regional	50.0	380.7	788 Lvov	16.0
398.9	752 Midland Regional	25.0	398.9	752 Midland Regional	25.0	400	734 Katowice	12.0
480	625 North Regional	50.0	480	625 North Regional	50.0	563	533 Wilno	16.0
1,554.4	193 Daventry (Nat.)	30.0	1,554.4	193 Daventry (Nat.)	30.0	1,411.8	212.5 Warsaw	120.0
AUSTRIA								
218	1,373 Salzburg	0.5	218	1,373 Salzburg	0.5	PORTUGAL		
245.9	1,220 Linz	0.5	245.9	1,220 Linz	0.5	241.6	1,241.8 Oporto	0.25
283	1,058 Innsbruck	0.5	283	1,058 Innsbruck	0.5	282.2	1,063 Lisbon (CT1AA)	2.0
352.1	852 Graz	7.0	352.1	852 Graz	7.0	ROMANIA		
453.2	662 Klagenfurt	0.5	453.2	662 Klagenfurt	0.5	304	761 Bucharest	12.0
518	579.1 Vienna	15.0	518	579.1 Vienna	15.0	RUSSIA		
also on 1,252.6 m. from 7 p.m. (Mon., Wed., Sat.)								
BELGIUM								
207.3	1,447 Franchimont	0.2	207.3	1,447 Franchimont	0.2	351	855.5 Leningrad (RV70)	20.0
208.3	1,440 Antwerp	0.4	208.3	1,440 Antwerp	0.4	358	838 Moscow (Exp.)	15.0
210.1	1,428 Liege (Seraing)	0.15	210.1	1,428 Liege (Seraing)	0.15	385	779 Stalino (RV20)	15.0
215.3	1,393 Chatelineau	0.2	215.3	1,393 Chatelineau	0.2	389.6	770 Archangel	10.0
215.4	1,392.5 Bruxelles	0.2	215.4	1,392.5 Bruxelles	0.2	470	630.2 Sebastopol	10.0
Conference								
215.5	1,392 Liege	0.1	215.5	1,392 Liege	0.1	502.4	579 Nijni Novgorod	10.0
230.3	1,304 Radio Wallonia	0.3	230.3	1,304 Radio Wallonia	0.3	644	465.8 Kazan (RV17)	10.0
239.5	1,258 Binche	0.3	239.5	1,258 Binche	0.3	720	416.6 Moscow (PTT)	20.0
240.2	1,249 Liege (Exp.)	0.1	240.2	1,249 Liege (Exp.)	0.1	825	363.6 Sverdlovsk (RV5)	50.0
245.9	1,220 Radio Schaarbeek	0.3	245.9	1,220 Radio Schaarbeek	0.3	848.7	353.5 Rostov (Don)	20.0
268.5	1,177 Liege (Cointe)	0.4	268.5	1,177 Liege (Cointe)	0.4	882	340 Saratov	20.0
337.8	888 Brussels (No. 2)	15.0	337.8	888 Brussels (No. 2)	15.0	937.5	320 Kharkov (RV4)	25.0
509	590 Brussels (No. 1)	15.0	509	590 Brussels (No. 1)	15.0	967.7	310 Alma Ata	10.0
BULGARIA								
318.8	941 Sofia (Rodno Radio)	1.0	318.8	941 Sofia (Rodno Radio)	1.0	1,000	300 Leningrad	100.0
CZECHO-SLOVAKIA								
58	5,172 Prague	0.5	58	5,172 Prague	0.5	1,034	290 Kiev	100.0
249.6	1,201.8 Prague (2)	5.0	249.6	1,201.8 Prague (2)	5.0	1,071.2	280 Tiflis (RV7)	100.0
263.8	1,137 Moravska	11.0	263.8	1,137 Moravska	11.0	1,106	271.2 Minsk (RV10)	35.0
Ostrava								
279.3	1,073.6 Bratislava	14.0	279.3	1,073.6 Bratislava	14.0	1,116	268.5 Moscow Popoff	75.0
293	1,022 Kosice	2.5	293	1,022 Kosice	2.5	1,171.5	256 Taschkent	25.0
341.7	878 Brunn (Bruno)	35.0	341.7	878 Brunn (Bruno)	35.0	1,260	278 Bakou	35.0
488.6	614 Prague	120.0	488.6	614 Prague	120.0	1,304	270 Moscow (Trades Unions)	165.0
DENMARK								
281	1,060 Copenhagen	0.75	281	1,060 Copenhagen	0.75	also on 50 m. (6,000 Kcs.)		
1,153	260 Kalundborg	7.5	1,153	260 Kalundborg	7.5	1,380	217.4 Novosibirsk	100.0
also on 31.51 m. (9,520 Kcs.)								
ESTONIA								
298.8	1,004 Tallinn	11.0	298.8	1,004 Tallinn	11.0	1,815	232.5 Moscow KV1	100.0
465.8	644 Tartu	0.5	465.8	644 Tartu	0.5	also on 46.6 m. (6,438 Kcs)		
FINLAND								
291	1,031 Tampere	1.0	291	1,031 Tampere	1.0	1,000	187.5 Irkutsk (RV14)	10.0
291	1,031 Viipuri	13.0	291	1,031 Viipuri	13.0	SPAIN		
368.1	815 Helsinki	13.2	368.1	815 Helsinki	13.2	252.3	1,193 Barcelona (EAJ15)	6.0
1,796	167 Lahti	54.0	1,796	167 Lahti	54.0	267.6	1,121 Valencia	8.0
FRANCE								
220	1,363.2 Béziers	0.5	220	1,363.2 Béziers	0.5	348.9	860 Barcelona (EAJ1)	8.0
226.8	1,324 Fécamp	10.0	226.8	1,324 Fécamp	10.0	368.1	815 Seville (EAJ5)	1.5
237.2	1,265 Bordeaux	2.0	237.2	1,265 Bordeaux	2.0	411.2	729 Madrid (EAJ7)	2.0
Sud-Ouest								
249.5	1,202.4 Juan-les-Pins	0.5	249.5	1,202.4 Juan-les-Pins	0.5	424.3	707 Madrid (Espana)	2.0
255	1,175 Toulouse (PTT)	1.0	255	1,175 Toulouse (PTT)	1.0	456.6	557 San Sebastian (EAJ8)	0.6
265.4	1,130 Lille (PTT)	1.3	265.4	1,130 Lille (PTT)	1.3	SWEDEN		
271.4	1,105 Rennes	1.3	271.4	1,105 Rennes	1.3	231	1,301 Malmö	1.2
286	1,040.1 Montpellier	0.8	286	1,040.1 Montpellier	0.8	257	1,166 Horby	10.0
291.7	1,028 Radio Lyons	10.0	291.7	1,028 Radio Lyons	10.0	308.5	972 Falun	0.5
293.7	1,021.5 Limoges (PTT)	0.5	293.7	1,021.5 Limoges (PTT)	0.5	321.9	932 Göteborg	10.0
304.9	984 Bordeaux (PTT)	13.0	304.9	984 Bordeaux (PTT)	13.0	435.4	689 Stockholm	55.0
309.9	968 Radio Vitus	1.0	309.9	968 Radio Vitus	1.0	541.5	554 Sundsvall	10.0
(also on 43.75 m. (6,865 Kcs.)								
315	950 Marseilles	1.6	315	950 Marseilles	1.6	770	389 Ostersund	0.6
328.2	914 Poste Parisien	60.0	328.2	914 Poste Parisien	60.0	1,229.5	244 Boden	0.6
345.2	869 Strasbourg (PTT)	11.5	345.2	869 Strasbourg (PTT)	11.5	1,348	232.5 Molata	30.0
and 32.26 m. (9,309 Kcs.)								
GERMANY								
19 737	15,200 Zeesen (DJB)	8.0	19 737	15,200 Zeesen (DJB)	8.0	SWITZERLAND		
31 38	9,560 Zeesen (DJA)	8.0	31 38	9,560 Zeesen (DJA)	8.0	244.1	1,229 Basle	0.65
217	1,382 Königsberg	0.9	217	1,382 Königsberg	0.9	245.9	1,220 Berne	0.5
227.4	1,319 Flensburg	0.5	227.4	1,319 Flensburg	0.5	403	743 Sötlens	25.0
232.2	1,292 Kiel	0.25	232.2	1,292 Kiel	0.25	459.4	653 Beromünster	60.0
238.9	1,256 Nürnberg	2.0	238.9	1,256 Nürnberg	2.0	700	395 Geneva	1.25
245.9	1,220 Cassel	0.25	245.9	1,220 Cassel	0.25	TURKEY		
253.1	1,185 Gleiwitz	5.0	253.1	1,185 Gleiwitz	5.0	1,230	250 Istanbul	5.0
259.3	1,157 Leipzig	2.0	259.3	1,157 Leipzig	2.0	1,538	295 Ankara	7.0
289.8	1,122 Bremen	0.2	289.8	1,122 Bremen	0.2	YUGOSLAVIA		
270.5	1,085 Heilsberg	60.0	270.5	1,085 Heilsberg	60.0	307	977 Zagreb (Agram)	0.75
283.6	1,058 Magdeburg	0.5	283.6	1,058 Magdeburg	0.5	430.4	697 Belgrade	2.5
283.6	1,058 Berlin (E)	0.5	283.6	1,058 Berlin (E)	0.5	574.7	522 Ljubljana	5.2
283.6	1,058 Stettin	0.5	283.6	1,058 Stettin	0.5			
318.8	941 Dresden	0.25	318.8	941 Dresden	0.25			
325	923 Breslau	60.0	325	923 Breslau	60.0			
360.6	832 Muhlacker	60.0	360.6	832 Muhlacker	60.0			
372.2	806 Hamburg	1.5	372.2	806 Hamburg	1.5			
389.6	770 Frankfurt	1.5	389.6	770 Frankfurt	1.5			
389.6	770 Leipzig (testing)	120.0	389.6	770 Leipzig (testing)	120.0			
419.9	716 Berlin	1.5	419.9	716 Berlin	1.5			
453.2	662 Danzig	60.0	453.2	662 Danzig	60.0			
472.4	635 Langenberg	1.5	472.4	635 Langenberg	1.5			
532.9	563 Munich	0.5	532.9	563 Munich	0.5			
559.7	536 Kaiserslautern	1.5	559.7	536 Kaiserslautern	1.5			
559.7	536 Augsburg	0.3	559.7	536 Augsburg	0.3			
560	530 Hanover	0.3	560	530 Hanover	0.3			
569.3	527 Freiburg	0.25	569.3	527 Freiburg	0.25			
1,020	185 Norddeich KVA	10.0	1,020	185 Norddeich KVA	10.0			
1,634.9	182.5 Zeesen	60.0	1,634.9	182.5 Zeesen	60.0			
2,525	119.3 Königswusterhausen (press)	15.0	2,525	119.3 Königswusterhausen (press)	15.0			
2,900	103.5 Hausen	15.0	2,900	103.5 Hausen	15.0			
4,000	75 ditto	15.0	4,000	75 ditto	15.0			
HOLLAND								
296.1	1,013 Huizen	8.5	296.1	1,013 Huizen	8.5			
1,071.4	230 Scheveningen-Haven	10.0	1,071.4	230 Scheveningen-Haven	10.0			
1,875	160 Hilversum	8.5	1,875	160 Hilversum	8.5			
HUNGARY								
208.5	1,433.4 Budapest (2)	3.0	208.5	1,433.4 Budapest (2)	3.0			
210	1,430 Magyazovar	1.5	210	1,430 Magyazovar	1.5			
550	545 Budapest (1)	13.5	550	545 Budapest (1)	13.5			
also relayed on 75 m.								
ICELAND								
1,200	250 Reykjavik	21.0	1,200	250 Reykjavik	21.0			
IRISH FREE STATE								
222.9	1,344.6 Cork (6CK)	1.2	222.9	1,344.6 Cork (6CK)	1.2			
416.2	720.7 Dublin	1.2	416.2	720.7 Dublin	1.2			
413	725 Athlone (tests)	60.0	413	725 Athlone (tests)	60.0			
ITALY								
25.4	11,870 Rome (2RO)	15.0	25.4	11,870 Rome (2RO)	15.0			
247.7	1,211 Trieste	10.0	247.7	1,211 Trieste	10.0			
269.2	1,115 Bari (testing)	20.0	269.2	1,115 Bari (testing)	20.0			
273.7	1,096 Turin (Torino)	7.0	273.7	1,096				

NO GUESSWORK WITH LOTUS COMPONENTS

With the aid of the simple point-to-point wiring chart and full-size print, anyone can construct the LOTUS LANDMARK THREE in an hour or so, and, in addition to being easy to construct, the LOTUS LANDMARK THREE has been designed for easy tuning. It is very compact and includes the world-famous LOTUS Components, which, for many years, have been acknowledged as unequalled for efficiency and reliability, every one being GUARANTEED. By following the simple instructions supplied you will be able to enjoy the pick of the British and Continental broadcasts on a set you have built yourself.



LANDMARK 3 KIT SET 3 39'6

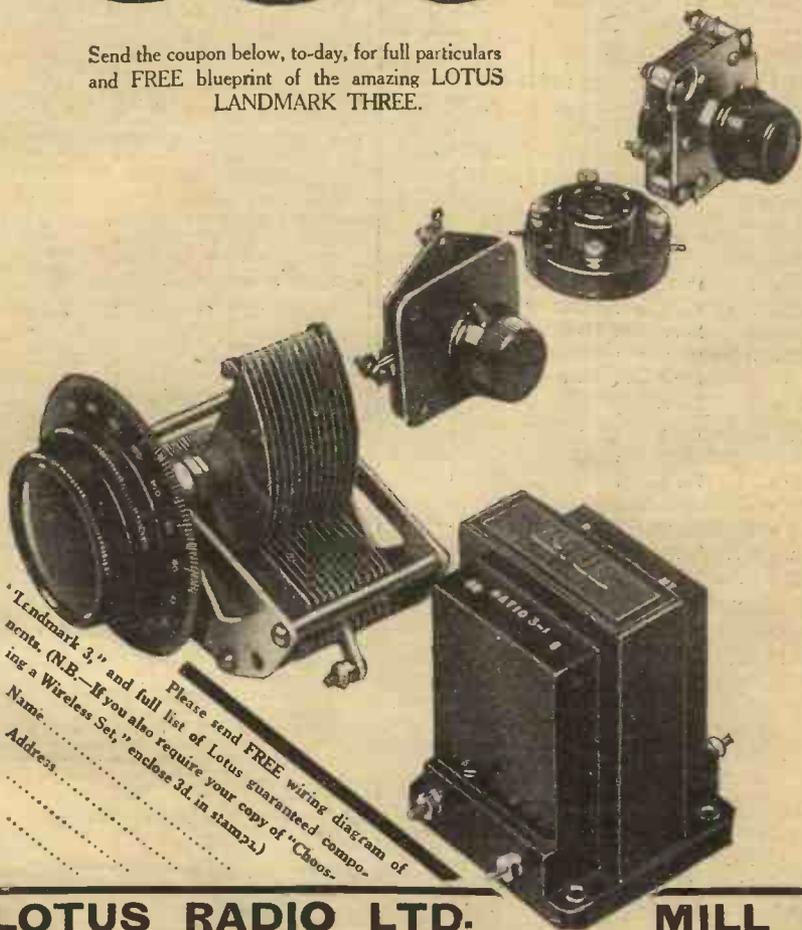
Send the coupon below, to-day, for full particulars and FREE blueprint of the amazing LOTUS LANDMARK THREE.

LOTUS GUARANTEED COMPONENTS

All the components in the "Landmark 3" Kit Set are obtainable separately, in addition to a big range of other components available. All are of the famous Lotus "Guaranteed" standard of quality and efficiency.

Here are a few of them:—

D.R.60 H.F. Coil	5/6	Slow-Motion Condenser	6/6
D.R.50 Aerial Coil	5/6	Direct Drive Condenser	3/6
2-gang Condenser	19/9	Differential Condenser	4/6
3-gang Condenser	29/6	Reaction Condenser	4/-
Output Choke	5/6	Disc Drive	5/-
R.F. Choke	2/6	Universal Switch	1/6
L.F. Transformer No. 1	5/6	Valve Holders,	from 6d.
L.F. Transformer No. 2	7/6	Jack Switch JS8	from 1/6
A.F. Power Choke	15/-		



"Landmark 3," and full list of Lotus guaranteed components. (N.B.—If you also require your copy of "Choosing a Wireless Set," enclose 3d. in stamps.)

Please send FREE wiring diagram of

Name.....

Address.....

LOTUS RADIO LTD.

MILL LANE - LIVERPOOL

FREE! RESISTANCE CALCULATION CHART STAND 273

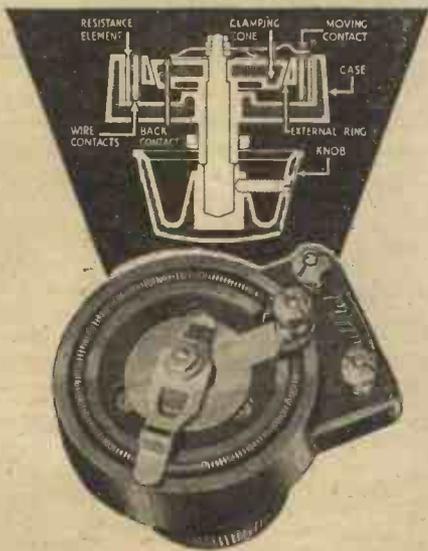
When visiting our Stand ask for a free copy of the *Watmel* Resistance Calculation Chart.

WATMEL POTENTIOMETERS AND RESISTANCES

The 1932-33 Series of *Watmel* Potentiometers and Resistances will also be on view and we should like you to see the novel and advanced ideas used in the construction of our Type 3 Non-Inductive Resistance.

This new All-British Resistance is guaranteed to give a far steadier performance than resistances constructed on old and obsolete principles. **Price 4/6**

Trade Enquiries invited.



Don't forget **STAND 273**



WATMEL WIRELESS CO., LTD.,
Imperial Works, HIGH STREET, EDGWARE,
Telephone: Edgware 0323

M.C.70

Postcard Radio Literature

GET THESE CATALOGUES FREE

Here "Observer" reviews the latest booklets and folders issued by well-known manufacturers. If you want copies of any or all of them **FREE OF CHARGE**, just send a postcard giving the index numbers of the catalogues required (shown at the end of each paragraph) to "Postcard Radio Literature," "AMATEUR WIRELESS," 58/61, Fetter Lane, E.C.4. "Observer" will see that you get all the literature you desire. Please write your name and address in block letters.

Ekco Consolettes

THERE are four consolettes in the new Ekco range—combined sets and speakers working direct from the mains. One of these is a super-het. and interesting details of all models are given in the new Ekco folder. **818**

For Set Builders

Handy terminal blocks have just been produced by Ward & Goldstone. They have many advantages over existing types and I advise set builders to get details of these and the other new parts for set construction. **819**

Telsen Sets

Apart from a wide range of new components, Telsen have some fine new kit sets. Full details are available free through my Catalogue Service. **820**

Parafeed and Antinodal

The Parafeed coupling units and Antinodal short-wave adaptors produced by R.I. will interest set builders. Why not put your name down now on the Free Mailing List for details of these and other new R.I. products? **821**

Igranic Details

Pentode and output chokes, variable condensers and screened dual-wave coils are among the new Igranic parts, while the Igranic permanent-magnet moving-coil speaker just introduced will interest all set users. Full technical details are given in new Igranic literature. **822**

A Westinghouse Photo Cell

An inexpensive photo cell has just been produced by Westinghouse. This new cell, the type PA1, costs only £2, and I am sure it will appeal to television and home-talkie enthusiasts. A new folder describes it and its applications. **823**

New Belling-Lee Parts

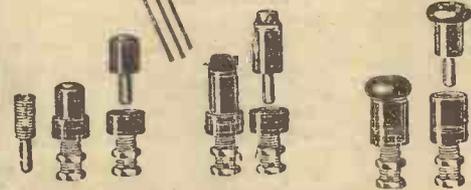
You will find some interesting new components in the Belling-Lee range, new anode connectors, twin socket strip wander fuses, panel-mounting fuse holders, and so on. Get your name put down through my Catalogue Service for the latest literature so soon as it is available. **824**

Bryce Mains Transformers

If you are contemplating making up any mains-drive apparatus, you should get the new Bryce catalogue which describes a wide range of mains transformers and smoothing chokes. **OBSERVER. 825**



The successes that Eelex products have gained in the wireless industry prove without a doubt that for absolute reliability you cannot do better than insist upon components and accessories bearing the name Eelex.



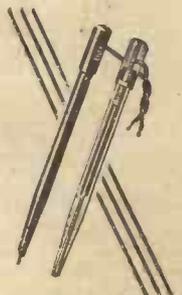
ALL-MAINS PLUGS AND SOCKETS

2 DM Type S. 2 DW Type S. MPS Type.
Types 2 DWS and 2 DMS in six colours.
Plugs, 2d. Sockets, 2d.
Series MPS in red and black only.
Plugs, 4d. Sockets, 2d.

EELIX TESTING PRODS

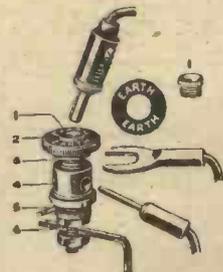
For looking for faults in your set without the danger of shorting or burning out valves, a pair of Eelex Testing Prods are invaluable—the connecting points are enclosed in red and black insulated handles and only come into operation when required.

Price per pair, 3/6.



EELIX TREBLE-DUTY TERMINAL

The new and improved Eelex Treble-Duty Terminal will be found to be very useful in any home-constructed set. 40 different indicating tops all interchangeable and supplied—the head cannot come off. This terminal can take three different connections. Price 4½d. each



Write for List B23

J. J. EASTICK & SONS,

Eelex House,

118 Bunhill Row,

LONDON : : E.C.1

Phone: Metropolitan 0314/5/6-



WHERE
COMPACTNESS,
EFFICIENCY and
PRICE COUNT . . .
USE

DUBILIER

TYPES 665 and 670
CONDENSERS

In every respect—save size and price—Dubilier type 665 and 670 are big condensers. The same high-grade materials, the same irreproachable finish and workmanship, the same exhaustive testing are all features of the 665's and 670's just as they are the characteristics of the more bulky Dubilier Condenser. The Type 665 and 670 are designed to fill the bill where chassis space is at a premium, where smallness of size must go with efficiency and utter dependability.

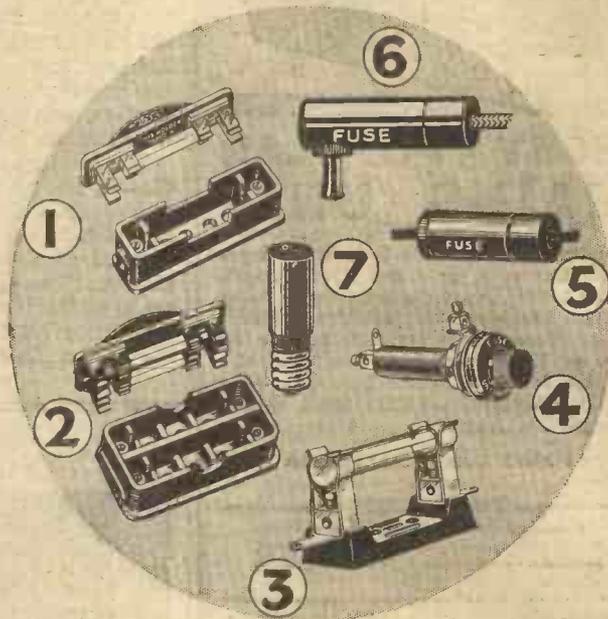


Dubilier type 665 and 670 condensers are available in all popular capacities at prices ranging from 6d. to 1/6.



**DUBILIER
CONDENSER
CO. (1925) LTD.,**
Ducon Works, Victoria
Road, North Acton,
London, W.3

FUSE HOLDERS Programme 1932-33



- 1 SINGLE SAFETY BASEBOARD FUSE-HOLDER. Fuse carried on lid, making shocks impossible. Complete with 1 amp. fuse 1/6
- 2 TWIN SAFETY BASEBOARD FUSE-HOLDER. Fuses carried on lid rendering shocks impossible. Complete with two 1 amp. fuses 2/6
- 3 SINGLE OPEN FUSE-HOLDER. With 1 amp. fuse 9d.
- 4 PANEL FUSE-HOLDER. For panel mounting. With 1 amp. fuse 1/6
- 5 FLEX FUSE-HOLDER. With 1 amp. fuse 1/-
- 6 WANDER FUSE. With 150 m/a. fuse 1/-
- 7 "SCRUFUSE," Not bulb, not cartridge, yet both! 6d.

5 different colour-coded ratings 60 to 750 m/a.

SPARE FUSES (shown actual size)

LONG FUSE. All ratings, 60, 150, 250, 500, 750 m/a., 1 amp., 2 amp., 3 amp.
SHORT FUSE. For WANDER-FUSE only, 60 and 150 m/a.

Each rating a different colour avoiding possibility of error

Dealers will fit other ratings in any of these holders at the time of purchase.



Advert. of Belling & Lee Ltd., Cambridge Arterial Road, Enfield, Middlesex.

Advertisers Appreciate Mention of "A.W." with Your Order

STAND 13



**OLYMPIA'S
MOST POPULAR
MAINS UNIT**

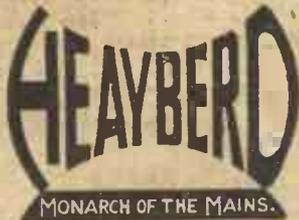
Heayberd's latest Mains Unit is proving a great attraction at Stand 13, Olympia, where a selection of the last thing in Radio Mains Equipment is exhibited. Model D.120 Mains Unit is especially suitable for two or three valve Receivers. Output: 20 m.a. at 120 v. Three tappings: S.G., 60/120 v. Var., 100 and 120 v. fixed. Trickle Charger 2 v. .3 amp.

Price 85/- Complete

—POST NOW—

I enclose 3d. stamps for latest Catalogue of Radio Mains Equipment, packed with technical tips and diagrams.

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10 Finsbury St., London, E.C.2
(One minute from Moorgate Station)

We undertake to solve all Radio Problems, including S/W Transmission and Reception. Whatever your difficulty, write us.

Charges: 3/- per query, four or more 2/6 each, including diagrams.

RADIO TECHNICAL AGENCY,
(Dept. A.W.) 2 Westgate Chambers, Newport, Mon.

NEW EPOCH SPEAKERS

THREE interesting new permanent-magnet speakers and a mains-driven set in a console type of cabinet are produced by the Epoch Radio Manufacturing Co., Ltd., for the new season. The permanent-magnet speakers have integral tapped input transformers, matching up the speaker with the output stage. The popular A2 model has been increased in sensitivity by about 100 per cent., and the sturdy chassis and large-magnet dimensions of the A2 and of the other models ensure long life.

The new Epoch set is built up on a metal chassis, has completely screened coils and condensers and has the tuning control calibrated in wavelengths. A speaker is fitted integral with the set and above the set chassis. The appearance of the complete set is strikingly modern and sets quite a new line in cabinet design.

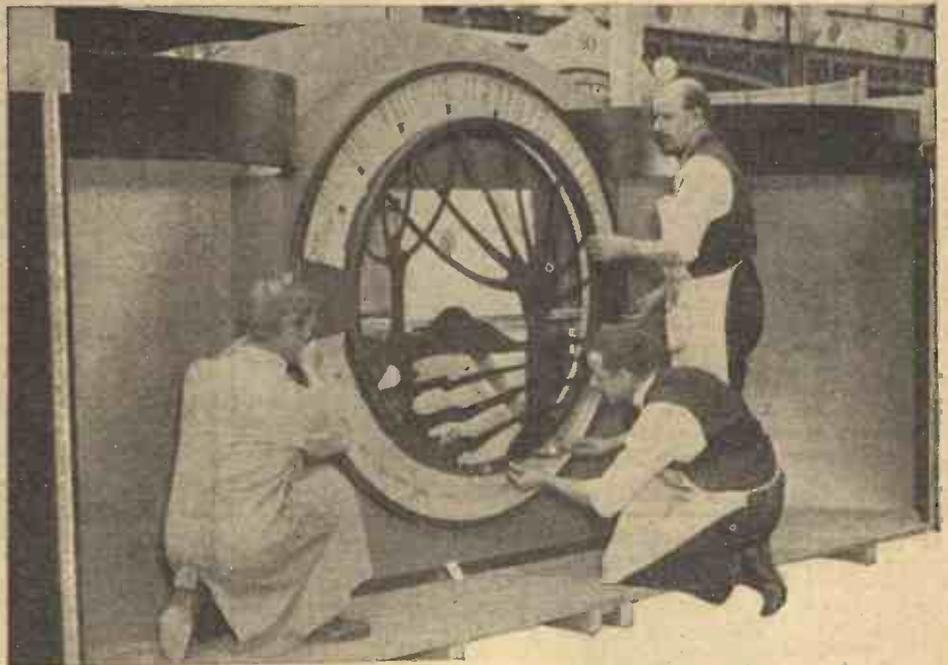
Full details of these new Epoch pro-

ductions can be obtained from the Epoch Radio Manufacturing Co., Ltd., of Exmouth House, Exmouth Street, London, E.C.1.

AN interesting exhibit at Olympia is the model studio in the Exhibition Buildings put up by Messrs. E. K. Cole, Ltd., for demonstrating new Ekco sets. Prominent B.B.C. artistes will give performances several times daily and immediately afterwards records of these items will be played through the new Ekco all-electric sets, so that the public can judge the good quality of reproduction.

It is understood that this is the first time that direct comparison between reproduction and the performance of a living artiste has been invited and it is certainly a good test of the quality achieved by Ekco in the new receivers.

HOW IT WAS BUILT



Putting the finishing touches to the giant station-indicating dial which you will see on the Ekco Stand at Olympia

“NEW SETS FOR OLD”

YOU MUST

have that new set this year and get it at practically half price by purchasing through us, disposing of your old set (if any) at a most generous allowance.

**HUNDREDS OF SATISFIED
CLIENTS WILL ENDORSE THIS**

Just write for particulars, enclosing 1½d. stamp, naming your old set, which we will buy and the new set you fancy and a quotation will follow. Balance payable in cash or hire-purchase.

FREE Wireless Set, to introduce the Radialaddin Club.

Please forward this **INQUIRY FORM** (without obligation):
I am interested in purchasing the undermentioned Radio Receiver:

Make..... Model and list price.....

Present set: Make..... Batteries or mains.....

Date of purchase..... Original cost of set.....

Balance of purchase price would be payable by me as follows:

Plan A. Whole of balance in cash.
Plan B. Whole of balance over (six, nine, twelve* months).
* Delete unwanted words.

NAME (in full)
Block Letters.

ADDRESS

RADIALADDIN, Limited

THE LARGEST RADIO EXCHANGE DEALERS IN THE UNITED KINGDOM

(Dept. A.W.), 47-48 Berners Street, London, W.1. Museum 1821.

A NEW RECORD CHANGER

A NEW automatic record changer has been produced by the Garrard Engineering & Manufacturing Company, Ltd. This is mounted up on an all-metal chassis and handles eight 10- or eight 12-in. records. The chassis incorporates electric turntable drive, pick-up, the automatic record-changing mechanism and the controls, such as the speed regulator and record rejector switch.

The records are supported on three prongs and arms, rotated by a large cam, which allow the records to drop one by one on to the centre turntable. The cam also moves the pick-up clear of records and raises



The Garrard electric gramophone motor with automatic record changer

it step-by-step as each record drops. The arms are easily adjustable for handling 10 or 12-in. records and there is a control to reject any record.

Extreme simplicity is a feature of the new Garrard record changers and as it is self-contained on its metal baseplate, it can be fitted into most radiograms without alteration to the existing cabinet arrangement.

Details can be obtained free on mention of "A.W." from The Garrard Engineering & Manufacturing Company, Ltd., Newcastle Street, Swindon, Wilts.

CHRISTOPHER STONE AT OLYMPIA

A NUMBER of people prominent in broadcasting, are assisting in recitals in the Columbia Theatre in the Olympia Annexe during the show. Mr. Christopher Stone is presiding at recitals every day, together with Mr. John Macdonell, who was connected with the B.B.C. Surprise Items. Other "favourites" by radio and record will be Clapham and Dwyer, Flotsam and Jetsam and Debroy Somers.

In the Polar announcement on page 193 of "A.W." for August 13, the Polar Star three-gang condenser was incorrectly stated to have a capacity of 5,000 per section. This should, of course, be .0005-microfarads per section. Full details are given of these new Star gang condensers in the Polar catalogue, copies of which can be obtained from Messrs. Wingrove & Rogers, Ltd., 188-9, Strand, W.C.2.

The Belfast Wireless Exhibition this year will be opened on September 14, and the B.B.C. has arranged to lend the new model of Broadcasting House, which will first be seen at Olympia. On September 10, Captain R. L. Henderson is coming to the microphone to tell listeners something of the plans and preparations of the organisers of the exhibition

New Times Sales Co

NEW 1933 RADIO ON EASIEST OF EASY TERMS

QUICKEST DELIVERY

MANUFACTURERS' KITS

- RADIO FOR THE MILLION "STATION MASTER 3" (Model B).** With valves, cabinet and speaker as advertised. Cash price, £7/10/-. Balance in 11 monthly payments of 14/-. **10/-** order
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- R. & A. "BANTAM" PERMANENT-MAGNET MOVING-COIL SPEAKER** with 3-ratio input transformer. Cash price £1/7/6. Balance in 5 monthly payments of 5/- **5/-** order
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- ATLAS ELIMINATOR, Type A.C.244.** Three tapings, S.G., detector and power. Output, 120 volts at 20 m/A. Cash price, £2/19/6. Balance in 11 monthly payments of 5/6. **5/6** order
- ULTRA IMP PERMANENT MAGNET MOVING-COIL SPEAKER,** with input transformer. Cash price £1/17/6. Balance in 5 monthly payments of 6/10. **6/10** order
- EPOCH "20 C" PERMANENT MAGNET MOVING-COIL SPEAKER.** With 3-ratio input transformer. This speaker will handle up to 5 watts. Cash price, £1/15/-. Balance in 5 monthly payments of 6/6. **6/6** order
- E.KCO H.T. UNIT, Type A.C.25.** For multi-valve sets requiring up to 25 m/a, 3 tapings, S.G., detector and 120/150 volts. For A.C. mains. Cash price, £3/17/6. Balance in 11 monthly payments of 7/1. **7/1** order

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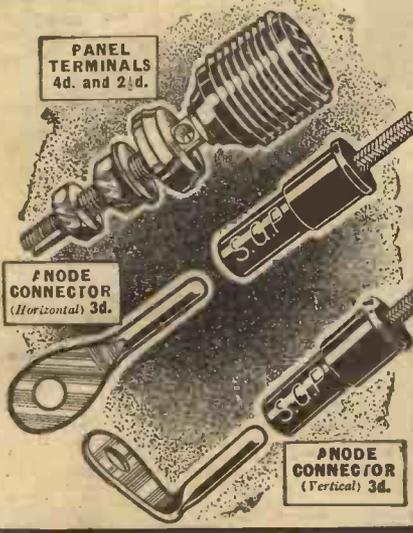
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THE "VOICE OF THE WORLD"

READERS of AMATEUR WIRELESS can obtain at the Gramophone Company's Stand at Olympia (No. 55), free tickets to view one of the finest impressionist films yet produced. New Era Productions have produced the talkie and as a token of acknowledgement of the help given by H.M.V. in allowing the producers access to their works and studios, the New Era people have given permission for the film to be shown at Olympia before it is generally released throughout the country.

Arthur Elton, a brilliant young producer, was responsible for the film production which features the London Symphony Orchestra conducted by Dr. Malcolm Sargent, Ambrose and his band, Florence Austral, Peter Dawson, Mabel Constanduros and Claude Hulbert.

"Voice of the World" is the first of a series of films in which an endeavour is to be made to translate to the screen some of the wealth and romance which is to be found in everyday life. The main idea of the film is to convey the story of an industry which is only ten years old. One is able to gain an impression of the vast machinery and organisation necessary for the production of radio receivers and accessories. The intricate way in which the receiver chassis is built-up and tested at every stage is shown step by step.

The talkie, which has a running time of thirty-six minutes is 3,100 feet long, although over 50,000 feet of film was used in the hundreds of shots taken. The London Symphony Orchestra is the first full-size orchestra to be filmed in this country.

A LIGHTNING SAFEGUARD

A NOVEL aerial lead-in which also acts as a lightning safeguard and as a protection against static discharge is the Pressland Aerial Control Cop. It also incorporates a sliding plunger working in a sleeve in the lead-in tube, by means of which selectivity can be controlled and the volume varied. The device being a series-aerial condenser contained within the tube. This handy multi-purpose lead-in tube costs only 2s. 6d. in a 6-in. size.

Visitors to Olympia should note that the new Micro Perophone & Chromogram, Ltd., cabinet is shown by Messrs. Simpsons Electricals, Ltd. This cabinet is to be supplied complete with the Simpsons' electric gramophone drive, the new Limit pick-up, and with or without a loud-speaker. There is room enough for the cabinet to take any all-mains set of about four-valve size. Details can be obtained from Micro Perophone & Chromogram, Ltd., of 76 and 78 City Road, E.C.1.

TEKADE DEMONSTRATION ROOMS

Large show and demonstration rooms at 67 Hammersmith Road, London, W., have been taken by Tekade Radio & Electric, Ltd., for the duration of the Show. These demonstration rooms are exactly opposite the Empire Hall and all types of motor speakers and sets incorporating these speakers are on show.

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AMPLIFIERS, RECEIVERS AND RADIO GRAMS. Marconi long-wave to 25,000 metres field Set, 6-valve and 4-valve Note Filter, £7. Edison Bell All Mains 2-valve Pentode A.C. Sets, £3 10s. each. Radio Gram, Electramonic A.C., All Mains, B.T.H. Motor, M.C. Speaker, complete with valves, one mahogany, one oak, unused, £22 10s. each. Ultra Twin Cub 2-valve A.C. All Mains Set, £4 10s. Lissen A.C. Radio Gram Console, £14.

11-Valve Cinema Vertical Amplifiers, fitted for Gramo and Photo Cell, £15. 75 R.C.A. Gramo Scratch Filters, 3/6. R.C.A. Speaker Filters, 3/6. 10 Asbestos Gloves, 7s. 6d. each.

Amplifiers, Mains Igranic A.C., 5-watt, £4; ditto, 24 watts output, £6 10s. Mains Northern Electric H.M.V., 10-watt, £5. Edibell Mike or Gramo A.C. Amplifiers, £4. All less valves.

Battery Sets. Short-wave, 2-valve Burndepf, Mahogany, £3 10s. 2-Valve Oak Alford ditto. 5-valve Battery Transportable, Mahogany, case with valves, £3. G.E.C. Victor III in neat metal cabinet, drum dial, 3-range switch, 200/2,000 metres, new, £2 15s. Fellows Little Giant III in Oak Cabinet, with three matched valves, 35/-, List £8. Ediswan 2-valve sets, 25/6. Portable 5-Valve Sets by Royal Radio, etc. Guaranteed perfect working order, wonderful range and quality, £3 5s. to clear.

MAINS UNITS. Igranic H.T. and L.T., for 110 volt or 220-volt mains, 32/6. H.T. Mains Units, famous British make, 220-volt D.C. 15 m/a., leatherette case, plug and cord 25/-. A.C. Mains Units, 220-volt, 50 cycles, 15 m/a., brand new, 45/-. Pye Universal H.T. Eliminator for portables or sets, £2 7s. 6d., List £5.

PETROL-ELECTRIC GENERATING SETS. 4 1/2 kW, 100 volts 45 amps. Dynamo coupled to 4-cylinder engine with water cooler and regulator. Price £50. 3 1/2 kW., ditto, as new, £40. 2 1/2 kW. 220 volts 12 amps. Dynamo coupled to 2-cylinder Aster 3 1/2 h.p. engine. Price as new, £35. 1 1/2 kW. Twin A.B.C. ditto, 75 volts 25 amps., as new, £30. 1 kW. single-cylinder R.N. Set, 50 volts 10 amps., £18. 0 3/4 kW. Stuart Turner Petrol Electric, 300 watts, £23; 150 watts, £18.

DYNAMOS AND MOTORS. I.K.W. Crompton, 100 volts 10 amps., £6 10s. 10 Crompton 100 volt 3 amps., 35/-. H.T. and L.T., 18 volts 20 amps. and 480 volts 200 m/a., for combined charging of L.T. & H.T. Cells, £6 10s. D.C. 220 volt Crypto Motors 1 h.p., 2,500 r.p.m., £5; 440 volt ditto, 1 h.p., £5 10s. Dynamos, 30 amps. 100 volts, 1,800 revs, £12; 20 amps 100 volts, 1,800 revs., £7 10s.; 10 amps, 100 volts, 1,800 revs., £6 10s.; 4 amps, 100 volts, 1,800 revs., £3. There are a number of 40-amp 8-volt Dynamos which charge up to 35-2-volt or 4-volt cells at once. Enclosed ball bearings. Bargain at £5 10s. D.C. Generators, Shunt wound for charging 6-9 volts, 8 amperes, ball-bearing enclosed. Fitt'd Auto cut-in-out, 25/-, 100 volts 4 amps., ditto, 35/-. 30 volts 15 amps., £5.

DYNAMOS. L. T. Charging. Aero, 12 volts 250 watts, with auto

cut-out, 25/-; W.W., 20 volts 5 amps., 50/-; L., 12 volts 8 amps., 45/-; Ct., 18 volts 8 amps., £5/-; 80 volts 20 amps., £7 10s.; and Four 100 v. motors, 10/-. High Tension Charging Motor Generators. 230 volts A.C. to 100 volts, 100 m/a., D.C., 70/-; H.T. Anode Motor Generators, 100 volts D.C. to 250 volts, 250 m/a., £10. 220 volts D.C. to 400 volts D.C., 200 m/a., £12. G.E.C. and B.T.H. 2-Conn. Aircraft Generators. 950 volts 60 m/a., & 8 volts 5 amp., £5; 600 volts 80 m/a. & 8 volts 3 amp., 22/6. Fine Newton H.T. Generators, 1/2 kW. 2,000 v., £20. Slow Speed Motor Generator, 1 kW., 2,000 volts, £24; 2 kW., 2,000 and 4,000 volts, £30. Large E.V. Megger Hand Generators, 600 volts, £5 15s.

MOTOR GENERATORS. 4 R.C.A., 220 volt to 500 volt, 200 m/a., £5; 3-phase 380 volts to 12 volts 10 amps., and 320 volts 360 m/a., £6; 230 volt A.C. coupled to D.C. 350 volts 300 m/a. and 12 volts 10 amps., £6 10s.; 100 to 240 volts, £4. S.M.D. Co., 12 volts to 800 volts, £4; 220 D.C. to 310 volt 300 m/a. and 12 volts 10 amps., £6; ditto to 480 volts 200 m/a. and 18 volts 20 amps., £6 10s. 200 volts D.C. to 6 amps. 20 volts, £6 10s.; 220 volts D.C. to 400 volts 100 m/a., £5; 220 volts D.C. to 750 volts 200 m/a., £10; 110 volts D.C. to 2,610 volts 500 m/a., £20; 200 volts D.C. to 4,000 volts D.C. 1 amp., £30.

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MOTORS. Vactric, 1/50 h.p. Universal 3,400 r.p.m. 220 v., 17/6. Standard Cables small 3-phase 50-cycle, 30-. E. M. I. Kalee 1/8th h.p., 240 volts D.C., 30/-. Wagner D.C. 1/6th h.p., 220 volts, 35/-; A.C., 1/6th h.p., 40/-. Garrard Electric Power Units for Gramos. Universal Electric Motors with pulley and encl. adj. Resistance, with bakelite panel fitted 12 adjustments, for any mains volt 50 up to 250 volts. List £5 15s. Sale, Motor 20/-; Mains Res., 7/6; or the pair, 25/-.

METERS. 150 3-amp. Battery Testers No. 108 with moving-coil meter and graded Rheo., 12/6. Silvertown astatic horizontal galvos, jewel pivots, 7/-. 40 Sifem polarised Central Zero Ammeters, 3-0-3 amps., 7/-. 3 Recording Graph. Voltmeters by Elliott, £4 10s. Cambridge meters for Promoters to 1,200 cent., 35/-; 3-in. dial 1,500 volt D.C. Moving Coil panel, 35/-. Testing Sets, Elliott, etc., E.108, 4 ranges amps and volts, 45/-. A.C. Hot Wire, 1/2 amp., 5/-, 6 and 110 volts, 5/9. Cell Testers, pocket, 15/-; with spikes, 30/-. Bridges, 10,000-ohm 4-dial Wheatstone, with Galvo, £10. G.P.O. type, £7 10s. Mirror Galvos Reflecting Beam, by Paul Gambrell, Sullivan, and Tinsley, £3 to £10. Standard Resistance Boxes and Universal Shunts, 35/-. Electrostatic Voltmeters to 2,800 volts, £2. 1st grade Moving Coil Meter movements for 5/-; In portable wood case, 7/6, or complete Portable Meters, 12/-; for home make test sets. Record Circscale, as illus., 25/-; Weston & Turner Moving Coil Panel Meters, 0-300 volts, 20/-; 2 1/2-in. dial flush.

DIX-ONEMETERS are 60/- only, a remarkably small price for a meter worth £10 in comparison with others. Latest Model, Mirror Double Scale, Meulded Base. The finest Precision Multi-Measuring instrument is the Dix-Onemeter, the acknowledged Radio Standard beloved by Expert and Amateur. Test Booklet "A" Free.

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WIRE. Lead-covered single 3/029, 7/- 50 yds.; 7/029 ditto, 9/6 per 50 yds. L.C. Twin, 1/064, 12/- per 50 yd. coil; L.C. Twin, 1/044, 16/- per 50 yd. coil. Plain V.I.R. lighting, 1/044 660 meg-5/3 per 100 yds.; 9,000 yards 27/40 Litz for H.F. coils, 1/- per dozen yards. Heavy Mains Flex, for Electric Heaters and Irons, etc., 4/- per doz. yds., post 6d. Twin lighting Flex, 2/- per doz. yds., post 4d. Insulated Earth Cable, 1/6 per doz. yds., post 4d. Lrad-in Cable, rubber-covered, 2/- doz. yards, post 4d. Red and Black Flex, 1/6 per doz. yds., post 3d.

LAMPS. 150 Red and Gold or Black and Gold Chinese 10-in. Lamp Pedestals, 1/6. Festoons, decorative for 230 volts, 14 bulbs and cord, 12/6. Olchems Miners Safety Lamps, 12/6. Solid Brass Barrel or Car Inspection Lamps, 2/6. Compl'te Field Helio with stand and spares, 45/-. Tubes of Argon, Helium, Oxygen and Uranium, 20/- set.

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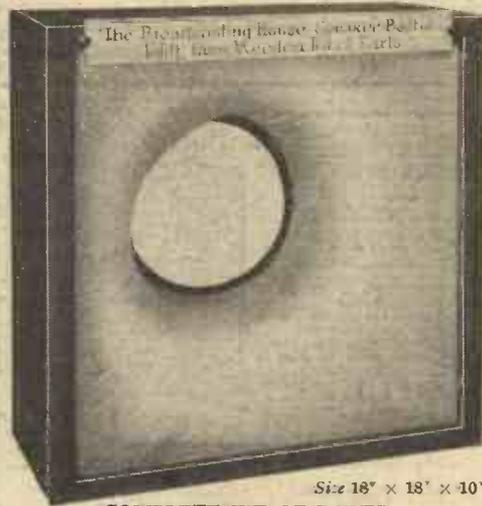
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as described in this week's issue of "Amateur Wireless."

On page 333 of this issue are full constructional details. From this you will see that the box baffle is both simple and inexpensive to build. The speakers using this baffle will be working on the "Amateur Wireless" Stand (No. 7) at the Radio Exhibition at Olympia—go and hear it and judge for yourself. Build your box baffle with a Weedon kit of parts exactly as supplied to "Amateur Wireless" and used on their stand at Olympia.

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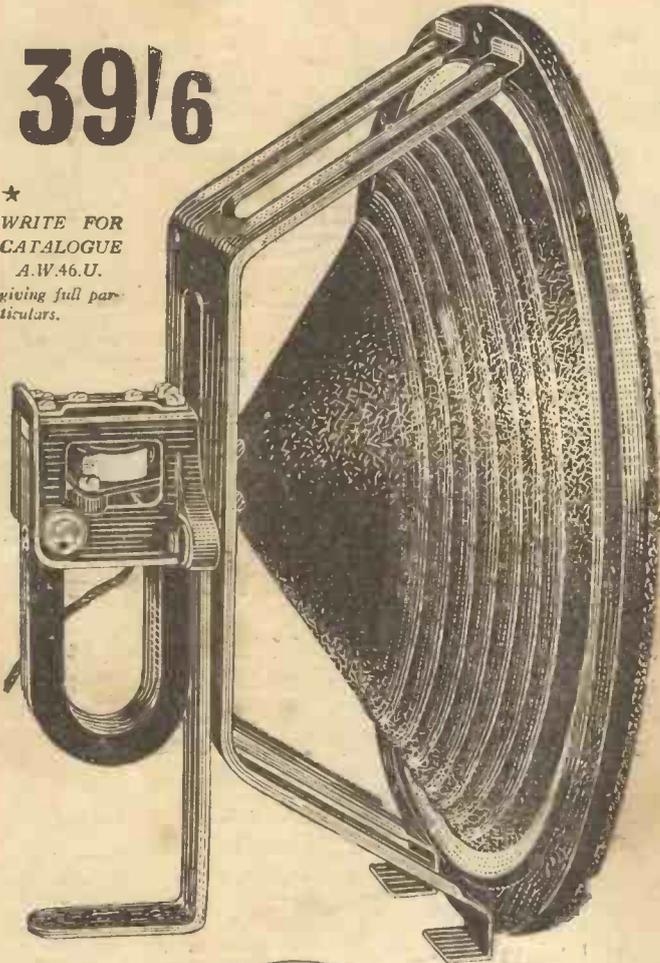
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