OUR SUPPLEMENT—"WIRELESS MADE EASY"

THE COMING SUPER-HET—AND WHAT YOU WILL FIND IN IT

PRACTICAL SHORT-WAVE HINTS & TIPS

# Amateur Wireless

and Radiovision

Every Thursday 3d

Vol. XXI. No. 541 Saturday, October 22, 1932


Registered at the G.P.O. as a Newspaper

Pages 835-836 are missing

# AMAZING DISCOVERY

## 98% RADIO SETS "DOWN" IN EFFICIENCY THROUGH FAULTY GRID LEAKS OR MICA CONDENSERS!

***A RECENT analysis of Kit sets and Home Constructor Receivers reveals the astounding fact that 98% were considerably 'down' in efficiency through faulty Grid Leaks or Mica Condensers. These tests were carried out by one of the foremost Radio Engineers in the Country on sets which the owners thought were working satisfactorily.***

The above facts were brought to the notice of TELSEN Engineers who immediately commenced intensive research and experimental work to discover the causes. Every known make of Grid Leak and Mica Condenser was tested and examined in conjunction with all types of Receivers.

Invaluable information and new data were obtained from these investigations among which were startling revelations concerning the rapid deterioration and consequent loss of efficiency in these components.

The new TELSEN Grid Leaks and Mica Condensers are the direct outcome of this amazing discovery. They have been designed on entirely new lines and embody the new

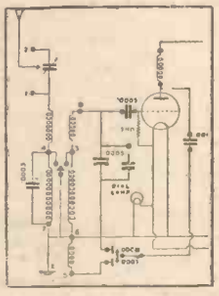

TELSEN FIXED MICA CONDENSER
*(Shown with Grid Leak Clips removed).*

principles formulated by the Telsen Radio Engineers to overcome the numerous faults


Two views of the TELSEN GRID LEAK.

disclosed and to attain permanent efficiency.

### TRY THIS SIMPLE TEST



*Tune in a station at the top of the medium wavelength band—say the Northern Regional. Note the signal level. Now connect a Telsen Mica Condenser (up to .0003 mfd. in value) across the aerial tuning condenser. Decrease the value of the tuning condenser until the same station is heard, and it will be found that the signal strength is equal to that previously obtained, proving that the Telsen Mica Condenser has an efficiency comparable with that of the variable air condenser, the most efficient type of condenser used in radio broadcast reception.*

The new TELSEN Grid Leaks and Mica Condensers set a world's standard in lasting efficiency.

### IT'S THE 'LASTING EFFICIENCY' THAT COUNTS


TELSEN FIXED MICA CONDENSER.
*(Complete with Grid Leak Clips & Grid Leak)*

## WE HEAR

That well over a quarter of a million radio components are produced *every day* in the new Telsen Works (the largest and best equipped radio organisation in the world, employing in the neighbourhood of 8,000 workpeople)—and that even this record output is only barely sufficient to meet the enormous and still rapidly increasing demand for these popularly priced quality components.

★ ★ ★

That enormous numbers of home constructors are fitting the new Telsen Drum Drive and Ganged Condenser Assembly, whose single knob operated tuning scale, calibrated in actual wavelengths, makes station logging literally as easy as A.B.C.

★ ★ ★

That the new Telsen Telornor (illuminated variable ratio slow-motion Disc Drive, whose handsome silver oxidised escutcheon plate permits of the very effective grouping of all controls) gives home-built sets the dignity and beauty of line of expensive commercial radio receivers.

★ ★ ★

That home constructors everywhere are thrilled with the performance of the sensational new Telsen JUPITER S.G.3 and AJAX 3 receivers, and that free 1/- blueprints and constructional details of these amazing sets are given with the Telsen Radiomag No. 3, price 6d.

*Announcement of The Telsen Electric Co., Ltd., Aston, Birmingham.*

# FOR EVERY SET — *there's a*
# PILOT AUTHOR KIT
## CASH — C.O.D — or H.P.

## EVERYTHING RADIO
IMMEDIATE DELIVERY—
CASH, C.O.D. or H.P.

**CARRIAGE PAID TO YOUR DOOR**

**COSSOR MELODY MAKER MODEL 334** with Metallised Variable-mu S.G. and Detector Valves, Power Valve and Cabinet. Cash Price, £6/7/6. Balance in 11 monthly payments of 11/10. — Send 10/- only

**LISSEN "SKYSCRAPER 3."** Chassis model with (Lissen) S.G., Detector and Pentode valves. Cash Price £4/9/6. Carriage paid. — Send 8/3 only
**Balance in 11 monthly payments of 8/3.**

**LISSEN SKYSCRAPER 3.** Cabinet model. Complete with Lissen speaker and Lissen S.G., Detector and Pentode valves. Cash Price £6/5/0. Carriage Paid. Balance in 11 monthly payments of 11/6. — Send 11/6 only

**SLEKTUN SCOUT S.G.3.** S.G., Detector and Power. Pilot Author Kit "A" (less valves and cabinet). Cash or C.O.D., £3/19/6. Carriage Paid. Balance in 11 monthly payments of 7/3. — Send 7/3 only

**W.B. PERMANENT-MAGNET MOVING-COIL SPEAKER P.M.2.** With 3-ratio input transformer. Cash Price £4/5/0. Carriage Paid. Balance in 11 monthly payments of 7/10. — With 7/9 order

**R & A "VICTOR" PERMANENT-MAGNET MOVING-COIL SPEAKER DE LUXE.** With 6-ratio input transformer and protecting grille. Cash Price £3/10/0. Carriage Paid. Balance in 11 monthly payments of 6/5. — With 6/5 order

**EPOCH "20 C" PERMANENT MAGNET MOVING-COIL SPEAKER.** (New Edition). With 5-ratio input transformer. Cash Price £1/15/0. Carriage Paid. Balance in 5 monthly payments of 6/6. — Send 6/6 only

**BLUE SPOT SPEAKER UNIT AND CHASSIS. TYPE 100U.** Cash Price £1/12/6. Carriage Paid. Balance in 6 monthly payments of 5/2. — Send 5/2 only

**BLUE SPOT UNIT AND CHASSIS TYPE 99 PP.M.** Including matched Transformer. Cash Price £2/19/6. Balance in 11 monthly payments of 5/6. — Send 5/6 only

**ATLAS ELIMINATOR. Type A.C.244.** Three tappings. S.G., detector and power. Output: 120 volts at 20 m/a. Cash Price £2/19/6. Carriage Paid. Balance in 11 monthly payments of 5/6. — Send 5/6 only

**EKCO H.T. UNIT. Type A.C.25.** For multi-valve sets requiring up to 25 m/a. 3 tappings, S.G., detector and 120/150 volts. For A.C. mains. Cash price, £3/17/6. Balance in 11 monthly payments of 7/-. — With 7/- order

**EKCO A.C.12 H.T. ELIMINATOR** for A.C. mains. Tapped S.G. 80 v. 120/150 v. at 12 m/a. Cash Price £2/15/0. Balance in 11 monthly payments of 5/-. — Send 5/0 only

**GARRARD INDUCTION GRAMOPHONE MOTOR.** For A.C. mains. Model 202. Mounted on 12-inch nickel motor plate with fully automatic electric starting and stopping switch. Cash Price £2/10/0. Carriage Paid. Balance in 11 monthly payments of 4/7. — Send 4/7 only

**ROLA PERMANENT MAGNET MOVING-COIL SPEAKER F.6.** With universal tapped input transformer. Cash Price £2/9/6. Carriage Paid. Balance in 11 monthly payments of 4/6. — Send 4/6 only

**RADIO FOR THE MILLION "STATION MASTER 3"** (Model A). With valves and cabinet for battery use. Cash Price £5/11/0. Carriage Paid. Balance in 11 monthly payments of 10/2. — Send 10/2 only

## WIZARD

### KIT "A"
As described in Sept. 17 issue. Author Kit of specified parts, including ready-drilled panel, less valves and cabinet.

**76/-** CASH OR C.O.D. CARRIAGE PAID

*Or 12 monthly payments of* 7/-

*Specified Valves* .. .. .. .. £1 : 12 : 3
*Peto-Scott Special Cabinet* .. .. £1 : 0 : 0

### KIT "B"
As Kit "A" above, with valves, but less cabinet.

Cash or C.O.D. Carriage Paid. **£5-8-3**
Or 12 monthly payments of 10/-.

**KIT "C."** As Kit "A" above but complete with valves and cabinet. Cash or C.O.D., Carriage paid, £6/8/3. Or 12 monthly payments of 11/10.

## THE QUALITY 30/- TWO
## PILOT ALTERNATIVE KIT

### KIT "A"
Editor's Kit of recommended parts containing Ready Drilled Ply Panel, less Valves, Speaker and Cabinet.

**30/-** CASH OR C.O.D. CARRIAGE PAID

*Set of Specified Valves* .. .. .. .. 15/9
*Oak Cabinet to Specification* .. .. .. 10/6

**IMPORTANT** *Parts, Kits, Miscellaneous Components, Finished Receivers or Accessories for Cash, C.O.D. or H.P. on our own system of Easy Payments. Send us a list of your wants. We will quote you by return C.O.D. orders value over 10/- sent carriage and post charges paid.*

## PETO-SCOTT WALNUT CABINET SPEAKER

CASH or C.O.D., or by 12 monthly payments of 4/6. **47/6**

**FITTED TO CHOICE BLUE SPOT 100U or Peto-Scott P.M. Moving Coil SPEAKER.**

*In handsome Walnut cabinet with contrasting Walnut inlaid veneers. Hand French polished. Carefully designed of specially chosen wood to provide the perfect acoustic conditions necessary for the correct condition of the upper and lower musical frequencies. Eminently suitable for 3 or 4-valve receivers.*

**IF THE MAKERS CAN DELIVER—PETO-SCOTT WILL SUPPLY IMMEDIATELY**

## 1933 WALNUT ADAPTAGRAM

Convert your Set to a Radiogram with this beautiful inlaid Walnut Cabinet. Supplied with vignette front as illustrated and motor board, ready to take your own Set, Gramophone Motor and Pick-up. Panel 18 in. by 8½in.; Baseboard, 14 in.; Speaker compartment, 17 in. by 19½ in.; overall dimensions, 38½ in. high, 21½ in. wide, 15½ in. deep. Generous accommodation for batteries or mains equipment. Fitted with back. Baffle Board 3/6 extra if required. Model "A" Cash or C.O.D. Easy Terms: 12 monthly payments of 5/9. Carriage and packing 2/6 extra. **63/-**

MODEL "B" with Garrard Double Spring Motor and B.T.H. Combined Pick-up and Volume Control. Cash or C.O.D. 6 guineas, or 12 monthly payments of 12/-. Carriage Paid. **6 GNS.**

MODEL "C" with Collaro Electric Gramophone Unit complete with Pick-up and Volume Control. Cash or C.O.D. 7 Guineas or 12 monthly payments of 13/9. Carriage Paid. **7 GNS.**

**BUILT LIKE A FINE PIANO**

## PILOT BAND-PASS UNIT

Whether your Set is Mains or Battery operated, the PILOT BAND-PASS UNIT cuts out programme interference effectively and sharpens tuning to needle-point selectivity. It is simple to attach and can be operated by anyone without technical knowledge. No valves or extras required, CASH or C.O.D. **25/-** Or 6 monthly payments of 4/6

Instantly converts any Set to Band-pass Tuning with Needle-sharp Selectivity.

## STOP PRESS OFFERS

**W.B. PERMANENT-MAGNET MOVING-COIL SPEAKER. Type PM4.** Complete with transformer. Cash Price £2/2/0. Carriage Paid. Balance in 7 monthly payments of 5/9. — Send 5/9 only

**1932 KELSEY SHORT WAVE ADAPTOR.** Tunes in the Short Wave Stations on your existing Set. Cash or C.O.D. Carriage Paid, £1/19/6. Balance in 7 monthly payments of 5/3. — Send 5/3 only

**READY RADIO KENDALL-PRICE S.G.4.** S.G., Detector, L.F. and Power. Complete kit less valves and cabinet. Cash Price £4/6/6. Carriage Paid. Balance in 11 monthly payments of 8/-. — Send 8/- only

**UNIVOLT ELECTRIC UNIT.** Standard unit with Univolt pick-up, automatic start-and-stop, for A.C. mains, 110/250 v. Cash Price £5/15/6. Carriage Paid. Balance in 11 monthly payments of 10/6. — Send 10/6 only

**GARRARD AUTOMATIC RECORD CHANGER** for A.C. mains. Mounted on unit plate complete ready for fitting in position, including Garrard pick-up and tone-arm. Cash Price £10/0/0. Carriage Paid. Balance in 11 monthly payments of 18/6. — Send 18/6 only

**PETO-SCOTT CO. LTD. 77 City Rd. London, E.C.1.** Telephone: Clerkenwell 9406/7
*West End Showrooms: 62 High Holborn, London, W.C.2.* Telephone: Holborn 3248

Dear Sirs, Please send me CASH/C.O.D./H.P. .....
for which I enclose £.....s. .... d. CASH/H.P. Deposit Also send your FREE 1933 Radio Catalogue.
NAME .....
ADDRESS .....
A.W. 22/10/32.

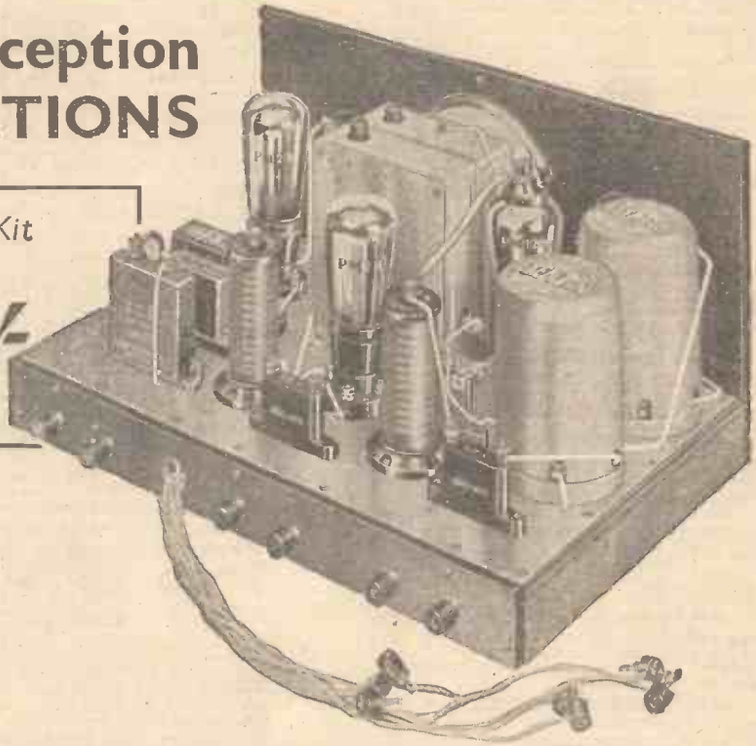
*Buy by Post—it's Quicker*

# Here's the Set for YOU !

## SLEKTUN ★ A Triumph of Simple Construction

# SCOUT S.G.3

## Amazing Reception 40-50 STATIONS



### Kit includes

- ★ The famou Slektun Super Transformer.
- ★ Slektun Dual Range Coils.
- ★ Cyldon Ganged Condenser with Sector Vision Escutcheon.
- ★ T.C.C. Fixed Condensers.

  W.B. Valve Holders and Switches.
- ★ Ready Drilled Panel and Terminal Strip of "Permcol" non-discolorable Ebonite.
- ★ Baseboard Assembly covered with "Konductite" metallic screening material.
- ★ All necessary screws, terminals, connecting wire, wander plugs and flex.

Complete Kit of Parts

**84/-**

### FREE

**Blueprint and Construction Book**

The book of the Scout S.G.3 is the most comprehensive Radio Set Construction book ever printed. Ask your dealer or write for a FREE copy.

**This super set has been designed so that the amateur can build as good a receiver as the radio engineer. All you have to do is to put it together. Every component has been carefully chosen for easy construction and perfect results. Amazing range and selectivity are obtained, and powerful, distortionless performance is assured by the use of Slektun Dual Range Coils and the Slektun Super Transformer. 40-50 stations can be tuned in at full loud-speaker strength—including even Fécamp, a station almost impossible to get with most receivers.**

**The entire set can be built in an evening by anyone—at very moderate cost. Ask your dealer or write for the FREE Constructional Book.**

# SLEKTUN

## QUALITY COMPONENTS

SLEKTUN PRODUCTS, LTD.
21 Douglas Street, Westminster, S.W.1

*—Use this Coupon*

To SLEKTUN PRODUCTS, LTD.
21 Douglas Street, Westminster, S,W,1

Please send me the FREE illustrated Book of the Scout S.G.3, together with the full-size Blue Print. I enclose 1½d. stamp to cover cost of postage

Name.....

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A.W.5 .....

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*To Ensure Speedy Delivery, Mention "A.W." to Advertisers*

# Amateur Wireless & Radiovision

BRITAIN'S LEADING RADIO WEEKLY
FOR CONSTRUCTOR, LISTENER & EXPERIMENTER

EDITOR: BERNARD E. JONES. TECHNICAL EDITOR: J. H. REYNER, B.SC. A.M.I.E.E. RESEARCH CONSULTANT: W. JAMES. ASSISTANT EDITOR: H. CORBISHLEY.


## NEWS & GOSSIP OF THE WEEK

### OUR NEW "SUPER"

THIS week we announce the introduction of an amazing new super-het—a worthy successor to the "Century Super" which broke all records for home constructor sets. The new "Century Super" has been designed by three of the most popular set designers in the country—W. James, Percy W. Harris and Rutherford-Wilkins. An introduction to the set is given on page 837 and next week's issue will be a bumper number, giving the full story of the construction.

### EVERYBODY CAN BUILD IT

SO that everyone will have an opportunity of making up this new super-het, next week's bumper number will contain a profusely illustrated constructional guide. There will be a pictorial diagram of the set and a full-size layout and wiring guide. You can start building the new "Century Super" without even having to buy a blueprint. Make sure of next week's issue. You cannot afford to miss it!

### HENRY HALL'S BAND

ON October 24 Henry Hall's Band is to undergo a change. Three members of the present band are leaving and three newcomers are to take their places. Harry Robins, the versatile drummer and xylophonist, is leaving to take up stage work again, and Henry Hall is now trying to decide which of three "possibles" shall take Robins' place. Another vacancy is caused by the departure of Mr. Denahey, the tenor saxophone player. Additional "pep" will be obtained by including a trumpeter, Mr. A. Williams, in place of the oboe. The new sax. player, Mr. J. Halsall, comes from Billy Cotton's popular band.

### IN THIS ISSUE

*Features You Should Not Miss*



**The Post Office pirate tracking vans are now touring the country, and here one of them is seen with its direction-finding receivers at work outside a row of houses, while a Post Office Inspector examines listeners' licences**

### OTHER DANCE BANDS CHANGING

THIS is the season of change in the dance-band world. We hear that Roy Fox is forming a new band and that his present band at the Monseigneur will be led by the pianist. At the Dorchester there is talk of the Blue Lyres being changed, but nothing is yet decided.

### BOY OBOIST IN VAUDEVILLE

THE boy oboist, Dick Matthews, who has just left the B.B.C. Dance Band owing to the difficulty of scoring numbers specially for his instrument, will appear from time to time as deputy for oboe players in various B.B.C. orchestras. He will also appear before the microphone on November 7 in a vaudeville show.

### MOBILE VAN FOR BELFAST

THE B.B.C. is getting right down to the new Belfast high-power station. The famous mobile test van is on the way to Belfast to seek out the most suitable site. As we have mentioned before, it is proposed to build the new station about fifteen miles south-west of the city. This will make it somewhere in the vicinity of Mount Divis, which is 1,500 feet above sea level. We think the power will be between 50 and 70 kilowatts.

**NEXT WEEK: THE "NEW CENTURY SUPER"—YOU CAN'T AFFORD TO MISS IT!**

# NEWS & GOSSIP OF THE WEEK—*Continued*

## INSTALLING THE NEW ORGAN

NEXT month the B.B.C. will be installing the large organ specially built for the Concert Studio at Broadcasting House. There will be a movable console on the stage. A very interesting point will be the remote console fitted up in another studio, to allow the organist to hear what his playing sounds like through a loud-speaker.

## AN AERIAL BLOWN DOWN

THERE is one of the tallest wooden masts in the world at Breslau, the latest station in the German Regional scheme. This carries a vertical aerial—or, at least, it did until recently, when heavy storms during the last ten days caused extensive damage to the wooden tower! This explains why Breslau, although a 60-kilowatter, has been a weaker signal of late. It is working with a temporary aerial.

## A BUSY PLAYWRIGHT

MR. L. DU GARDE PEACH is very active in the service of broadcasting at present. In addition to the script of one of the "star" programmes of B.B.C. birthday week, *Communications*—1922-1932, he has written a new radio play, *Nor' West*. This mystery of the sea is to be, according to the Productions Director's forecast, a close rival of the same author's *The Marie Celeste*, which has been heard several times by listeners. *Nor' West* will be heard by Regional listeners on October 24 and National listeners on October 23.

## TOURING THE TWENTY-TWO

ONE of the features of the "Tour of Broadcasting House" programme, which is to be given in birthday week, on November 14, to be exact, will be a revue specially written by Henrik Ege. In this will be a cast of twenty-two people, one in each of the twenty-two studios of Broadcasting House. The revue will call for amazing dexterity on the part of the producers at the Dramatic Control panel in manipulating cue-lights and potentiometers to "fade in" and "fade out" one studio after another in proper sequence.

*In The Beginners' Supplement*

### NEXT WEEK

**STEP-BY-STEP BUILDING THE "NEW CENTURY SUPER."** In addition to a full-size blackprint of the layout of the new set there will be two pages of illustrated details on how to build the new set.

**ADDING A THIRD VALVE.** Another practical article in the "Build As You Learn" series by Percy W. Harris.

**WHAT THE VALVE IS.** J. H. Reyner and the Staff of "A.W." continue the Elementary Wireless Course for Beginners.

**MAKING ANY AERIAL SELECTIVE.** A special supplement article of interest to all listeners.

**WHAT YOU MUST KNOW ABOUT ACCUMULATORS.** Practical advice on the proper upkeep of the low-tension battery that heats the valve filaments. Of great value to all battery set owners.

## EX-ANNOUNCER'S NEW ROLE

A FORMER B.B.C. announcer, the Hon. David Tennant, will broadcast a reading of the seventeenth-century religious poetry on October 30. Mr. Tennant was heard anonymously in the closing item of the "Good-bye, Savoy Hill" programme recently, being wrongly assumed by a number of people to be the Director-General, Sir John Reith, or alternatively, Sir Charles Carpendale!

## TELEVISION RECEIVERS

ANOTHER television receiver has now been delivered to the B.B.C. by the Baird people. This is being used by the engineers. As soon as the third machine arrives it will be installed in the Press Listening Room. We shall have to re-name this room the "Stop, Look and Listen" room!

## MIKES ANCIENT AND MODERN

ALTHOUGH at Broadcasting House there are microphones of every conceivable type, it was recently brought home to the B.B.C. that some of the microphones in provincial centres are getting rusty. At Edinburgh, during a recent attempt to record a programme, it was found that the microphones were giving at least 25 per cent background hiss, some of them being four or five years old. The order has now gone forth that every studio is to have the latest microphones, as at London.

## ANOTHER GAP FILLED

### When School Broadcasts End

WHEN the present school broadcasting term ends at Christmas the B.B.C. will fill the gap that now frequently occurs between the hours of three and four in the afternoon. Light music, of the cinema-organ and café-orchestra type, will be the main fare in this new hour. We shall then have continuous broadcasting from 12 midday until 12 midnight. Slowly we seem to be catching up to the American idea, which is to start with early morning physical jerks and go on until midnight, or later, without a single break.

## TELEVISION MANNEQUIN PARADE

ON October 28 the B.B.C. will stage its first mannequin parade for television purposes. Dresses and gowns by the leading *modistes* will be displayed but no names will be mentioned. Later we hear there will be a television broadcast of a greyhound. Physical culture experts are also billed.

## IMPROVING RELATIONS

THE other afternoon Mr. Fred Bates, the N.B.C. liaison official in this country, had the pleasant task of introducing Mr. Warwick Deeping, the novelist, to American listeners, via a B.B.C. studio and the transatlantic 'phone. By the way, Mr. Bates is out to improve relations between the B.B.C. and the N.B.C. He ought to know his job, having been associated with the Dawes and Young Commissions.

## MISSING THEIR CUE!

### Bad Luck in the Talks Department

NO one can say the B.B.C. Talks Department has had a lot of luck lately. First there was the Vernon Bartlett misunderstanding, when Mr. Bartlett turned up at the studio in Geneva at 10 p.m., when he was wanted for relaying by the B.B.C. at 9.20 p.m. Then Professor Cornfold's talk had to be read by an announcer, owing to a hold-up on the line up from Cambridge. And now J. B. Priestley has had his talk delayed owing to the mislaying at the studio of his manuscript.

## THE LATEST IN ALARMS!

**This burglar alarm is switched on by a photo cell-device which can work in the dark. The gramo-radio side of the apparatus is switched on. the receiver of a telephone is lifted off its hook and the record rings up the police! At the same time a powerful light is switched on and the camera at the left takes a "snap" of the eavesdropper**

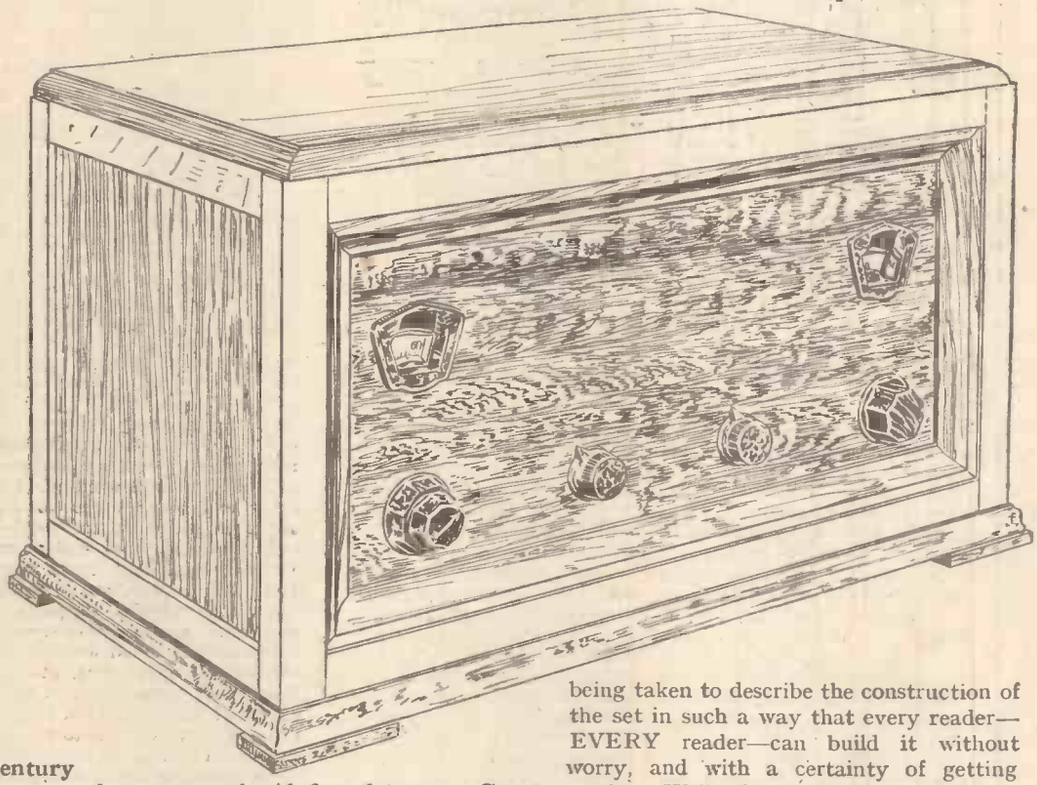
# SPECIAL ENLARGED NUMBER NEXT WEEK

## *The Editor Talks about his Splendid Supplement, his New-style Full-size Print and, chiefly, about the "A.W." "NEW CENTURY SUPER"*

FOR many weeks past we have been presenting a supplement with each issue of AMATEUR WIRELESS—undoubtedly the most successful and the best appreciated series of supplements ever issued with any wireless periodical. Next week's issue of "A.W." will contain a further supplement, stronger than ever in the quality of its contents. (Turn, in due course, to the last page of this week's AMATEUR WIRELESS supplement, and see what we promise.)

### A SPECIAL NUMBER

But will you make particular note, too, that next week's AMATEUR WIRELESS will contain many extra pages and include not only the supplement, but a **full-size blackprint of a remarkable set,** and the issue in itself will be outstanding, both in interest and in the number and variety of its pages. It will be a special number, very largely devoted to a special subject, the **"New Century Super," a successor to a set that made radio history.** The "Century Super" in AMATEUR WIRELESS last year, and its companion set, the "Super 60" in the *Wireless Magazine*, were the most successful home-constructor sets of recent years, and have set a fashion in super-hets which is reflected in the manufactured receivers of to-day. There is no need to remind you that the original "Century Super" was a success on the grand scale, and I predict that the **"New Century Super"** which will see the light next week, will repeat it. Mr. W. James designed last year's great set. This year, Mr. W. James—known to everybody as a designer of exceptional merit; Mr. Percy W. Harris—a famous radio personality with whom every reader is familiar; and Mr. S. Rutherford Wilkins—in charge of "A.W."'s Construction Dept. and a keen radio technician; all three have collaborated in the design of the "New Century Super." It is a collaboration of radio giants, ensuring that in the soundness of its design and technique, in the complete way in which it fills the bill, and in the practical and workmanlike style in which the details of the set have been managed, the "New Century Super" has no equal. It stands alone. The collaborators have given of their best and the result is something of which they and AMATEUR WIRELESS and its readers can all be proud. Mr. W. James talks of this set on another page in this present issue, and all I need do is briefly to tabulate some, but by no means all, of its advantages. **Selectivity,** given by the aerial input filter. **Sensitivity,**



by a screened-grid first detector. **Great magnification, with distortionless volume control,** given by the variable-mu intermediate frequency valves.

There is **very small H.T. consumption, with large output.** There is **freedom from interference**; there is **power**; there is **marked simplicity of control**; there is **good quality** and, what every reader wants, there are **just as many stations as you will ever want to get.** And what about the cost? Extremely moderate, particularly in relation to what you get for the money.

### FULL DETAILS NEXT WEEK

We shall describe this absolutely modern set next week, and shall present with every copy—stitched in so it cannot accidentally fall out and be omitted—a Full-size Blackprint of the "New Century Super," an absolutely full-size layout plan just as good in every way as a blueprint, but grey-black, and for that reason all the more readable. The issue will contain constructional details, specification, circuit diagram, etc., etc., and particular care is being taken to describe the construction of the set in such a way that every reader—EVERY reader—can build it without worry, and with a certainty of getting results. Well-informed wireless men know what the super-het can do and are eagerly awaiting this new version, but beginners, for whom the word "super-het" may have quite unnecessary terrors, can take it from me that with our instructions before them they can build with ease and operate with pleasure the "New Century Super" and obtain from it in all certainty the most wonderful service.

**My advice!** There will be a big run upon next week's issue of AMATEUR WIRELESS, so will you immediately, please, order your copy. Failing this, be sure to get your copy **first thing** next Thursday morning, or you run a considerable risk of being disappointed.—THE EDITOR.

**A Special Number, complete with our "Wireless Made Easy" Supplement, and Full-size Blackprint, on Sale Next Thursday, October 27, at our Usual Price, 3d.**

# HINTS AND TIPS ON SHORT-WAVE WORK

Useful information of particular interest to the short-wave enthusiast

## H.F. AMPLIFICATION ON SHORT WAVES

IT has been generally accepted that a screen-grid H.F. stage in a short-wave receiver is purely a passenger and of little material advantage.

While admitting that the amplification gained at these high frequencies is only slight, there are numerous definite reasons why a screen-grid stage should never be omitted if the maximum sensitivity is required *with ease of control*. After experimenting a considerable time with an S.G.3 short-wave receiver, an appreciable gain was obtained on wavelengths down to as low as 18 metres.

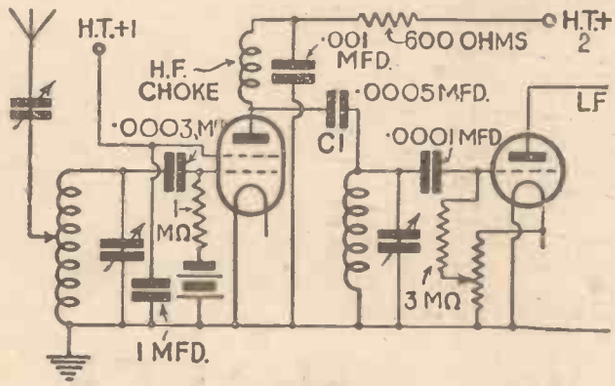



*Fig. 1. A good short-wave circuit in which a screen-grid valve is used*

A theoretical circuit, Fig. 1, shows that the arrangement is quite usual and does not call for any comment. It is in this case the components, etc., that account for the unusual efficiency. As is only to be expected, the most important components are the screen-grid valve and the high-frequency choke. The maximum amplification was obtained when using a moderately low impedance screen-grid valve, such as the Cossor 220SG, together with a choke such as the Lewcos. It is important that the impedance of the screen-grid valve should not exceed 200,000 ohms, and at this figure to have a mutual conductance as high as possible.

It cannot be too strongly emphasised that the H.F. choke must be of the highest efficiency possible to obtain any appreciable amplification on wavelengths of 25 metres and under.

The selectivity of a normal short-wave receiver is particularly good when a screen-grid stage is added; as the load on the detector circuit is decreased, the selectivity is inclined to be too great for normal working, so that care must be taken to flatten the tuning as far as possible.

Between the screen-grid and the detector stages is the coupling condenser C1. This should have a capacity of .0005 microfarad and be taken directly to the fixed plates of the tuning condenser in the detector stage. If a tapping or a coupling coil has formerly been used, these should be disregarded.

An efficient air-space condenser should always be used in series with the aerial to minimise damping, one having a maximum capacity of .000075 microfarad or .0001 microfarad will usually be found quite suitable.

To anyone who has handled an S.G.3 short-wave receiver the ease of control can readily be appreciated. The reaction is set a little below the maximum point and can be left in such a position while searching for a station, being adjusted to regulate the volume when the station has been correctly tuned in. The normal detector circuit compares very badly with such a receiver as the sensitivity is mainly dependent on the smoothness of the reaction control, while the receiver is usually oscillating or on the verge of oscillation when searching for stations.

## AERIAL DAMPING

AN aerial having a length of between 50 and 60 ft. is fairly average and usually is quite satisfactory when used with a standard broadcast receiver. On short waves, however, such an aerial, unless due precautions are taken, would so heavily damp the grid circuit that the receiver would probably refuse to oscillate.

The use of two aerials is not always convenient, so in such circumstances slight modification on the following lines should be made to the aerial circuit.

Firstly, remove the aerial from the top of the coil and connect to a tapping on the coil by means of a *short* length of single flex and a crocodile clip. Secondly, replace the fixed condenser in series with the aerial with a variable air-space condenser having a maximum capacity of .0001 microfarad. Thirdly, should the aerial coil be of commercial design, it is more than probable that this is wound with a covered wire or has the windings totally enclosed. In such cases the circuit should be slightly altered in the following way.

Wind about two or three turns of 20 s.w.g. d.c.c. wire tightly around the windings already on the coil. Join one end of this primary winding directly to earth, the other side being taken to the small variable condenser in series with the aerial lead-in wire.

In some cases it may be beneficial not to connect the primary coil directly to the secondary coil, but to couple this in the following manner. Remove the earth connection from your receiver and join this to one end of the primary winding, the other end being taken to the aerial pre-set condenser.

On wavelengths under 20 metres, aerial damping is even more troublesome, and in many cases the previous suggestions will not completely overcome this trouble. When working on such low wavelengths, it has been found by experiment that an aerial having a total length of 15 to 18 ft. is ample to supply maximum efficiency. At the same time, the aerial condenser should not have a maximum capacity exceeding 50 micro-microfarads, with a low minimum of approximately 1 micro-microfarad. Incidentally, below 20 metres, it is nearly always an advantage to omit the earth connection should this go directly to a water pipe or a similar type of earth. A much more satisfactory arrangement is to use a counterpoise earth of a similar length to the aerial employed.

## INCREASING THE CLARITY OF WEAK SIGNALS

THE reproduction with a short-wave receiver is usually very pleasant and mellow, particularly on the really short waves round about 20 metres. While this may be satisfactory on a powerful station giving a musical programme, imagine what will happen with a powerful station broadcasting news, etc. The pitch of the speech will be so low that the majority of the news will be unintelligible and it will be necessary to incorporate a simple control so that some of the predominating bass notes can be reduced or removed altogether. A simple control is shown in Fig. 2; this consists of a .25-henry choke with a variable resistance of 25,000 ohms. Although this control is very effective, the regulation is sufficiently smooth to permit an easy variation of the pitch to be obtained.

A low-consumption pentode, such as the Mazda Pen220, is particularly useful in the output stage, as not only is the volume greatly increased, but at the same time the pitch is raised to a great extent.

One does not consider the use of a moderately high impedance triode in the output stage. With a 120-volt H.T. battery and 1½-volt grid bias, a valve such as the Cossor 210Det will give a considerably higher output than a small pentode or power valve; but only when listening to a *weak* station and *using headphones*. A signal that can hardly be heard with an ordinary power valve is usually receivable at fair strength with a detector valve in the output stage.

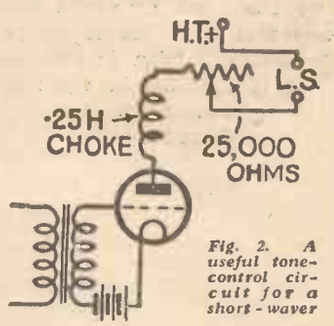
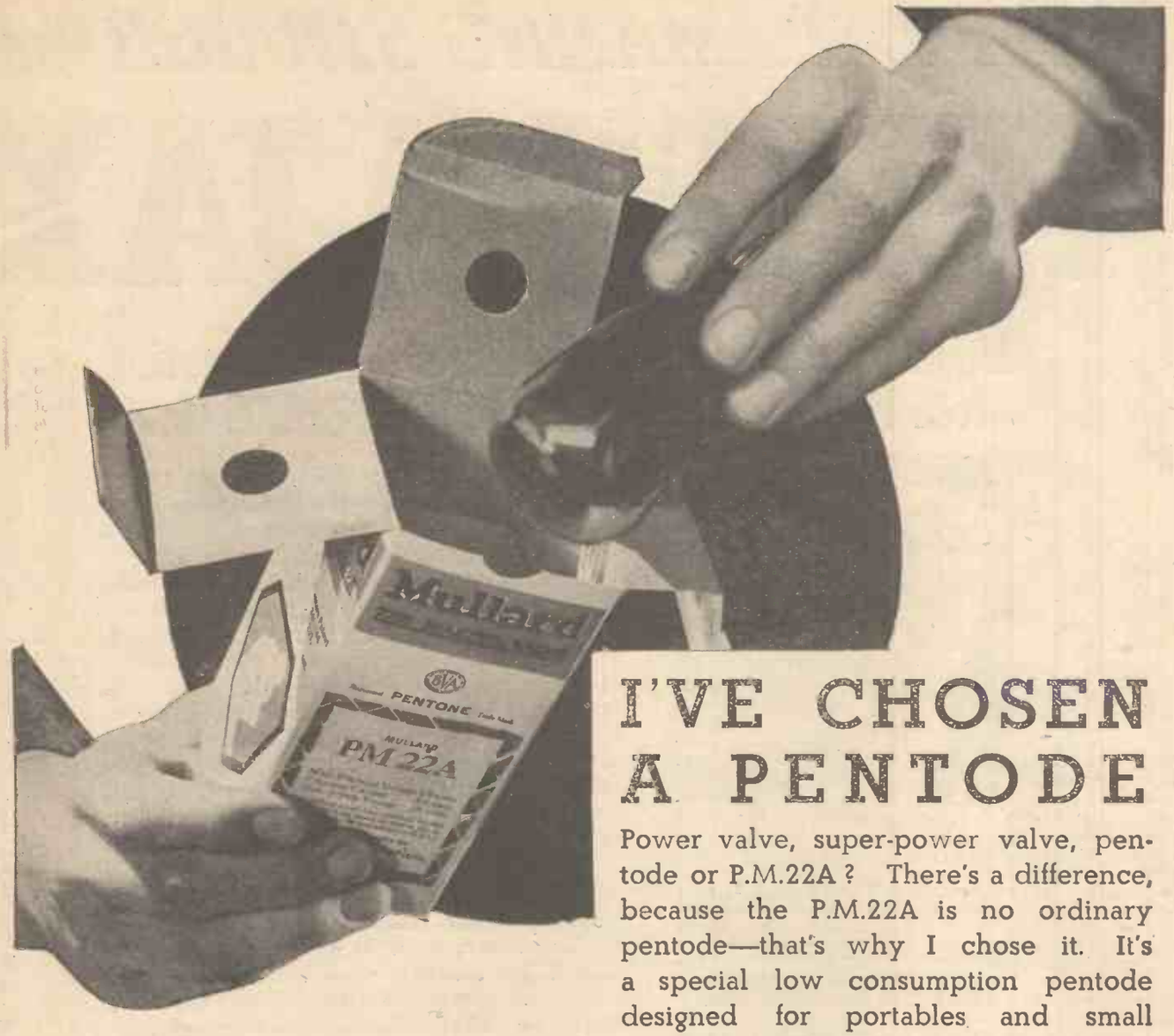



*Fig. 2. A useful tone-control circuit for a short-waver*

If such a valve is not at hand, a screen-grid valve can be used quite easily. It is not usually appreciated that the standard screen-grid valve is very flexible and can be used in nearly any position in the receiver It will take the place of the power valve by merely plugging this in and omitting to make any contact to the screw terminal at the top of the bulb. When used in this way the actual anode is not required and the screening grid is used in its place. The effect of this is to reduce the impedance to about 7,000 or 8,000 ohms, and as the slope is usually about 1.5 milliampere per volt, it is then turned into a really useful L.F. valve.

THE "NEW CENTURY SUPER"
See page 837 for news of outstanding interest to you.




# I'VE CHOSEN A PENTODE

Power valve, super-power valve, pentode or P.M.22A? There's a difference, because the P.M.22A is no ordinary pentode—that's why I chose it. It's a special low consumption pentode designed for portables and small battery sets: it works off an ordinary 100 volt high tension battery and only uses 4½ milliamps: it's the pentode you can use without draining your batteries.

PM 22A

**PRICE 17/6**

MADE IN ENGLAND.

*The valves specified for the "Amateur Wireless push pull Amplifier" described in this issue are: (1) Mullard P.M.1HL and (2) Mullard P.M.22A.*

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# TELSEN AJAX

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**3**

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**NOT a "Kit" set which you have to buy complete—but simply a brilliant new circuit design using certain specified Telsen Components (some of which you may already have!)—that's the amazing new Telsen AJAX 3! It's the receiver countless home constructors have waited for—a receiver which is as inexpensive to build, as economical to run and as simple to operate as only a "straight three" can be, yet which is capable of such tremendous range and power, such razor-sharp selectivity and such superb reproduction that it literally sets an entirely new standard of performance for receivers of its type! Yet its construction has been so simplified that you can build it *easily* in an evening . . . even if you are an absolute novice! You simply can't go wrong, for not only is a *full-size* Blueprint given FREE with the TELSEN RADIOMAG No. 3, but every stage in its construction is explained by carefully worded instructions and clearly understandable illustrations. Get your copy of the TELSEN RADIOMAG now—and build the AJAX 3 this evening!**

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# 3

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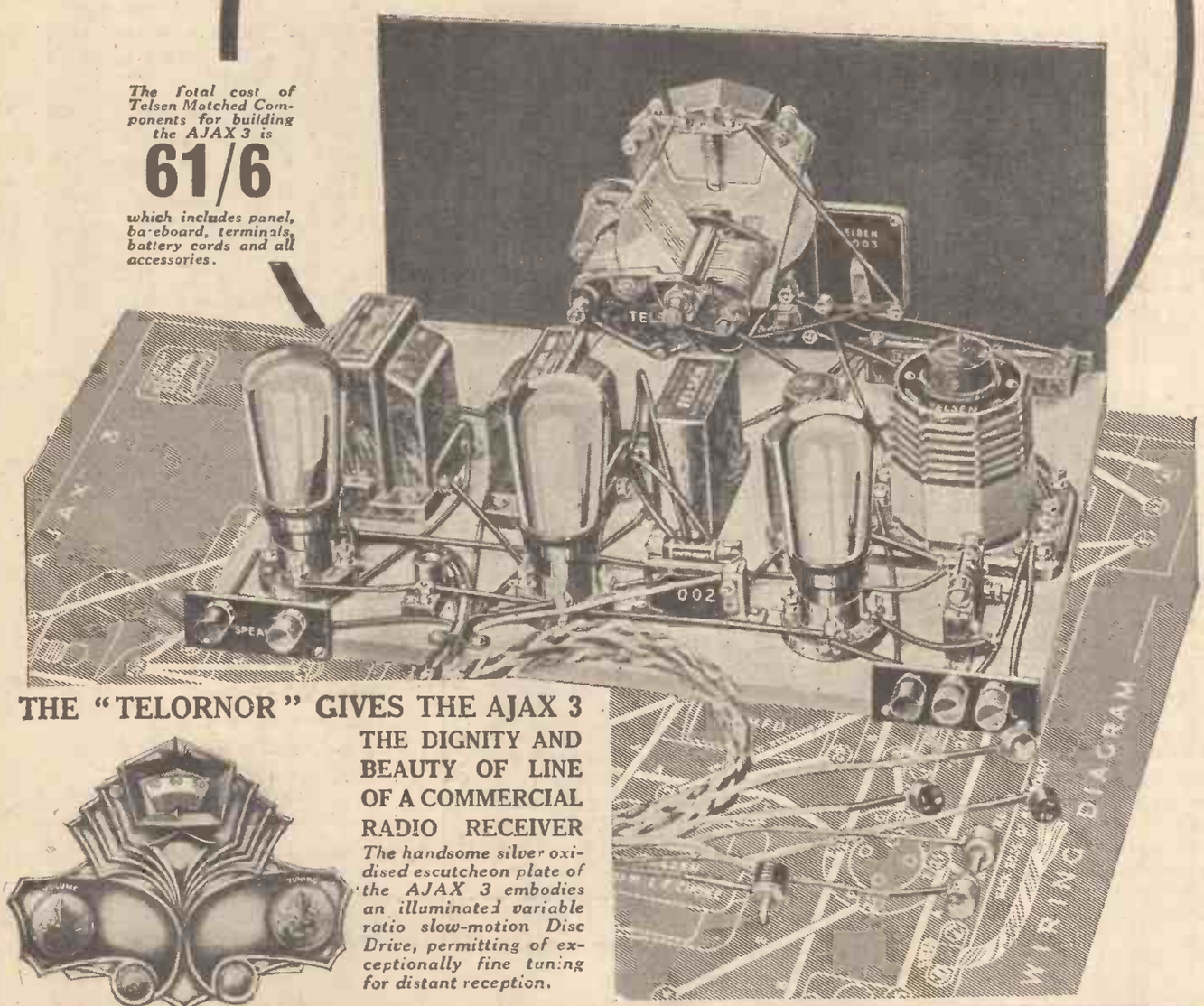
*The total cost of Telsen Matched Components for building the AJAX 3 is*

**61/6**

*which includes panel, baseboard, terminals, battery cords and all accessories.*

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*The handsome silver oxidised escutcheon plate of the AJAX 3 embodies an illuminated variable ratio slow-motion Disc Drive, permitting of exceptionally fine tuning for distant reception.*

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*Trawlers, liners, tramps ... all alike trust to*

# MARCONI VALVES

NOTHING can be more desolate than the sea. Nowhere do men feel more utterly alone. And in the old days (the 'good old days'?) sailors *were* utterly alone. Vessels burnt and men starved and went down and no-one ever knew. The sea is no less terrible today—but sailors are safer. In twenty odd years wireless has saved innumerable lives. And what are the valves that serve trawler, liner and tramp alike? They are Marconi valves—*When lives depend on a valve they choose Marconi.*

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Marconi D.C. valves are standardised by many leading set manufacturers on account of their unequalled economy and durability and consistently high efficiency. The range includes a type for every possible purpose, each one fitted with the standard Marconi heater requiring only 0.25 Amp. at 16 Volts, giving a total power consumption of only about 60 Watts for the whole set.

We show here the curve for Marconi VDS, the new high-conductance Variable-mu type. Note how the amplification decreases evenly and smoothly with rising grid bias, and the enormous reserves of sensitivity, all under perfect control.

**MARCONI D.C. MAINS VALVES**

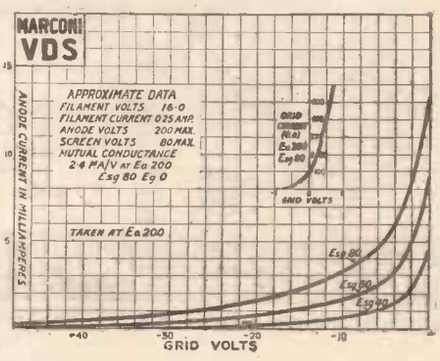
| | | |
|---|---|---|
| DSB | Screen Grid (Single Stage) ... | 19/- |
| DS | Screen Grid (Multi Stage) ... | 19/- |
| VDS | Variable-Mu ..... | 19/- |
| DH | General Purpose ..... | 13/6 |
| DL | L.F. and Power ..... | 15/- |
| DPT | Power Pentode..... | 20/- |

**WHAT IS THE PURPOSE?—**

**WE HAVE THE VALVE!**

Ask your local dealer or write direct to The Marconiphone Company, Radio House, Tottenham Court Road, London, W.1, for the Marconi Valve Folder which gives curves, facts and figures for all types of valves.

G. Marconi



# On Your Wavelength!

## THE LONG AND SHORT OF IT

IT is a great pity, I think, that so many set and component manufacturers label their wave-change switches "Long" and "Short," or simply "L" and "S." Already this is causing a certain amount of confusion amongst the uninitiated, and matters are likely to become a good deal worse when genuine short-wave wireless achieves the popularity that is sure to come its way as soon as the Empire broadcasting station gets into its stride. Not a few listeners of the kind that know little about the workings of wireless have come to me puzzled over this "Short" wave business. "My set," said one of these, "is supposed to receive the short waves, for the switch is so marked. I keep on reading about the wonders of short-wave transmissions, but I am told that I cannot tune them in with this set. Can you tell me why?" You see the kind of thing I mean. There is absolutely no excuse for the misuse of the term "short," for it is an accepted practice to call wavelengths below 100 metres, short; those between 100 and 1,000 metres, medium; and the remainder above 1,000 metres, long.

## OTHER INSTANCES

THIS, though, is not the only case in which unhappily chosen names lead to confusion. Before the advent of the mains receiving set, it was customary to call the detector valve the rectifier. In the older wireless books and in early issues of AMATEUR WIRELESS and *Wireless Magazine* you will find this done as often as not. Then came the all-electric A.C. set with either a metal or a valve rectifier, whose purpose was, of course, to iron A.C. out into D.C. Most writers then saw the wisdom of calling this apparatus the rectifier and of using the term detector for the valve whose function is to convert H.F. into L.F. in the strictly wireless department of the set. We do, though, still continue to talk about this valve as the rectifier, which is a pity. Another unfortunate name is that of the condenser, which does not condense. And don't you hate the word "network," which occupies such a prominent place in the more high-brow type of wireless article? It is largely used to describe systems of chokes and condensers, and anything less like a network than these I cannot imagine.

## THE WORST OF ALL

THE outstanding case of confusion, not only in wireless alone, but in electricity as a whole, is that of the flow of current. Before anything was known about electrons, it was believed that current flowed from the positive terminal of a battery through an outside conductor back to the negative terminal. We know nowadays that a current travels in precisely the opposite direction and consists of an actual movement of electrons. It is impossible to obtain a grasp of the principles of, say, the wireless valve unless you realise that current does flow in this way. But all the old rules, many of which are still in use, for finding the polarity of electro-magnets and so on, postulate a current flow in a direction precisely opposite to that which actually occurs. These things badly require straightening out.

## DUBLIN CALLING

YOU have no doubt observed that the Dublin station is often much more easily received than he was a short time ago. This is because the new big transmitter—situated, I think, at Moydown—is being brought into operation. So far as I can make out, he is not yet using full power or anything like it. When he really gets to work, the new Dublin station will be putting out 100 whole kilowatts, and the transmitting apparatus is arranged so that there will be no difficulty about increasing the power to double this amount if required. Dublin's wavelength of 413 metres is a pretty good one for distance-getting, and I prophesy that it won't be long before we find the Irish station showing a pretty hefty wipe-out in this country.

## A PEEP AHEAD

ACTUALLY, before so very many months have passed there will be a super-power station on nearly every available channel between 413 and 550 metres. Munich is going up to 60 kilowatts and Vienna probably to 100. The new Berlin station will be a big fellow and I believe that Belgrade contemplates a big increase. As Brussels, Florence, Prague, the North Regional, Langenberg, Beromuenster, Rome, Stockholm, and Dublin are now all in the super-power class, you will see, if you examine the lists, that this means that every channel, except those used for groups of common-wave stations, will be occupied by a really big noise. Don't forget that there are quite a number of Russians preparing to lift up 50- or 100-kilowatt voices within the limits of the same band of wavelengths. The need for selectivity will become more and more evident.

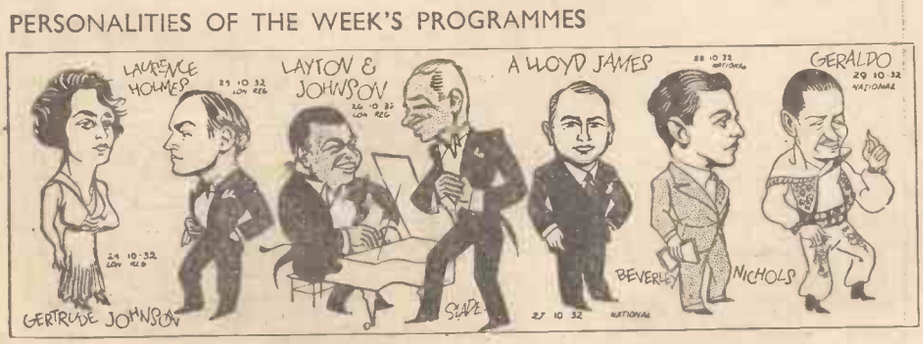
## STRANGE SECRECY

MY two morning papers for the day on which this note is written both tell me that the Post Office anti-pirate campaign has just been launched. One of them, though, speaks of G.P.O. vans as cunningly disguised and throws out hints about frame aerials made to look like step-ladders! (Help!) The second paper publishes a picture of one of these vans which is so cunningly disguised as to look exactly like . . . a Post Office detector van. In fact, both its back and its sides are plastered with placards warning pirates and asking whether *your* set is licensed. On the top of the van is something that looks suspiciously like a dummy frame aerial. I am all for fair and above-board methods in the campaign, and I am sure that nothing makes pirates stampede to the Post Office like the sight of an obvious G.P.O. van.

## THE LOST TALK

SOMETHING that never happened before since broadcasting began occurred in the National programmes the other night. Listeners were kept waiting for fifteen whole minutes for a talk which in the end couldn't be given at all. Mr. J. B. Priestley was billed to give the first of a series of talks to "an unnamed listener." At the appointed time an announcer asked us to wait a few moments as the manuscript had been mislaid. And then for a quarter of an hour there followed the most impressive silence—one only wished that they could have turned the microphone on to the people who were engaged in making the search. It appears that, in accordance with the B.B.C.'s weird rule, Mr. Priestley's manuscript had been submitted for approval. It had been dealt with by some official who had left it under a pile of papers on his desk. Well, well, these little things will happen. But why on earth didn't somebody have the *nous* to turn on the gramophone during those fifteen minutes instead of leaving us in silence? If there isn't a gramophone available at Broadcasting House for use in emergencies of this kind, all I can say is that there ought to be.

PERSONALITIES OF THE WEEK'S PROGRAMMES



# On Your Wavelength! (continued)

## AN OUT-OF-THE-WAY FAULT

I HAD a breakdown with a battery set the other night that would have taken a bit of tracing if I hadn't had measuring instruments available for the purpose. The set simply became absolutely silent, and a careful examination of its wiring or stringent tests of its components would have disclosed no fault whatever. Actually, I was able to track down the defect in quick time, and I certainly couldn't have done so if I didn't make a habit of having always an ammeter in the low-tension leads and a milliammeter in the high-tension leads of the set. As both instruments showed zero readings, it was clear that this was an L.T. fault. A simple test proved that it wasn't located inside the set, and as the battery was known to be right up to the mark there was only one place left—the L.T. leads. These looked perfectly good, but there proved to be a complete disconnection in one of them. When the outer cotton covering of the wire was removed, it was found that there was a hole inside the rubber insulation which had allowed acid fumes from the battery to reach the fine stranded wires. These had been eaten away by corrosion until the lead gave out.

## WATCH VALVE HOLDERS

AS a matter of fact, the most fruitful source of trouble in both battery and mains sets is, so far as my experience goes, that apparently harmless component, the valve holder. I don't know how many instances I have come across in the last twelve months of sets reduced to silence by "dud" valve holders. Over and over again I have dealt with sets which have been working perfectly for a long time, but refused to function at all when switched on one evening. It was quite clear that no part of the internals of the set had been touched; yet an examination disclosed a broken valve-holder contact. This kind of fault, unless you are expecting it when you come to examine a broken-down set, is not at all easy to track down. It may lead even the expert to burst into tears and fling handfuls of hair on to the carpet. The golden rule is always to use, not the terminals, but the *sockets* of valve holders when you are testing a set.

## NOT SURPRISING

THERE is still far too much broadcasting of "National" items by Regional stations. It is not surprising, in view of the amount of this kind of thing that is done, that some Continental countries ask why on earth the B.B.C. wants nine separate wavelengths if it broadcasts the same items on all or most of them. When you come to think of it, the position is ridiculous. It is absolutely certain that nobody who can hear the London Regional is unable to tune in 5XX. What is the sense of giving the listener, not alternative programmes, but alternative wavelengths for the same programme? In any case, it seems to happen pretty frequently that the Regionals are all sending out the same item. Looking at to-day's Midland Regional programme, for instance, I find that at midday it is "giving" this item to the London Regional, the North Regional, and the Scottish Regional. At 1.15 p.m., it is "taking" a concert from the North Regional, which is also taken by the London Regional and the Scottish Regional. At 2 p.m., the Scottish Studio Orchestra supplies the programmes of all Regional stations. From 2.40 p.m. to 3 p.m. the same station does the schools programme for all, and at 10.35 p.m. every station in the country, Regionals and Nationals alike, is sending out the same dance music. Is this kind of thing good enough?

## PENNY WISE . . .

APROPOS of a recent paragraph on long-lived valves, a correspondent makes the point that it is not always wise to run a valve to the very last limit. He cites his own experience with a valve which, after four years' useful service, began to show signs of decrepitude. The symptoms took the form of an occasional "crash" not unlike a strong atmospheric—though he tested this possibility by disconnecting the aerial. At all events, one evening the set suddenly went "dead." For a few seconds he thought the failure was due to a temporary breakdown at the transmitter, until an unmistakable whiff of burnt insulation made him spring for the set and switch off. It was found afterwards that the grid of the ancient valve had collapsed on to the filament.

## TEN MILLION VOLTS

PRESSURES of this order are now being produced artificially at the G.E.C. laboratory in Pittsfield. The voltage is built up gradually and then discharged in the form of a lightning discharge, which, for the fraction of a second it lasts, develops twice as much power as all the generating stations in the United States combined. The flash produced by a 10,000,000-volt discharge will easily split a large wooden post, and will fuse a tube of sand into a solid glasslike substance; similar, in fact, to the so-called thunderbolts or fulgurites found in nature. A close study of these artificial flashes tends to show that ordinary lightning is not an oscillating discharge, as was once thought, but a series of direct-current pulses repeated at short intervals.

## EUROPEAN BROADCASTERS

### TURIN

**273-7 metres (1,096 kilocycles), 7 kilowatts. 578 miles from London. Relayed by Milan, Genoa, and Florence. Transmits at intervals from 7.15 a.m. Main programme starts at 6 p.m. Announcements in Italian, the call being "Radio Milano e Torino," when the relays are made from Milan. Closes down with a Fascisti hymn and the Italian National Anthem.**


## D.C. MAINS VARIATIONS

I WONDER how many people realise the very large variations in voltage which may take place on an electric-light main. Just recently, I had to look at a D.C. mains set belonging to a friend of mine on which I found two of the valves defective. One had lost its emission entirely and the other had gone one better and blown up. I repaired this set and adjusted it on my own D.C. supply, which I make myself, and it was quite O.K. When I took it round to his house to install it, I found that the current through the valves, which were all run in series in the usual way, was appreciably greater than I expected; and investigation showed that the voltage on his supply instead of being 250, was actually over 270!

Now, by law, the supply companies are allowed a variation of + or —4 per cent. Therefore, a 250-volt supply is allowed a 10-volt rise or drop, so that the voltage may be anything from 240 volts to 260; but in the case in question the percentage rise was nearer 10 per cent. than 4 per cent., and I had to provide my friend with a special resistance which he used during the day and cut out during the evening, for I found that at night time, when the lighting load came on, the voltage dropped to a respectable value.

## WORTH INVESTIGATION

ON the other hand, of course, one may have a voltage correct during the daytime, in which case it may be 10 to 20 volts down at night, which will give poorer results. I believe it is worth while checking one's mains voltage occasionally, just to make sure that everything is O.K. Theoretically, you should be able to claim on the supply company, and if you have been wise enough to advise the company that you are operating a wireless set from your supply and have obtained their consent, then the company is liable for any damage which may result from fluctuation in the mains voltage over and above the stipulated 4 per cent. The "if" is a big one, because I have never yet met anybody who fulfilled his own contract and advised the supply company that he proposed to use a wireless set or any other apparatus.

THERMION.

# OVER 75% of the Units sold in Gt. Britain to-day ARE EKCO

*All models are similar in external appearance*
*Size 9" × 5" × 3½"*

**Prices from 39/6 or by Easy Payments**

1. Whatever your Set—there is an EKCO Unit for it.
2. Made to fit inside all portables—contact plugs recessed.
3. Connections a few seconds' work, and contact certain.
4. Patent bridge plugs make voltage variation simple.
5. High, Medium or Low voltage variation.
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9. Westinghouse *Permanent* Metal Rectification.
10. Low running costs.
11. All Units conform to I.E.E. Regulations and Recommendations.
12. Extremely handsome appearance. Solid drawn steel case with an artistic oxidised copper finish.
13. Components and construction of the highest quality.
14. Made by the pioneers and specialists of ALL-ELECTRIC RADIO—we lead, others copy.
15. Easiest of Easy Payment Terms available.
16. Guaranteed for one year.

***Every two seconds an EKCO Mains Unit is completely manufactured and sold.***

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Ekco Works, Southend-on-Sea.
Please send me illustrated FREE literature of EKCO All-Electric Radio.

*Name* .....

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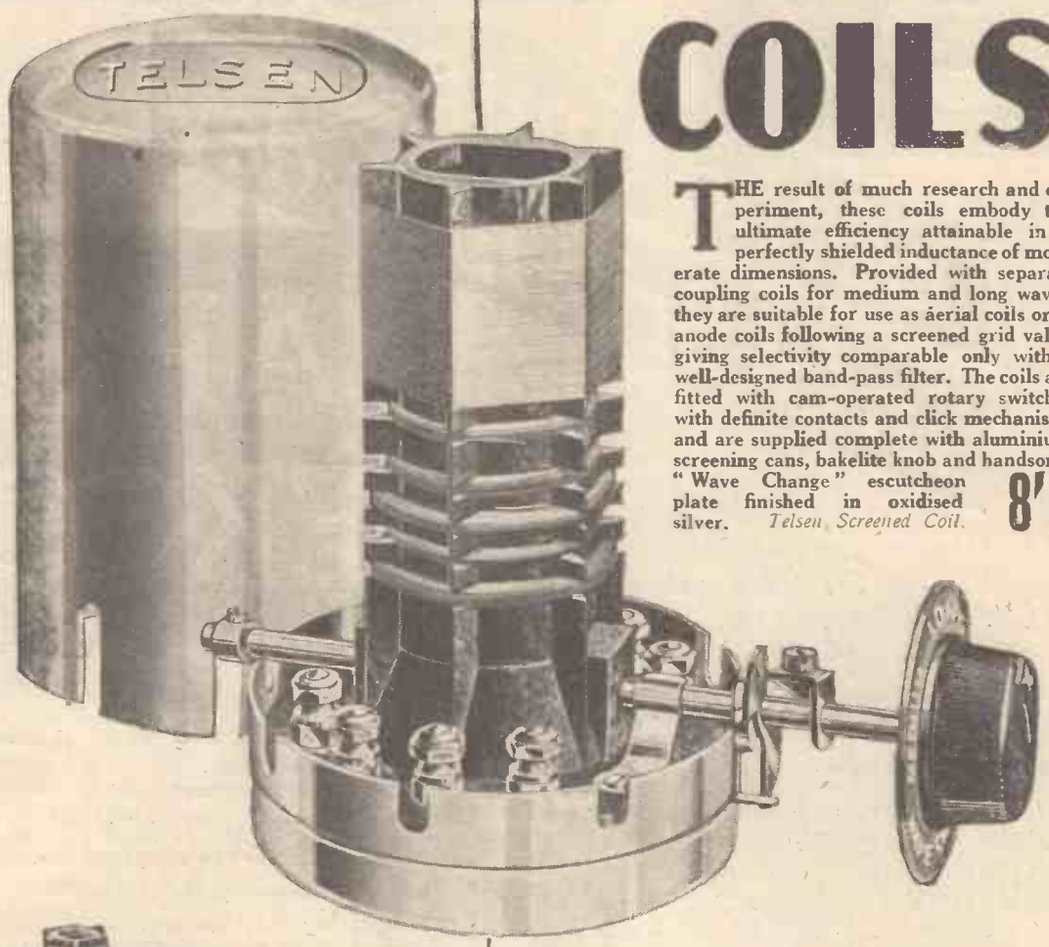
***Don't Forget to Say That You Saw it in "A.W."***

TELSEN

# SCREENED TUNING COILS




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. *Telsen Screened Coil.* **8/6**

*Triple Matched Screened Coils* **25/6**

*Twin Matched Screened Coils* **17/-**

*Full instructions are supplied with every Telsen Screened Tuning Coil, showing you the alternative methods of mounting the coils, either singly or in twin-matched or triple-matched form, as required.*

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RADIO COMPONENTS

**BUY A COPY OF THE TELSEN RADIOMAG - PRICE 6d.**

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

# USING THE SCREEN-GRID AS A DETECTOR

Our Technical Editor gives practical information of the conditions under which it is necessary to operate a screen-grid valve when used as a detector

DESPITE the fact that the screen-grid valve is becoming very popular as a detector, particularly in mains-operated receivers, there seems to be little definite information as to the best conditions under which the valve should be used. The advantages of the valve are an increased sensitivity over the ordinary three-electrode valve and a considerable reduction in the damping which the valve introduces into the tuned circuit just preceding it. Consequently this circuit not only tunes more sharply, giving better selectivity, but it also develops more voltage for a given signal, so that the increase in sensitivity is further enhanced.

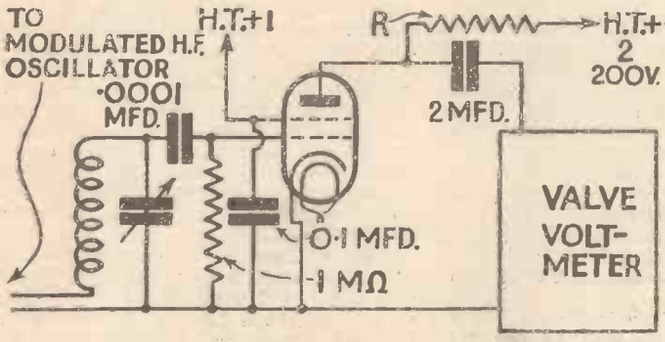



Fig. 1. A typical screen-grid detector circuit using cumulative grid rectification. The anode resistance should be 20,000 to 50,000

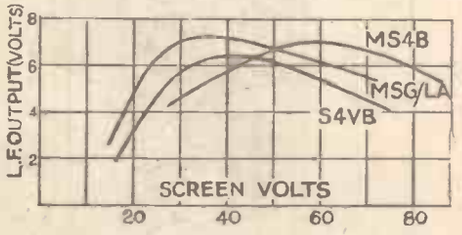



Fig. 2. Best results are usually obtained with somewhat lower screen voltages than usual, 30 to 50-volts being the average

### A Sensitive Arrangement

The most sensitive method of using a screen-grid detector is as an ordinary grid rectifier. For this purpose the customary condenser and leak should be inserted in the grid lead and these can have values of .0001 microfarad and 1 megohm respectively. The operation of the detector, however, depends very largely upon the proper adjustment of the screen voltage. There will be found to be one particular voltage at which the signal strength is greatest and the actual value of this voltage depends very largely on the operating conditions. It is proposed in this article to give some idea of the manner in which the efficiency may vary.

Firstly, regarding this question of screen volts, a series of tests were made with a screen-grid detector resistance—coupled to a valve voltmeter, as shown in Fig. 1. The value of the anode resistance was of the order of 20,000 to 50,000 ohms, but the actual value was varied for each reading until the voltage actually on the anode of the valve was 100. With the anode voltage kept constant in this way it is quite easy to select the optimum screen voltage and then to find the value of anode resistance which will give these operating conditions.

Fig. 2 illustrates the variation of output voltage for a constant input. The voltage shown is the actual low-frequency voltage developed across the resistance R and it will be seen to reach a maximum at one particular value of screen voltage. The maximum is not sharply defined, however, so that an alteration of 10 volts either way will not make any material difference to the results.

The S4VB and MSG/LA require a much smaller screen voltage than usual in order to give good detector characteristics, while the MS4B operates well as a detector under its normal amplifying conditions.

Where there is no danger of overloading it is best to choose the optimum value of screen voltage. In many cases, however, it will be necessary to handle a considerable grid swing, and if this has to be done, the screen voltage must be increased. This involves a sacrifice of sensitivity and the designer must make his own compromise between ability to handle a strong signal without overloading and sensitivity to weaker signals.

Fig. 3 shows the variation between the L.F. output and the H.F. input, for two different values of screen voltage. The curve with the higher screen voltage will be seen to be less sensitive than the other, but it remains straight for a longer distance and will actually give out more volts on the L.F. side before it overloads.

The screen-grid valve may be used quite successfully as an anode-bend detector although there is not much advantage in this procedure. With A.C. valves, however one of the big bugbears of the anode-bend detector is removed. Fig. 4 shows an anode-bend rectifier circuit with the customary self-biased arrangement. Under ordinary conditions the anode-bend rectifier obeys a square law, so that if the input is doubled the output goes up four times, and this, of course, introduces distortion.

With the arrangement shown, however, the arrival of a signal causes the anode current to increase, due to the rectifier action. This increased anode current flows through the bias resistance and increases the bias. The effect of this is to prevent the anode current from increasing as much as it would have done, and, in fact, the relation between the output voltage

(Continued on page 870)

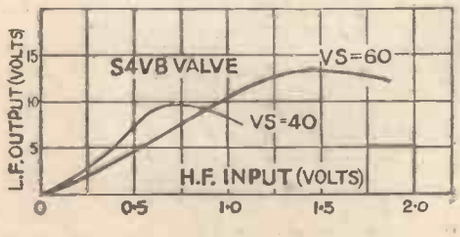



Fig. 3. (left) Increasing the screen voltage beyond the best value causes the sensitivity to fall off but gives greater freedom from overloading

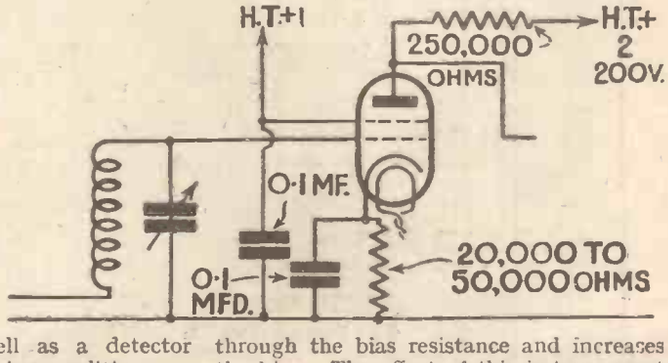



Fig. 4. (right) A typical anode-bend detector circuit. Owing to a reflex action in this circuit the rectification is practically linear

# THREE EMINENT EXPERTS DESIGN— THE NEW CENTURY SUPER

The production of the "New Century Super" is the result of the combined efforts of the three experts whose portraits are shown above: they are, W. JAMES (top), PERCY W. HARRIS (centre), and S. RUTHERFORD WILKINS.

*YOU CAN BE SURE OF THE "NEW CENTURY."*

## W. JAMES on THE MOST MODERN SET OF TO-DAY

A GOOD super-heterodyne receiver must be selective and also able to bring in stations with the least possible interference. Much, therefore, depends upon the first tuned circuit.

If this is of poor design, the chances are that, although the tuning is sharp enough, there are interferences which may tend to spoil the reception of certain stations. Tests prove that the best results are obtained when an input filter is used. This should have two circuits, and the usual ganging difficulty may be avoided by fitting a two-gang tuning condenser having, besides the main adjusting knob, a trimming control. There will then be no difficulty in tuning accurately, and in the "New Century Super" this has been carried into effect.

It is advisable to have in the aerial wire to the first circuit a pre-set condenser and to adjust this according to the size of the aerial and the locality. When near a local station the condenser may be set at a value below the maximum in order to reduce the input. A screen-grid valve makes an excellent first detector when fitted with a grid condenser and leak. The stability of the circuit is better than when a bi-grid or a three-electrode valve is fitted. There is, in fact, a marked all-round improvement. It is easy to adjust the valve, and the extra cost is more than compensated for.

A separate oscillator has proved to be better than the other arrangement in which the first detector works as an oscillator as well. For simplicity, the oscillator is best tuned with a separate condenser, but the oscillator coil can easily be coupled to the input filter coils, one switch knob controlling the three coils. This helps in making a neat layout, and the complications of gang tuning these circuits are avoided.

The tuning of the oscillator is always sharp, and so it is necessary to use a good slow-motion type tuning condenser. Accuracy here is important for the logging of stations. Thus it will be seen that, although the coils are controlled by a ganged switch, the condensers are not ganged, so that exact tuning may be obtained. The tuning of the "New Century Super" is very sharp, as it must be in these days for good results, but yet it is not tricky and not difficult.

The next important point is the method of controlling volume. When the second detector and output circuits are fixed, as is usually the case, the volume control actually varies the input to the detector. It works in the high-frequency circuit, and many attempts have been made to combine

## PERCY W. HARRIS on SUPER THRILLS with the SUPER-HET

THIS article will, I am sure, be read by many readers of AMATEUR WIRELESS who, so far have neither built nor operated a super-heterodyne receiver. They are for this reason, in a very enviable position, for they have a great deal of pleasure coming to them!

It is easy to understand why the "super" has not achieved the same measure of popularity as the "straight" set. Until recently it could justifiably be said that this type of receiver was complicated and expensive to build, whatever the results might be. Those of us who have collaborated in the production of the "New Century Super" have, we hope, changed all this.

Modern valves are so good and modern "straight" circuits so efficient that you might easily fall into the error of assuming that nowadays a "super" is not worth building. Don't you believe it! A 7 H.P. car will take you from London to Cornwall in a day, but it is much more comfortable to go there in a Rolls-Royce. And one of the first things that can be said about the super-heterodyne is that it is the Rolls-Royce of Radio.

I have had many thrills with super-heterodynes. I remember one evening, a brand new super-het. was delivered to my room on the 13th floor of the Hotel Pennsylvania in New York. Five minutes after I had connected it up a wire fell into the "innards" of the set and blew eight brand new and perfectly good valves in one vivid flash. All the usual wireless shops being closed, I scoured New York and finally succeeded at half-past nine at night in buying eight substitutes from a United Cigar Store on Lower Broadway. I then sat up until about two o'clock in the morning picking up station after station, all over the United States, even as far west as California.

That was an 8-valve set and every valve took a quarter of an ampere filament current. Our new "Super" has far fewer valves, takes far less current and is infinitely more efficient.

The charm of the "Super" which in our new design has been so simplified as to make it as easy to build and operate as a "straight" set is its immense reserve of power, the clear-cut supply of good quality reproduction free of background noises, and the fact that there is plenty of sensitivity to spare, when with an ordinary set the station you want would have faded down to inaudibility. The many faults which "supers" have had in the past, have been eliminated in our latest design and the co-operation of the component manufacturers

(*Continued on page 875*)

**FULL DETAILS OF THE "NEW CENTURY SUPER" NEXT WEEK**

# OUR BROADCAST CRITIC on VAUDEVILLE

TOMMY HANDLEY
who made a welcome reappearance last week

I HAPPENED to hear the second broadcast of *The White Blackbird* and found that it contained some clever characterisation, and also some very good playing. I thought William, played by Patrick Price, very well done. After the play was over I left the set on to hear an orchestral concert by Section D of the Orchestra. I was greatly entertained to find the microphone had also been left on, evidently by mistake. Some extraordinary sounds were emanating from the studio. One of the 'cellists had a good practice of some passage that was apparently worrying him. Then someone said: "I am now going to make a test." If that was not Dr. Boult then I do not know his voice when I hear it.

Unfortunately someone found out that the microphone was on and we did not hear the test. Instead the announcer apologised for the delay. The concert began with Weber's *Der Freichütz*. I wish the B.B.C. would not translate those words by "The Marksman." Why not "The Freeshooter"? Much better translation.

I did not linger long. The horns so massacred the opening passage that I switched into the Regional. I listened to the London Singers whose singing I should have liked better had they been dead in tune. They were not so bad as the B.B.C. horns, but they were not *quite* up to their usual standard. As I have thus criticised them, I should add, in fairness, that their rhythm was beyond reproach.

* * *

There was a fine bass-baritone on the other night—William Heughan. I do not remember having heard him before. He sang absolutely in tune, which I always appreciate. The only complaint I have is that I only heard one word in four. However, that is a matter I put before him to correct for another time. A voice like his is really worth hearing.

## GOOD VAUDEVILLE

I wonder what you thought of *House-Party*. Like all these extravaganzas it required one's patience in places. I can quite imagine that anyone coming into a room, switching on and listening to it might be inclined to switch off again immediately. I find the only way is to give each broadcast a chance unless someone sings or plays out of tune. Then I think there is only one thing to be done. I always do it.

* * *

There were two sets of impersonations in the Saturday evening vaudeville—one good and the other not so bad, putting it generously. The good one was given by Bransby Williams who is more of a natural comedian than people sometimes think. His impersonations, presumably sprung on him by the audience, of Chirgwin, Forbes Robertson, George Graves, Gus Elen, Irving, Lauder, Formby, and Beerbohm Tree were really true to life. George Graves reciting Shakespeare took my fancy enormously.

Rita Brunstrom satirised American speech and typical lack of culture very cleverly in her interview with a press representative. I was amused at her remarks (as the American film-star) that her success was largely due to her perfect English speech. Very good satire.

* * *

I can always listen to Stainless Stephen. The reason is that he takes such care with his actual matter. He never comes to London to broadcast without bringing something worth saying with him. Comedians who rely on what they say, and not on how they say it, are worth a dozen of the other kind. The Spotless One was well up to form the other night. I hope he will come again soon.

* * *

There was an exceedingly funny turn in the Monday night vaudeville. In the programme a certain Mrs. Pullpleasure was advertised to play violin solos. Knowing what some of these violin solos in vaudeville can be, I was about to switch off for a while when something she said made me think she was trying to pull pleasure out of pulling my leg. I am glad I did not switch off because she was really brilliant. Having indignantly denied that she ever intended to play the violin, she proceeded to give a lecture on museums which was one of the funniest things I have heard for a long time. If you did not hear her, look out for her again. Surely you will not forget her name (or "nom-de-studio") *Mrs. Pullpleasure*!

* * *

Jeanne de Casalis was good as the friend visiting someone in a nursing home who had recently undergone an operation for appendicitis. I had a similar operation a few years ago. All I can say is that if "Mrs. Feather" had visited me and said half what she said to that friend of hers I should not be writing these notes. She frightened the poor soul into sneezing (with its attendant risks of bursting stitches) in a thoroughly typical way. "Mrs. Feather" is not so far from real life after all. I know one or two people who correspond to her!

* * *

Tommy Handley on encyclopedias was good. How he varies! It is with every respect to him that I say that. Sometimes I cannot laugh at him; sometimes I cannot do anything else. Anyhow, I congratulate him on saying a few really funny things the other night.

* * *

Did you hear the New English Singers? They took the Personal Hour on Sunday afternoon. As they are new—at least I suppose that is true, as I have not heard them before—I think it quite fair to prophesy concerning them. When they are a little more together, and a wee bit more evenly balanced, they will be one of the radio successes. The quality *is* there. Just a little better ensemble and they will be beyond reproach.

WHITAKER-WILSON.

## PROGRAMME POINTERS

*It is impossible not to make comparisons and to draw distinctions between those singers whose diction is beyond reproach and those whose diction demands reproach. The variation is so marked that I feel I must point to it. It is literally a fact that in some instances it is practically an impossibility to miss a word even if one is not listening intently. It is also a fact that in other cases—no matter how carefully one listens—a word here and there is all one can understand. I heard a singer recently of whom I was unable to write an acceptable criticism not merely because I could not hear her words, but because I had not the faintest idea what language she was supposed to be singing. I am not exaggerating. If an ordinary audition fails to separate the sheep from the goats, would it not be possible to use the Blattnerphone and make the singer listen to his—or more often her—performances? I believe that the Blattnerphone is not used for music in the ordinary way, but I imagine some sort of result might be obtained. Until some singers are made to realise how bad they are in this respect—and how good some others are—we shall not get much further. Good singing might be described as putting your words so vividly before your audience that they cannot miss them, and making a pleasant noise while you do it!*

## FOR PLAYING YOUR GRAMOPHONE

# The A.W. BAT POWER A

### PENTODES IN PUSH-PULL!

HAVE you ever been called on to provide some local club or function with loud-speaker gear so that public address announcements can be made, or so that gramophone records can be reproduced through loudspeakers?

This little assistance in social matters cannot easily be given with an ordinary set. The power output is not sufficient. What you need is a special power amplifier for the job, but here a snag crops up.

Most power amplifiers are greedy. They take so much high-tension that any possibility of working them from dry batteries is ruled out of the question. That means that either you have to get a mains unit suitable for the local supply, or else the amplifier be worked from high-tension accumulators. The B.B.C. nearly always works its power amplifiers from H.T. accumulators, but then the B.B.C. has a van to carry them about!

You will find their lack of portability a disadvantage. Moreover, they will probably have to be bought specially for the job, which makes the simple fitting up of loud-speaker gear for perhaps only one occasion so expensive a matter that the hon. sec. of the function will probably wish that the social committee had not asked for loud-speakers!

**If you make up a really suitable and economical amplifier for this kind of work you will find that it has dozens of other uses. It is a good gramophone amplifier where more than usual power is needed. It can be used for out-of-doors speakers, provided the speakers themselves are fitted with directional baffles or of the horn type to make the most use of the sound output.**

### WHY IT IS ECONOMICAL

The reason why this amplifier is so particularly economical, although giving a useful power output, is that its output stage consists of two pentodes in push-pull. The new pentodes are very economical, and if suitably biased the total H.T. consumption of this amplifier can be kept down to well under 10-milliamperes. The steady D.C. is between 7 to 8 milliamperes only.

You might think that the use of pentodes would mean a number of special and probably expensive components such as pentode input and output transformers, complicated decoupling arrangements and so on.

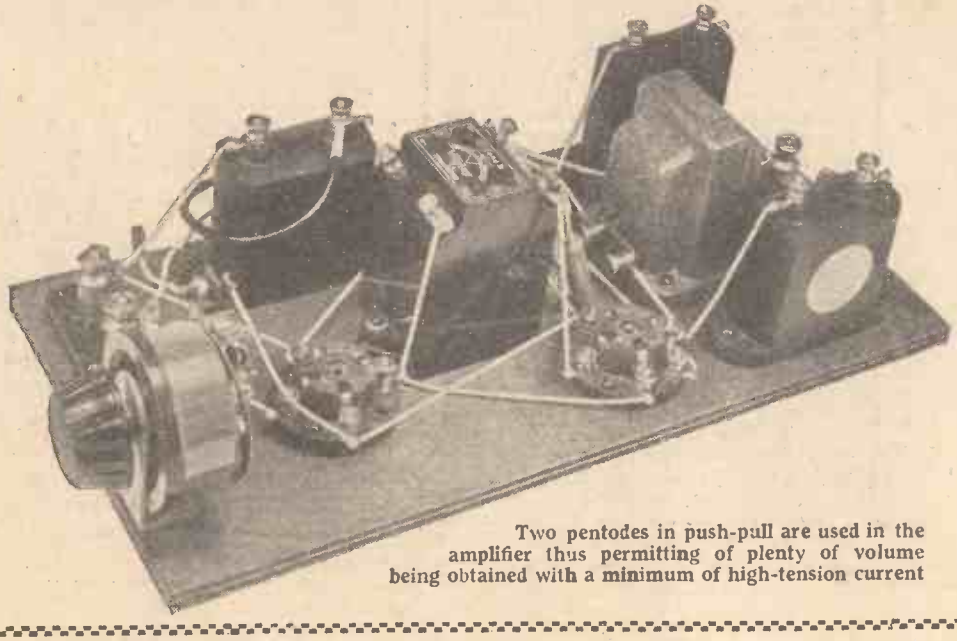
You have only to look at the photographs of the amplifier to see that there are no expensive components. The amplifier can be made up from parts, many of which the average keen wireless man will have in his spare parts box.

The photographs show that there are no special pentode input and output transformers, and you will have to glance at the circuit diagram to see how these components have been dispensed with and how an ordinary L.F. transformer, a choke, and a few resistances and condensers have been made to take their place.

For the many occasions when you want a loud-sp this useful big volume but economical amplifier and is so economical in high-tension consumpt

### THE CIRCUIT—IT'S SIMPLE

The first valve of the amplifier is an ordinary triode, and in the grid circuit of this is the input volume control ganged up with the main on-off switch.



**Two pentodes in push-pull are used in the amplifier thus permitting of plenty of volume being obtained with a minimum of high-tension current**

*COMPONENTS YOU WILL NEE*

**CONDENSERS, FIXED**
3—2-microfarad condensers (Lissen, Telsen, Dubilier, Wilburn, Ferranti, Formo, T.C.C.).
1—.005-microfarad fixed condenser (Lissen, Telsen, Dubilier, Formo, T.C.C.).

**CHOKES, LOW-FREQUENCY**
1—Centre-tapped output choke (Lissen, Telsen).

**RESISTANCES, FIXED**
2—¼-megohm wire-end grid leaks (Lissen, Dubilier).
1—20,000-ohm spaghetti resistance (Lewcos Lissen, Telsen, Sovereign, Bulgin).

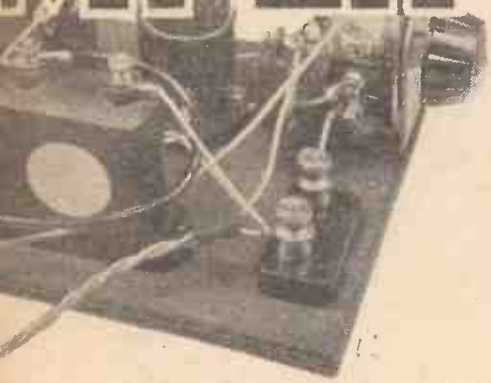
**POTENTIOMETER**
1—250,000-ohm potentiometer combined with switch (Bulgin type VS20).

**HOLDERS, VALVE**
1—4-pin and 2 5-pin valve holders (Telsen, Lissen, W.B., Igranic).

**TRANSFORMER, LOW-FREQUENCY**
1—Low-frequency transformer (Varley Nicore II, Lissen, Telsen, Igranic, Ferranti, Sovereign, R.I., Lewcos).

## ELECTRICALLY OR PUBLIC ADDRESS

# TTERY-OPERATED MPLIFIER



### USES VERY LITTLE H.T.

eaker amplifier of more than usual power output, will do the trick. It uses pentodes in push-pull tion that it can be worked from dry batteries.

This triode has the primary of an ordinary L.F. transformer in its anode circuit. It is decoupled to cut out any chance of motor-boating.

The secondary of this transformer has its ends connected to the grids of the push-pull valves. In a circuit of this description there is no need to have the stabilising resistances which are sometimes put in each grid lead to cut out parasitic oscillation.

**A novel scheme is the way in which the centre tap to the secondary of this transformer has been arranged so that bias can be applied to the grids.**

Two quarter-megohm leaks in series are connected across the G.B.– and grid terminals of the transformer–, that is across the whole secondary winding. The grid bias to the pentodes is applied to the join point of these two leads.

The screening grids of the pentodes are taken direct to a separate H.T. tapping so that they can be adjusted to be as economical as possible. This separate H.T. tapping could have been dispensed with and the screening grid voltage obtained through a dropping resistance connected to the main H.T. tap. This would have necessitated further decoupling, however; would have made independent adjustment of the screening grid voltage impossible, and would also have put up the cost. A single flex lead is cheaper than a dropping resistance and decoupling condenser!

### NOVEL OUTPUT IDEA

**The second novel scheme in the amplifier is the output arrangement. It dispenses with the usual tapped primary pentode output transformer. In this way it saves cost.**

A choke and condenser system is used in place of a pentode output transformer. The choke is connected between the two anodes of the pentodes. The centre tapping of this choke is taken to the main H.T. tapping. Connected to each end of the choke is a 2-mfd. fixed condenser. The other sides of the condensers are taken to the loud-speaker output terminals and across these terminals is shunted a .005-mfd. fixed condenser for tone correction. In this ingenious way, you see, an ordinary tapped choke is used as the pentode output and the two 2-mfd. condensers pass the audio-frequency output to the speaker.

Constructionally, the amplifier is just as simple and ingenious as its circuit layout. The fact that it is cheap to build can be seen from an examination of the components list.

This gives details of the transformer, centre-tapped choke, ganged volume control and switch and the other parts needed for the amplifier. It also gives recommended accessories in the way of H.T. and L.T. supply, and speaker.

*When ordering the components you will be well advised to get also a copy of the full-size blueprint which has been prepared in connection with this amplifier. It costs only one shilling post free, and can be obtained from the Blueprint Department,* AMATEUR WIRELESS, *58-61 Fetter Lane, London, E.C.4.*

A reduced reproduction of this print is given on page 852. This is to scale and so you can gauge the positions of the

*D TO BUILD THE AMPLIFIER*

**SUNDRIES**

Connecting wire and sleeving (Lewcos, Quickwyre, Jiffilinx).
Four yards thin flex (Lewcoflex).
7—Wander plugs marked H.T.—, H.T.+1, H.T.+2, H.T.+3, G.B.+, G.B.—1, G.B.—2, (Belling-Lee, Clix, Eelex).
2—Spade terminals marked L.T.—, L.T.+ (Belling Lee, Clix, Eelex).
Small bracket (Wearite).
Baseboard, 12 in. by 6 in. (Peto-Scott, Camco).
2—Terminal blocks (Lissen, Telsen).

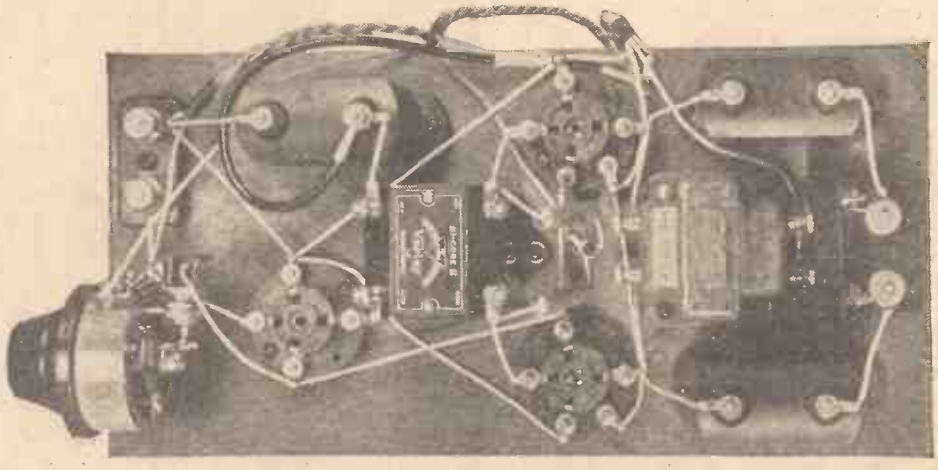
*ACCESSORIES*

**BATTERIES**

120-volt high-tension battery (Lissen, Drydex, Fuller, Ever Ready).
9-volt grid-bias battery (Lissen, Drydex, Fuller, Ever Ready).
Accumulator (Lissen, Exide, Fuller, Ever Ready).

**LOUD-SPEAKER**

Loud-speaker (Rola, Lissen, H.M.V., Blue Spot, W.B., Epoch, Celestion).



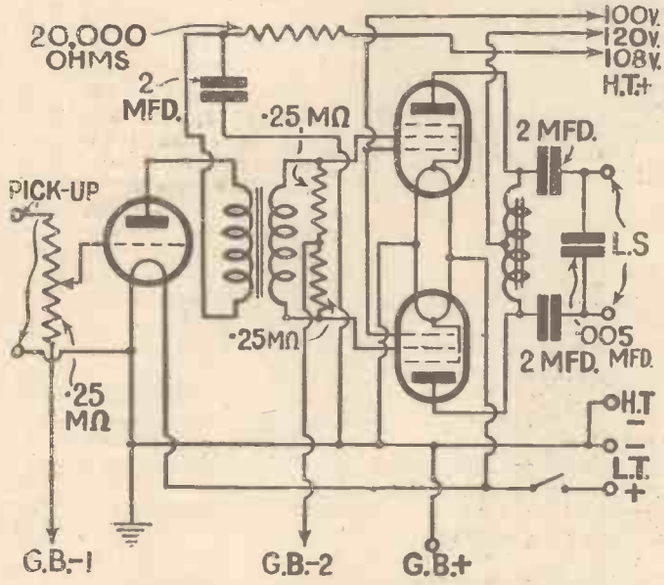
**This plan view shows the simple construction of the amplifier, with all the components mounted on a baseboard**

# AN AMPLIFIER TO PLAY YOUR GRAMOPHONE ELECTRICALLY (Continued)

parts on the small plywood baseboard; but, of course, it is much easier to work with a full-size print and plot the mounting positions direct.

### HOW TO BUILD IT

All the parts are mounted on the 12 in. by 6 in. baseboard. There is no panel.




**Although this amplifier has pentodes in push-pull, the circuit is quite simple. The input transformer has quarter-megohm leaks across the secondary, to avoid the necessity for a special tapped secondary transformer, and the output is taken through a choke and double condenser arrangement, so that no tapped output transformer is needed. These are factors which make the amplifier cheap to build.**

Two terminal blocks are fitted, one at each end for the input and output leads. The three groups of battery flexes are taken direct from the various components on the baseboard. The parts are arranged in a logical order and more or less as you see them represented symbolically in the theoretical circuit diagram.

The ganged volume control and switch is mounted at one end of the baseboard close to the input terminals. The first valve of the amplifier is right at the back of the volume control, and at the side of this holder is its decoupling condenser and spaghetti resistance. The transformer which is used in the special way as a pentode input transformer is about in the centre of the baseboard.

The valve holders are arranged one on each side of the transformer, thus still further keeping the amplifier layout like the circuit diagram. A tapped choke is between them, near the other end of the baseboard, and the output condensers are arranged one on each side of the choke.

When you start the wiring, you will see that the two quarter-megohm leaks, by means of which a centre tap is obtained on the secondary of the transformer, are connected with their lower ends wired together under a spade tag. This is the tag of the grid bias lead which biases the pentode grids.

### NO SOLDERING NEEDED

The amplifier is shown wired up on the point-to-point system, but as the leads are so direct it is possible to carry out most of the wiring without soldering. The only points where soldering is advisable are on the contacts of the ganged switch mounted on the volume control. This control is mounted on an L-shaped aluminium bracket. The bracket must be screwed to the baseboard before the potentiometer is clamped to it.

The eight battery flexes are taken direct from the various components on the baseboard and when wander plugs and spade tags have been attached they can be twisted and held in groups by small pieces of adhesive tape at the ends of the twists.

### CHOOSING THE ACCESSORIES

If you have wired up the amplifier correctly it should be all ready for working directly the batteries are connected up and the valves plugged in. Suitable batteries can be chosen from the accessory section of the components list, but quite likely you will test the amplifier out with the ordinary batteries of your set. Suitable valves are shown in the valve table, these being battery-type 2-volters of well-known make.

If the amplifier is worked from a 120-volt power type battery, then the main H.T. lead (the one going to the centre tapping on the choke) is taken to 120-volts. The anode lead from the first L.F. valve of the amplifier (which is connected to the 20,000-ohms decoupling resistance) is taken to the 108-volt point. The screening grids of the pentodes are given 100 volts.

### GIVING IT BIAS

This bias on the first valve should not be too much. Probably 1½-volts will be sufficient with the average valve of the PM1HL type specified. The bias leads to the pentodes should be taken to about 4½ volts negative on the battery, as the valves of the PM22A class, working with 120-volts H.T. and 100-volts on the screening grid, not more than 4½-volts negative bias is generally needed.

**Once you have adjusted the voltages correctly, the amplifier needs no further attention. As the volume control is turned up from the minimum position the amplifier is switched on and then the input is applied through the volume control.**

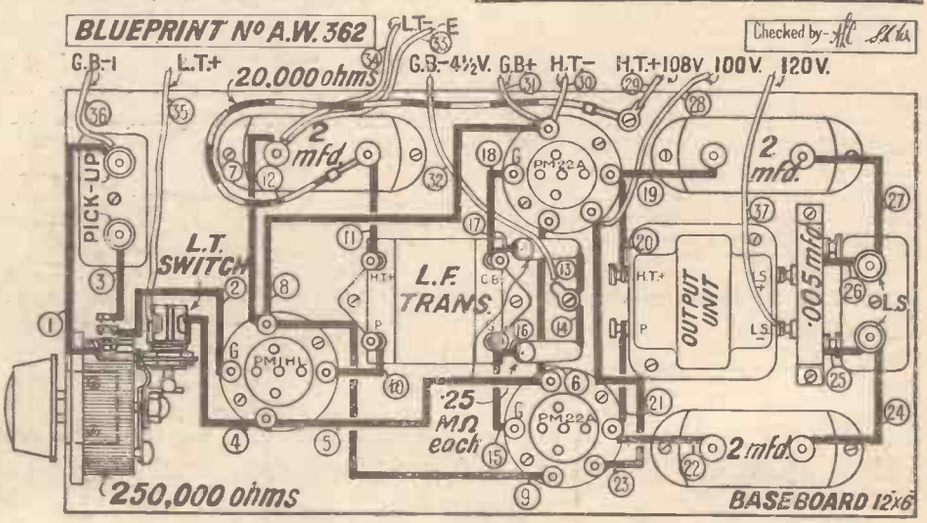
If you find it necessary to alter the speaker output arrangements or to vary the grid bias, switch the amplifier off first.

*The amplifier can be seen this week in the Radio Department of Messrs. Selfridge and Co., Ltd., Oxford Street, London, W.1.*

**SUITABLE TWO-VOLT VALVES FOR THE AMPLIFIER**

| | L.F. | Output (2) |
|---|---|---|
| Mullard ... | PM1HL | PM22A |
| Marconi ... | HL2 | PT2 |
| Osram... ... | HL2 | PT2 |
| Mazda... ... | HL210 | Pen 220 |
| Cossor... ... | 210HL | 220 HPT |
| Six-Sixty ... | 210HL | *SS230PP |
| Lissen... ... | HL210 | PT225 |
| Triotron ... | SD2 | *P215 |
| Tungsram ... | L210 | *PP230 |
| E T A ... ... | BY1814 | — |
| Fotos ... ... | BC18 | *BD100 |

*Pentodes marked * are not low consumption.*




**A reduced reproduction of the layout and wiring blueprint. A full-size print is obtainable from these offices, price 1/-**

# How YOU can Stop Interference

KENNETH ULLYETT describes some simple cures for man-made static. These can be effected on your set, and are the result of Post Office experiments in reducing interference

THE Post Office engineers checked up nearly ten thousand cases of interference last year and as a result of this experience they claim to have cures for practically every variety of man-made static.

If you are seriously troubled with local interference of this kind you can, of course, get the assistance of the Post Office experts by writing to the B.B.C. or direct to the Post Office. Before doing so, however, you will find it worth while trying a number of simple ideas for cutting out interference,


**This shows one of the special sheathed aerials in part section. The covering of the wire is used as an earth and the centre core as the aerial**

not at source (for the source is often difficult to trace) but on your own set.

These schemes for reducing local interference are based on the Post Office experiments and you will thus have a good idea of whether it is possible to cut out the interference by simple alterations to the aerial and mains wiring of the set, or whether it will be essential for the Post Office to use a direction finder in order to locate the source of interference.

Motor, flashing sign and neon lamp interference does not, as a rule, extend for more than two or three hundred yards from the source, and this can generally be checked by some simple alteration to the aerial system.

### H.F. Interference

H.F. interference is most troublesome and a more frequent source of trouble, to which about 90 per cent. of the cases of H.F. interference are attributed arises from the passage of H.F. strays into the mains wiring. The H.F. voltage imposed on the house wiring in this way may be only a few microamps, but if the aerial is anywhere near the mains wiring (or if the set is mains driven and the mains leads, therefore, run close to the set wiring) the interference can be considerable. The microvolts of interfering H.F. induced in this way can have the same effect as the field strength of a local transmitter!

The first step is to cut out any possibility of high-frequency interference getting to the set via the mains wires. If you have the electric light then you will be able to fit a simple filter, but if the electric light is only in a neighbour's house, then it will be necessary to get his permission to fit a filter.

The simplest filter for a direct current mains supply is shown by the theoretical circuit diagram, Fig. 1. It is easy to arrange. Take two 2-microfarad condensers of a voltage rating at least double that of the mains supply and connect them in series across the mains wiring of the house, as close to the meter as possible. The join point of the two condensers should be connected to earth and this earth connection should preferably be a short, direct one to the earth and not the earthing connection which is generally a part of the mains wiring. The Post Office engineers fit 600 microhenry chokes in series with each mains lead in bad cases of interference.

When you have stopped stray H.F. currents getting to the set through the mains wiring you can then start at the other end of the set and prevent induction of interference by the aerial.

There are bad cases where fitting a counterpose earth (a series of insulated wires) in place of a proper earth connection does not affect a cure and the Post Office are making use of a simple way of cutting out man-made static induced through the aerial.

You can quite easily try this scheme. Lead covered copper wire as used for external mains wiring should be used for the aerial. There is no need to use the heaviest gauge lead-covered wire.

This should be strung up like ordinary aerial wire, and you should, of course, keep the direction of the aerial at right angles to any possible source of interference. The aerial should not run parallel with tramway cables or power lines, for instance.

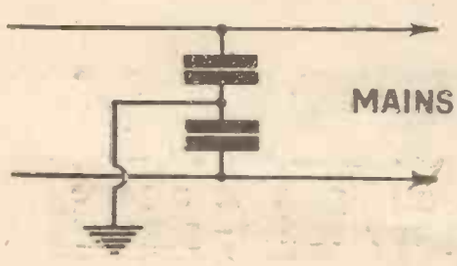



**Fig. 1. A simple filter circuit to by-pass H.F. interference on electric light wires. The centre connection between the two condensers is earthed**

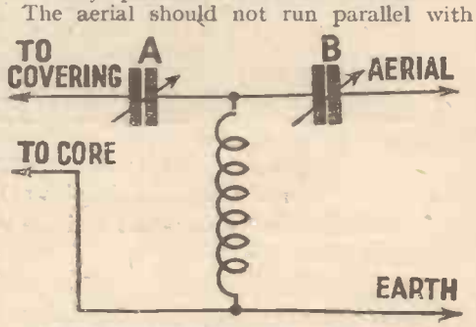



**Fig. 2. A filter circuit which is put between the sheathed aerial and the set. A is the tuning condenser and B the coupler**

### A Special Type of Aerial

Now for connecting up the special aerial to the aerial and earth terminals of the set. There are two ways of making use of the lead-covered aerial, these being shown by Figs. 3 and 4. Fig. 3 gives the better result, but it requires an additional tuned circuit which is shown separately by Fig. 2.

The aerial of lead covered wire is brought close to the set, being carefully insulated all the way. The aerial terminal is connected to the core, while the earth terminal of the set is connected to the lead sheathing. No other earth is needed.

(*Continued at foot of page* 858)

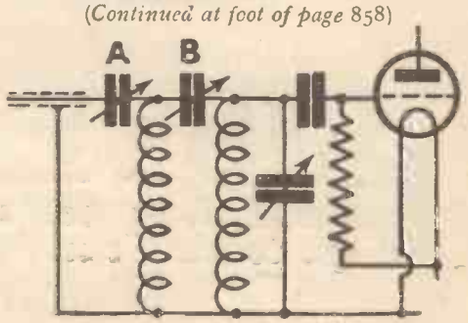



**Fig. 3. A complete circuit using the sheathed aerial and the filter shown by Fig. 2**

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# THE CONCERTS AT BROADCASTING HOUSE

I HAVE a B.B.C. announcement before me to the effect that on Saturday, October 15, a Chamber Music Concert was to be given in the Concert Hall at Broadcasting House. It is the first public concert in the new building. Tickets could be had at prices varying from 7s. 6d. down to 2s. The players were the members of the Catterall Quartet and the programme comprised favourite quartets by Haydn, Mozart, and Schubert. John Coates also sang two groups of English songs, one Elizabethan and the other modern.

I had a good look round the concert hall at Broadcasting House a few days ago. Undoubtedly, it is very suitable for chamber concerts.

Its shape is irregular. It is much broader at the balcony end than at the stage end. The fixed platform is quite narrow, but there is an extension which will accommodate the B.B.C. Symphony Orchestra. None too comfortably, I imagine, but it *can* be done. The lighting arrangements are a feature of the hall. They can be seen at the side in the accompanying picture, and consist of rather quaint glass panels in which powerful lights are placed.

The hall—at least, when empty—is singularly peaceful. I went into it with a member of the B.B.C., and we remarked how extraordinarily restful the effect was. The seating accommodation is for 538 people in addition to the full orchestra.

On the western wall, directly under the lights, are six friezes of which the carvings are of classical scenes representing poetry, dancing, a ball game of some kind, a foot race, a sacrifice, and music. The poetry scene shows the winged horse Pegasus unsealing the spring of Poetry. He is rather like your old rocking horse, but the scene is not amiss. The ball scene rather intrigued me. Odysseus is represented watching Nausicaa and some companions playing ball. All I can say is that they will never catch the ball in their present attitudes. It couldn't be done!

The foot race represents Milanion conquering Atalanta. I don't wonder. Atalanta sadly needs training.

In the course of my work I meet many musicians and hear a good deal of opinion. The times are hard for musicians and everyone is complaining—at least, those who earn their living largely on the concert platform—that the B.B.C. is strangling them inch by inch. Whether that is quite true or not I am not prepared to say. On the other hand, I think I see the point of view. Nowadays if you are to be anybody in the musical world you must work for the B.B.C. Precious little else is being done.

Musicians complain that the B.B.C. calmly goes on its way, retaining those who have been fortunate enough to gain admittance within those marble halls. It is being said that the outsider stands no chance. Others say that they are asked to broadcast once in two years and are paid four guineas for the privilege.

It is obvious that the B.B.C. cannot employ the entire musical profession.

Broadcasting certainly caused a deep depression in the music teaching world. Bad times generally, of course, did not tend to improve matters. A teacher with a large practice told me he had lost over two hundred a year owing to pupils having given up learning. I told him I did not wish to depress him, but I thought that figure might be doubled because of those pupils who *might* have come to him, but who did not.

I do not think it fair to put all the blame on the B.B.C. On the other hand, I sincerely hope that Broadcasting House will continue to do everything possible to relieve the situation, which is undoubtedly grave. Perhaps the day will come when the B.B.C. will hold out a helping hand by going to the other extreme and "commandeering" all concerts throughout the country. It might be possible in that case to offer employment. On the other hand, it might not. Still, there it is. Broadcasting House is running a concert, probably the first of a series. You can buy tickets and go if you wish or you can stay at home and hear it that way.

WHITAKER-WILSON.

## "HOW YOU CAN STOP INTERFERENCE"

(*Continued from page* 854)

In the scheme of connections shown by Fig. 4 the aerial is connected through a coupled circuit. The coil of this should be an ordinary dual-range coil to match up with the coil or coils in the set. The condenser A should be an ordinary .0005 tuning condenser and the condenser B can be a pre-set with a maximum value of .0003 microfarad.

Another type of sheathed aerial wire with part of the covering removed to show the arrangement of the core

When first setting up this aerial arrangement, unscrew the pre-set condenser, so that there is the least possible coupling between the aerial and the set. In all probability the addition of this special filter circuit will alter the dial readings on the set by a few degrees.

The connection scheme shown by Fig. 4 is easier to work as there is no independent tuning. The lead sheathing is connected direct to the earth terminal of the set (the normal earth being disconnected) and the core of the wire is taken through a .0003-microfarad compression condenser to the aerial terminal.

If your set does not use screened coils, then you will probably find it necessary to fit screening cans on these, or to line the set cabinet with metal foil, in order to cut out direction induction by the coil.

### Using Reaction

The special aerial system shown may entail a slight loss of sensitivity, but this can usually be counteracted by increasing reaction. This can safely be done as there will be a noiseless background free from interference.

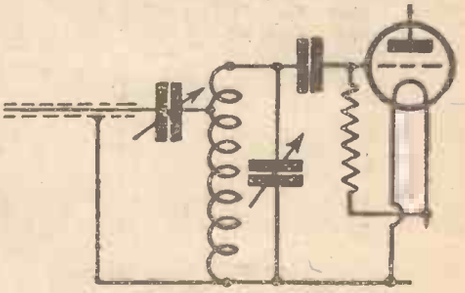

Fig. 4.—A simple way of using a sheathed aerial without an intermediary filter circuit. The core of the aerial wire is taken through a coupling condenser to the grid circuit of the first valve

# IGRANIC QUALITY COMPONENTS

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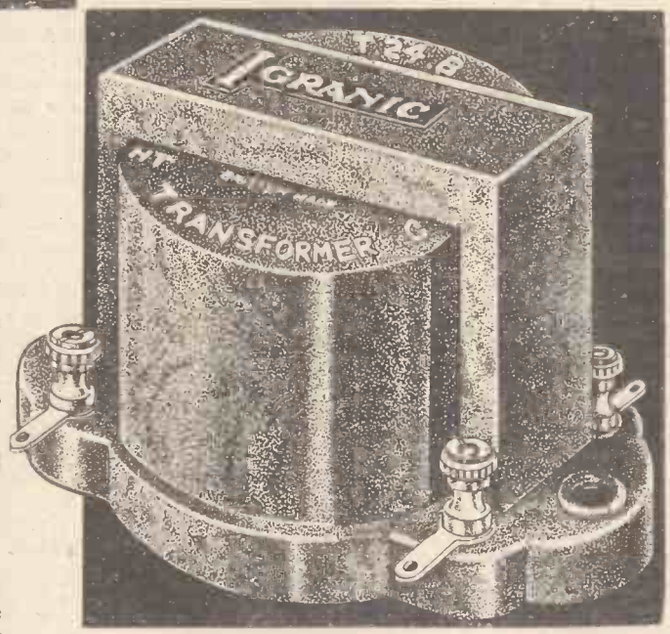


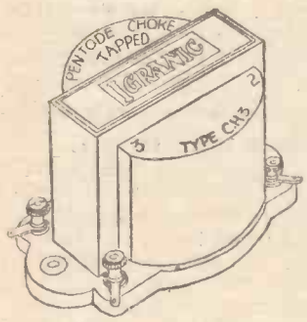


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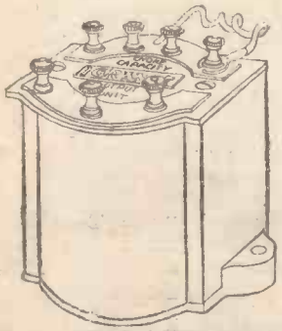

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CVS—19

# What Our Readers Think

*The Editor does not necessarily agree with the views expressed by readers and does not accept responsibility for the letters published. Letters cannot be published which do not bear the sender's full name and address*

### A Curious Fault

SIR,—I think the following experience may be of interest to some of your less experienced readers. I was recently asked to examine a well-known manufactured battery set mounted on a metal chassis.

The on-off switch was constructed of a brass rod threaded into an ebonite bush with the contact point threaded on the other end. Through constant use this rod had worked down the ebonite bush until it came into contact with the contact point and consequently, owing to the metal chassis being earthed, the whole lot was shorting; the switch got very hot and the L.T. flex melted. It was very difficult to detect where the shorting was occuring because the actual point was hidden by the ebonite bush.—B.J.D. (Bristol).

### Collecting the Volts

SIR,—With reference to Thermion's recent note "Collecting the Volts" ("On Your Wavelength") I thought, perhaps, the following would interest you.

I am employed on the mains department of an electricity supply undertaking and we had a report come in that the metal cover of a pit in the pavement was "alive."

Upon investigating this, we found that the shock was only obtained if one touched the omnibus that pulled up in the vicinity. In this case the shock was considerable and quite a loud "crack" could be heard as the contact was being made. The situation of the occurrence was at the foot of Crouch Hill, Hornsey, N.8.

L. H. L. (London, N.).

### A Grid-leak Point

SIR,—Being a wireless constructor I naturally take a keen interest in components. I have always been in favour of having the wire soldered on to grid leaks ready for wiring into circuits but there is one point manufacturers seem to have overlooked, namely, that the grid-leaks are not supplied with insulating sleeving for protection against short circuits when the points of connection are far apart. The extra sleeving would not cost much and would certainly save the "rending of hair" when one finds that the grid leaks have caused a valve to burn-out through the bare wire touching a wire at high potential.

F. N. B. (Stratford).

### Power Limitation

SIR,—I was much interested in Thermion's recent remarks on the question of high-powered broadcasting stations. I entirely agree with him that the best thing the Madrid Conference could do would be to limit all stations to a power of 10 k.w.

In this district interference from foreign stations at night is almost intolerable. Even the most expensive S.G.3's (commercial sets, as well as home constructed) sometimes have difficulty in separating Mühlacker from London Regional; and this, not because of the power of the Regional station, but because of the colossal power of Mühlacker.

Every medium-wave British station suffers very badly here from fading, and really the only satisfactory reception that can be obtained is from Daventry National.

J. G. D. (Southwold, Suffolk).

### Accumulator Charging Methods

SIR,—I am glad to see from articles in AMATEUR WIRELESS that you are doing your best to enable your readers to obtain satisfaction from their low-tension accumulators. This is a great deal more than the average so-called charging station does. I have seen batteries returned in the most disgusting condition; terminals corroded, the tops of cells awash with acid spray, and very often short of distilled water. I have seen cells practically ruined through charging at too high a rate, and being filled with acid of the wrong specific gravity.

H. K. A. G. (Battle).

### Faulty Components

SIR,—I read with much interest Thermion's caustic comments upon American sets and valves, and particularly his query on page 494, "Can you beat it." In view of his invitation I feel myself justified in troubling you with this letter.

Whilst I hold no brief whatsoever for American manufacturers, I am of the opinion that some of our English manufacturers have but little to pride themselves on, unless of course my experience is an exception.

In November last I decided to build the "A.W." Britain's Super, and to that end purchased a kit of parts. In due course I assembled the kit and found trouble at once. I eventually traced it to two sources, a faulty coil and a gang condenser. These components were returned and exchanged. The set then worked, but not at all satisfactorily, particularly the band-pass coil. I took this off the baseboard and found that one of the wires underneath was to all intents and purposes broken. With the aid of solder I repaired it. Some little time later it went wrong again, and eventually I returned it to the makers who replaced it with a new one within a few days. From the commencement of working of the set I had trouble with one of the valves—intermittent silence. It was eventually traced to the screen-grid valve of a well-known make, and I was informed by one of their representatives that on test there was nothing wrong with it, and I was also given the gratuitous information that it was as good as the day it left the factory. I replaced it in the set, and still the same trouble occurred. I bought a new valve and the trouble ceased. I subsequently sent the valve to the makers, and was then informed that on test at their London depot it was found that the filament was sagging, and would have to go to the works for a further test. After an interval of many days a new valve was sent. I am still wondering what will be the next defect, but at present the set is functioning satisfactorily.

C. H. (London).

**The Editor invites letters from readers on all interesting radio subjects. For the most interesting letter published each week a general-purpose valve or other component to the same value will be given.**

---

**The True Road to Radio** (Ferranti, Ltd., 5s. net).—This is the title of a comprehensive book, the third edition of which has just been published by Ferranti, Ltd. In its 245 pages it deals in an interesting way with the technical side of wireless, giving facts and figures in connection with H.F. and L.F. amplification, detection, rejectors, power output, mains supply systems, and the design of radio circuits. It is a handsome production, being well bound, printed on art paper, and profusely illustrated. In this third edition, a number of alterations have been made, a good deal of information about band-pass circuits has been included, and the section dealing with H.T. supply units has been extended to include the latest type of valve rectifiers and details of automatic grid bias arrangements. Copies of "The True Road to Radio" can be obtained, price 5s. from Messrs. Ferranti, Ltd., Hollinwood, Lancs.

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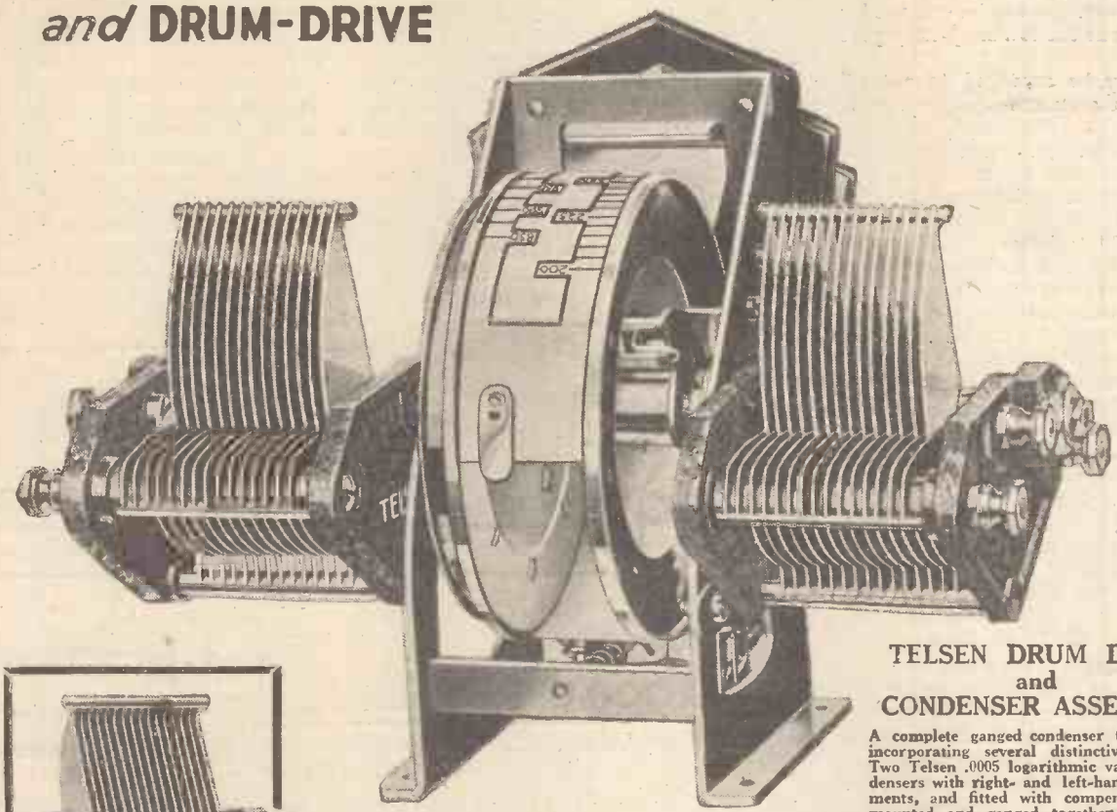
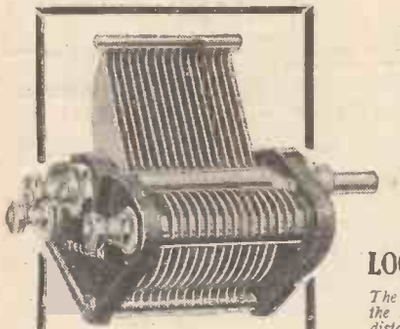
The new wing of the National Museum of Wales, Cardiff, will be opened on October 25 by Prince George. The proceedings will be relayed on the West Regional wavelength. They will also be relayed to the North Regional transmitter for the benefit of listeners in North Wales.

# TELSEN LOGARITHMIC CONDENSERS and DRUM-DRIVE





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**17/6**

## TELSEN LOGARITHMIC CONDENSERS

*The frame is braced by three solid pillars, and the vanes clamped at three points, making distortion impossible. The rotor is also built into a rigid unit, the vanes being held at both ends. Generous bearings obviate backlash or end-plate. Models with left-hand and right-hand movements respectively incorporate a compensator (max. cap. 60 micro-micro-kenrys).*

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| *Cap.* .0005 (*left-hand movement with trimmer*) | 5/- |
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## TELSEN DRUM DRIVE

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# IN MY WIRELESS DEN

WEEKLY HINTS — CONSTRUCTIONAL & THEORETICAL

BY W. JAMES

## CUTTING OUT WHISTLE

A GOOD deal of the mush and high-pitched whistles heard when tuning to some distant stations can be cut out by including a filter in the low-frequency part of the set.

The filter may be arranged to cut off notes of above a certain frequency and it therefore clarifies the results. With sharp tuning circuits there is, of course, a cutting of the higher notes, but the results are not the same as when a satisfactory filter is used.

The filter ought to be connected to the detector circuit, for then the low-frequency amplifier or power stage will not have to handle the high notes unnecessarily. There is no sense in connecting the filter to the power stage, in the loud-speaker circuit, for instance, if it is possible to connect it to the detector and so avoid having the power valve deal with the unwanted signals. It is possible that the mush and interference will fully load the power stage, even though the wanted signal is relatively weak, but this cannot happen when the filter is joined to the detector. Many sets would be all the better for the addition of a filter, and if this is a good one the quality of the reception as judged by listening to the local stations, will not be affected.

## WATCH THE ANODE CURRENT

WHEN a power valve having a good slope is used it is necessary to adjust the grid bias very carefully. The reason is that the anode current is varied by a large amount with a small change in the bias.

If you tested by listening only, you might easily use too little bias, with the result that the anode current would be more than necessary. The best method is, of course, to use a milliammeter in the plate circuit of the power valve. You can then increase the bias, noting the plate current and the quality until the most effective results are obtained.

The life of a dry battery falls rapidly if the current is increased, and it is therefore advisable to adjust the set to take the smallest current consistent with results. If the power valve is over or under biased the maximum results will not be obtained.

It is better to use a little too much bias than too little, for then the anode current will be below normal and the high-tension battery will have a longer life. Very often the quality and volume are not appreciably affected by using a little more than the theoretically best bias and as this leads to economy in working the rule should be to use as much bias as possible.

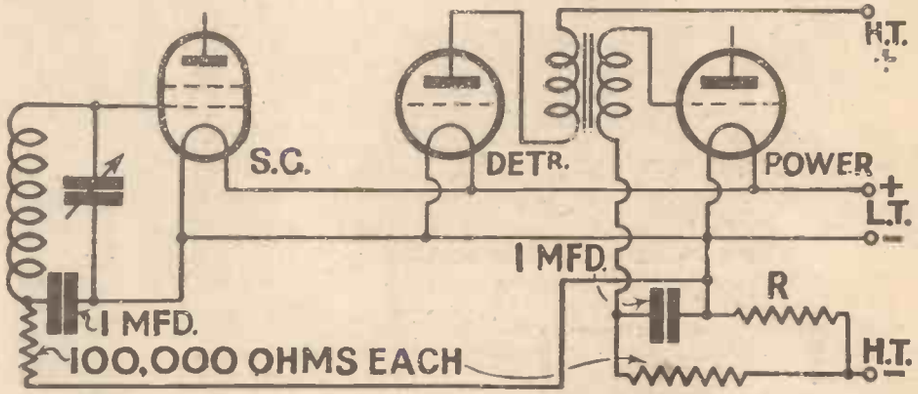
This advice has often been given, I know, but I have met numerous cases where excessive expenditure on H.T. batteries has been due to the use of too little bias.

## GETTING "FREE" BIAS

IS it worth while fitting a "free" bias circuit to a battery set?

This question is often asked. It is well known that resistances and condensers are used in mains sets to provide the bias for the grids of the valves, and this is why, I suppose, people ask whether it is worth applying these circuits to sets run from batteries.

The object is first to save the cost of the grid battery that is normally used. There is also a second object, which is to avoid the trouble of looking after the grid battery, and finally it is thought that the "free" bias automatically adjusts itself to the valve and high tension.




**This is a typical three-valve circuit in which automatic bias is applied by means of voltage-dropping resistances**

Now, while grid batteries can be obtained for a shilling or two and are reliable components, there is not much to be gained by going over to the "free" bias scheme. This may be quite costly if there are two or three bias circuits, as resistances, decoupling resistances and condensers are needed. Further, the bias is not "free."

If the voltage across the high-tension supply is normally 120 and the maximum bias required is 10, the effective high-tension is 110 volts. The loss in high tension combined with the cost probably make the scheme *not* attractive, but those who like to try these things will find the circuit shown above useful.

This shows bias for the screen-grid valve and the power valve. There are two decoupling resistances of 100,000 ohms each and two condensers of 1 microfarad each. Resistance R is joined between the negative side of the low tension and the negative high tension. Its value may be found by dividing the total bias required by the total current.

For instance, if the power valve needs 10 volts bias and the total current is 15 milliamperes, the resistance is 666 ohms, or, say, 650 ohms. If the screen-grid valve is to have a bias of 1 volt the tap must be made at one-tenth of the resistance from the low-tension end and two resistances could be connected if desired.

## IN A SUPER-HET

THERE is nearly always a component in the anode circuit of a detector for passing high-frequency currents from the anode to the filament.

In many sets a by-pass condenser alone is used. But in a super-heterodyne set, something more is often necessary for the best results. A high-frequency choking coil is often used with one or two condensers. This choking coil may be rather different from the type used in ordinary sets, for the reason that the wavelength of the high-frequency currents is higher.

Many chokes are satisfactory only over the normal broadcast band, but in a *super* the wavelength to which the circuits of the intermediate frequency amplifiers are tuned is above this band. The result is that a special choke is often necessary.

Given a good choke and a by-pass condenser in the anode circuit of the second detector, several advantages are obtained. First, the operation of the detector is improved. Secondly, whistles are avoided, and thirdly, high-frequency currents are kept out of the power valve. It therefore pays to use the right parts here and they cost no more than unsuitable components.

## IS IT MICROPHONIC?

IT is sometimes rather difficult to stop microphonic noises in a self-contained set, particularly when the parts are very close together.

You might try changing valves and so on, only to discover that the trouble remains. In some cases the only cure is to mount the part of the set carrying the valves upon rubber. The difficulty is that often the loud-speaker sets the whole cabinet vibrating, and these vibrations are transmitted to the valves, tuning condenser, and other parts.

If, therefore, the chassis is mounted upon rubber the vibrations will not pass from the cabinet to the chassis. It has been found in many bad cases that mounting upon rubber improves the results.

The sides of the cabinet may sometimes be stiffened with good results and a piece of wood jambed between the sides is usually effective.

SETS OF THE SEASON

# The METEOR THREE KIT

THIS is a kit set that will delight the heart of the true experimental constructor. It is a set bristling with good points. It gives a wide range of ordinary broadcast programmes with relatively simple operation, while offering plenty of scope for more spectacular efforts by the seasoned amateur.

This Meteor is a screen-grid, detector, power combination with the great attraction of all-wave tuning. Medium and long waves are covered by two well-designed dual-range coils, which are interchangeable with two special short-wave coils for below 100 metres.

My tests, which I must confess have interested me for several evenings, confirm an early impression that this is a "hot" three, capable of really astounding feats of station-getting and separation. Midnight oil has yielded a fine crop of American stations on the short waves, in addition to hosts of Continental amateurs and such short-wave relays as Zeesen, Rome, Paris, and Moscow.

### THE METEOR-THREE IN BRIEF

**Makers.**—Ready Radio Ltd.

**Price.**—£8 17s. 6d. This includes the kit of parts, the valves, the walnut cabinet, and the fitted moving-coil loud-speaker. A less expensive kit is model B, available price £5 7s. 6d., without the speaker.

**Circuit.**—All-wave three-valver, the medium and long waves covered with dual-range coils and the short waves with interchangeable coils. Screen-grid coupled to detector by a variable differential system.

**Power Supply.**—Batteries, for which there is ample room inside the cabinet.

**Type.**—Kit set with metal-chassis assembly, providing simplified wiring and high efficiency.

**Remarks.**—An outstanding kit set, especially recommended to amateurs who delight in getting the last ounce out of three valves. Good quality from the moving coil.

My test model of the Meteor was a ready-assembled set in an attractive consolette cabinet, with permanent-magnet moving-coil loud-speaker. The aim has been to give battery users really good quality at a reasonable price. I am confident the makers have succeeded in their aim.

The circuit makes more of three valves than the average amateur would think possible. A fine system of variable selectivity has been adopted, with a panel-mounted knob giving a ready control over this very important aspect of modern reception. As the designers rightly remark, a fixed degree of selectivity is not always the best practice with a three-valver, since conditions vary so much, not only with locality, but with the time of reception.

With the variable selectivity device on this set you can be sure of getting as much out of the high-frequency amplification as the conditions at any given time will permit, and you will have the great satisfaction of knowing that, though the volume may be cut down for the separation of two particularly difficult adjacent stations, it can be brought right up to scratch for many other stations.

### Selectivity with Range

Anybody can make a three-valver selective, but it takes a good designer to effect the best possible compromise between selectivity and range. That is what the designers have done with this set. Even if it were a normal broadcast set I should say it is outstanding. When you remember that good short-wave reception is also provided you have to admit that the Meteor is a great achievement.

Aerial coupling is quite normal, the aerial being taken through a .0004-microfarad pre-set type of condenser to the grid end of the aerial coil. It is in the high-frequency coupling that the real development has been done. Here we find a differential type of condenser of .0001 microfarad acting as the variable coupling for energy transfer from the anode of the screen-grid to the grid of the detector.

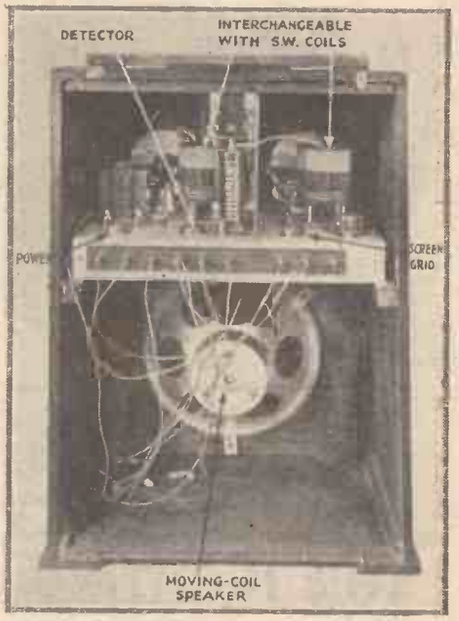
Reaction is applied to the grid-tuning winding in the detector circuit by means of the usual coil and condenser across the anode circuit. Transformer coupling follows the detector, with a 20,000 ohms resistance in series with the primary instead of a high-frequency choke.

Such is the basic circuit. It has been interpreted in the most modern way by the use of a metal chassis, the assembly of which is made clear by a wealth of photographs in the instruction booklet. The fixing of the two tuning condensers, selectivity condenser, reaction condenser and two switches, one for battery on-off and the other for the dual-range coils used for broadcast reception, is very simple to understand, and so is the assembly of the two tuning coil bases, valve holders and other small parts on the metal chassis.

The wiring, as with all these modern metal-chassis sets, is simplified by earthing to the metal chassis all parts common to earth.

This set is worth a good batch of valves, such as the Mullard combination chosen by the makers. The screen-grid is one of the latest high-efficiency metallised types, PM12A, the detector is a PM2DX, and for the power valve you have a choice of a PM2 small power valve or a PM22 pentode.

When you operate this Meteor set you appreciate the designers' point about not using a gang condenser for tuning. Weak stations that are entirely missed with badly-ganged constructor sets come in at full blast on the Meteor, simply because they are accurately tuned in.




**The Meteor Three is metal-chassis built and most of the wiring is underneath the base**

I soon became accustomed to the controls, I almost, but not quite, got Mühlacker clear of London Regional. Certainly Scottish Regional was clear, and so was Langenberg of North Regional.

One of the remarkable features of the Meteor is the way foreign stations come in at full strength during daylight. I got Prague, Langenberg, Rome, both Brussels, and Fécamp at great strength during an afternoon test.

On the short waves, with the special coils, you soon appreciate the smoothness of the reaction—essential for short-wave success. The screen-grid valve certainly pulls its weight all round the dial.

SET TESTER.

# Read what J. H. REYNER says about FILT!

*J. H. Reyner, B.Sc., A.C.G.I., D.I.C., A.M.I.E.E., M.Inst.R.E., Consulting Radio Engineer. The well-known designer of many famous sets described in the foremost wireless publications.*

J. H. REYNER.
B.Sc., A.C.G.I., D.I.C., A.M.I.E.E., M.Inst.R.E.
CONSULTING RADIO ENGINEER.

THE FURZEHILL LABORATORIES,
BOREHAM WOOD,
HERTS.

TELEPHONE: ELSTREE 130.
RAILWAY STATION: ELSTREE (L.M.S.)

24th September 1932.

JHR/MW.

Messrs. Graham Farish Ltd.
Masons Hill,
Bromley,
Kent.

Dear Sirs,

I have been much interested in the Filt Percolative Earth which you have submitted for test. The importance of a good earth connection is often overlooked, although attention to this point is repaid by improved signal strength and less liability to interference from external sources, particularly with Mains receivers.

A low electrical resistance is the first essential, and you appear to have gone to the root of the matter by providing an earth bowl filled with chemicals which firstly attract the moisture from the surrounding soil and then saturate it with salts of high electrical conductivity.

My tests indicate that the device is both simple and effective and that the earth resistance is definitely lower than is obtained by the usual methods.

I imagine that in the majority of cases the installation of the Filt Earth will give a definite improvement in results.

Yours faithfully,

J. H. Reyner

## Why YOU should fit a FILT

Efficient earthing is vital to good reception. Without it you cannot obtain the power, purity or volume of which your set is capable.

Filt is the most efficient scientific earthing system ever invented. As soon as the copper receptacle is buried, the wonderful chemical it contains begins to spread through the soil, making a permanent highly conductive area to a depth of several feet, ensuring perfect earthing in any climate.

Get a FILT to-day. It may put right faults that you thought could only be remedied by expensive new valves or parts.


GRAHAM FARISH

# FILT

PERCOLATIVE EARTH

Obtainable from your radio dealer or post free from the sole manufacturers,

Graham Farish Ltd.
203 Masons Hill, Bromley, Kent

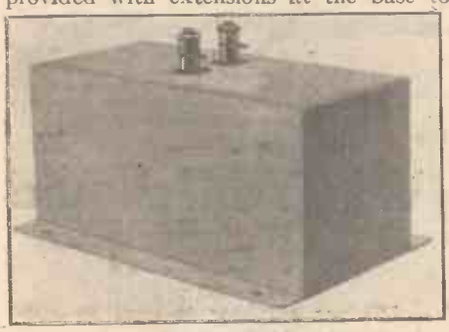
PRICE 2/6 COMPLETE

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


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

## NEW PEAK CONDENSER

WE have received for test and review this week a 4-microfarad 800 volt D.C. working Peak condenser, manufactured by Messrs. Wilburn & Co. This condenser forms an addition to the range of Peak condensers placed on the market some months ago, and of which, as readers will recall, we recently tested two samples. The external construction of this condenser is similar to its predecessors in that it is housed in a grey finished metal can provided with extensions at the base to



**One of the new Peak condensers. A test on a 4-mfd. 800-volt test job is described**

facilitate baseboard mounting. For the external connections to the condenser, terminals and soldering tags are provided, these being located at the top of the condenser.

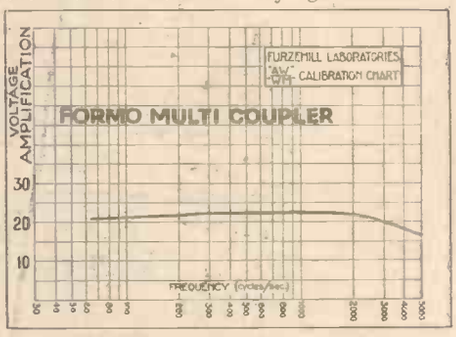
On test the measured capacity of the condenser was 3.96 microfarads, which figure is in very good agreement with the rated value. The insulation resistance was also excellent, this being too high to obtain any accurate measurement, both before and after a full voltage run.

This condenser appears to be quite satisfactory in use and it can be recommended.

## FORMO MULTI-COUPLER

WE have tested this week one of the new Formo Multi-couplers. Essentially this consists of a parallel-feed low-frequency transformer, along with the necessary coupling condenser and resistances. A very small transformer is employed, the core being of a special high-permeability iron. The primary inductance of the transformer with no direct current in circuit—that is, under working conditions—is over 100 henries. The overall resistance of the anode resistance is 50,000 ohms and it is tapped at 30,000 ohms from the anode end, thus allowing the best results to be obtained with valves of various impedances. The connections from the components in the coupler are all brought out to separate terminals, thus enabling various methods of connection to be employed. For example, the transformer may be parallel fed in the usual way, or it may be auto-coupled, so obtaining a variation of the effective step-up ratio. The coupler is housed in a metal can and mounted on a small moulded bakelite base, the eight terminals being arranged thereon.

The coupler was tested using the normal parallel-feed system, and an HL type of valve, such as would normally be employed in the detector stage, was used. The effective amplification of the transformer can be seen plotted against the frequency on the accompanying chart. It will be seen from the curve that a very good overall




**This curve shows the effective amplification of the Formo Multi-coupler plotted against frequency**

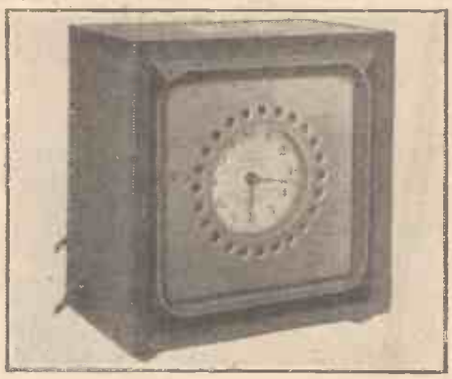
response is obtained from 64 cycles up to about 3,000 cycles. The component is very well made and can be recommended.

## ELECTONE PROGRAMME SELECTOR

AN interesting device which we have received for review is the Electone Programme Selector. This is a device for automatically switching on the receiver at a predetermined time. It consists of a spring-driven clock mechanism having fixed to the hour spindle a wiper which moves over the studs arranged behind the clock-face. Around the periphery of the face are also 24 small holes corresponding to the studs behind.

The device is connected in series with the filament or mains supply of the receiver. In order to switch on the receiver with the device in circuit it is necessary to insert one of the small spring pins provided in the appropriate hole. When the wiper attached to the hour hand makes contact with the stud, a circuit is completed through the metal pin and the framework of the clock. The contact will remain made for one half-hour after which the wiper will leave the stud and the receiver will be switched off unless further pins have been inserted in adjacent holes. Six of these pins are provided, thus giving a three-hour programme stretch.

We tested the action of the switch both in the filament circuit of battery-driven sets and in the mains lead to all electric sets. The contact was effective and the make and break quite satisfactory. A special fibre cover is placed over the face of the clock for mains working to minimise



**An automatic switch—the Electone**

risk of shock, but even so it is recommended that any alterations in the setting should not be made with the set switched on.

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The Children's Hour is taking its part in the Worcester County Week by giving a "Worcestershire Corner" on October 22.

As the series of plays, "Summer Laughter," ended for this year with the passing of summer time, a new series, under the general title of "Burlesque," will take their place in West Regional programmes for the autumn and winter months, beginning on October 21.

A new series of anonymous talks will be given for West Regional listeners under the title of "My Job and Why I Like It." The first of these, on October 22, will be given by a village craftsman.

A school concert given by the boys of Dean Close School, Cheltenham, will be heard on October 24. The school choir will be assisted by an orchestra composed mainly of students.

The fourth instalment of "Vignettes of Variety" is entitled *Playbills*, and will be heard on October 25 from the Birmingham studios.

Harold Samuel, the famous Bach player, is the artist at the symphony concert to be given by the City of Birmingham Orchestra on October 27.

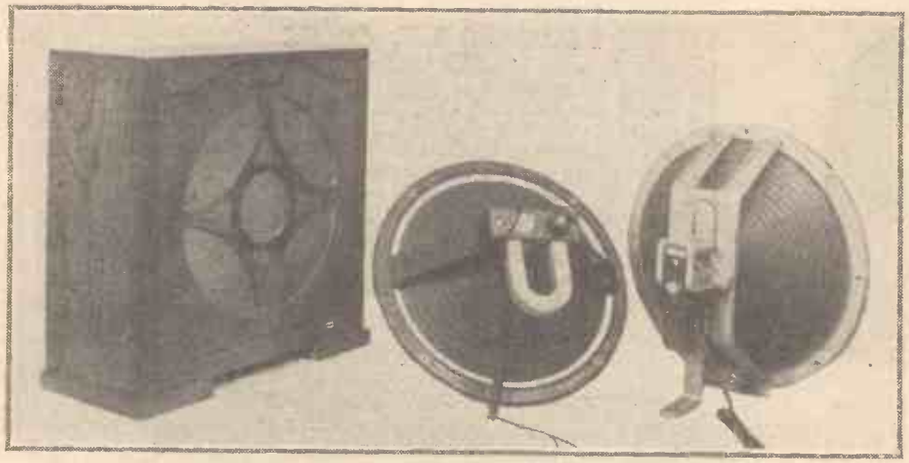
## CHEAPER BLUE SPOT SPEAKERS

ALL set users will be interested to know that some big price reductions have been made in connection with Blue Spot speakers, and the value now offered is notable.

Three popular Blue Spot speakers are shown in the accompanying group, these including the well-known 100U inductor type speaker, which now costs 32s. 6d. in chassis form, the popular 31K cabinet speaker, which is of solid oak and which uses the 66K unit; also the 66KC, which is a standard Blue Spot chassis fitted with the 66K unit.

The 31K speaker complete costs only 31s. 6d., while the 66KC chassis job costs only 19s. 9d. The 66K unit alone costs only 15s., without chassis, which is excellent value. The 66R unit is of larger construction and is a high-quality unit for fitting to any solidly constructed chassis, such as the Blue Spot Major. The 66R unit cost 35s.

Full details of these speakers and units, of the Blue Spot permanent-magnet speakers and the Blue Spot pick-up, can be obtained free on mention of "A.W." from the British Blue Spot Co., Ltd., Blue Spot House, 94-96 Rosoman Street, Rosebery Avenue, E.C.1.



**Three of the popular Blue Spot speakers, including the 66KC speaker and the 31K cabinet speaker, both of which are fitted with the 66K unit, and the 100U chassis job**

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A HALF-HOUR thrill will be broadcast Regionally on November 4, and Nationally on November 3. Entitled "The Other Room," it is taken from a short story by Don Marquis. The production is by Howard Rose, who has also adapted the play for the microphone.

Ballet music associated with the dancing of Anna Pavlova will be broadcast in the Regional programme on October 29. This will be the second concert of a similar nature conducted by Walford Hyden, who was first Pavlova's rehearsal-accompanist.

Readers in the Burton-on-Trent district should note that an Amateur Radio Society has been formed and new members are welcomed. Information can be obtained from the hon. sec., Mr. W. A. Mead, Addiscombe, Branstone Road, Burton-on-Trent.

Radio telephone transmitting apparatus is being fitted up in the Traffic Department of Edinburgh Police Headquarters by way of experiment. Tests (the first of their kind in Scotland) are shortly to be carried out by sending messages to be picked up by a specially equipped patrol car as it traverses the city, and the possibilities of the innovation as a means of running criminals to earth are being closely watched by other police authorities in Scotland.

# TELSEN L.F. TRANSFORMERS COUPLING UNITS and OUTPUT CHOKES

### TELSEN "RADIOGRAND" L.F. TRANSFORMERS

*Typical of all that is finest in British Radio craftsmanship. Designed in accordance with recent research, constructed on the soundest engineering principles and tested rigorously for immaculate performance and enduring efficiency.*

*Ratio 3-1*
*Ratio 5-1* **7/6**

### TELSEN "RADIOGRAND" (Ratio 1.75-1) TRANSFORMER

*For use in high-class receivers employing two stages of L.F. amplification. When used following an L.F. stage employing choke or resistance coupling, it gives ample volume with remarkable reproduction.* **10/6**

### TELSEN "RADIOGRAND" (Ratio 7-1) TRANSFORMER

*Gives extra high amplification on receivers employing only one stage of L.F. amplification. Not recommended for use with two L.F. stages, as overloading is likely to occur.* **10/6**

### TELSEN POWER PENTODE OUTPUT CHOKE

*For mains operated pentodes taking an anode current of up to 40 m.a. Serves both to prevent direct current passing through the speaker and to match the speaker to the pentode valve, with the choice of three ratios—1-1, 1.3-1, 1.7-1. Used with a 1-mfd. condenser it gives a great increase in both quality and volume.* **10/6**

### TELSEN TAPPED PENTODE OUTPUT CHOKE

*For mains and battery operated pentodes taking an anode current of up to 20 m.a. The single tapping provides (by reversing) ratios of 1-1, 1.6-1, 2.5-1, ensuring perfect matching under widely varying conditions. Also suitable for matching a low-impedance speaker with an ordinary power valve, a 1-mfd. coupling condenser being recommended for this purpose.* **7/6**

### TELSEN INTERVALVE L.F. COUPLING CHOKES

*Primarily designed for use as coupling chokes but may be used in any circuit carrying not more than the stipulated maximum current. The 100H type is for H. or H.L. type valves and the 40H for L. types.*

| Rating. | Normal Current. | Max. Current. |
|---|---|---|
| 40 H. — | 5 m.a. | 10 m.a. |
| 100 H. — | 3 m.a. | 8 m.a. |

**5/-**

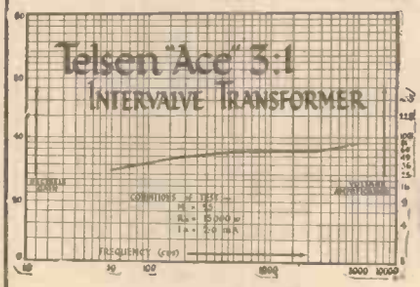
### TELSEN OUTPUT CHOKE

*Designed for use with power or super-power valves taking an anode current of up to 40 m.a., this output filter provides an ideal response curve under all conditions. For use with a condenser of not less than 1 mfd. capacity.* **7/-**

### THE TELSEN "ACE"

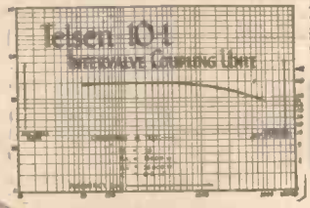
**The Telsen "Ace" is eminently suitable for Receivers where highest efficiency is required at low cost and where space is limited. As its characteristic curve will show, it gives a performance equal to that of the most costly transformers.**

**Ratio 3-1**
**Ratio 5-1** **5/6**




### TELSEN 10-1 INTERVALVE COUPLING UNIT

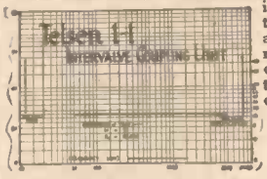
**A filter-fed transformer using a high permeability nickel alloy core, securing a 10-1 voltage step-up while preserving an exceptionally good frequency characteristic. The response is compensated in the higher frequencies for use with a pentode valve giving an amplification greater than anything previously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




**12/6**

### TELSEN 1-1 INTERVALVE COUPLING UNIT

**A modern development of the deservedly popular R.C. unit incorporating a low pass filter feed in its anode circuit, thus preventing "motor-boating," "threshold howl" and other instability due to common couplings in eliminator and battery circuits. Used with an H.L. type valve it gives an amplification of about 20 and a perfect frequency response on a negligible consumption of H.T. current.**




**7/6**

### TELSEN MULTI-RATIO OUTPUT TRANSFORMER

*For use with moving-coil speakers, having a low-impedance speech coil winding, and suitable for anode currents of up to 40 m.a. Three ratios—9-1, 15-1, 22.5-1—allow for correct matching of speakers of widely varying characteristics.* **10/6**

### TELSEN OUTPUT TRANSFORMER (Ratio 1-1)

*For connecting the speaker to the output stage, using a triode valve. Avoids saturation by isolating the D.C. from the speaker windings. Also keeps H.T. voltage from the speaker and its lead, which is especially important where a D.C. eliminator is being used. Suitable for anode currents of up to 40 m.a.* **10/6**

**TELSEN**
**RADIO COMPONENTS**

**BUY A COPY OF THE TELSEN RADIOMAG - PRICE 6d.**

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

## "USING THE SCREEN-GRID AS A DETECTOR"

(*Continued from page 847*)

and the input is tolerably a straight line, giving distortionless rectification.

The operating conditions here are that with no signal the anode current shall be quite small (0.1 milliamp. in the present tests), and this condition is obtained by

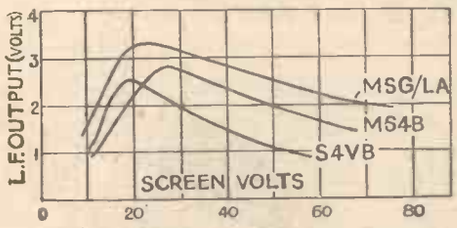



**Fig. 5. The optimum screen voltage is more critical with the anode-bend-circuit and is also distinctly lower**

suitable adjustment of the self-biasing resistance. If this is done the actual value of anode resistance is not at all critical, the usual value being about 250,000 ohms.

Once again there is an optimum anode voltage and this is quite different from that for the grid rectifier. It is in fact only about half as great and is rather more sharply defined. However, much the same state of affairs occurs as with the grid rectifier, viz.: that with the optimum screen voltage the detector overloads too easily, and it is necessary to sacrifice some of the efficiency in order to obtain satisfactory handling capacity.

The curves, Fig. 5, show the L.F. output in terms of screen voltage with a constant H.F. input to a screen-grid valve used as an anode rectifier. Comparison of these figures with those of Fig. 2 will show that the sensitivity is only about one half that of the same valve used as a grid rectifier.

---

An industrial relay from the depot in Derby of a firm of well-known motor manufacturers is to be given next week. Engines made by this firm were used very largely during the Great War for heavy aeroplanes and cars. The talk will be given by Mr. A. F. Sidgreaves.

### DOES YOURS RATTLE ?

**About once a year it will pay you to tighten up all the small screws in the actuating mechanism of a moving-iron type speaker.**

**The vibration in an ordinary speaker unit is considerable and if there are any slack clamping screws they will in time set up the rattle**

## GIANT LOUD-SPEAKERS ON TOUR

HUGE loud-speaker equipment nearly 200 times as powerful as the speaker on the average set featured in the tour of the "Daily Mirror Eight" around the coastal resorts of England and Wales.

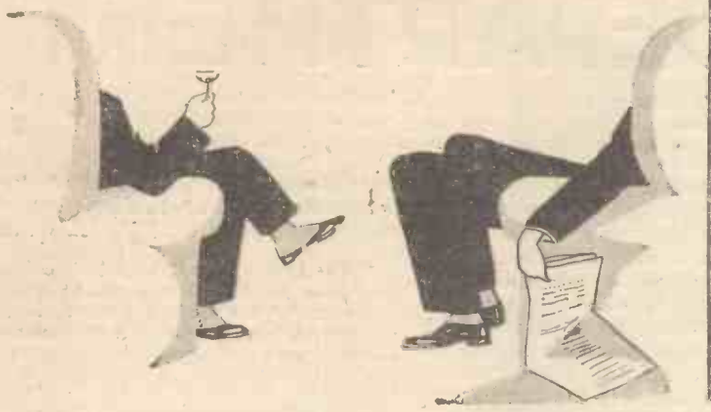
The travelling loud-speaker gear was designed and supplied by Messrs. Tannoy Products and the speaker van accompanying the tour was fitted up with a

**The giant loud-speaker van fitted with the Tannoy equipment**

250-watt amplifier. All the power for the operation of this big public-address plant was obtained from a motor-generator on the van. Banks of power valves provided the huge output to the loud-speakers on the roof.

B.B.C. type microphone arrangements were used in conjunction with the special amplifiers designed by Tannoy Products and announcements were made through the loud-speaker equipment in just the same way as an ordinary broadcast. The van is shown by the photograph above.

# "Comparisons"



"Comparisons are odious. We frequently assess faulty values without reference to the perfect, by which, after all, only true comparisons can be made.

"You, for example, until to-night, thought your Loud-speaker was quite good, but my 'CHALLENGER,' although not perfect, certainly represents the 'best yet.'"

"Yes, I must admit your argument, and although I bow to your judgment when you say the 'Challenger' is not perfect, it certainly seems so to me. I must say I have now heard speech and music reproduced as I have never before thought possible, but such reproduction is beyond my purse."

"Nonsense! An R. & A. 'Challenger' will cost you a modest 35/-."

**The R. & A. 'Challenger' is a Permanent-magnet Moving-coil Reproducer,** of which the *Wireless World* states:—

"Performance . . . is such that it merits discussion from an absolute standpoint and without regard to the very reasonable price asked . . . overall sensitivity . . . slightly better than average of its class . . . the reproduction in the bass below 100 cycles quite definitely above average . . . full-bodied bass without boom . . . speech natural . . . balance in music exceptionally good."

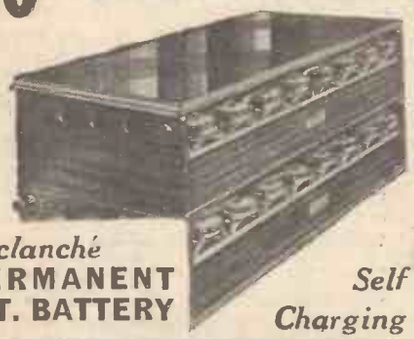
**Complete with 3-ratio Ferranti Transformer.**

**35/-**

*Holdens*

## REPRODUCERS & AMPLIFIERS LTD., WOLVERHAMPTON

# 30% Price Reduction



*Leclanché* **PERMANENT H.T. BATTERY** *Self Charging*

**STANDARD**

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**Popular Type Battery for Ordinary Sets**

**Any Voltage Any Capacity**

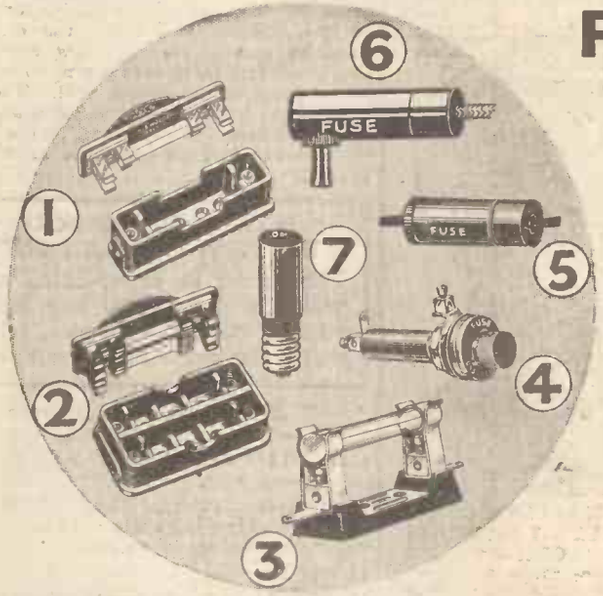
Model H5, No. 3 size, 12,500 milliamp capacity, 120 volts, 84 cells. Price, complete without trays. Tray containers extra if required.

**5/- Down** **37/8**

Other capacities, 2,000 to 25,000 milliamps.

**STANDARD BATTERY CO., Dept. A.W.**
**184-188 Shaftesbury Avenue, London, W.C.2**

# FUSE HOLDERS AND FUSES




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 WANDERFUSE. With 150 m/a. fuse **1/-**

7 "SCRUFUSE," Not bulb, not cartridge, yet both! .. **6d.**

SPARE FUSES, *LONG FUSE.* 60, 150, 250, 500, 750 m/a., 1, 2, or 3 amp. *SHORT FUSE* (for wanderfuse only), 60 150, and 500 m/a. All ratings and sizes 6d. each.

*Each rating a different colour (avoiding possibility of error.)*

*Ratings:—(Black) 60 m/a. (Red) 150 m/a. (Brown) 250 m/a. (Yellow) 500 m/a. (Green) 750 m/a.*

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

**BELLING-LEE**

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

# OUR QUERY DEPARTMENT

*The attention of readers is directed to the rules printed below. Replies are sent by post, only a selection of queries of general interest are printed here.*

### Patent Royalties

SIR,—I understand all wireless receivers made are subject to royalties, but I have never seen it fully explained. Does one have to pay royalties on any set made up from the designs which appear from time to time in the pages of your journal, whether made for personal use or for the use of friends? Furthermore, if one has an existing receiver and uses the components of this set, with other new parts, to make up a later design of receiver, is it essential that royalty be paid on the new set? I should appreciate as much information as possible on the subject.

S. Y. J. (Bucks.).

Quite a number of the wireless patents that originally existed and for which royalty had to be paid have now lapsed. It is, therefore, possible to build up wireless receivers which do not make use of existing patents. Royalty cannot be demanded for such sets. The question as to which patents are still in existence, however, is one which cannot be dealt with briefly. If you have a set upon which royalty has already been paid and you want to modernise the receiver without increasing the number of valves, then no further royalty is payable provided you do not infringe fresh patents in altering your set. If you build up sets for sale among your friends and you infringe different firms' patents, then you are liable for royalty on the patents you make use of. These royalties, usually, are payable to the Marconi Co., who share them with the numerous firms who belong to the patent pool. The whole question of what royalty is payable on sets made for sale will be made clear by the Marconi Co., to whom you are advised to write for particulars.



### Electrolytic Condensers

SIR,—In replying to a querist in AMATEUR WIRELESS, September 17, 1932, you stated that "wet electrolytic condensers should be mounted in a horizontal position with the vent holes at the top." Do you not mean that the condensers should be placed in a vertical position as otherwise it is not possible to have the vent holes at the top? Furthermore, you say "it is not advisable to use electrolytic condensers on the rectifier side of the smoothing-circuit choke." I am using one in such a position and there are millions of sets in the States so fitted. I can see where the error occurred in regard to the fitting of the electrolytic condenser, but I cannot reconcile your statement concerning where the condenser should not be fitted, when my own knowledge tells me that electrolytic condensers can be used on the rectifier side of the smoothing circuit.

L. W. (M/c)..

The statement that "electrolytic condensers should be fitted in a horizontal position" is incorrect. If the vent-holes are to be at the top, the condensers themselves must necessarily be fitted in a vertical position. As regards the advice that "it is not advisable to place electrolytic condensers on the rectifier side of the smoothing-circuit choke," this advice is particularly sound. The current from the rectifier, before reaching the smoothing choke, still possesses some of its A.C. qualities, i.e., an A.C. ripple of double the frequency of the supply, and this ripple in the current is sufficient to cause a fairly large leakage of current across an electrolytic condenser if arranged on the rectifier side of the choke. After the current has been smoothed by passing through the high-inductive smoothing choke, very little leakage will occur across such a condenser when arranged on the receiver side of the smoothing choke. Quite apart from this, the A.C. ripple on the rectifier side of the choke is likely to damage electrolytic condensers; this applies more to dry electrolytic condensers than to the wet type. We are aware that in many American sets the electrolytic condensers are placed on both sides of the smoothing-circuit choke.

Reference to the leaflets supplied by British manufacturers with electrolytic condensers substantiate our advice.

---

An hour's vaudeville for West Regional listeners will be given on November 4.

Ghosts will be abroad in the Belfast studio on Hallow-e'en (October 31)! A special play has been selected for this evening called *The Ghost of Gillhall*, a tale of old Ireland by Patrick Riddell.

A third edition of Mungo Dewar's revue with a naval flavour, *Eight Bells*, will form part of the programme from Belfast on November 4.

### WHEN SUBMITTING QUERIES

Please write concisely, giving essential particulars. A Fee of One Shilling (postal order), a stamped addressed envelope, and the coupon on the last page must accompany all letters. The following points should be noted.

Not more than two questions should be sent with any one letter.

The designing of apparatus or receivers cannot be undertaken.

Modifications of a straightforward nature can be made to blueprints, but we reserve to ourselves the right to determine the extent of an alteration to come within the scope of a query. Modifications to proprietary receivers and designs published by contemporary journals cannot be undertaken.

Readers' sets and components cannot be tested at this office. Readers desiring specific information upon any problem should not ask for it to be published in a forthcoming issue, as only queries of general interest are published and these only at our discretion. Queries cannot be answered by telephone or personally.

Readers ordering blueprints and requiring technical information in addition, should address a separate letter to the Query Department and conform with the rules.

### A Radiogram Conversion

THE Univolt electric unit—a combined gramophone motor, pick-up, volume control, and selfstop—is described in a new folder just sent me. A Junior model of the unit is available without the pick-up equipment and in either case it is possible, for a small extra charge, to have a universal motor fitted for A.C. and D.C. operation. The Univolt unit is a complete radiogram adaptor. **861**

### The Antinodal Idea

R.I. Ltd. have sent me details of the R.I. Antinodal Short-wave Converter—the A.C. edition. It is claimed that this is the only A.C. short-wave converter that can be connected externally to an A.C.-operated set without removing the valves or altering the wiring. It enables you to bring in the short-wave stations from 18 to 80 metres. Altogether a good idea and fully described in the folder, a copy of which you can have free. **862**

### The R. & A.'s

Until I received the new R. & A. folder I did not know that there were so many speakers in the range. The "Challenger," a permanent-magnet, moving-coil handling 3 watts A.C. without distortion, and having a cadmium-plated, 15 per cent. forged cobalt steel magnet, is one of the many R. & A.'s that looks like being a popular favourite. The biggest of the family is the R. & A. Victor, a big permanent-magnet speaker. **863**

### Tone Control

The Multitone system of tone control is described in the new Multitone booklet. It gives circuits showing how to use this novel tone control transformer, together with curves which show what happens when the control is affected. If you want to fit a tone control to your set, then get this book. **864**

### Give It a Cabinet

A fine cabinet to house the Osram Music Magnet is made by the Vibranti people and described in a newly issued sheet. It is only one of the many Vibranti cabinets and I advise you to write through my free catalogue service for details of the right "box" for your set.—OBSERVER. **865**

# BROADCASTING STATIONS

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

| Metres | Kilo-cycles | Station and Call Sign | Power (Kw.) |
|---|---|---|---|
| 19.737 | 15,200 | Zeesen (DJB) | 8.0 |
| 25.4 | 11,810 | Rome (2RO) | 15.0 |
| 25.53 | 11,751 | Chelmsford (G5SW) | 16.0 |
| 31.25 | 9,598 | Lisbon (CTIAA) | 2.0 |
| 31.51 | 9,520 | Skamleback | 0.5 |
| 31.38 | 9,560 | Zeesen (DJA) | 8.0 |
| 32.26 | 9,300 | Rabat | 0.5 |
| 40.3 | 7,464 | Radio Nations | 20.0 |
| 43.75 | 6,865 | Vitus/Paris | 0.3 |
| 50.0 | 6,000 | Moscow | 20.0 |
| 58 | 5,172 | Prague | 0.5 |
| 198.5 | 1,510 | Riga (test) | 16.0 |
| 203.6 | 1,473 | Seraing | 0.2 |
| 206 | 1,460 | Antwerp | 0.4 |
| 208.5 | 1,438.5 | Budapest (2) | 3.0 |
| 210 | 1,430 | Magyarovar | 1.5 |
| 211.3 | 1,420 | Newcastle | 1.0 |
| 214.3 | 1,400 | Aberdeen | 1.0 |
| 214.3 | 1,400 | Warsaw (2) | 1.9 |
| 215.6 | 1,319 | Brussels (Conf) | 0.25 |
| 217.1 | 1,382 | Königsberg | 0.9 |
| 218 | 1,373 | Salzburg | 0.5 |
| 220.1 | 1,362.9 | Béziers | 0.5 |
| 222.9 | 1,344.6 | Cork (6CK) | 1.2 |
| 225.2 | 1,331.7 | Fécamp | 10.0 |
| 227.4 | 1,319 | Flensburg | 0.5 |
| 230.6 | 1,301 | Malmö | 1.2 |
| 231.1 | 1,298 | R. Wallonia | 0.3 |
| 233.4 | 1,292 | Kiel | 0.25 |
| 235 | 1,283 | Lodz | 2.2 |
| 235.5 | 1,274 | Kristianssand | 0.5 |
| 237.2 | 1,265 | Bordeaux-Sud-Ouest | 2.0 |
| 238 | 1,260 | Nimes | 0.5 |
| 238.9 | 1,256 | Nürnberg | 2.0 |
| 239 | 1,255 | Binche | 0.3 |
| 240.1 | 1,249.1 | Stavanger | 0.5 |
| 241.3 | 1,243 | Liege (Exp.) | 0.2 |
| 242 | 1,238 | Belfast | 1.0 |
| 244.1 | 1,229 | Basle | 0.5 |
| 245.9 | 1,220 | Berne | 0.5 |
| 245.9 | 1,220 | Cassel | 0.25 |
| 245.9 | 1,220 | Linz | 0.5 |
| 247.7 | 1,211 | Trieste | 10.0 |
| 249 | 1,205 | Prague (Strasnice) | 5.0 |
| 249.7 | 1,201.3 | Juan-les-Pins | 1.0 |
| 250 | 1,200 | Radio Schaerbeek | 0.3 |
| 252.3 | 1,189 | Barcelona (EAJ15) | 6.0 |
| 253.4 | 1,184 | Gleiwitz | 5.0 |
| 255 | 1,175 | Toulouse (PTT) | 1.0 |
| 256.7 | 1,168 | Hörby | 10.0 |
| 259.3 | 1,157 | Leipzig | 2.0 |
| 261.6 | 1,147 | London National | 50.0 |
| 263.8 | 1,137 | Moravska-Ostrava | 11.0 |
| 265.8 | 1,238.5 | Lille (PTT) | 1.3 |
| 266.7 | 1,124.4 | Bremen | 0.3 |
| 266.8 | 1,124.5 | Valencia | 8.0 |
| 270 | 1,111 | Bari | 20.0 |
| 271 | 1,107 | Cointe-Liege | 0.3 |
| 271.4 | 1,105 | Rennes | 1.3 |
| 273.7 | 1,096 | Turin (Torino) | 7.0 |
| 276.5 | 1,085 | Heilsberg | 60.0 |
| 279.5 | 1,073.2 | Bratislava | 14.0 |
| 281 | 1,067 | Copenhagen | 0.75 |
| 282.2 | 1,063 | Lisbon (CTIAA) | 2.0 |
| 283 | 1,058 | Innsbruck | 0.5 |
| 283.6 | 1,058 | Berlin (E) | 0.5 |
| 283.6 | 1,058 | Magdeburg | 0.5 |
| 283.6 | 1,058 | Stettin | 0.5 |
| 286 | 1,049 | Montpellier | 0.8 |
| 287.1 | 1,045 | Radio Lyons | 10.0 |
| 288.5 | 1,040 | Bournemouth | 1.0 |
| 288.5 | 1,040 | Plymouth | 0.12 |
| 288.5 | 1,040 | Scottish National | 50.0 |
| 288.5 | 1,040 | Swansea | 0.12 |
| 291 | 1,031 | Tampere | 1.0 |
| 291 | 1,031 | Viipuri | 13.0 |
| 293 | 1,022 | Kosice | 2.5 |
| 293.7 | 1,021.5 | Limoges (PTT) | 1.0 |
| 296.1 | 1,013 | Hilversum | 20.0 |
| 298.8 | 1,004 | Tallinn | 11.0 |
| 301.5 | 995 | North National | 50.0 |
| 304.9 | 984 | Bordeaux (PTT) | 13.0 |
| 306.8 | 978 | Zagreb (Agram) | 0.75 |
| 307.1 | 976.6 | Falun | 0.5 |
| 308.4 | 972.6 | Vitus-Paris | 1.0 |
| 309.9 | 968 | Cardiff | 1.0 |
| 212.8 | 959 | Cracow | 1.5 |
| 313.9 | 955.6 | Genoa (Genova) | 10.0 |
| 315 | 950 | Marseilles | 1.6 |
| 318.8 | 941 | Naples (Napoli) | 1.5 |
| 318.8 | 941 | Soña (Rodnö Radio) | 1.0 |
| 319.7 | 936 | Dresden | 0.25 |
| 321.9 | 932 | Göteborg | 10.0 |
| 325 | 923 | Breslau | 60.0 |
| 328.2 | 914 | Poste Parisien | 60.0 |
| 331.4 | 906 | Milan | 50.0 |
| 335 | 896 | Poznan | 1.9 |
| 337.8 | 888 | Brussels (No. 2) | 15.0 |
| 342.1 | 877 | Brunn (Brno) | 35.0 |
| 345.2 | 869 | Strasbourg (PTT) | 11.5 |
| 348 8 | 860 | Barcelona (EAJ1) | 8.6 |
| 351 | 855 5 | Leningrad (RV20) | 20.0 |
| 352.1 | 852 | Graz | 7.0 |
| 355.8 | 843 | London Regional | 50.0 |
| 360.5 | 832 | Mühlacker | 60.0 |
| 363.4 | 825.5 | Algiers (PTT) | 16.0 |
| 365.5 | 820 7 | Bergen | 1.0 |
| 366.2 | 819 4 | Seville (EAJ5) | 1.5 |
| 366.3 | 819 | Fredriksstad | 0.7 |
| 368.1 | 815 | Bolzano | 1.0 |
| 368.5 | 814 | Helsinki | 13.2 |
| 369.3 | 812.1 | Radio LL (Paris) | 1.0 |
| 372.2 | 806 | Hamburg | 1.5 |
| 376.4 | 797 | Scottish Regional | 50.0 |
| 380.7 | 788 | Lvov | 16.0 |
| 385 | 779 | Radio Toulouse | 60.0 |
| 385 | 779 | Stalino (RV26) | 10.0 |
| 388.5 | 772 | Archangel | 10.0 |
| 389.6 | 770 | Frankfurt-a-m. | 1.5 |
| 394 | 761 | Bucharest | 12.0 |
| 398.9 | 752 | Midland Regional | 25.0 |
| 403 | 743 | Söttens | 25.0 |
| 408 | 734 | Katowice | 12.0 |
| 413.8 | 725 | Athlone (tests) | 60.0 |
| 413.8 | 725 | Dublin | 1.2 |
| 416.4 | 720.5 | Radio Maroc (Rabat) | 2.5 |
| 419 | 716 | Berlin | 1.5 |
| 423.4 | 707 | Madrid (Espana) | 2.0 |
| 424.3 | 707 | Madrid (EAJ7) | 2.0 |
| 431 | 695 | Belgrade | 2.8 |
| 431 | 696 | Parede (tests) | 1.5 |
| 435.4 | 689 | Stockholm | 55.0 |
| 441.2 | 680 | Rome (Roma) | 60.0 |
| 447.1 | 671 | Paris (PTT) | 7.0 |
| 453.2 | 662 | Danzig | 0.5 |
| 453.2 | 663 | Klagenfurt | 0.5 |
| 455 | 659 | Radio Agen | 0.5 |
| 459.4 | 653 | Beromuenster | 60.0 |
| 456.6 | 557 | San Sebastian (EAJ8) | 0.6 |
| 465.8 | 644 | Lyons (PTT) | 1.6 |
| 469.8 | 640 | Tartu | 0.5 |
| 472.4 | 635 | Langenberg | 60.0 |
| 480 | 625 | North-Regional | 50.0 |
| 488.6 | 614 | Prague | 120.0 |
| 495.8 | 605 | Trondheim | 1.2 |
| 500.8 | 599 | Florence (Firenze) | 20.0 |
| 508.5 | 590 | Astrakhan (RV35) | 10.0 |
| 509.3 | 589 | Brussels (No. 1) | 15.0 |
| 518.1 | 579 | Vienna | 15.0 |
| also testing on 1,254 m. from 7 p.m. (Mon., Wed., Sat.). | | | |
| 525.4 | 571 | Riga | 15.0 |
| 527 | 569.8 | Palermo | 3.0 |
| 532.9 | 563 | Munich | 1.5 |
| 541.5 | 554 | Sundsvall | 10.0 |
| 550 | 545 | Budapest (1) | 18.5 |
| 559.7 | 536 | Kaiserslautern | 1.5 |
| 559.7 | 536 | Augsburg | 0.3 |
| 564.4 | 531.5 | Wilno | 16.0 |
| 564.9 | 531 | Hanover | 0.3 |
| 569.1 | 527.1 | Grenoble (PTT) | 2.0 |
| 569.3 | 527 | Freiburg | 0.25 |
| 574.7 | 522 | Ljubljana | 5.2 |
| 675 | 444 | Oufa (RV22) | 10.0 |
| 678.7 | 442 | Lausanne | 0.6 |
| 710.4 | 417 | Moscow (RV2) | 20.0 |
| 748 | 401 | Ostersund | 0.6 |
| 759.5 | 395 | Geneva | 1.25 |
| 848.7 | 353.5 | Rostov (Don) | 20.0 |
| 882 | 340 | Saratov | 20.0 |
| 937.5 | 320 | Kharkov (RV4) | 20.0 |
| 967.7 | 310 | Alma Ata | 10.0 |
| 1,000 | 300 | Leningrad | 100.0 |
| 1,034.5 | 290 | Kiev | 100.0 |
| 1,071.2 | 280 | Tiflis (RV7) | 100.0 |
| 1,071.4 | 280 | Scheveningen-Haven | 10.0 |
| 1,083 | 277 | Oslo | 60.0 |
| 1,107 | 271 | Minsk (RV10) | 35.0 |
| 1,117.4 | 268.5 | Moscow Popoff | 40.0 |
| 1,153.8 | 260 | Kalundborg | 7.5 |
| 1,170 | 256 | Taschkent | 25.0 |
| 1,190.5 | 252 | Luxemburg | 100.0 |
| 1,200 | 250 | Istanbul | 5.0 |
| 1,200 | 250 | Reykjavik | 21.0 |
| 1,229.5 | 244 | Boden | 0.6 |
| 1,252.6 | 239.5 | Vienna Exp. | 8.0 |
| 1,260 | 238 | Bakou | 35.0 |
| 1,304 | 230 | Moscow (Trades Upions) | 165.0 |
| 1,348 | 222.5 | Motala | 30.0 |
| 1,380 | 217.4 | Novosibirsk (RV6) | 100.0 |
| 1,411.8 | 212.5 | Warsaw | 120.0 |
| 1,445.7 | 207.5 | Eiffel Tower | 13.5 |
| 1,481.5 | 202.5 | Moscow RV1 | 500.0 |
| 1,538 | 195 | Ankara | 7.0 |
| 1,554.4 | 193 | Daventry (Nat.) | 30.0 |
| 1,600 | 187.5 | Irkutsk (RV14) | 10.0 |
| 1,620 | 185 | Norddeich KVA | 10.0 |
| 1,634.9 | 183.5 | Zeesen | 60.0 |
| 1,725 | 174 | Radio Paris | 75.0 |
| 1,796 | 167 | Lahti | 54.0 |
| 1,875 | 160 | Huizen | 8.5 |
| 1,910.8 | 157 | Sverdlovsk (RV38) | 20.0 |
| 1,935 | 155 | Kaunas | 7.0 |
| 2,625 | 119 | Königswuster-Hausen (press) | 20.0 |
| 2,650 | 113 | Eiffel Tower | 15.0 |
| 2,900 | 103.5 | Königswuster-Hausen (press) | 15.0 |
| 4,000 | 75 | Königswuster-Hausen (press) | 15.0 |

## "THE 'NEW CENTURY SUPER'"

(*Continued from page* 848).

### The Most Modern Set of To-day

an adequate range of control and negligible distortion.

Fortunately, there are now available variable-mu screen-grid valves, and it is only necessary to adjust their grid-bias in order to vary the amplification over a wide range. With two stages of intermediate-frequency amplification the maximum magnification is enormous, but by adjusting the control it is possible to cut this down to very little.

Actually, the total current can be kept at a reasonable figure by using the right valves. A pentode output valve, for example, will handle a signal of the desired strength for relatively little high-tension. This type of valve has been proved to have a good life, and may be used with confidence. You must be careful not to break the plate circuit before switching off, but apart from this there are no snags.

A good deal of work has gone into the production of this new super-heterodyne receiver, working from batteries, and tests have shown that it has a remarkable performance. It is naturally much better than the original "A.W." "Century Super," and I feel that it will meet the needs of a large number of readers.

W. JAMES.

### Super Thrills with the Super-het

in producing just what is required to complete the picture, has still further simplified our task.

Of course, we have not beaten Mother Nature completely. We have not been able to introduce a correction device which will change opera to jazz, or talks to music, and we have no thunder-storm eliminator, but I think you will agree that all the things you look for in a good set have been properly attended to.

PERCY W. HARRIS.

# THE SCOTTISH SHOW

THE Scottish National Radio Exhibition which is being held in the Waverley Market, Edinburgh, closes this Saturday, October 22. Readers who have not yet taken advantage of this opportunity to see the latest wireless goods displayed in this popular centre of Edinburgh are strongly advised to do so. An accompanying list shows that at the Scottish National Show are represented not only the leading radio firms in Scotland, but manufacturers of National repute.

The Exhibition is organised under the auspices of the Radio Manufacturers' Association and the B.B.C. has an exhibit of outstanding interest. This is a model studio from which programmes which would normally be put on in the Scottish Broadcasting House in Queen Street, Edinburgh, are staged every day at the Exhibition.

The admission is 6d. and special arrangements have been made for those going to the Show to obtain vouchers entitling their holders to travel from any station in Scotland to Edinburgh at single fare for the double journey. Particulars of this scheme and any other details in connection with the Scottish National Show can be obtained at the Organisers' Office, 6-7 Waverley Market, Edinburgh.

LIST OF EXHIBITORS THIRD SCOTTISH NATIONAL RADIO EXHIBITION, WAVERLEY MARKET, EDINBURGH

Peter H. Ronaldson
Thomson & Brown Bros., Ltd.
Ultra Electric, Ltd.
L. McMichael, Ltd.
The British Radiophone, Ltd.
A. Borland.
Edinburgh Rubber Co.
Partridge, Wilson & Co.
Allied Music Traders, Ltd.
R. S. Macrae.
John Ritchie & Co.
Oldham & Son, Ltd.
Wood & Cairns, Ltd.
H. Clarke & Co. (Manchester), Ltd.
Itonia, Ltd.
Robt. B. Donaldson.
H. G. Rawson (Sheffield and London), Ltd.
E. K. Cole.
Chloride Electrical Storage Co. Ltd.
The Edison Swan Electric Co., Ltd.
Philips Lamps, Ltd.
Chas. A. Osborn
The Marconiphone Co., Ltd.
Igranic Electric Co., Ltd.
Roberts Radio.
Epoch Radio Manufacturing Co., Ltd.
Radiovision, Ltd.
Mullard Wireless Service Co., Ltd.
Ever Ready Co. (G.B.), Ltd.
Spensers (Scotland), Ltd.
Jenners, Princes Street, Edinburgh, Ltd.
D. & G. Innes
National Accumulator Co., Ltd.
A. C. Cossor, Ltd.
The British Broadcasting Corporation
A. H Baird
Michael Black, Ltd.
T. T. Young & Co.
The General Electric Co., Ltd.
Psychon, Ltd.
Murphy Radio, Ltd.
James Robertson
Kenwell Radio, Ltd.
Gilbert Ashton & Co.
Radio Gramophone Development Co., Ltd.
Electrical and Radio Products (1931), Ltd.
Henry Tatton & Son
Caledonian Wireless Colleges, Ltd.
Baxendale & Co., Ltd.
Simpsons Electricals, Ltd.
The Clydesdale Supply Co. (1922), Ltd.
Stenibac (Cabinets), Ltd.
Siemens Electric Lamps and Supplies, Ltd.
Sunbeam Electric, Ltd.

TURN TO PAGE 837
The set of the century—the "New Century Super"!

"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.

# OUR LISTENING POST

By JAY COOTE

RECEPTION conditions, generally, during the past week have vastly improved and I have been able to register the reappearance of a number of transmissions which, although constituting nightly logs last winter, had entirely faded away during the spring and summer months. Amongst these are Reykjavik, Ljubljana, and Riga. The first named was well received on several nights, and in particular at the end of the week, as it keeps up its broadcast of dance music on Saturdays until midnight, which corresponds to our 1 a.m. G.M.T. In addition, I picked up on two evenings what appeared to be test transmissions from Rostov-Don (U.S.S.R.) on 848.7 metres. From a 4-kilowatter, according to reports, it has developed into a high-power station and, notwithstanding its distance from London, was clearly heard between 9.45 and 10.15 p.m. G.M.T. The studio, similar to most of the Russians, possesses both a man and woman announcer.

### The Power Goes Up

If Hilversum on 296.1 metres is one of your favourite stations, its increased power during the evening will have been welcome. The new 20-kilowatt transmitter does not work during the daytime. In addition to the extra power, the station has been equipped with an ultra-modern vertical aerial some 148 metres high. Personally, I am very pleased that the A.V.R.O. and V.A.R.A. broadcasts now occupy the lower channel for a further three months.

Beromuenster and Sottens now appear in my log with three stars against them as reliable stations to which to turn on any evening. Moreover, the Berne, Basle, and Zurich studios, in order to give their listeners an insight into foreign programmes, have decided to carry out relays at regular intervals. Curiously enough, it was through Beromuenster I heard the best relay of the opera *Faust* as performed at Paris on October 8. Both Ecole Supérieure and the Eiffel Tower, which took it, were poor transmissions.

### Berlin on Short Waves

This reference to relays also reminds me that Berlin has been carrying out tests on short waves with Buenos Aires as a preliminary to an interchange of programmes. They will take place on Tuesdays and Fridays between 10 and 11 p.m. G.M.T. It will also be possible to hear them through Zeesen on 31.38 metres as well as through most of the German stations on the broadcast band.

Whether it is possible to pick up broadcasts from the experimental station at Craiunelu on 2,000 metres I cannot say, but freak reception also exists on the longish waves, and it might be worth your while to make a search for this Rumanian station. Its power is 1 kilowatt and its duty that of providing field measurements to assist in finding a suitable site for the high-power transmitter which Budapest intends to install.

A correspondent recently wrote to me that on a wavelength between 1,800 and 2,000 metres he had heard a call, "*Hallo ! Hallo ! Vitajé*," but failed to trace it. Should you hear this at any time, bear in mind that the official call-letters allotted to Radio Paris are F8ÁJ, or in French (phonetically) *Eff-wit-ah-ezhay*, and consequently this was a test by the Radio Paris transmitter.

But here is a puzzle. Has anybody heard a call on about 439 metres, in possibly Spanish or Portuguese, which sounded something like *Radio Mareeko*? I am told that it was picked up in the early hours of the morning, and it does not tally with the name of any existing station in Europe.

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