

STARTLING NEW SET: FREE BLUEPRINT

Amateur Wireless

and
Radiovision

ALSO FREE 8-PAGE
SUPPLEMENT
FOR BEGINNERS

Every
Wednesday

3^D

Vol. XXII. No. 555.

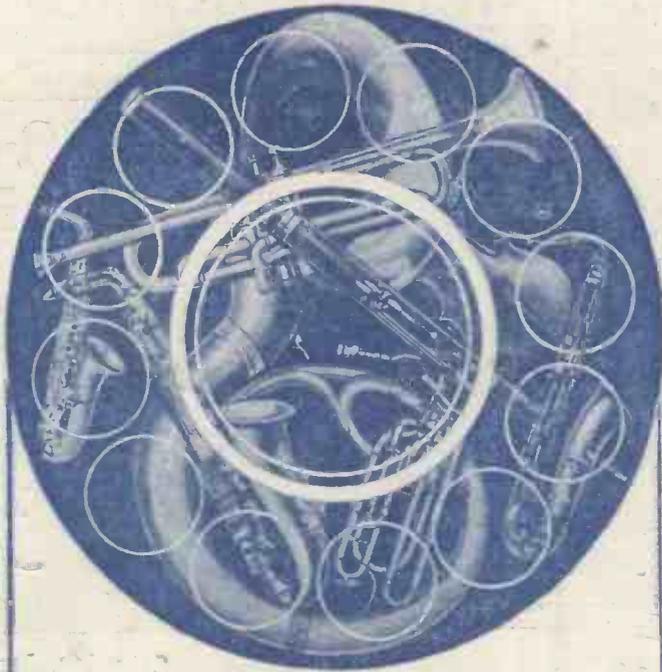
Saturday, January 28, 1933

THE MELODY RANGER



IT'S NEW
IT'S DIFFERENT
IT'S GUARANTEED

COVERS FOUR WAVEBANDS AT THE TOUCH OF A SWITCH



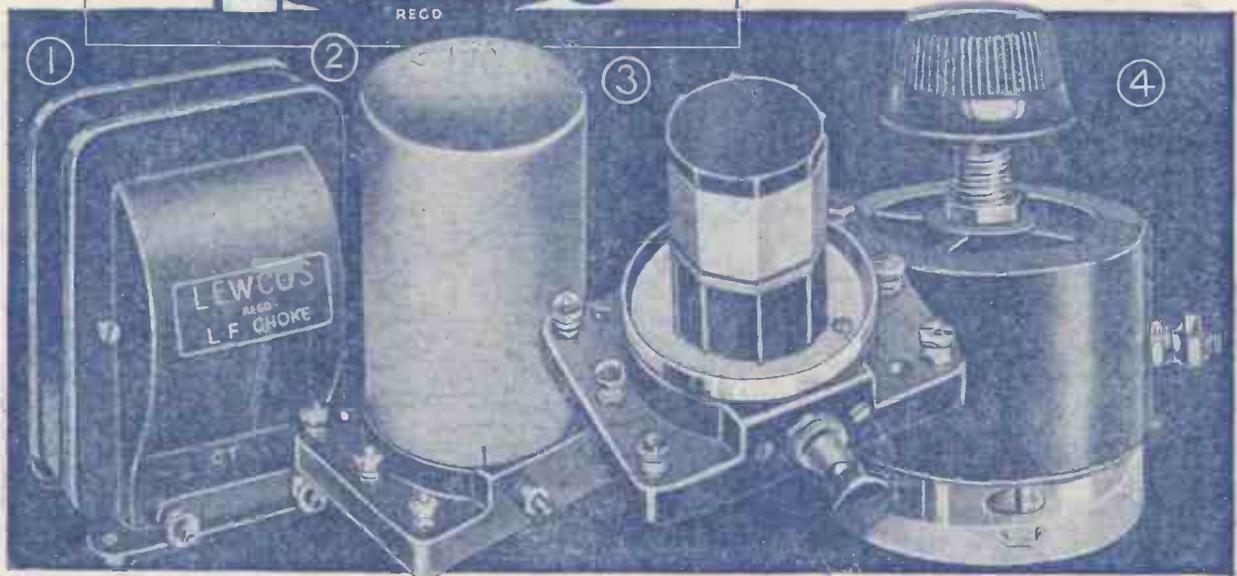
**ONLY
PERFECTION
IN DETAIL
CAN GIVE
PERFECTION
IN RESULTS**

Make sure of brilliant success by insisting on Lewcos Components. They are of one grade only—the highest that perfect precision in manufacture and tested quality of material can attain.

Write for free descriptive leaflets indispensable to all constructors who are aiming at the most advanced radio practice.

- | | | |
|--------------------------------|----------------------------|---------------------|
| 1. The L.F. Choke | Price 12/6 | Leaflet Ref. No. 76 |
| 2. The T.O.S. Coil | Price 8/6 | " " 75 |
| 3. The A.T.G. Coil | Price 8/6 | " " 75 |
| 4. The Potentiometer | Price 3/- to 8/- | " " 79 & 81 |

Lewcos RADIO COMPONENTS



LEWCOS RADIO PRODUCTS FOR BETTER RECEPTION

THE LONDON ELECTRIC WIRE COMPANY AND SMITHS LTD (Section A), CHURCH RD., LEYTON, LONDON, E.10

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

Recommended for the "MELODY RANGER"

DI-FEED



THE NEW L.F. TRANSFORMER
WITH THE HIGH PERMEABILITY

'K' METAL CORE

R.I. have evolved an interesting, inexpensive transformer, the "Di-Feed." This model follows the famous series of nickel alloy core transformers, the "Hypermu," "Hypermite," and "Parafeed."

The design of the "Di-Feed" is based on further metallurgical research in nickel alloys resulting in "K" metal, which is used for the core. This remarkable alloy enables the primary winding to carry direct current up to 4 milliamperes without saturation with a no load inductance of approximately 30 henries. The overall curve is excellent due to the special method of winding, as employed in the famous "Hypermu," which reduces the leakance to an absolute minimum. A section of the winding is shown in the illustration.

The "Di-Feed" is equally suitable for parallel-feed if this method be preferred. It is a small transformer fitted in a beautiful bakelite case and is exactly right for modern compact set building.

"Di-Feed" is without doubt a fine job, the accuracy of assembly and neat finish are fully up to the high standard introduced by R.I. in their first transformer in 1922 and the famous R.I. models that have followed.

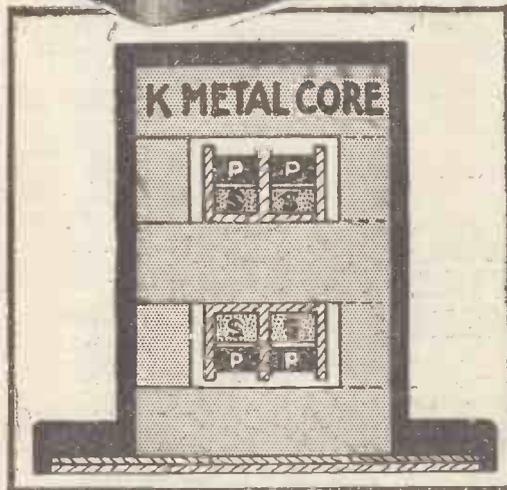


Illustration showing "K" METAL CORE and method of winding as employed in the "Hypermu"

R.I. "DI-FEED" L.F. INTERVALVE TRANSFORMER

List No. DY33. Primary D.C. Resistance, 780 ohms. Secondary D.C. resistance, 3,700 ohms. Primary Inductance, 30 henries. Ratio $1/3\frac{1}{2}$ or $1/4\frac{1}{2}$ (auto connected). Size $2\frac{1}{2} \times 1\frac{1}{2} \times 2\frac{1}{2}$ ins. high.

7/-

A leaflet with diagrams gives fullest information to constructors and is enclosed in each carton. Free copies are obtainable from your dealer or direct from R.I.



The Advt. of Radio Instruments Ltd., Croydon, Surrey. Phone: Thornton Heath 3211.

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



1805 A.D.

“England expects every man this day . . . !”

1933

You can expect
The **LION**
H.T. BATTERY
to do its duty
every day

. . . and besides giving you efficient service and giving your Set greater and more lasting power, the Lion H.T. Battery COSTS LESS! It is made in one of the largest factories in Great Britain devoted exclusively to battery manufacture. It is made by men who know what you want and who know how to produce it at the price you want to pay. It is the battery with the lowest internal resistance.

● LOOK AT THE PRICES!

- 60v. H.T. 4/6 ● 100v. H.T. 7/-
- 120v. H.T. 9/- ● 9v. G.B. 10d.
- 4½v. Pocket Lamp Battery 4½d.



Sold under Limited Licence

● BRITISH MADE ●

YOUR DEALER CAN SUPPLY

Advt. of VINGES DRY BATTERIES LTD., LION WORKS, GARFORD STREET, LONDON, E.14. Telephone: EAST 1902

MAKE MONEY by MAKING Wireless Batteries,

IF you are a wide awake man, eager to make MORE MONEY, anxious to make ends meet and to enjoy more comforts; if you have had a “cut” in salary, are on “short time” and want to make up the deficiency—HERE IS THE FINEST OPPORTUNITY IN THE WORLD! Millions of people are regularly wanting millions of wireless batteries. YOU can MAKE them in your spare time, according to our patented simplified process and improved formula. SELL them when you like and where you like—and build up a spare time business in a BIG INDUSTRY which is increasing by leaps and bounds!

MILLIONS OF BATTERIES WANTED!



**TEN
IN EVERY
FOURTEEN
BRITISH
HOMES
ARE WITHOUT
ELECTRICITY—**

which means that your market consists of 5/7ths of the whole population or

**6.000.000
POTENTIAL!
CUSTOMERS!**

because YOU will be able to supply them with BETTER Batteries at a LOWER Price. This means regular sales and ever increasing purchasers. No previous knowledge of wireless or electricity is needed. No expensive plant or large capital outlay. You can start with just small, simple tools and hand presses. So simple is the work that the children can help you!

**Ensure for Yourself
a Prosperous New
Year!**
Make pounds in your spare time week in and week out throughout the year—here's your Opportunity!

**One Man
Earned £960
in Spare Time**

Here is the chance of a lifetime! Profits up to £300 a year per licence! We GUARANTEE you a weekly PROFIT provided your output reaches the required and easily attainable standard of efficiency. All instructions are ABSOLUTELY FREE and are continued until you are proficient.

No drudgery, millions of customers waiting and a **GUARANTEED PROFIT**

Full details HOW TO START are FREE and the coupon below will bring them to you. Write AT ONCE—without delay—and snap up the opportunity you have so long been awaiting.

SEND THIS FORM

To Mr. V. England-Richards,
The England-Richards Co., Ltd.,
1224, King's Lynn, Norfolk.
Sir—Please send me at once, and FREE, full details as to how I can Make Money at Home in my spare time, and also Testimony from those already making money. I enclose 2d. in stamps for postage.
Print your name and address boldly in capital letters on a plain sheet of paper and pin this coupon to it. “Amateur Wireless,” 28,1/33.

A POWER BATTERY ENTHUSIAST

writes

12/10/32.

"I wish to inform you that I purchased a Siemens V.7 Type 100 volt battery on August 1st.1931.

This battery has been used every day for about 5 to 6 hours a day (on a 3 Valve set) and it is still reading over 80 volts.

I recommend your batteries to all my friends and those that have accepted my advice have since thanked me and say that in future they will use no other make!"

S.E.7.

This testimonial demonstrates the extraordinary service which can be obtained from a "FULL O' POWER" Battery. Naturally the actual length of service depends on the individual requirements of Radio Sets, but we are confident no other battery will give you as good service.



SIZE V.7
 100 VOLTS POWER
 In these times a Power Battery is a real economy. Three times the service at less than double the cost of a popular type battery, and you get more volume and purer tone.
 PRICE 20/-
 V.8, 120 volts. 24/-



FULL O'POWER RADIO BATTERIES

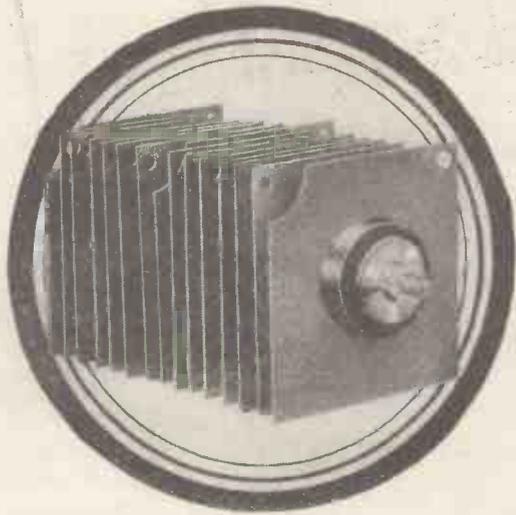
ARE DEFINITELY THE BATTERIES TO USE WITH YOUR SET

APPLY TO YOUR DEALER FOR LEAFLET 667 giving particulars and prices of all types, or direct from us at address below.

Dept. of SIEMENS ELECTRIC LAMPS AND SUPPLIES LIMITED, 38/39, Upper Thames Street, London, E.C.4.

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

DO YOU WANT.....



Do you want an A.C. Mains Receiver that will give you full and lasting quality for years without renewal of the rectifier? A set that will give you endless pleasure with the minimum of worry? Or do you want the expense of periodically replacing the rectifier; breakdowns; repair bills; transit costs; or differences with the maker or retailer?

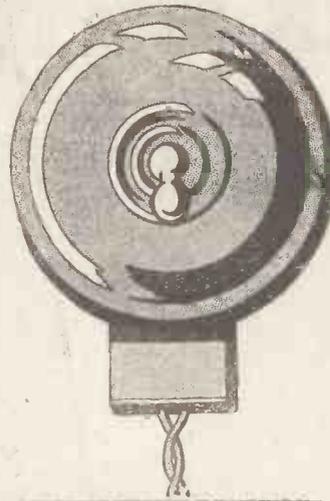
Buy a Westinghouse-equipped set and get better and more reliable reception, with a **dead-silent background**, now and for years to come.

If you are not yet acquainted with the advantages of **Metal Rectification** write for a copy of the "All-Metal Way, 1933."

WESTINGHOUSE METAL RECTIFIERS

The Westinghouse Brake & Saxby Signal Co. Ltd.
82, YORK RD., KING'S CROSS, LONDON, N.1

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



RUN YOUR SET ANY SET off the **ELECTRIC LIGHT**

In the new T.C.C. Book, "The Design and Construction of Radio Power Units," complete details are given how to construct four really efficient A.C. Power Units with one or other of which you can once and for all dispense with costly and inefficient batteries—you can supply your Set *continuously* with adequate power. This book also tells how to eliminate interference. For D.C. users there is also valuable data on D.C. apparatus. And there is also a *practical* Rotary Resistance Calculator. Ask your dealer for a copy to-day.

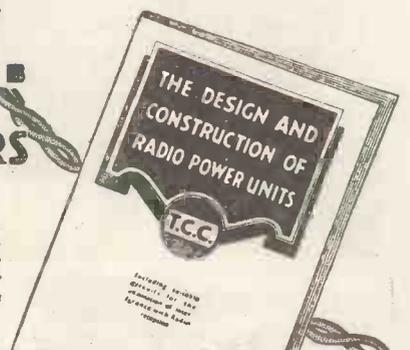
CONTENTS

- RADIO POWER UNITS—and how to build them.
-
- NOTES ON A.C. POWER UNITS.
-
- OPERATING RECEIVERS ON D.C. MAINS.
-
- ABOUT T. C. C. ELECTROLYTIC CONDENSERS.
-
- ELIMINATION OF INTERFERENCE.
-
- FOUR T.C.C. POWER UNITS (A.C.) with full constructional details.
-
- ROTATING RESISTANCE CALCULATOR.

T.C.C. ALL-BRITISH CONDENSERS

ASK YOUR DEALER

If you have any difficulty in obtaining a copy of this book, fill in the coupon and post to us with six penny stamps. We will send you a copy by return.



COUPON

To Publicity Dept., The Telegraph Condenser Co. Ltd., Wakes Farm Road, N. Acton, London, W.3.

Please send me a copy of your book, "The Design and Construction of Radio Power Units," for which I enclose six penny stamps to cover cost and postage.

NAME.....

ADDRESS.....

A. W. 28/1/33.....

the "MELODY RANGER" is no better than its valves!

The "Melody Ranger," sensational as it is acknowledged to be, is, like every other set, 'no better than its valves.' In fact, the more advanced the design and the more outstanding the performance of any receiver, the more essential it is to ensure that the valves fulfil its most exacting demands consistently and efficiently.

Marconi valves, bearing the most famous name in radio, are renowned for dependably high efficiency and extreme economy in working. Fit a Marconi valve team in your "Melody Ranger" and you will secure unequalled range and tone, coupled with the absolute reliability and economy which only Marconi valves can provide.

THE CORRECT MARCONI VALVE TEAM IS :-		
High Frequency	Marconi VS2 (met)	16/6
Detector	Marconi HL210	7/-
L.F.	Marconi HL210	7/-
Power	Marconi LP2	8/9

MARCONI VALVES

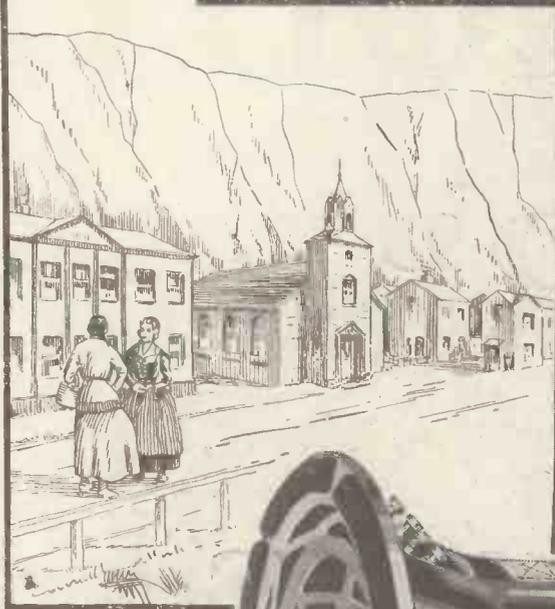


are chosen by the B.B.C., Imperial Airways, Trinity House lightships and Beacon Stations, Metropolitan Police, Imperial and International Communications, large liners, etc., etc., for their

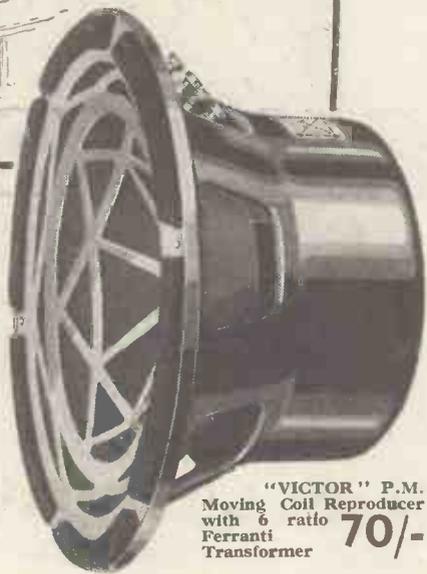
dependable efficiency.

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

ICELAND



The Sun never sets



"VICTOR" P.M. Moving Coil Reproducer with 6 ratio Ferranti Transformer **70/-**

Though the climatic conditions of Iceland are not so vastly different from those obtaining in Northern Europe, its remoteness from manufacturing centres demands consistency of performance in imported articles, and it is noteworthy that we have been favoured with orders from the Icelandic Broadcasting Corporation—proof positive of the enduring reliability of R. & A. Reproducers.

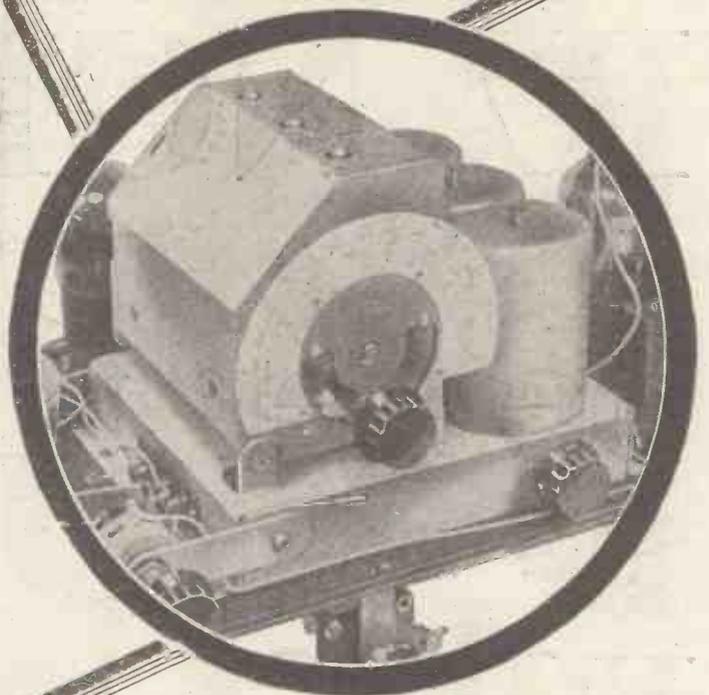
Ask your Dealer to demonstrate. Prices range from 15/- to 70/-.

ON

REPRODUGERS & AMPLIFIERS, LTD., WOLVERHAMPTON.



NOTHING can take the place of RADIOPAK



THE band-pass "Radiopak" simplifies set construction as well as it simplifies selectivity. No development in modern component design is so important as this to the amateur constructor. Revolutionary in conception and design, neat, compact, and robust, above all the "Radiopak" is efficient. There is no alternative to the "Radiopak."

Consisting of screened coils, with provision for reaction, ganged condenser with drive, combined volume control, and on-off power switch, mounted neatly on a metal chassis, the "Radiopak" needs only the addition of valves, low-frequency circuit, loud-speaker, and batteries or mains unit to form a complete receiver.

Because the coils and condenser are matched with the highest possible degree of accuracy before leaving our factory, all ganging difficulty is eliminated, and each unit is supplied with a tuning scale calibrated in wavelengths.

- Width along front of baseboard, 9 1/4 in.
- Depth " " " " 6 in.
- Height " " " " 6 1/2 in.
- Supplied with full-size fixing template.
- STANDARD TYPE 535A fitted with 10,000-ohms potentiometer **£3 0 0**
- Extra Knob 6d. each



THE BRITISH RADIOPHONE LTD. ALDWYCH HOUSE, ALDWYCH, W.C.2 Telephone: HOLBORN 6744

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Ring out the old: ring in the new

Triumph of plate-less accumulators

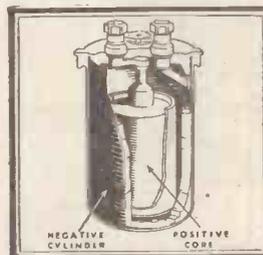
Nuisance of frequent re-charging overcome at last

THE familiar glass-box accumulator is a thing of the past. The new accumulator is a handsome cylinder (covered in bakelite) giving twice the ampere-hour capacity. Thus, though no bigger than your 40 amp.-hour accumulator and costing little more, it needs charging only half as often. It is also much more durable.

This revolution is owed to the work of John Fuller, Faraday's collaborator and a founder of the battery industry—work that his son and grandson perfected. The negative electrode, a pasted lead cylinder, itself acts as the battery container—a central core forms the positive. With no "grids" to interfere, you get complete effect throughout the active paste. Brings your wireless up to date—the saving on re-charging alone would repay you!

BLOCK

plate-less accumulators



80 AMP HRS. 11/6

THE NEW ACCUMULATOR

1. Negative electrode is itself the battery's container—nearly all weight is thus active material.
2. Circular, gridless formation gives uninterrupted action throughout the paste.
3. Total result—Twice the amp. hour capacity per lb. weight.
4. No sulphation; Won't run down when inactive; No grid buckling; Extraordinarily long life; Almost unbreakable.

TAS, Bb.15

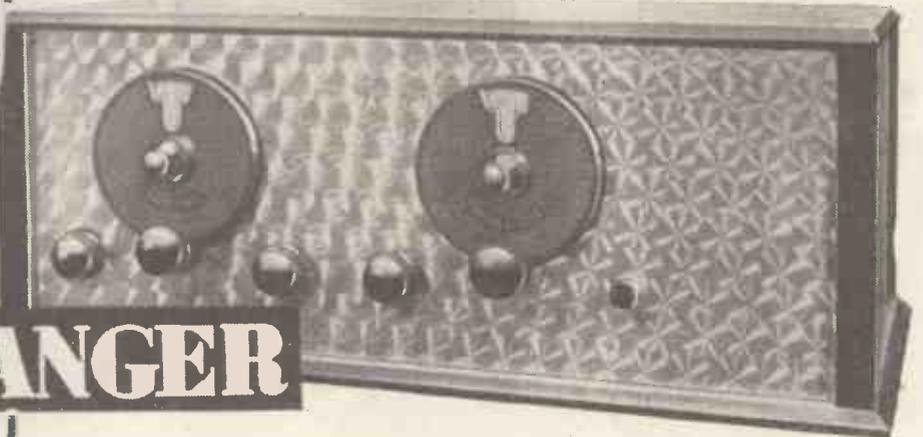
TEL. GRA : 3346.
BLOCK BATTERIES LTD, ABBEY ROAD, BARKING, ESSEX.

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

THE KIT THE AUTHOR USED!

**BEWARE
OF
SUBSTITUTE
KITS** BE SAFE
BUY BY POST
FROM
PETO-SCOTT

- **THE NO SUBSTITUTE KIT**
- **COMPLETE DOWN TO THE LAST SCREW**
- **COSTS YOU NOT A PENNY MORE**



MELODY RANGER

**DOMINATING
FEATURES . . .**

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

**. . . VITAL TO
100% SUCCESS**

The **PILOT AUTHOR KIT** is an **EXACT DUPLICATE** of the "Melody Ranger," **SEEN, TESTED** and **ACCLAIMED** by our **TRADE FRIENDS'** letters in "AMATEUR WIRELESS," January 14, 1933. **READ THESE EXTRACTS:**

G. P. Kendall (of READY RADIO, Ltd.), says: "Selectivity is adequate, range and sensitivity are quite outstanding. Altogether, a very fine broadcast receiver."

Donald P. Marcus (of DIRECT RADIO) says: "Your new 'Melody Ranger' will be the outstanding set for 1933."

J. Godchaux Abrahams, says: "In presenting such a receiver . . . you have, at least, anticipated 1934."

J. H. Reyner, B.Sc., A.M.I.E.E., says: "The achievement of the 'A.W.' Technical Staff . . . is a veritable triumph."

Why run the risk of departing from the Author?—
BUILD YOUR "MELODY RANGER" WITH A

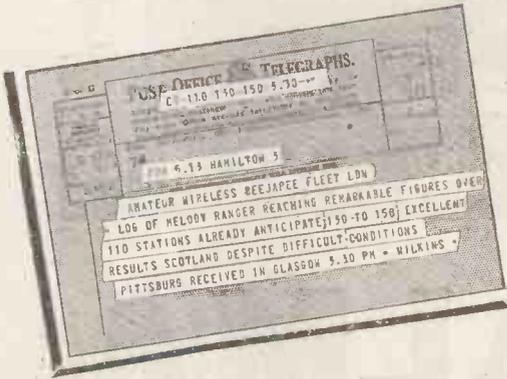
PILOT AUTHOR KIT

TIME HAS PROVED "THE AUTHOR KNOWS BEST!"

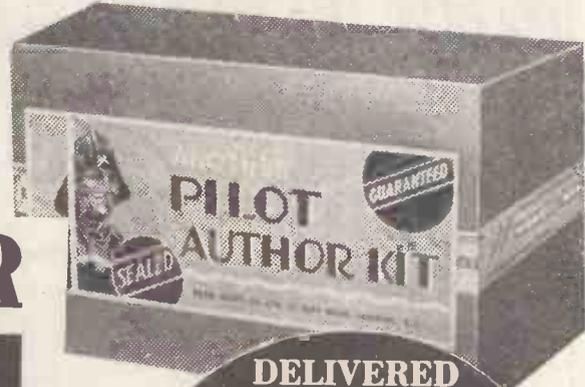
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OVER 150 STATIONS

says Mr. S. Rutherford Wilkins with his
AUTHOR KIT



You can only duplicate Mr. S. Rutherford Wilkins' results with a PILOT AUTHOR KIT. There is no substitute



MELODY RANGER PILOT AUTHOR KIT

EXACT TO SPECIFICATION

Complete with wiring-diagrams and operating instructions

THESE ARE THE PARTS THE AUTHOR USED

	£	s.	d.
1 Peto-Scott aluminium panel, 18 in. by 7 in., ready drilled	5	0	
1 Peto-Scott baseboard, 18 in. by 10 in.	1	6	
Peto-Scott screening foil, 18 in. by 10 in.			9
1 Peto-Scott aluminium screen, 9½ in. by 6 in., ready drilled	2	0	
1 Bulgin 50,000-ohms potentiometer, type VC36 with insulating washers	4	0	
1 type K.6 knob for volume control			4½
2 Lissen Universal 4-range coils, complete with two couplers and extension rod	1	10	0
2 Telsen 1-mfd. fixed condensers	4	6	
1 Dubilier 1-mfd. fixed condenser, type 9200	2	9	
2 J.B. .0005-mfd. variable condensers, type JL6	11	0	
1 Ready Radio .0003-mfd. variable condenser, type Micadi	3	0	
2 Ready Radio complete extension equipments and mounting brackets	2	0	
1 Ready Radio .0003-mfd. variable condenser, type Micalog	3	6	
2 Igranic Indigraph slow-motion dials, type VINIL	10	0	
1 Ready Radio low-loss screen-grid valve holder, type S.G. short-wave	1	6	
1 Ready Radio low-loss four-pin valve holder, type short-wave baseboard	1	3	
2 Ready Radio Standard four-pin valve holders	1	0	
1 Wearite H.F. choke, type H.F.0	6	6	
1 Sektun Standard H.F. choke	4	0	
1 Igranic short-wave H.F. choke	2	0	
3 Lissen fixed condensers, .0001 mfd., .002 mfd., .006 mfd.	2	0	
5 Graham Farish Ohmites (1,000 ohms, 30,000 ohms, 40,000 ohms, 1 megohm and 4 megohms)	7	6	
1 Graham Farish vertical mounting resistance holder			6
1 Bulgin Junior 3-point switch, S.30	1	0	
1 Lissen .00017-mfd. pre-set condenser	2	0	
2 Peto-Scott panel brackets	2	0	
1 Ready Radio L.F. transformer, 3-1	8	6	
2 Belling Lee type R terminals, marked			5
11 Belling Lee Midget marked wander plugs	1	10	
2 Belling Lee spade terminals, marked			4
1 Peto-Scott Red Triangle ebonite terminal strip, 2 in. by 2 in., ready drilled			3
2 Telsen terminal blocks			1 0
2 Peto-Scott coil tap plug mounts, with screws and ebonite distance pieces			1 3
6 Yards thin flex, connecting wire, screws, etc.			3 0
Copy "Amateur Wireless" (January 28th issue)			Gratis

KIT "A" CASH OR C.O.D. £5 6 0

PETO-SCOTT
"MELODY RANGER"
CABINET MODEL

Figured Hand Polished Oak American Type Cabinet. Soudly constructed of the very best materials. With lift-up lid. **15/-**

C.O.D.
All orders over 10/- C.O.D. charges and carriage paid

EASIWAY
NO DEPOSIT. Strict Privacy. No third party collections. We deal with you direct

CASH
All orders over 10/- sent carriage paid

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Carriage Paid
CASH or C.O.D.
KIT "A"
6 GNS.
with FREE Full size
Blueprint and Copy
Amateur Wireless

KIT "A" Author Kit comprising all FIRST SPECIFIED components including READY PRICED Engine turned Aluminium Panel as listed but less valves and cabinet. **11/6**
EASIWAY 12 MONTHLY PAYMENTS OF CASH or C.O.D. £6:6:0
4 Mullard Valves as specified £1:10:3

KIT "B"
As KIT "A" but with valves less cabinet, CASH or C.O.D. Carriage Paid. **£8 5 3**
or 12 monthly payments of 15/3

KIT "C" As KIT "A" complete with valves and Peto-Scott American type oak cabinet with lift-up lid. CASH or C.O.D. Carriage Paid. **£9 0 0**
or 12 monthly payments of 16/6

PILOT "MELODY RANGER" STRUCTAKIT
Comprises : 18-in. by 7-in. Aluminium Panel, ready drilled; 18-in. by 10-in. Baseboard; 18-in by 10-in Screening Foil; 9½-in. by 6-in. Aluminium Screen, ready drilled; 2 Panel Brackets; 2-in. by 2-in. Ebonite Strip, ready drilled; 2 Coil Tap Plug Mounts and Wire, Flex, Screws, etc., for panel and baseboard assembly of the "Melody Ranger" as specified by the Author. In sealed carton, CASH or C.O.D. **POST CHARGES PAID** **15/6**

PETO-SCOTT CO., LTD., 77 City Road, 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.

NAME.....
ADDRESS..... A.W.28/1/33

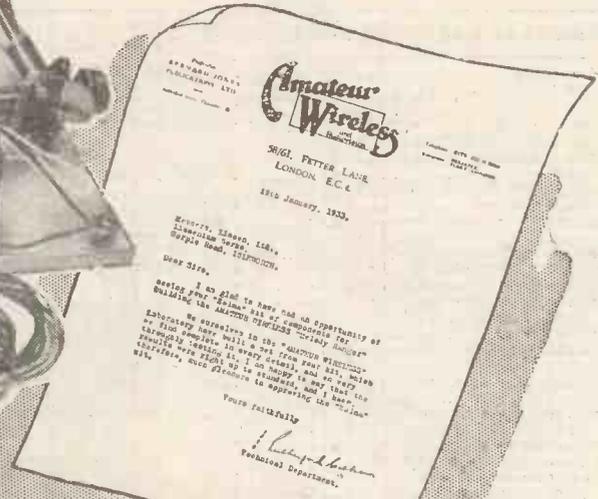
ANY ITEM SUPPLIED SEPARATELY—ORDERS OVER 10/- SENT C.O.D. CARRIAGE AND POST CHARGES PAID

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

The ORIGINAL DESIGNER Test Reports The A.W. MELODY RANGER



For ZALMA TEST REPORTED KITS



FULL
"MELODY RANGER"
RESULTS OBTAINABLE
WITH ZALMA KIT

Build your "A.W. Melody Ranger" with a Zalma Kit. Then you will be sure of getting full Melody Ranger results—see Mr. Rutherford Wilkins' Test Report. And then, too, you will save money and be sure of prompt delivery—the Zalma Kit complete is obtainable from your Radio Dealer.

1/- ZALMA BLUE PRINT FREE

Post this Coupon

To LISSEN LIMITED, "Zalma Dept. 1,"
Worples Road, Isleworth, Middlesex.
Please send me FREE your 1/- Zalma Blueprint of the "A.W. Melody Ranger."
Name
Address

ZALMA
KIT 'A' Includes every part required to build the set, complete except valves, batteries and accumulator.

CASH PRICE £5 5s. OR 13/- deposit and 12 monthly payments of 9/-

KIT 'B' As Kit "A" but including also four Lissen Valves—Metallised Screen-Grid S.G.215, Detector H.L.2, first low-frequency L.2, and Power Valve P.220.

CASH PRICE £6 15 9 OR 15/- deposit & 12 monthly payments of 11/9

ZALMA
TEST REPORTED
KITS

Your Radio Dealer can supply you with Zalma Kits on these Deferred Terms.

MADE BY LISSEN LTD.

WORPLE ROAD, ISLEWORTH, MIDDLESEX.



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

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W. JAMES.

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H. CORBISHLEY.

NEWS & GOSSIP OF THE WEEK

IT'S HERE

Enter the "Melody Ranger"

THIS week we present the sensational new receiver, the "Melody Ranger." Last week we told you of the extensive nation-wide tour which has been conducted with this set to prove it worthy of the introduction made this week. The "Melody Ranger" has been tried in every listening region over the country, and this week in a special bumper number it is presented in a fashion which marks a new step forward in radio journalism.

THE BLUEPRINT

STITCHED into every copy of this week's issue, so that it cannot fall out and get lost, is a full-size blueprint, printed in natural blue colour on white paper, which will make child's play of the construction of the "Melody Ranger." A full-size diagram is also given of all the wires used in this set. Three pages of large photographs show the step-by-step constructional features in building the set. You simply can't go wrong in building the "Melody Ranger."

FOR BEGINNERS

A Special Supplement

ALTHOUGH a large section of this week's issue is devoted to our sensational new receiver, beginners in radio are not overlooked. The "Wireless for Beginners" supplement this week is a special eight-page feature given as a free supplement in addition to every copy of "A.W." What with the free full-size blueprint, the special beginner's supplement and wiring guide for the "Melody Ranger," this is definitely a "gift" issue of "A.W." Next week's issue also will be a bumper number, full of good things and excellent value for the usual price of 3d.

THE WAVELENGTH MUDDLE

Getting Ready for Lucerne

ETHER congestion is getting worse and you need a good set like the "Melody Ranger" to pick out stations clear of interference. Experts, including representatives from the B.B.C., are getting plans ready for the next meeting of the International Broadcasting Union of Lucerne, when some new scheme will be formed to cut down station jamming. An authoritative article this week tells you what the experts will be up against at Lucerne.

VERSATILITY!

Henry's Many Roles

THERE are some versatile artists at Broadcasting House! Leslie Bridgewater, for example, not only conducts a Quintet, but is a composer and pianist of merit and is able to play every instrument in a modern orchestra. Peggy Cochrane made her broadcasting debut as a concert violinist, but now often takes part in cabaret as violinist, pianist and singer. Henry Hall conducts the B.B.C. Dance Orchestra, composes, makes special scores of dance tunes for his combination of instruments and plays the piano, to say nothing of the administrative work which he performs every day before entering on his musical tasks.

JACK AGAIN

Once a Month

ANOTHER broadcast by Jack Payne with his Band takes place in the National programme for February 13. These old friends of broadcasting are giving performances before the microphone at the rate of one a month to enable them to keep in touch with the listening public who now have the opportunity of seeing them in the flesh as well as hearing them by wireless.



The Free State Election: Mr. W. T. Cosgrave addresses a large meeting by radio-type public address equipment at Kells, Co. Meath

Also in this Issue—

FEATURES YOU SHOULD NOT MISS

All Over the World with the "Melody Ranger"

Practical Radio Dodges

Switching off from Another Room.

What Will Happen at Lucerne?

SPECIAL 8-PAGE SUPPLEMENT FOR BEGINNERS— "WIRELESS MADE EASY"— GIVEN FREE WITH EVERY COPY

THE NEW VIENNA

To Push out 120 kilowatts!

THE Austrian Radio Show which closed recently featured a scale model of the new Vienna station which will be working in a couple of months' time with 120 kilowatts. The new station is actually at Bisamberg, which is ten miles out of Vienna. By a strange coincidence, this new 120-kilowatt broadcaster will come on the ether within a few days of the U.I.R. wavelength meeting at Lucerne!

NOISY TRAFFIC SIGNALS

SOME listeners have complained recently of interference with radio reception caused by automatic traffic lights. We now hear that one or two of the large county and municipal authorities, when inviting tenders for traffic signals, have stipulated that they must not be "noisy" in a radio sense. One large firm of traffic signal manufacturers uses the charging time of a fixed condenser of large capacity (which charges through a variable resistance in series) to give the time signal for changing the lights. Noise is generally caused by arcing contacts in other types of traffic signal.

AMERICAN "NEWSPAPER" "STARS"

Relayed From Columbia

"HELLO, Fleet Street" is the title of a programme which is to come from America at the end of this month. The programme will originate in one of the New York studios of the Columbia Broadcasting System, who are presenting it

BUILD OUR STARTLING NEW SET—THE "MELODY RANGER"

NEWS & GOSSIP OF THE WEEK —Continued

as a final summing-up in a series of round-table discussions which they have recently broadcast under the title of "America's Grub Street Speaks." The participants in the discussion will include Mr. Richard Roy Smith, a New York publisher of note, on the subject

"ATALANTA" IN AFRICA
A FEW weeks ago in "A.W." a special photograph was published of the huge new "Atalanta" plane which is used by Imperial Airways for the Cairo to Cape Town Air Service. This aerial giant has now

latest success at the Adelphi Theatre. And now *Wireless Magazine* has paid him the compliment of naming its star February receiver the "Words and Music" Radiogram. This is a really de-luxe four-valver with two screen-grid stages for battery operation, which has picked

IT'S NEW—IT'S DIFFERENT—IT'S GUARANTEED

This issue is full of helpful features which will enable you to build "A.W.'s" sensational new set, the "Melody Ranger." In three illustrated pages the set is described in step-by-step fashion with large photographs showing all the constructional details. A Full-size Blueprint is stitched into every copy of this issue, while a full-size drawing of all the wires used in the set makes child's play

of wiring. The "Melody Ranger" itself is something entirely new in receiver design, and the way in which we present the constructional features this week marks a new note in radio journalism for the instructions are the most concise it is possible to give. You won't be disappointed with the "Melody Ranger"—it's new—it's different, it's guaranteed

of English and American Publishing; Mr. George Jean Nathan, editor, author and critic, on International Relationships among Authors; Mr. Ernest Boyd, the author, on International Criticism; and Mr. Theodore Dreiser on World Affairs and Literature.

WHAT ABOUT YOUR POEM?

THE B.B.C. is constantly searching for new talent in music—singing, playing or composing, in play-writing, in vaudeville and in all other branches of entertainment which can be transmitted successfully by means of the microphone. The B.B.C.'s latest invitation is extended to poets! It wants the late five-minute readings at the end of each night's programme from the studio to be representative of the loveliest poetry not only of the past but of the present, and it invites every listener to submit by February 28 poems from which a selection will be made. Those selected will be read at the microphone during the late readings in the month of April. Mr. Walter de la Mare and Mr. Eddie Marsh, editor of the volumes of "Georgian Poetry," will act as judges of the poetry submitted, and probably also Mr. T. S. Eliot. No restriction is set upon the theme, but no poem should be greater in length than can be read in five minutes. Any one listener should not send more than three poems, and they should be addressed to the B.B.C. marked "Poetry" on the envelope.

arrived in Africa and some interesting radio tests have been carried out during the trip by the Marconi engineers. The transmitter can go down to 40 metres, and some fine short-wave results have been obtained. For one thing, signals were heard over one thousand miles away from the plane.

UNIQUE ROYAL RECORD

ALTHOUGH millions of people throughout the Empire heard the broadcast by His Majesty The King to his people on Christmas Day, there must be many thousands who were unable to listen-in to His Majesty's message. It is therefore particularly interesting to know that H.M.V. have received permission from The King to issue a record of his speech. This was recorded on Christmas Day through a private telephone wire. The utmost secrecy was preserved until the finished record had been heard personally and approved by The King. He has now given his permission for the record to be placed on sale for the benefit of the British "Wireless for the Blind" Fund. All profits from the sale of this record, which has a special number, R.B.S.4359, will be devoted to this worthy charity.

"WORDS AND MUSIC" OF THE ETHER

NOEL COWARD is one of the most versatile men connected with the theatre to-day; "Words and Music" is the title of his

up seventy-five stations, including some American medium wavers. It is fully described in a special 16-page supplement which includes a half-scale blueprint.

PROGRESS AT DROITWICH

THINGS are moving rapidly in connection with Droitwich. The engineers have removed their testing gear from the proposed Wichbold site and the contract has been placed with Marconi's for the actual transmitter. It is now being built at Chelmsford and will be taken *en bloc* to the new site. Events have moved so rapidly that the legal arrangements for the Droitwich site have not yet actually been signed, sealed and settled. So the engineers had started building a transmitter for which there is, as yet, no definite site! This isn't as illogical as it seems, for the tests have shown that the 100-kilowatt outfit, at the least, is necessary, and even if there should be a last-minute hitch (extremely unlikely) in getting the desired spot at Droitwich, they know that some other site within a mile or so will be chosen.

GIANT VALVES

INCIDENTALLY, in connection with the new Droitwich transmitter, the power is so great that special new valves have been designed and will be used for the first time by the B.B.C. They are "hefty" enough to need a separate dynamo for the filament of each separate transmitting valve. They are, in fact, the biggest metal and glass valves yet made, and can handle 500 kilowatts.

BUDDING VAUDEVILLE STARS

THERE have been no developments in the vaudeville star quarrel between the B.B.C. and vested interests since the last announcement in "A.W." on this topic. But, unfortunately for the B.B.C., hundreds of enthusiastic amateurs are taking "pity" on the corporation and are offering their services for vaudeville hours. Letters from these keen but misguided folk show, in many cases, that they are not only not of professional status, but they haven't the vaguest idea of what the B.B.C. means. Clever vaudeville people have always been wanted by the B.B.C., but new talent seems hard to find. The dispute with the G.T.C. is not going to make any difference to the strict rules regarding auditions for the programme staff is not yet hard up for talent. So it says!

VAUDEVILLE REHEARSALS

ABOUT fifty people are given auditions every week for possible inclusion in vaudeville programmes. The percentage of failures is still high. "Programmes" reckon that they are lucky if they find one new possible vaudeville artiste out of the fifty tried in the two sessions every week.



Some well-known broadcasting personalities discuss their scripts in one of the studio lounges during a rehearsal interval. Included in this group are Margaretta Scott, Martita Hunt, Ralph Richardson and Herman Grisewood

WHAT WILL HAPPEN AT LUCERNE ?



European broadcasting experts are to meet at Lucerne in May to discuss the Prague Protocol. The wavelength changes made at the Madrid conference will have to be considered, as explained in this interesting article by Our B.B.C. Correspondent

EVERYBODY is complaining of ether congestion.

Not only are ordinary listeners troubled by excessive heterodyning, bad even for the time of year, but broadcasting authorities themselves are finding that there is little space within the existing wavebands for the new transmitters which keep springing up.

Until the U.I.R. meets again, nothing can be done.

All listeners are waiting for the experts to decide something, but the latest decision is that the U.I.R. will meet at Lucerne in May.

Leaving it Late

Therefore until this new conference has taken place, we cannot hope for any important reshuffling of wavelengths or at

European Broadcasters

BRUSSELS, No. 2

338.2 metres (887 kilocycles), 15 kilowatts. 220 miles from London. Programme in Flemish. Main programme starts at noon. Usual call is "Hier Brussel," the announce-



ments being in Flemish only. The opening call is followed by the initials of the association giving the sponsored concerts.

least no change of lasting importance. Any change which a country may make in its own transmitters' wavelengths in the meantime will have to be submitted to the experts at Lucerne.

The International Broadcasting Union had to wait until the Madrid Conference was over before it knew what wavelengths were free for broadcasting, but even that cannot be held as a reasonable excuse for delaying the production of a new scheme to cope with the vitally necessary wavelength reshuffles. The Madrid Conference opened on September 3 and was over by December 9. During the following weeks "A.W." and a number of other British papers published information relating to the Conference, so it cannot be thought that there was any "hold-up" on the

proceedings roughly what changes there were in the broadcasting bands.

What happens at Lucerne in May depends, of course, largely on the Madrid Conference results. As the Convention findings were signed by representatives of some seventy nations, it may be taken for granted that the findings really do represent the wishes of the nations concerned. Incidentally, Russia was represented at Madrid.

Ultra Short Waves

Below 200 metres there are few changes of interest to European broadcasting officials, but in view of the big interest in short-wave broadcasting, you should note that a broadcasting band round about 11 metres has been chosen.

There is no change in the normal broadcasting band between 200 and 550 metres, but the definite wavelength of 220 metres, which is allotted to certain small boats for shipping communication, is controlled. It is now stated that spark transmissions cannot be made between 6 p.m. and 11 p.m., so this may cut out some of the Morse you hear low down on the dial.

The Madrid experts have left it to the International Broadcasting Union to place a broadcasting station between 545 and 555 metres.

This station will be chosen as regards its power and geographical position, so that it won't interfere with the commercial stations on the 582-681-metre band.

At Madrid they discussed the possibility of extending the medium-wave band above 546 metres, but as this would mean shifting the International 600-metre S.O.S. band, it is hardly likely that anything would be done.

There are certain alterations in the waveband from 652 to 1,053 metres to allow of an extension of the broadcast band above 1,053 metres, but it is the band above this, known as the Regional band and going up

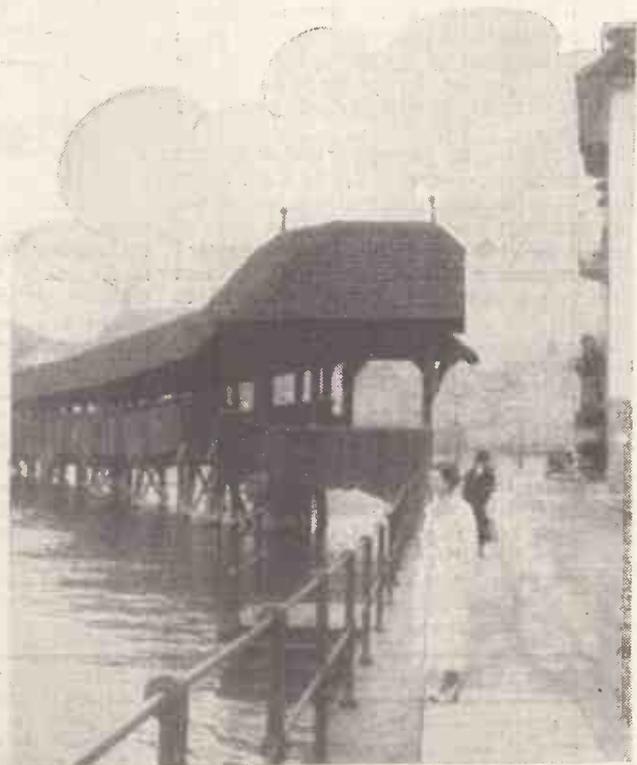
to 1,875 metres, which is of chief interest. The long-wave band from 1,250 metres up to 1,875 metres, has been allotted exclusively to broadcasting, with the exception of certain naval, military and police forces.

More Stations

It is impossible to give here a full account of the wavelength re-allocations as that particular section of the Madrid Convention takes up nearly ten closely typewritten sheets. Although it is not Madrid's business actually to allocate the waves to definite stations, but only to show for what purpose each waveband may be used, the Conference experts nevertheless have given many helpful footnotes showing how the wavelengths can be used by various services.

At Lucerne, therefore, the U.I.R. will not have to guess. They will follow largely on what has happened at Madrid.

Under the Prague Plan, the only countries having long wavelengths were Finland, France, Germany, Great Britain, Holland, Poland and Sweden. Even the number of transmitters has increased since the total (Russia excepted) of 213 in the spring of 1931.



A typical scene in Lucerne where, in two months' time, the U.I.R. experts will meet to form a new wavelength scheme as a successor to the Prague Plan. The frequency allocations made at Madrid will be taken into account and the experts will try to cut down station jamming

SWITCHING OFF FROM ANOTHER ROOM

How to Make a Remote-controlled Relay—By B. S. ROGERS

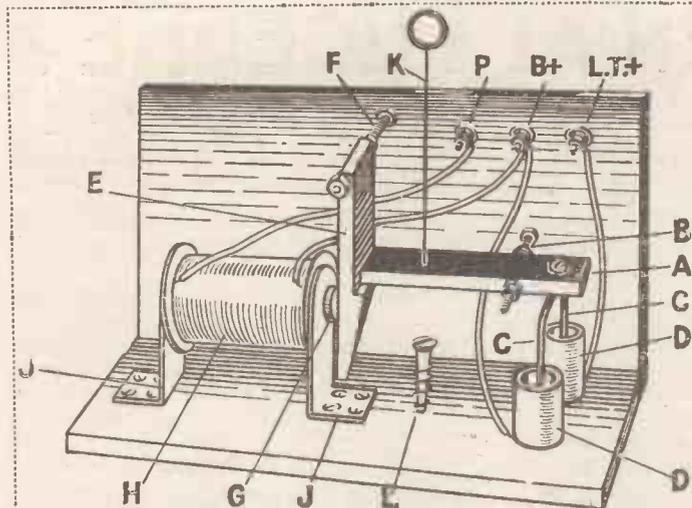


Fig. 1 The relay is made from odds and ends, and the construction is very simple

It is often very convenient to be able to switch off one's wireless set from a room other than that in which the set itself is situated. For instance, a loud-speaker extension may have been fitted to a bedroom. It is sometimes very pleasant to listen to the wireless when one is in bed, but not so pleasant to have to go downstairs to switch off. The following remote-controlled relay, which can be made very cheaply from odds and ends, has been found to work most satisfactorily.

The ebonite strip A (Fig. 1) is pivoted about a spindle B, and has attached to the right hand end of it a U-shaped piece of copper wire C, the two ends of which dip into two mercury cups D D. The ebonite strip is so pivoted that the left-hand end is heavier than the right-hand, and therefore the left-hand end will tend always to fall. The strip is normally held in the horizontal position by the lip of a soft iron armature E, which swings easily about the spindle F.

A small electro-magnet is placed so that the soft-iron core G is about 1/8 in. away from the swinging armature when the latter hangs normally. The two ends of the electro-magnet winding are connected to terminals P and B+ respectively, and the two mercury cups are connected to B+ and L.T.+ respectively.

The relay is connected to the set and battery as shown in Fig. 2. It will be seen that the mercury cups are in the positive lead from the battery to the set.

A bell push, which may be placed in any room desired, is connected between the L.T.—terminal on the set and terminal P on the relay. When contact is made at the push button, current flows from the battery through the winding of the electro-magnet, the core G of which becomes magnetised and attracts the armature E, thus allowing the left-hand end of the

push button the armature will return to the vertical position. It is necessary only momentarily to push the button to operate the relay.

A thread K is attached to the left-

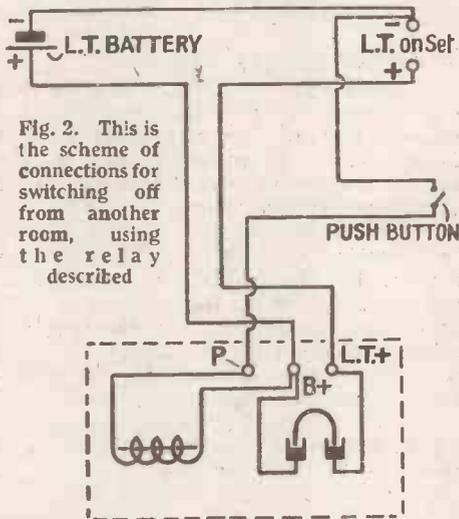


Fig. 2. This is the scheme of connections for switching off from another room, using the relay described

hand end of the ebonite strip, and by pulling up this thread the strip is again made to rest on the lip of the armature, thus resetting the relay.

The L.T. switch on the set itself is, of course, retained, and is used for normally switching on and off the L.T. supply. (Of course, when using the switch on the set the ebonite strip of the relay must be in the horizontal position.)

As regards the general layout of the relay, the sketch is self-explanatory, but one or two hints may be given on the details of construction.

The U-shaped copper wire may be attached to the ebonite strip by soldering it to the end of a screw which has previously been screwed through the ebonite.

It is most important that the mercury cups should be made out of solid metal, 3/8-inch holes drilled in 1/2-in. brass rod being very satisfactory. It is useless to attempt to make a cup by soldering a piece of brass to one end of a piece of tube, as mercury eats away solder.

The ebonite strip should be about 2 in. long and 1/2 in. wide and 1/4 in. thick, the hole for the spindle being 1/8 in. diameter and drilled about a third of the way from the right-hand end of the strip. If it is found that the left-hand end of the strip is not sufficiently heavy to fall automatically when the armature is attracted to the electro-magnet it may be weighted by putting in a screw.

The soft iron armature should be as light as possible so that it can easily be attracted by the electro-magnet. The portion underneath the lip must be chamfered so as to allow the ebonite strip to be pulled back into position.

The spindles may be of 6B.A. rod screwed to take nuts as shown. It is important that the ebonite strip and the armature should swing very freely, and it is advisable, therefore, that large clearances should be allowed when drilling the holes for the spindles.

The electro-magnet may be an old bell magnet; if this is not available a satisfactory one may be made by using about 1 1/2 in. of 1/2-in. diameter soft-iron rod for the core, and by soldering brass feet JJ at each end, as shown in the diagram. The brass and iron may be insulated by cardboard flanges and insulating tape. The bobbin thus made should be wound with 24S W.G. enamelled wire, the outside diameter of the wound bobbin being about 1 in. The current taken by a coil of these dimensions will be less than .5 ampere, when using a 2-volt battery. The current, of course, flows through the coil only when the push button is pressed. If it is found that the armature adheres to the core, due to any residual magnetism in the latter, a thin piece of paper pasted over the end of the core will prevent this.

The object of the woodscrew L shown underneath the ebonite strip is to limit the distance of travel of the strip when it falls.

DO YOU KNOW

THAT in a moving-coil speaker, permanent or energised, rattle may be due to lowering of the magnetic field or to the moving coil chattering against the pole pieces?

THAT in a band-pass set the aerial series condenser makes a big difference to

the ganging? As the capacity of this condenser is varied, the ganging between the sections is upset, for the aerial total capacity is changed. Watch this point when tuning, as you may find that the series condenser doesn't have its usual effect of varying the selectivity.

THAT a good value, with most band-pass coils, for a band-pass coupling condenser in a link circuit is .05 microfarad? The

shunt resistance can generally be of about 1,000 ohms.

THAT in some super-hets, provided with a separate oscillator, there is an H.T. tapping to this stage, separate from the other H.T. feeds in the set? If, on tuning, you find that the super-het gives rise to too many harmonics, you will generally find that the cause is too high an H.T. voltage on the oscillator valve anode.

On Your Wavelength!

A GOOD SHOW

DID you listen to the broadcast of "Tit-Bits of the Past?" I hope that you did, for it was a first-rate show. It consisted of Blattnerphone reproductions of the original broadcasts of important programmes, national happenings, and running commentaries on big sporting events of the past year or two. An exchange of programmes between ourselves and the United States, the Boat Race, the Derby in 1931 and 1932, the breaking of the speedboat record on Loch Lomond, the Schneider Trophy, and the King's Christmas greeting to the Empire were some of the outstanding items. It is a splendid idea to keep "canned" records of the past and to weld them into a programme of this kind. I hope that the B.B.C. will make an annual feature of it, and I would suggest that either Old Year's Day or New Year's Day would be the most appropriate occasion.

THE BLATTNERPHONE

THE Blattnerphone has become a very important part of broadcasting equipment nowadays, for it is with its assistance that it becomes possible to transmit the Empire programmes at five different times during the twenty-four hours. It is also used for repeating from medium-wave stations in this country items, or even complete programmes, that have gone so well that the "fan mails" from listeners demands an encore. Some readers will know all about it, but to others it may still be something of a mystery.

In the Blattnerphone a thin steel tape is drawn between the pole pieces of the magnets, being wound from a reel on one side to a second reel on the other. Being made of steel, the tape is permanently magnetised, the intensity of the magnetising in any particular spot corresponding to the magnitude of the speech currents through the electro-magnets.

A MAGNETIC RECORD

YOU can imagine the Blattnerphone tape upon which an item has been recorded as consisting of millions of minute magnets of varying strength. Between them they form a magnetic copy of whatever has been recorded. To "play" the tape a device corresponding to the pick-up is employed. It is, in fact, very similar to the pick-up, except that it has no needle. The tape is passed between the poles of its electro-magnets and the recording process is exactly reversed. The variations in the magnetic intensity in different parts of the tape set up fluctuating currents in the windings of the magnets and these are passed on to the grid of an amplifying valve. The basic idea is simplicity itself and it is just in making practical use of simple ideas that real inventive genius lies.

LONDON'S DECIBELS

THE Western Electric Company has just been carrying out a series of tests of London's noises. Sound-level, as you probably know, is measured nowadays in decibels, the bel being so named in honour of the inventor of the telephone, though no one seems to know why an "l" should have been lopped off in the process. The general results of the tests show that London is considerably less noisy than New York, though it cannot be called exactly a quiet city. For instance a lion roaring registers 85 decibels at a distance of 18 ft. and an L.C.C. tramcar scores no less than 87. Hence, it is interesting to read that the noise of Fleet Street, where the newspapers come from, is of the same intensity as that of the snarl of a Bengal tiger at a range of 15 ft. Trafalgar Square, though you might not have thought it, is a good deal quieter, reaching only the 65 decibels of a barking dog. Some time ago similar tests were made at the Capetown Zoo. I will merely state without any comment that cold, unyielding scientific methods discovered that the sound level of a cage full of jackals in full cry was exactly the same as that of women's voices in conversation.

THE NEW 5XX

CONTRACTS for the new 5XX are being placed and the work will go forward with a will. But let me say right away that any who put their trust in statements, such as I have seen, that the new station will be heard testing this summer are doomed to disappointment. It most certainly won't, for the building of a wireless station is not the kind of thing that you can do in five minutes. The old Daventry has given fine service, but the plant there is a long way out of date. It uses, for instance, the old system of high-power modulation in which the audio frequencies are not superimposed on the carrier until the latter has undergone amplification. In all modern stations low-power modulation is employed, owing to its many advantages. Under this

system the modulation is married to the carrier at a stage where the latter is of very small power. The modulated carrier then undergoes the amplification which brings it up to the power output rating of the station. The new 5XX is being designed as a 100-kilowatt station, but I expect that it is so arranged that an increase to much greater power can take place if and when required.

SERVING THE WHOLE COUNTRY

THE existing station, with its mere 30 kilowatts, is pretty well heard all over our islands, and it is confidently expected that an efficient modern transmitter with nearly four times the power will bring the whole of Great Britain into the new 5XX's service area. Power for power, the service area of a long-wave station is, of course, very much greater than that of one using the medium—and particularly the shorter medium—waves and with 100 kilowatts enormous ranges are obtainable. Most of this country, for instance, would be pretty well within the service area of the 120-kilowatt Warsaw if it were not for the interference caused by the Eiffel Tower.

CLOSING DOWN?

THERE are rumours, by the way, that the Eiffel Tower is shortly to close down as a programme-transmitting station and to confine itself solely to time signals, weather forecasts, shipping warnings, and so on. If so, it will probably relinquish its present wavelength of 1,445.7 metres and adopt one outside the limits of the long waveband. I shouldn't be surprised if it went up to something between 2,600 and 2,800 metres, where it used to work when it was the one and only regular broadcasting station in the whole of Europe. Except for sentimental reasons, there is nothing to be said for retaining the Eiffel Tower as an entertainment station, and its closing down would help not a little to clear up the overcrowding on the long waveband.

PERSONALITIES IN THE WEEK'S PROGRAMME



On Your Wavelength! (continued)

THE SONG OF THE PICK-UP

ONE of the drawbacks of the pick-up is that, besides passing on impulses to the grid of the valve to which it is connected, it will insist upon playing records all on its own by means of vibrations of its armature; worst of all, its little voice is often badly cracked. Radio-grams are—or, at all events, should be—provided with soundproof lids which completely drown the song, but a difficulty sometimes arises when the pick-up is fitted to the tone-arm of an ordinary gramophone. Some of these have no lids at all; some have lids that will close—though not on top of pick-up leads. The last case is the easiest to deal with; a small hole for the leads should be drilled in the lid. In the other two cases there are only two cures that I know. One of these is to put the gramophone into a tightly closed box during the playing of records; the other is to have the gramophone, the pick-up, and the wireless set in one room and to take the extension leads of the loud-speaker to another. Can't some inventor turn out a quiet pick-up? There should be a big market for it.

B.B.C. RECEPTION IN GERMANY

A FRIEND in Berlin has recently made some most interesting measurement on the strength of the British transmitters as received there. The best is North National, on which his valve voltmeter registered 2.5. On Scottish National, which he receives quite free from any sound of the relay stations on the same wavelength, he had a reading of just under 1 volt. London National gives him 0.4 volt. London Regional is swamped by Mühlacker. He tells me that, apart from the locals, his most powerful reception is from Prague, Stockholm, Budapest, and Vienna.

NEARLY A MILLION A YEAR

NO, dear reader, that is not the salary I draw for writing "On Your Wavelength!" It is the number of new wireless licences—a little short of 950,000, to be more accurate—that were taken out in 1932. Every year, just before the Wireless Exhibition, somebody comes along to prove that not much business can be done, since we must have reached the saturation point in wireless sets. And in the following twelve months about a million new ones are taken out, and so it goes on. The figures for December, 1932, alone reached 140,000. Personally, I think that we are a long way off the saturation point, for every year the possible market for wireless sets is increased, either by the lowering of the initial cost or by reducing running expenses through higher valve efficiency.

A SNAG—

ICAME across a silly little snag the other day which may be interesting. I was trying a special form of detector-amplifier tube of the sort

which we shall probably see on the market before many months are passed in this country. It consisted of two diodes and a triode on a common cathode. The diodes are used for detecting and also for automatic volume control, but since the sensitivity of a diode is so poor, an amplifier is used to step the signal strength up prior to applying it to the last valve. The diode itself is a very simple combination and can quite easily be incorporated in the same bulb as the amplifying valve, making a very compact and handy tube.

As I was saying, I was experimenting with this tube and could not understand why the signal strength which I obtained was so very weak in comparison with my expectations. I had checked over the characteristics of the amplifying portions and knew, within limits, what output I expected to get. On actual trial the results were very much below this, and I could not understand what was happening.

—AND THE REASON

I WAS actually applying an input signal of something like 10 volts and I expected that this would very comfortably overload the output valve which I was using. In fact, it only gave me about 2 volts output, and there was clearly something hopelessly wrong. I checked over the amplification of the triode portion and found it was quite in order, and it was only by going piece by piece over the whole circuit that I located the snag. When I did so I said several quite unprintable words and replaced the faulty component.

For this was what it was, a faulty H.F. choke. The voltage developed in the diode circuit is passed on to the amplifying portion of the valve through an H.F. choke and condenser filter in order to keep high frequency out of the L.F. stages. This particular choke was broken, so that there was no circuit through it; but it was, nevertheless, passing on the signal through

the very small self-capacity. This capacity is comparable with the grid to filament capacity of the triode, and therefore made a sort of capacity potentiometer. The result was that only a small fraction of the proper voltage was being applied to the triode, and when I replaced the defective choke with a proper one everything in the garden became very much more rosy. The most remarkable thing about the whole circuit was that the quality was extraordinarily good, and it was this very fact which misled me for some time.

SIGNALLING ON MICRO-WAVES

THE Air Ministry has installed a short-wave station operating on a wavelength of 15 centimetres, or roughly six inches, between Lypne and the St. Englevert aerodrome a few miles south of Calais, which shows that micro-waves are now a thoroughly practical proposition and not—as so many people imagine—a sort of laboratory plaything for experimenters. The new equipment, which is to be used for announcing the arrival and departure of aeroplanes making the cross-channel trip, will also be linked up with teleprinters; so that the messages can be printed if necessary—a wise precaution with operators speaking different languages. Tele-typewriters, by the way, are already widely used in America for distributing weather reports simultaneously to a number of airports, because for this kind of service speed and accuracy are of the first importance. The micro-wave aerial is a six-inch rod located at the focus of a 10-foot reflector, which concentrates the radiation into a narrow "pencil" directed towards the distant receiver. Incidentally, this should help to reduce interference due to the long-wave traffic signals from Croydon and Lypne, which is pretty heavy at times.

SERVING THE EMPIRE

IT is a very difficult business to find a means of providing an Empire service which will enable dwellers in the Dominions and Colonies to receive the London programmes at reasonable times. When, for instance, the London evening programme starts at 7 p.m. by our time, an Australian early bird would be just getting out of bed, whilst a Canadian would just have finished his lunch, and a dweller in India would be enjoying his first beauty sleep. What actually happens is that the main evening programme, and running commentaries upon any important events, sporting or otherwise, are relayed at five different times during each twenty-four hours. In this way, those who live in almost any part of our great Empire are able to receive the programmes during two hours lying between 6 p.m. and midnight by local time. It is a wonderful scheme and its success is sure to be very great.

THERMION.

RADIO-GRAM SWITCH POSITION

While it is convenient to have the radio-gram switch on the front of the panel, it is often inadvisable to mount it there as it may complicate the wiring. In a normal

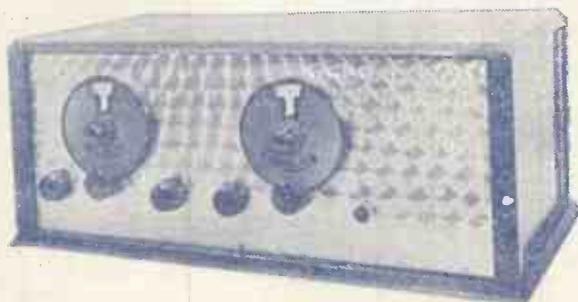


set the radio-gram switch wiring is in the detector circuit and the switch should be kept close to the detector holder, as shown here. The switch is seen mounted at the back of the set on a separate terminal strip near the detector holder

THE MELODY RANGER



Here are two versions of the "Melody Ranger." On the left is a handsome Camco Embassy cabinet, making the set a console, with self-contained moving-coil loud-speaker and all the batteries fitted into the top section above the set. On the right is the standard table cabinet made for the "Melody Ranger" by Direct Radio. With this cabinet the turned-metal panel of the set is exposed



IN the following pages we introduce you to our latest and, in many respects, our greatest set—The "Melody Ranger" four-valver. Designed to cover ultra-short, short, medium and long waves by the simple turn of a switch, the "Melody Ranger" is the first home-constructor's set of its type ever produced.

Viewed simply as a broadcast set, the "Melody Ranger" would be outstanding, for its many circuit refinements, but viewed as the first screen-grid all-waver without coil changing, it is a truly remarkable development.

As we clearly show in the many illustrated articles in this issue, the assembly of this unique four-valver is extremely simple. The wonderful results do not depend on expert knowledge on your part.

Advanced amateur and wireless beginner alike can tackle the construction of the "Melody Ranger" with every confidence that the results of the designer's nation-wide tour will be repeated.

We supply you in the following pages with a wealth of constructional and technical details of the "Melody Ranger." Read

first how to use the blueprint, as explained at the bottom of this page. Then turn over to the blueprint itself.

We tell you some of the stations you can get on this set, show you how the set looks when viewed by an artist, show you how the circuit diagram is interpreted in terms of carefully selected components, and lead you on in gentle stages to an understanding of the various circuit refinements.

We include a three-page step-by-step guide to the construction of the "Melody Ranger," adding some constructional wrinkles that the handyman will appreciate.

Then in the centre pages you can read the coherent story of the "Melody Ranger," its design conception, its circuit and its wonderfully simple though eminently practical interpretation.

We have gone to all this trouble with the pleasureable knowledge that we are helping you to build the most remarkable home constructor's set ever offered to wireless amateurs. We are enthusiastic about the "Melody Ranger." We know you will be too, when you have built it. Get on with the job—and the best of luck!

STITCHED into the pages of this issue you will find a full-size blueprint of the "Melody Ranger." This is an invaluable guide to the simple building of the new set.

It provides you with a full-size plan view of the completed job. What you see on this print is what you

would see looking straight down on the original set, that is, the "flat" view of the baseboard and the "edgewise" view of the panel.

As this is a full-size plan of the layout it can be used as a template when you are laying out the components on the baseboard. The actual parts specified are all carefully pictured in the exact positions they occupy in the original set. The simplest way to use the blueprint for the constructional process is to square up the left-hand edge of the print with the baseboard and then you can prick through with a bradawl or other sharp pointed instrument.

The marks made through the print on to the baseboard will then enable you to locate the components in your actual set. You will have the assurance that everything is exactly according to specification.

The only part of the baseboard that is not shown is the extreme right-hand end (looking from the back of the set) but as this has only a panel bracket, which is mounted just the same way as the bracket at the left-hand end, there is no real



HOW TO USE THE BLUEPRINT

need for this part, the inclusion of which is rendered impossible owing to the discrepancy between the size of the panel and the width

shown by the print.

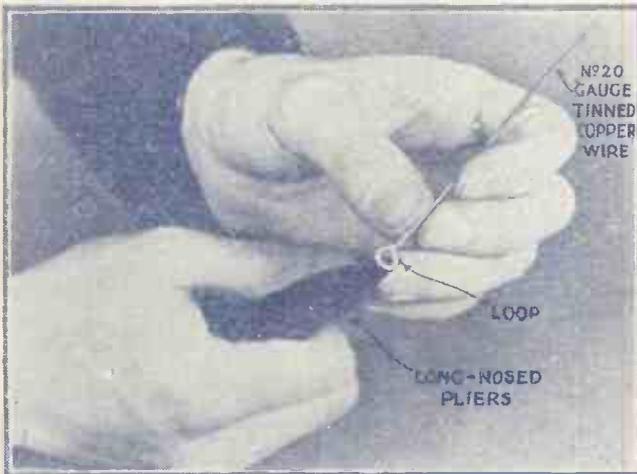
There is a separate wire measure on page 164, which should be utilised in conjunction with the print. The lengths there given are the actual sizes required provided they are placed in the same positions as shown in the blueprint.

Cross off the wires you see in the wire measure as you actually make them in your set in accordance with the point-to-point connections indicated by the blueprint.

Follow the Sequence

You must follow the wiring sequence indicated by the numbers on the blueprint or you will get the various leads rather badly mixed up.

From the blueprint you will see that the position on the baseboard of the metal screen is clearly shown. There is an important point to note: before fixing down the coils on each side of the screen you should put the coil-switch coupler through the vertical screen's hole. Then you will be able to link up with the coils quite easily. After that the coils can be secured as indicated by the blueprint.



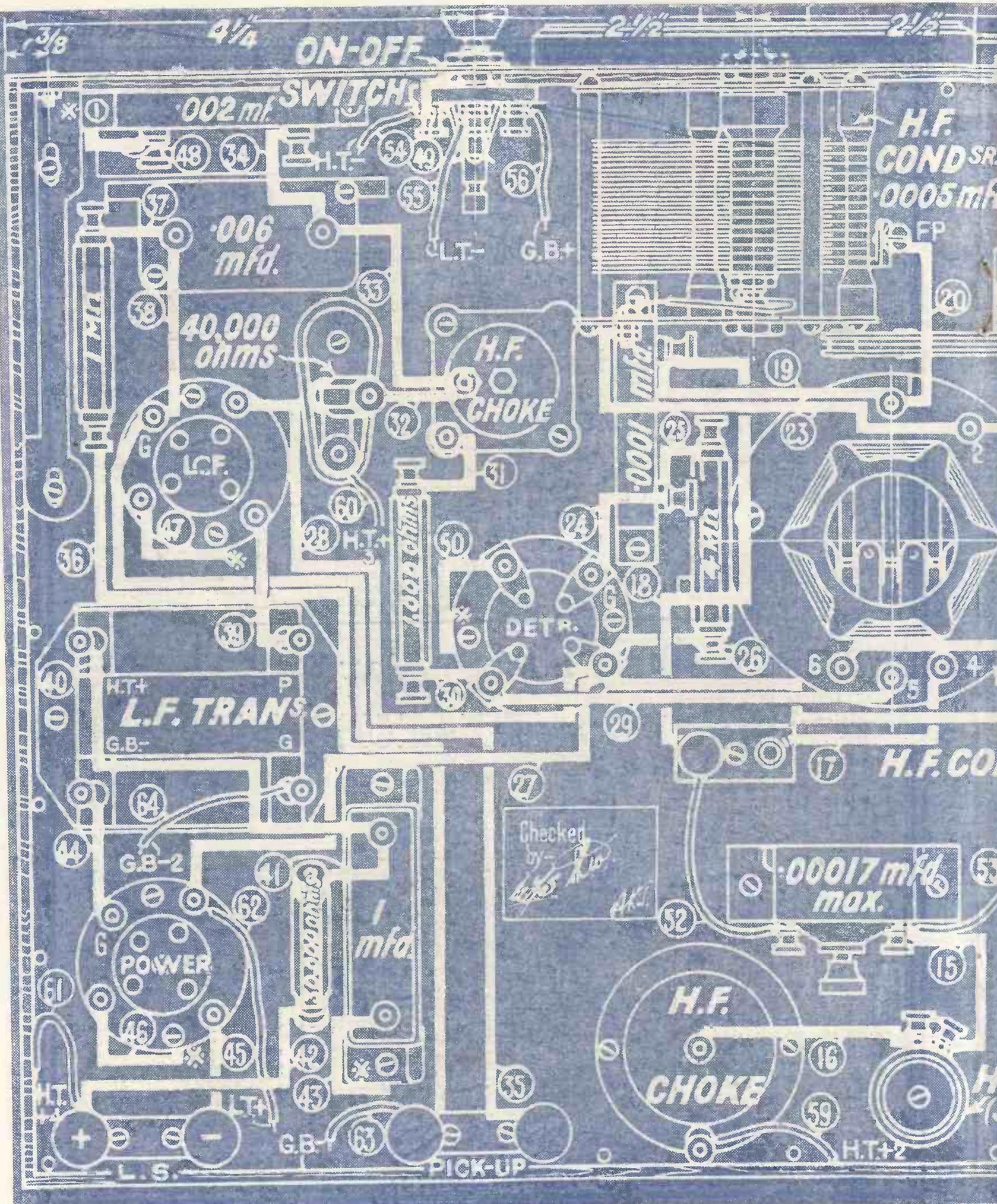
The wire you should use for the "Melody Ranger" and the method of making the loops

of our two pages

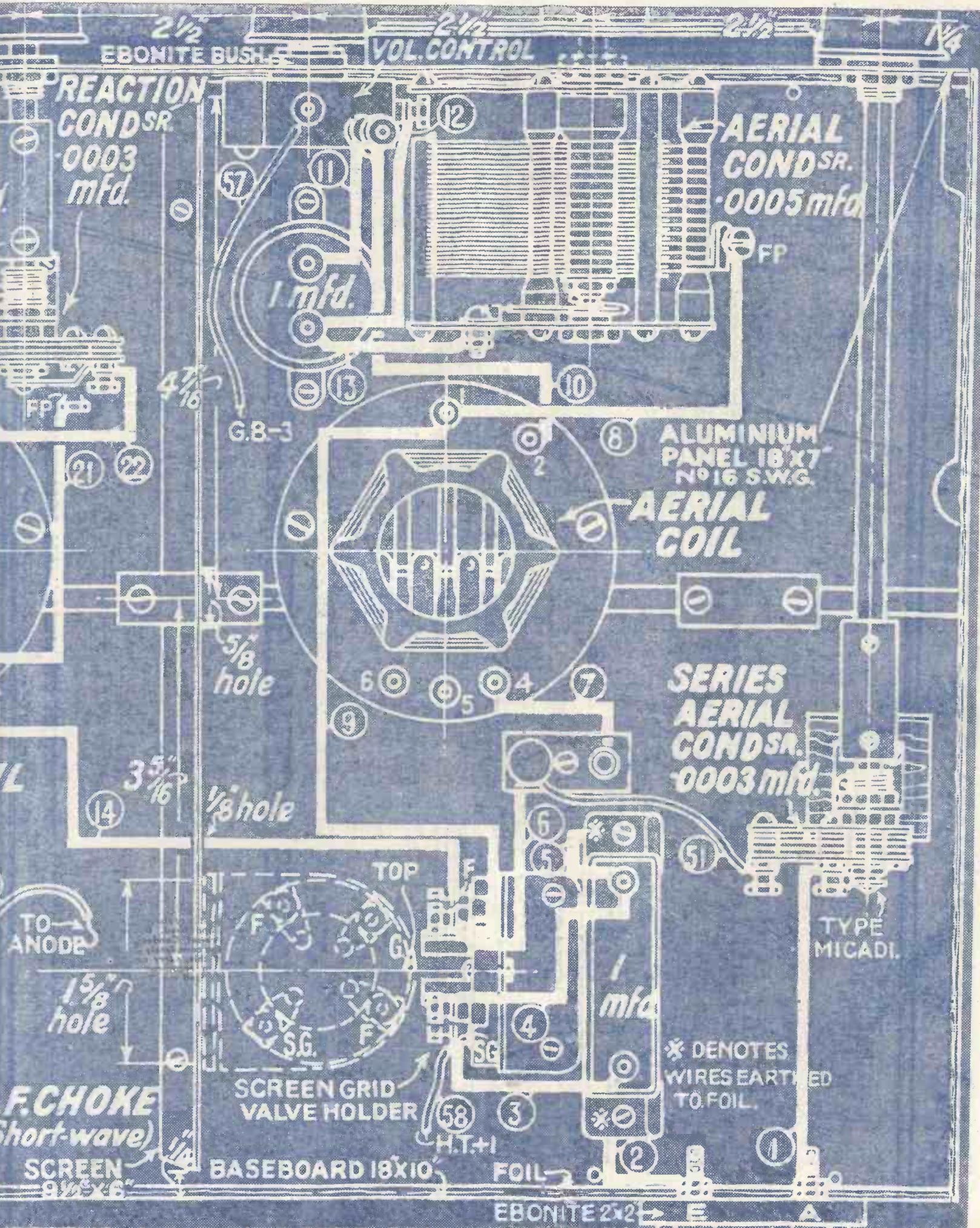
In the wiring process the blueprint is, of course, a very great aid. The print shows the point-to-point connections. It shows, that is, the electrical paths of the wires but not necessarily their physical paths.

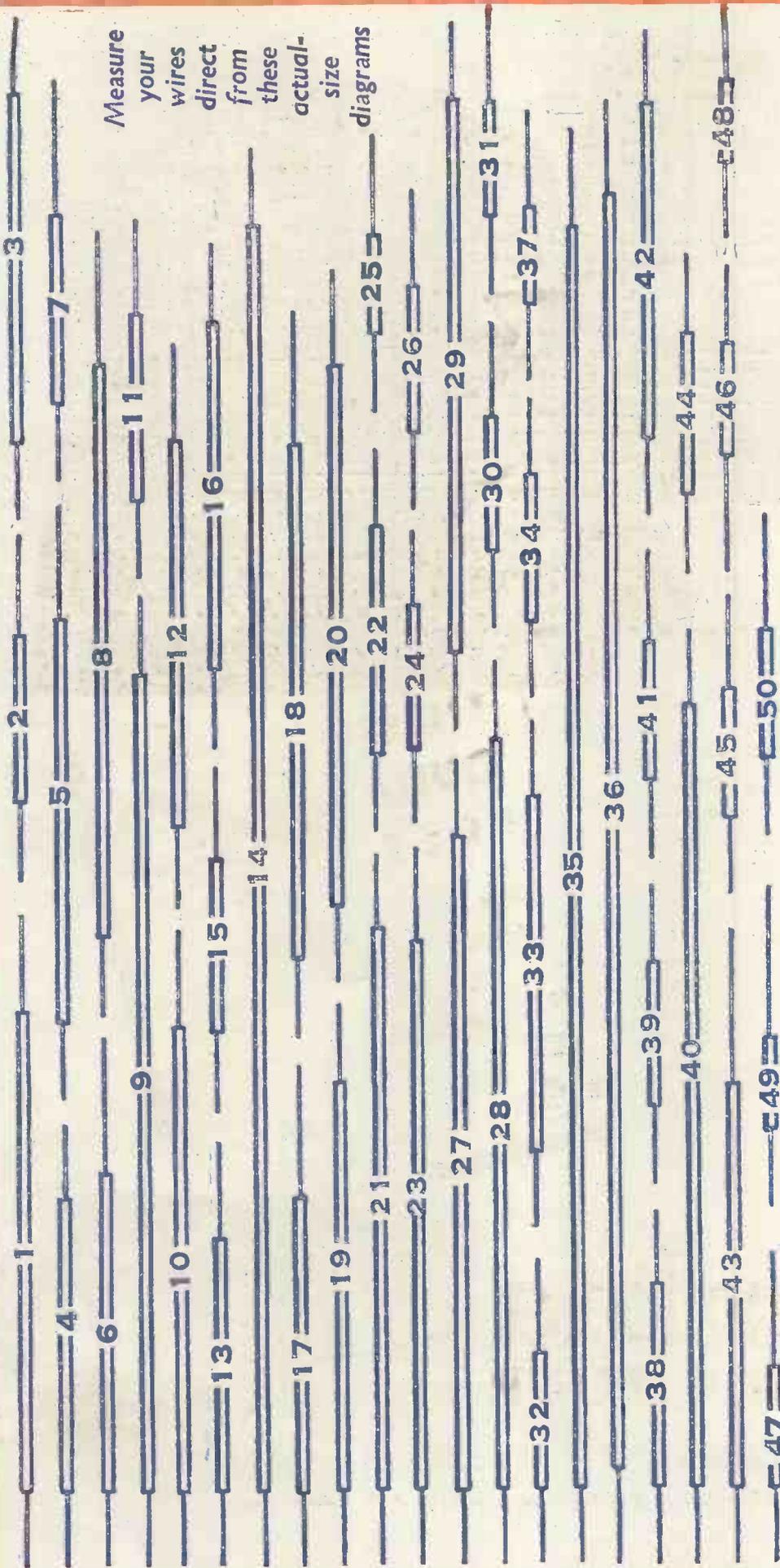
Do not go by the lengths of the wires

A FULL-SIZE BLUEPRINT OF THE "MELODY RANGER" IS GIVEN OVERLEAF



LAYOUT PLAN AND WIRING DIAGRAM OF THE "MELODY RANGER"—"Amateur Wireless," January 28, 1933.





Measure
your
wires
direct
from
these
actual-
size
diagrams

WIRES (ACTUAL SIZE) for the "MELODY RANGER"

by the baseboard screws between the components and the foil.
Wire No. 49.—First take it round the high-tension-negative terminal and then on round the fixing bush of the three-point switch.
The pairs of wires No. 6 and 7, and 17 and 18 must be shaped before being fixed finally to the tapping blocks of the tuning coils.
 The resistances held by the wiring *must* be kept clear of the metal foil of the baseboard.
Wire No. 36.—If the sleeving of this wire is taken under the soldering tag of the L.F. valve holder to which wire No. 46 goes, and then bent up at right angles to the baseboard, the resistance will not short on to the foil.

ABOVE we show all the wires needed for the wiring up of the components of the "Melody Ranger." In addition, you will see that the exact lengths of sleeving for these wires are also given.
 The wire to use is No. 20 round-tinned-copper, and with this use 1-millimetre insulated sleeving.
Round Loops.—The wire ends extending beyond the sleeving lengths vary according to the size of the loops to be made—roughly between 1/2 in. and 1 in.
 All the wire shown outside the sleeving forms the actual loop—there is no spare wire.
U-shaped Loops.—Wires No. 2, 5, 43, 46, 47, 48 and 50 are not fully looped, as the connections are made by U-shaping the ends of the wires. The U-shaped wires are fixed



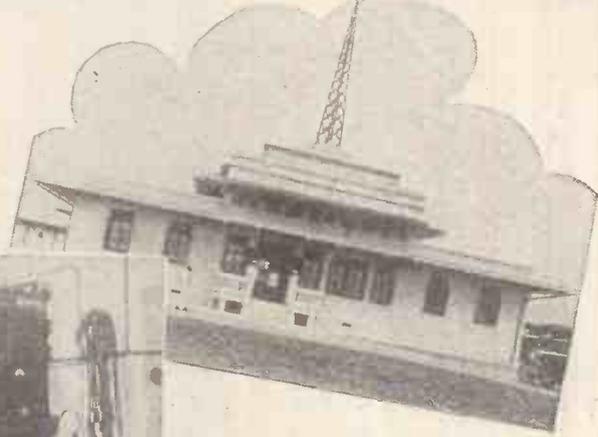
THE NUMBERS ON THESE WIRES CORRESPOND WITH THOSE ON THE BLUEPRINT

ALL OVER THE WORLD WITH THE "MELODY RANGER"!



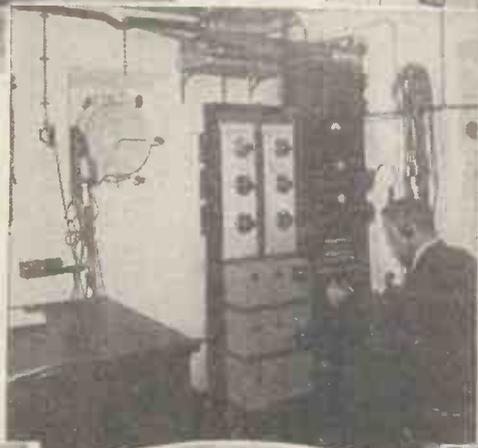
SHIP-TO-SHORE

Beelitz, the famous short-waver (above), is one of the many you will get on the short-wave section of the "Melody Ranger." Even ship-to-shore telephony can be heard. The cabin of a radio-telephone liner is shown on the right



BELOW 100 METRES

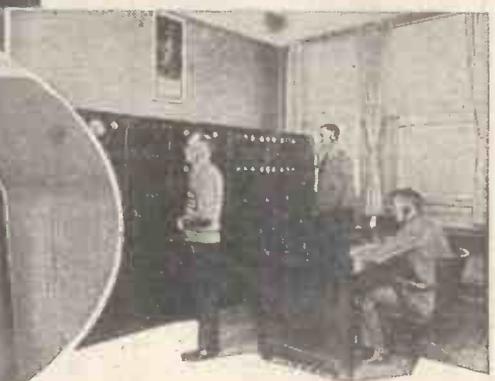
There's no limit to the distance-getting of the "Melody Ranger." Bangkok, Siam (above), is one of the DX stations you'll be able to "bag," while California (below) isn't out of your reach



If you want selectivity, you'll find the "Melody Ranger" will separate Muhlacker (above) from London. And for distance, it'll get Schenectady (below)



THE "MELODY RANGER" IS A MELODY SET WITH AN AMAZING RANGE—AND EASY TO TUNE!



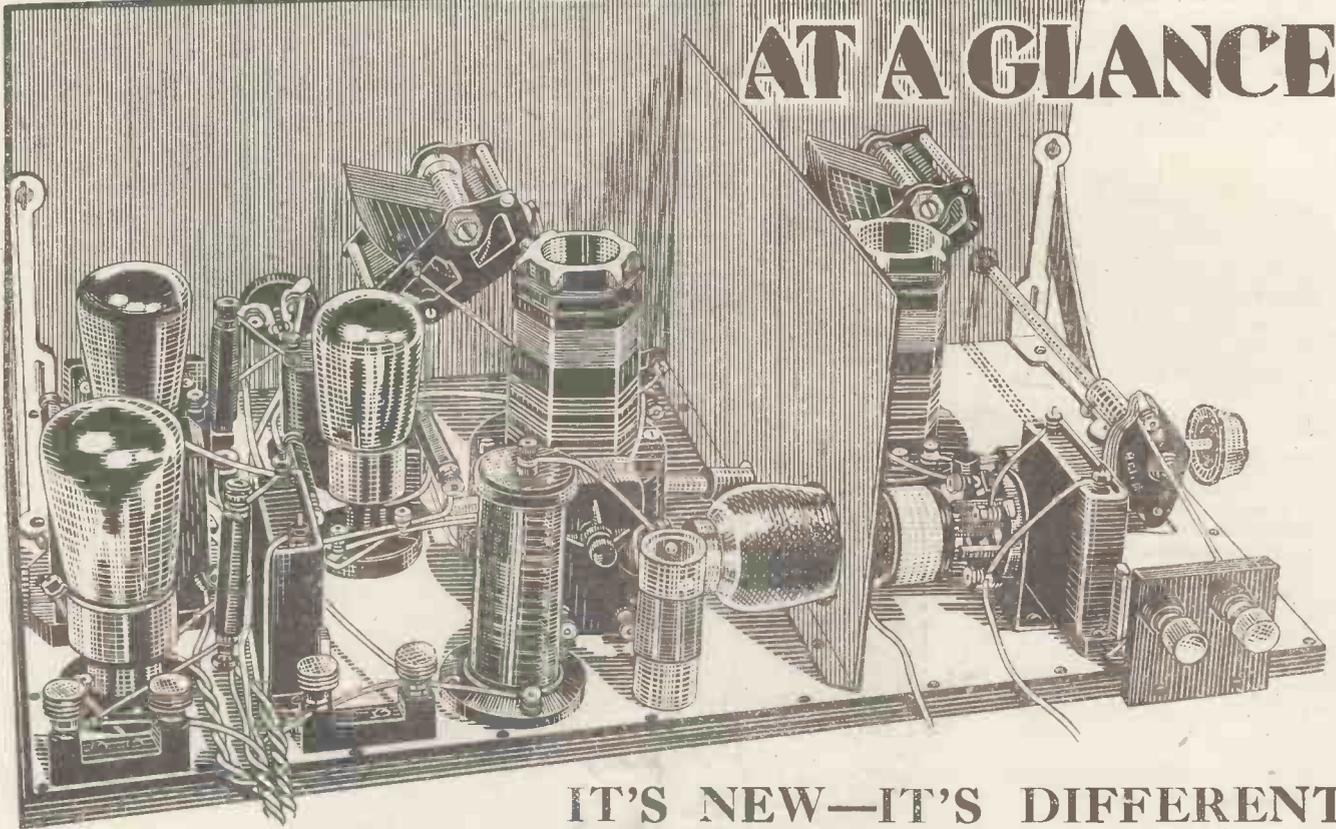
PLUGGING IN TO THE WORLD!

At the heart of the long-distance radio telephone, to Paris, Mexico and New York! You can cover the distance with the "Melody Ranger"



THE SET THAT DOES MORE THAN OTHERS

THE 'MELODY RANGER' AT A GLANCE



IT'S NEW—IT'S DIFFERENT

"A.W.'s" new receiver is shown here pictorially, and the salient features can be seen. In spite of its amazing performance, the construction is simple. Reference to the panel below will show the components required.

THE COMPONENTS YOU WILL NEED TO BUILD THE "MELODY RANGER"

CHOKES, HIGH-FREQUENCY

- 1—H.F. choke (Wearite type H.F.O., Lewcos, or Ready Radio).
- 1—H.F. choke (Slektun standard, Lissen astatic, Lewcos, Ready Radio, Goltone, Varley, Climax, R.I., Wearite).
- 1—Short-wave H.F. choke (Igranic type CHORT, Wearite, Goltone, Slektun).

COILS

- Two special coils complete with two couplers and extension rods (Lissen).

CONDENSERS, FIXED

- 1—.0001-mfd. fixed condenser (Lissen, Dubilier, Telsen, T.C.C., Graham Farish, Goltone).
- 1—.002-mfd. fixed condenser (Lissen, Dubilier, Telsen, T.C.C., Graham Farish, Goltone).
- 1—.006-mfd. fixed condenser (Lissen, Dubilier, Telsen, T.C.C., Graham Farish, Goltone).
- 2—1-mfd. fixed condensers (Telsen, Dubilier, Lissen, T.C.C., Goltone, Igranic).
- 1—1-mfd. fixed condenser (Dubilier type 9200, Telsen, T.C.C., Igranic).

CONDENSERS, VARIABLE

- 2—.0005-mfd. tuning condensers (J.B. type J16, Polar No. 3 with phosphor-bronze balls, Utility).
- 1—.0003-mfd. series aerial condenser (Ready Radio, special low minimum type Micadi).
- 1—.0003-mfd. reaction condenser (Ready Radio type Micalog).
- 1—.00017-mfd. preset condenser (Lissen, Ready Radio, Sovereign, Goltone).

DIALS

- 2—Slow motion (Igranic Indigraph type VINIL, Utility type W181).

HOLDERS, RESISTANCE

- 1—Vertical mounting holder (Graham Farish).

HOLDERS, VALVE

- 1—Low-loss screen-grid valve holder (Ready Radio type SG short-wave).
- 1—Low-loss four-pin valve holder (Ready Radio type short-wave baseboard).
- 2—Four-pin valve holders (Ready Radio standard).

PANEL AND BASEBOARD

- Aluminium panel, drilled to specification, 18 ins. x 7 ins. (Peto Scott or Ready Radio).
- Baseboard covered with foil 18 ins. x 10 ins. (Peto Scott or Ready Radio).
- Aluminium screen, drilled to specification, 9½ ins. x 6 ins. (Peto Scott or Ready Radio).

RESISTANCES, FIXED

- 1—1,000, one 30,000, one 40,000, one 1-megohm, one 4-megohm, fixed resistances (Graham Farish type Ohmite, Erie, Dubilier, Goltone, Claude Lyons).

SUNDRIES

- Pair of panel brackets (Peto Scott, Bulgin, Burton).
- Complete extension equipment and mounting brackets (Ready Radio).
- 6 yards thin flex (Lewcoflex, Goltone).
- Connecting wire and sleeving (Lewcos).
- Piece of ebonite 2 ins. x 2 ins. (Becol).
- 2—Coil tap mounts complete (Peto Scott, Bulgin), or four ½ in. sockets (Belling & Lee); piece of ebonite 2 ins. x ½ in. (Becol).
- Knob for volume control (Bulgin type K6).

SWITCH

- 1—Three-point switch (Bulgin Junior, W.B., Ready Radio, Telsen, Goltone).

TERMINALS AND PLUGS

- 2—Terminals, marked Aerial, Earth (Belling-Lee type R, Clix, Eelex, Bulgin).

- 11—Wander plugs, marked H.T.—, H.T.+1, H.T.+2, H.T.+3, H.T.+4, G.B.—, G.B.—1, G.B.—2, G.B.—3, two plain (Belling-Lee Midget, Clix, Eelex, Goltone, Gripso).
- 2—Spade terminals, marked L.T.—, L.T.— (Belling-Lee, Clix, Eelex, Goltone, Gripso).
- 2—Terminal blocks (Telsen, Lissen).

TRANSFORMER

- 1—Low-frequency (Ready Radio, Lissen, Telsen, Multitone, Varley, Bulgin, R.I. Di-feed, Slektun).

VOLUME CONTROL

- 50,000-ohm potentiometer, with insulating washers (Bulgin type VC38, Watmal type T1, Varley, Lewcos, Ready Radio, Sovereign).

ACCESSORIES FOR TABLE MODEL

- 2-volt accumulator (Lissen, Exide, Fuller "Block", C.A.V.).
- 16-volt grid-bias battery (Lissen, Ever Ready, Drydex, C.A.V., Pertrix).
- 120-volt H.T. battery (Lissen, Ever Ready, Drydex, C.A.V., Pertrix).
- Loud-speaker (W.B. type PM4 cabinet model, Rola type F5PM, Atlas, R. & A., Celestion, Epoch). Cabinet (Direct Radio, Peto Scott).
- Valves (PM12V, two PM2DX, PM2A Mullard).
- Mains unit (Regentone type W.I.C., Atlas, Ekco).

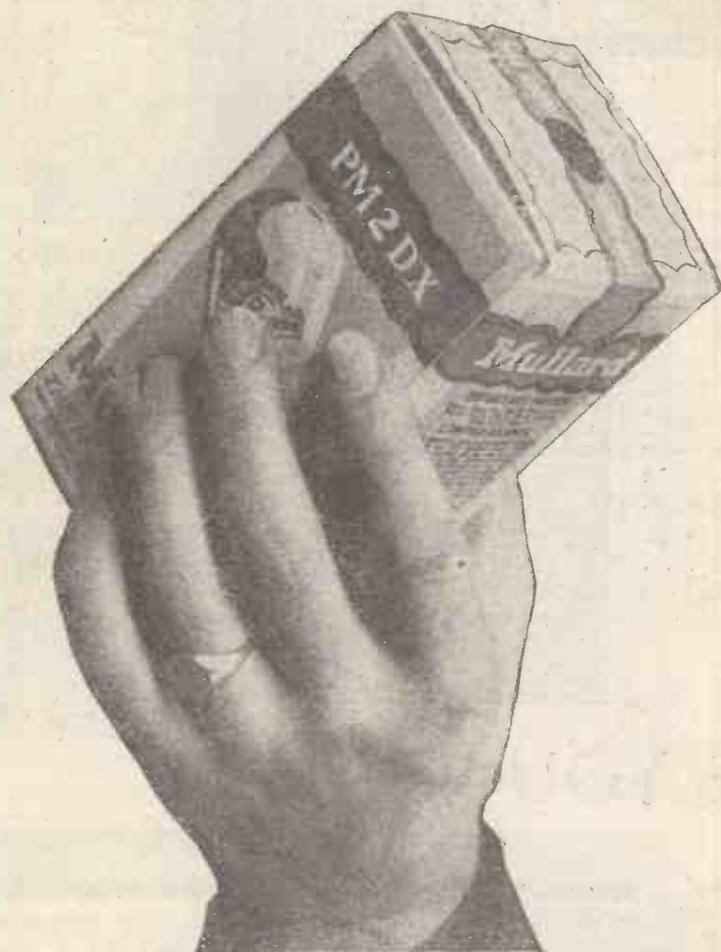
ALTERNATIVE ACCESSORIES FOR CONSOLE MODEL

- Cabinet (Cameo "Embassy," Myers-Hunt "Whitehall de Luxe" Peto Scott).
- Loud-speaker (W.B. type PM4 chassis model, Rola type F5PM, Atlas, R. & A., Celestion, Epoch).

THE SET THAT WILL DO MORE THAN OTHERS

Details of a Mains-driven Model of the "Melody Ranger" will be published shortly

Mr. Wilkins made sure of Better Radio



157 Stations logged on wavelengths ranging from 2,000 to 13 metres.

FOR HIS EXPERIMENTAL SET AND HIS TESTS OVER THE WHOLE COUNTRY, MR. WILKINS USED MULLARD MASTER VALVES

Mullard

THE · MASTER · VALVE

Adv. The Mullard Wireless Service Co., Ltd., Mullard House, Charing Cross Road, London, W.C.2.

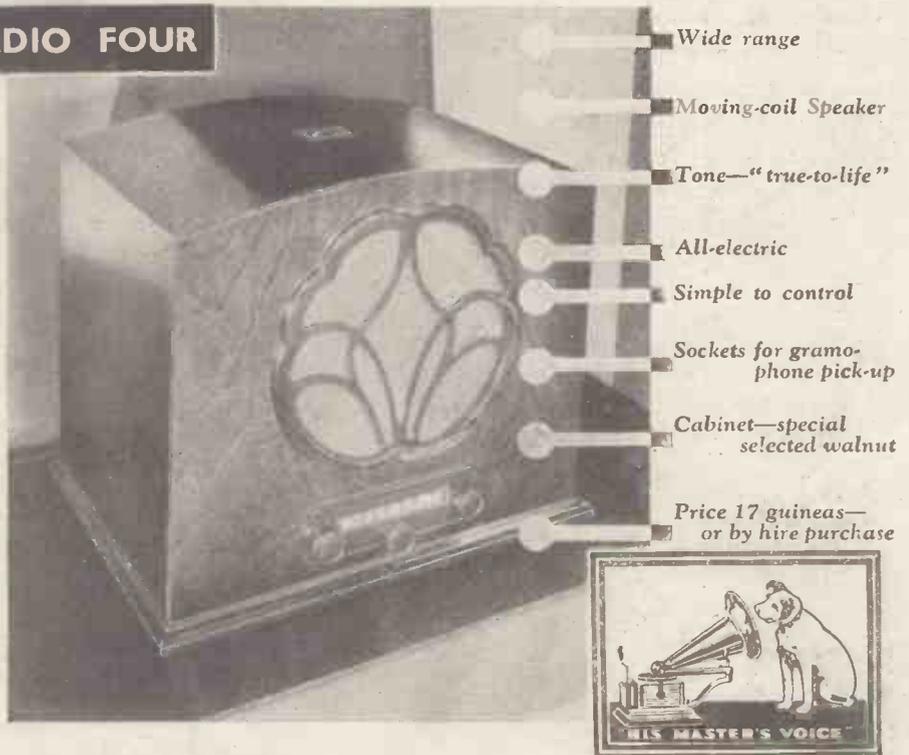
Arks

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

BY YOUR FIRESIDE ... TRAVEL EUROPE ...

WITH THE DE LUXE RADIO FOUR

● Yes, the concert-halls of Europe as if you were in them. The Paris Opera as a Paris audience hears it. That, and no less, is the meaning of "true-to-life" tone. The De Luxe Radio Four will give you other things, of course. It will give you all the stations in its wide range. It will give them simply, surely, immediately. It will give you volume enough for your largest room. It will let you reduce that mass of sound to a whisper—control it smoothly as well as completely—reduce its strength without reducing its richness. It will feed additional loud-speakers or connect with your gramophone pick-up. But . . . this above all . . . it will give you realism of tone . . . because it is by "His Master's Voice."

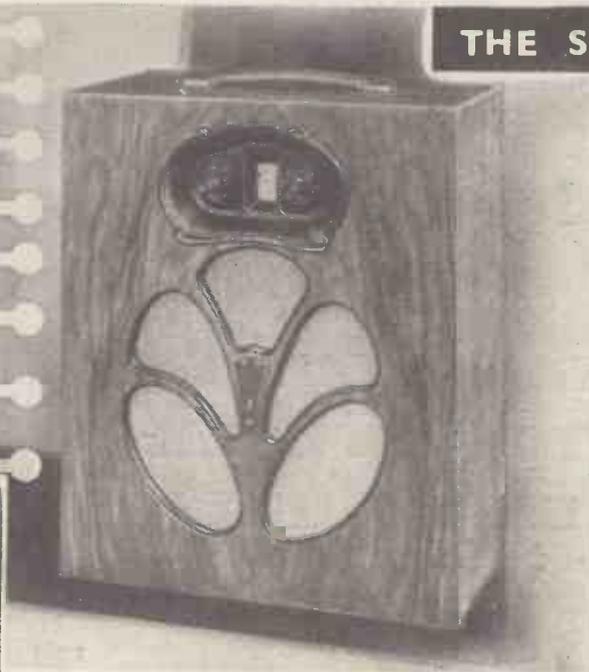


- Wide range
- Moving-coil Speaker
- Tone—"true-to-life"
- All-electric
- Simple to control
- Sockets for gramophone pick-up
- Cabinet—special selected walnut
- Price 17 guineas— or by hire purchase

... BUT IF YOU TRAVEL ... THEN

THE SUPERHET PORTABLE SIX

- Superhet Selectivity
- Great sensitivity
- Low battery consumption
- Local-distance switch
- Easy to carry
- Entirely self-contained
- Figured walnut cabinet
- Price 17 guineas— or by hire purchase



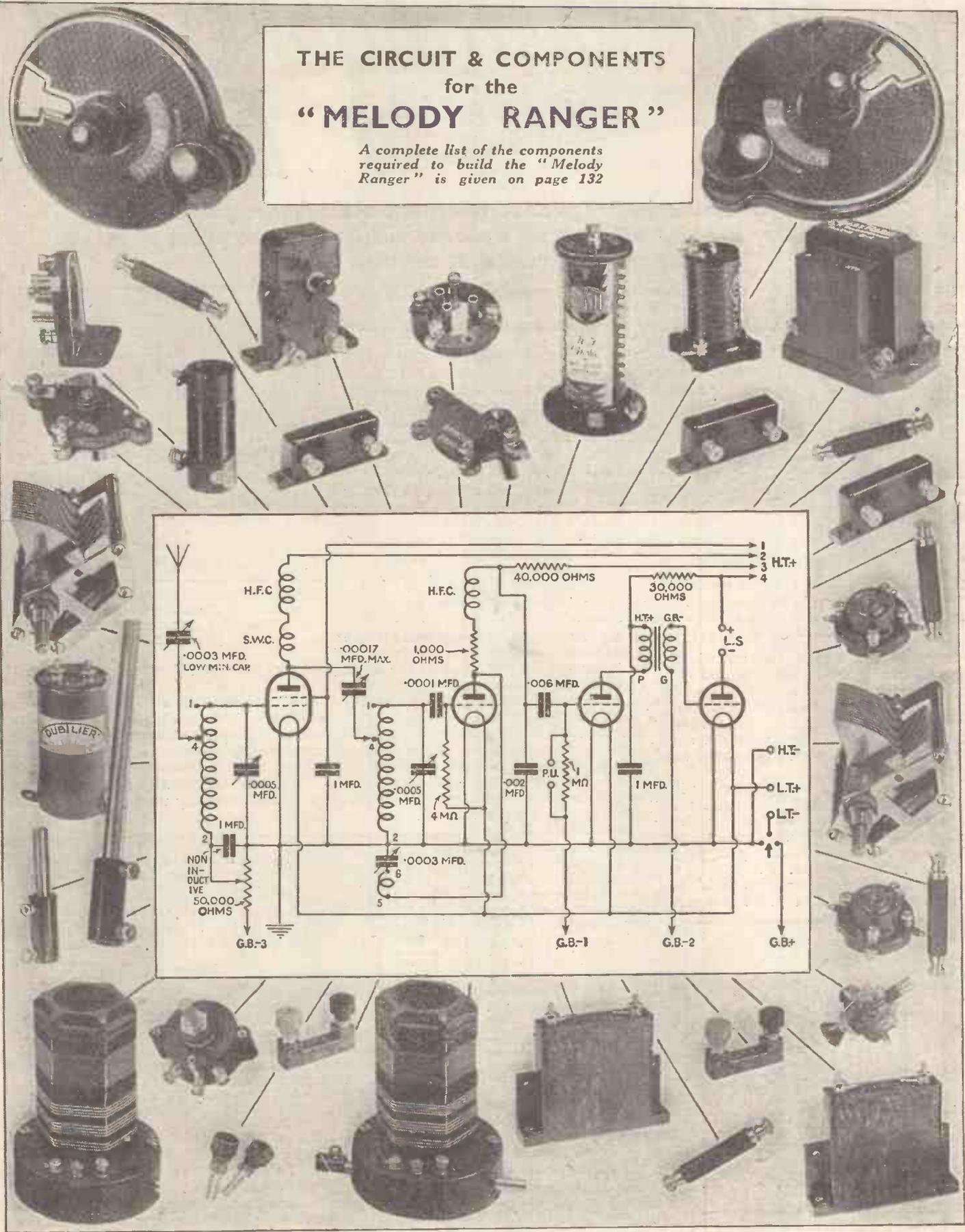
● For here you have a "His Master's Voice" receiver you can take anywhere. And you have an event in radio. For "His Master's Voice" have succeeded in bringing superhet circuit—modern selectivity at its very keenest—into the compass of a portable. The result is a self-contained, easily carried receiver, which stands out, even among far larger receivers, because of its power to isolate a difficult station. A six-valve receiver with an amazingly wide range. Childishly simple to control. With single-knob tuning. With low battery consumption. And—really pleasant to look at! . . . Remember that this is a superhet portable; that Captain Robinson, wireless critic of the "Observer," has described it as "the finest portable on the market"; and that your dealer will let you hear it without any obligation.

"His Master's Voice"

"True to Life" RADIO & RADIOGRAMS

THE CIRCUIT & COMPONENTS for the "MELODY RANGER"

A complete list of the components
required to build the "Melody
Ranger" is given on page 132



THE SET THAT DOES MORE THAN OTHERS!

The Melody Ranger Circuit Made Easy

Quite apart from the outstanding circuit development of the four-range tuning coils in the "Melody Ranger," this new set embodies numerous circuit points of outstanding interest which are described below

STARTING at the aerial end of the circuit we have first of all to consider the method of coupling the aerial lead to

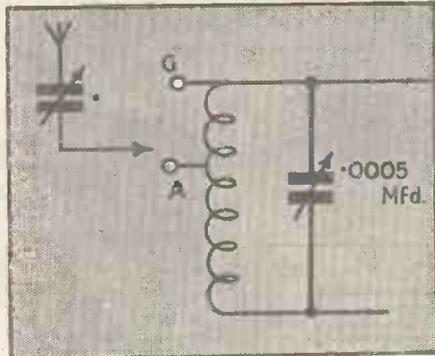


Fig. 1. Aerial coupling is varied by a pre-set condenser connected to alternative tappings on the aerial tuning coil

the tuning circuit. Two possible variations are provided. There is the usual pre-set type of condenser giving a wide range of coupling capacity due to its exceptionally low minimum. There is also an alternative coil tapping. This is essential for a set covering such a wide wavelength range as the "Melody Ranger."

On the two short wavelength ranges it is probable that the direct grid connection of the coil will be wanted but for the medium and long waves additional selectivity can easily be obtained by tapping down the aerial connection (1).

As the first valve of the set is a variable-mu type of screen-grid, negative bias has

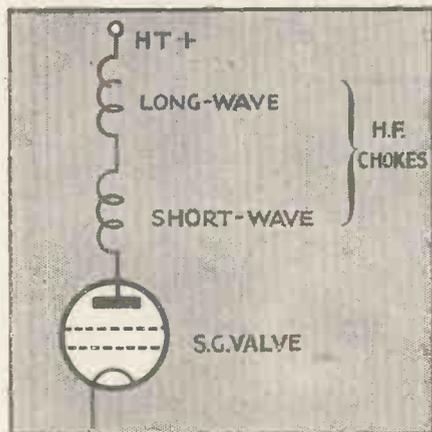


Fig. 3. To provide for efficient reaction on all wavelengths, there is a short-wave choke in series with a long-wave choke in the anode circuit of the screen-grid valve

to be applied to the control grid. This is done in this set by means of a potentiometer connected across the grid-bias battery (2).

The grid return connection that would normally go to the low-tension negative is now connected to the slider of the potentiometer. To ensure a low-impedance path for the high-frequency current a 1-microfarad fixed condenser of the non-inductive type is inserted between the slider and the low-tension negative.

While on the subject of the grid-bias for the variable-mu valve, we should mention that the filament switch has to be of the three-point type, so that when the low-tension is switched off, so also is the grid-bias supply from the potentiometer winding.

Further evidence of the special nature of this set's circuit is shown by the use of two high-frequency chokes in series in the anode circuit of the screen-grid valve. One is for the short waves and the other for the medium and long, the appropriate choke working according to the wavelength actually in use (3).

Between the screen-grid valve and the detector is a variable coupling condenser with a maximum capacity of .00017 microfarad. This enables the selectivity to be adjusted to suit the particular conditions prevailing at any given time (4).

Here again, as in the aerial circuit, there are two connections for the detector grid-coil, one a direct grid connection and the other to a tap on the coil. For the short waves the direct connection is wanted and for the medium and long waves you have the choice of either a direct connection or of a more selective connection to the tapping.

The detector valve, which is coupled to the screen-grid valve by an improved system of tuned grid has a specially-designed anode circuit arrangement to cope with the all-wave nature of the tuning range.

It will be seen that in series with the normal high-frequency choke, needed for the reaction control, there is a 1,000-ohm resistance on the anode side. This resistance takes the place of, and acts in much the same way as, a short-wave high-fre-

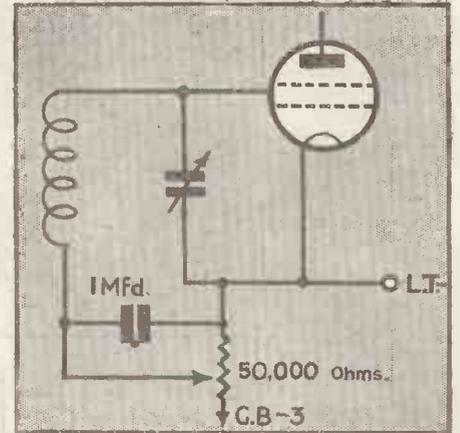


Fig. 2. Volume is controlled by varying the negative grid bias of the variable-mu valve by means of a potentiometer across the grid-bias battery

quency choke, and thus ensures good reaction control on the short-wave ranges (5).

On the other side of the choke there is another resistance, of 40,000 ohms, this being the anode resistance for the resistance-capacity coupling between the detector and the first low-frequency valve.

The resistance-capacity system of coupling is not so widely used in these days of single low-frequency stages, so some readers

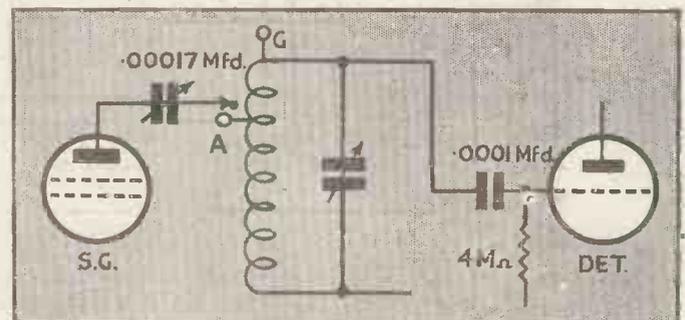


Fig. 4. The selectivity of the intervalve coupling is controllable by means of the pre-set-type coupling condenser between the anode of the screen-grid valve and the tuned-grid circuit of the detector valve

may not be aware of the need for a very careful choice of component values.

For a given anode resistance value there is an optimum value of coupling condenser and grid leak. The values of .006 microfarad and 1 megohm must be adhered to if good quality of reproduction is to be obtained.

(Continued on page 158)



**THE BATTERY THAT
POWERS THE SET
CONTROLS THE TONE**

EVER READY

WIRELESS BATTERIES

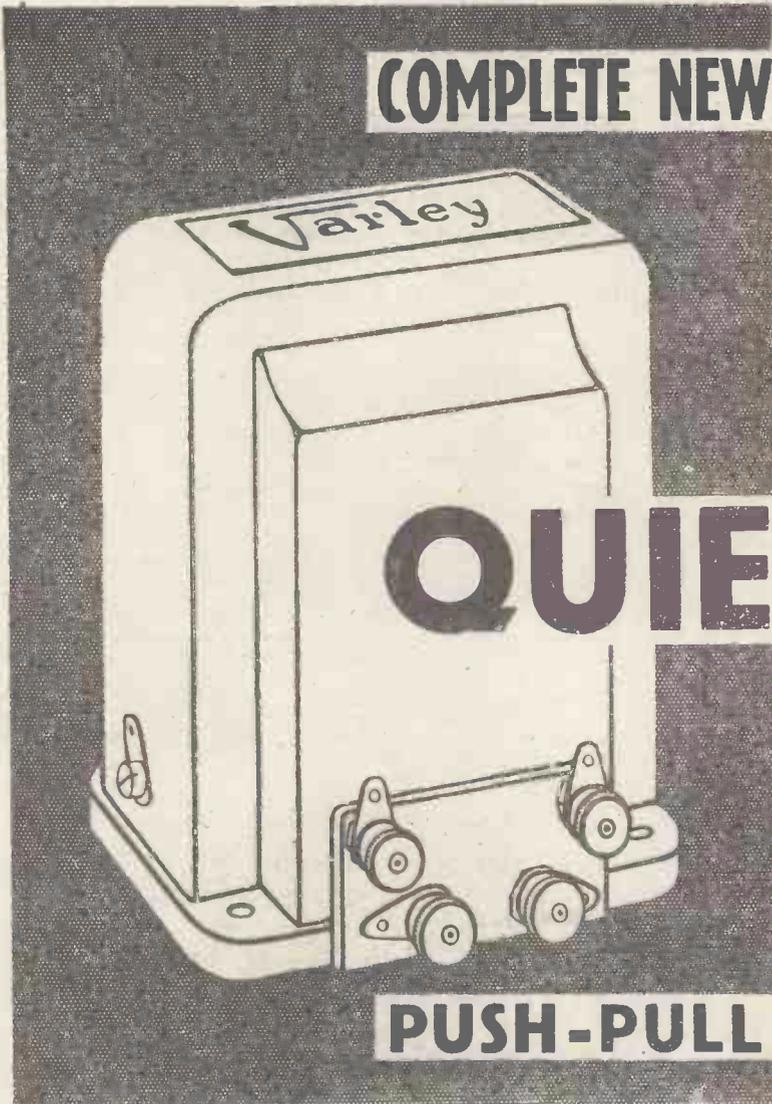
FOR LONG LIFE & PURE TONE

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COMPLETE NEW RANGE OF VARLEY



QUIESCENT

PUSH-PULL COMPONENTS

Radio's newest need . . . Varley's latest achievement. A range of Quiescent Push-Pull Components designed and manufactured by a pioneer firm, famous for over 30 years for the quality of their electrical coil-windings.

You are adapting your existing battery set? Or building the Wireless World "Quiescent Push-Pull Two"? In either case can you do better than choose Varley? Varley Quiescent Push-Pull Components are made in a wide range to suit your every need . . . an Input Transformer, ratio 9/1, and three different Output Transchokes to give you accurate matching.

Each Varley Output Transchoke is suitable for either high or low impedance speakers, thus avoiding the losses of an additional matching transformer and its expense—a double economy. Get all the advantages of this revolutionary Push-Pull system; use Varley—the quality products at a reasonable price.

- **DP36. QUIESCENT PUSH-PULL INPUT TRANSFORMER**
 Ratio 9/1
 Primary D.C. Resistance 825 ohms.
 Total Sec. D.C. Resistance 9300 ohms.
 Prim. Inductance 30 henries with no D.C.
 27 " " 2 M.A.
 22 " " 4 M.A.
 PRICE, including Royalty 17/6

- **DP37. QUIESCENT PUSH-PULL OUTPUT TRANSCHOKE**
 Ratios 3/1 and 42/1
 Primary D.C. Resistance 460 ohms.
 Sec. D.C. Resistance (3/1) 130 ohms.
 Sec. D.C. Resistance (42/1) 8 ohms.
 Primary Inductance (each half)
 13 henries with D.C. current of 26 M.A.
 PRICE, including Royalty 18/6

- **DP38. QUIESCENT PUSH-PULL OUTPUT TRANSCHOKE**
 Ratios 3/1 and 50/1
 Primary D.C. Resistance 400 ohms.
 Sec. D.C. Resistance (3/1) 130 ohms.
 Sec. D.C. Resistance (50/1) 9 ohms.
 Primary Inductance (each half)
 8 henries with D.C. current of 26 M.A.
 PRICE, including Royalty 16/6

- **DP39. QUIESCENT PUSH-PULL OUTPUT TRANSCHOKE**
 Ratios 3/1 and 75/1
 Primary D.C. Resistance 400 ohms.
 Sec. D.C. Resistance (3/1) 130 ohms.
 Sec. D.C. Resistance (75/1) 64 ohms.
 Primary Inductance (each half)
 8 henries with D.C. current of 26 M.A.
 PRICE, including Royalty 16/6

Varley

Prop.s.: OLIVER PELL CONTROL LTD.

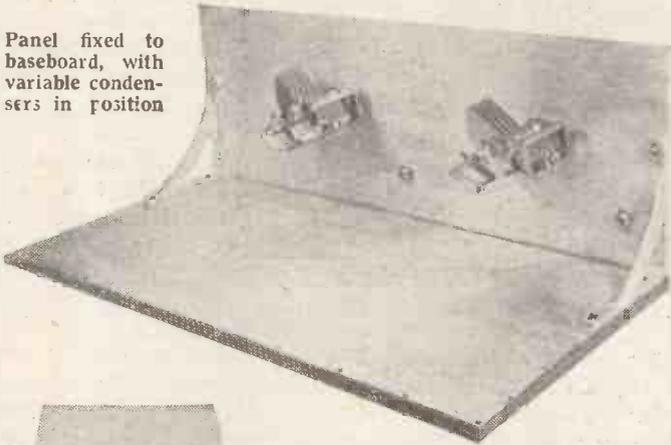
READY NOW

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

Step-by-Step Building The "Melody Ranger"

A Simple Constructional Guide to Building "A.W.'s Sensational New Receiver

Panel fixed to baseboard, with variable condensers in position



STEP 1.—The first step is to mount the panel on the baseboard. This assumes you have bought the panel already drilled. Otherwise this drilling must be done as shown by the diagram. The foil is tacked to the baseboard with gimp pins spaced every 2 ins. After fitting the panel to the baseboard you can fit the panel brackets for additional support. Then mount the two variable tuning condensers.

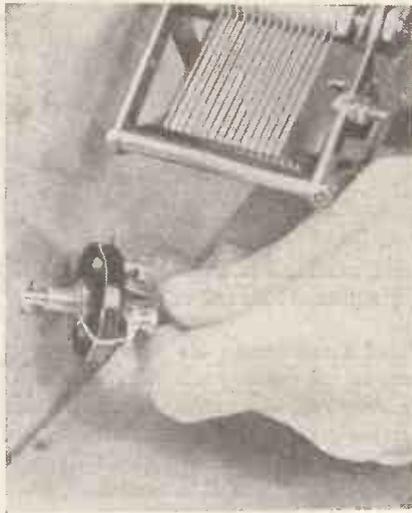
A PRECAUTION TO BE OBSERVED.—In the production of such a large illustration as our Full-size Double-page Blueprint, it sometimes happens that contraction takes place in the course of the many processes involved. Why we mention this is because the position of the spindles of the aerial and reaction condensers, if these are laid out according to a blueprint which suffers from slight contraction, may not coincide with the drillings of the panel.

Before screwing down these condensers on to the baseboard, you should lay the drilled panel on the blueprint and make certain that the lines marking the centres of the extension spindles coincide with the appropriate holes in the panel.



STEP 2.—Cutting away the foil. Mark out the small square on baseboard as shown by the print, and with a chisel or screwdriver indent the foil so that the unwanted piece can be prised off. This cutting away is essential to insulate the bracket of the aerial-coupling condenser from the earthed metal. Follow the blueprint for the exact size.

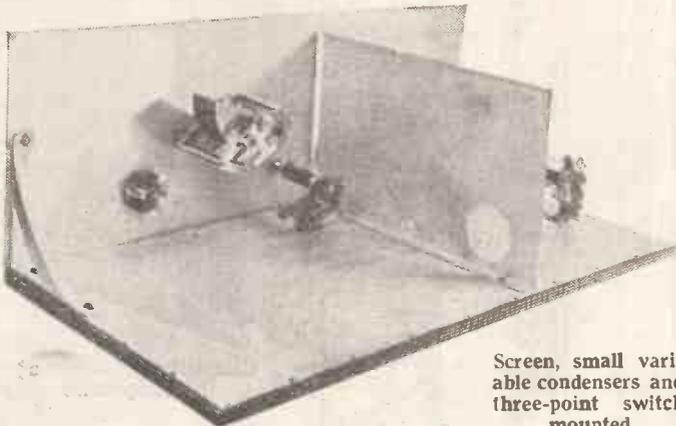
How the foil is cut away



How to fit the three-point switch with earth wire attached

STEP 3.—The three-point switch. There is a wire to be fitted at this stage round the three-point switch bush between the panel and the first fixing screw and going to one contact of the switch. This prevents noises due to the high-resistance contact that would otherwise be formed between bush and spindle. Essential to make this contact the negative high-tension.

STEP 4.—Fitting the small panel condensers. The aerial-coupling condenser is first screwed to its bracket and the bracket then fitted to the baseboard where the foil has been cut away. Place insulating coupler on the spindle of the condenser. Then push extension rod through the panel hole and join up with the coupler. The reaction condenser is similarly fitted, but here the bracket is connected intentionally to the foil. Clean this bracket before fixing, in order to ensure a good contact. Fit extension coupler as for aerial condenser. Mount the vertical screen, as shown by print, about 1/4 in. from the panel to prevent noises on short waves. We have now assembled the metal chassis forming the basis of the design. This consists of the metal panel mounted at right angles to the metal-foil baseboard, with the metal screen mounted at right angles to the panel and baseboard, thus forming two distinct sections for the screening of the two tuned circuits.



Screen, small variable condensers and three-point switch mounted

EASY TO BUILD, EASY TO WORK—AND EFFICIENT

STEP-BY-STEP BUILDING THE "MELODY RANGER" (Continued)



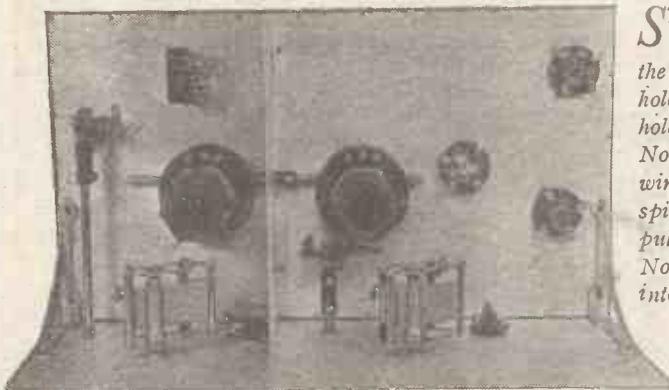
Mounting screen-grid valve-holder

STEP 5.—Mounting the S.G.-valve holder. Get the valve in the centre of the screen hole and insert in holder. Manoeuvre until correct position is found. See print. Before screwing down the coils, make sure switch coupler is in centre of hole provided in the screen.



Fitting volume control

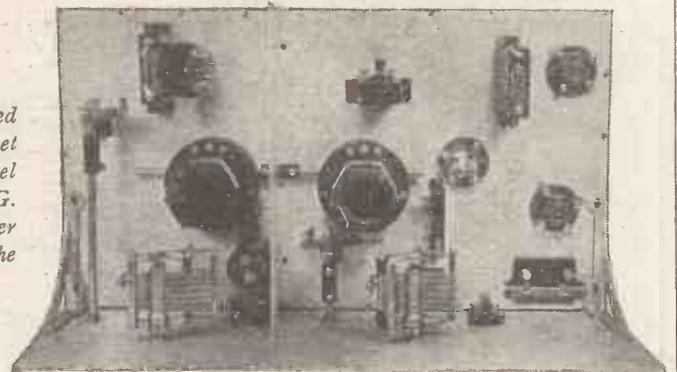
STEP 6.—Insulating the volume control. First put insulated washer over spindle. Insert the spindle in the hole. Centre the spindle. Place another insulating washer over spindle and screw up. Insulating washers provided with collars to prevent the spindle touching the panel are supplied complete with the volume control



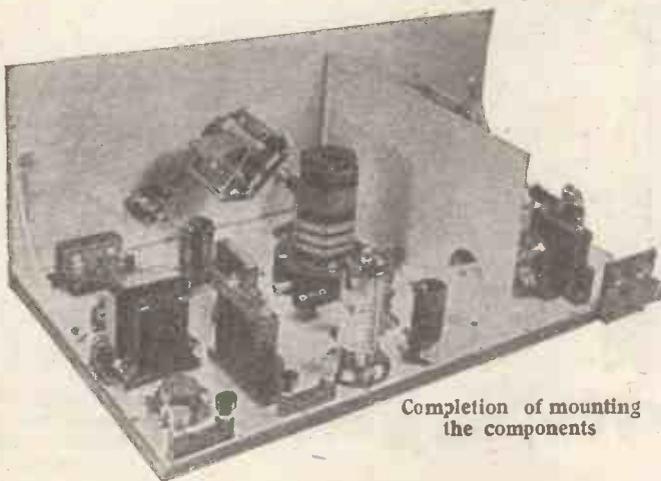
Showing relative positions of coils and valve-holders

STEP 7.—Plan of baseboard. The components now mounted are the coils, the aerial and reaction condensers, the tuning condensers, the screen-grid holder, and vertical screen; and now the three valve holders. See print for exact positions. Note the special low-loss valve holder for the efficient operation of the detector on the short waves. Note also that variable condensers are mounted slantwise to facilitate wiring of fixed plates. When fixing the two coils, place on one switch spindle the metal coupler. Place one coil on the baseboard and manipulate this coil so that the coupler comes half-way through the screen. Now place the other coil in the other section of the baseboard and slide into position so that the switch spindle fits into the coupler.

STEP 8.—Adding Fixed Condensers. As print shows, the fixed condensers are mounted in convenient positions. Mount the pre-set condenser for inter-valve coupling, de-coupling condenser near panel for variable- μ bias, screen-grid de-coupling condenser near S.G. holder, low-frequency de-coupling condenser beside power valve holder, grid condenser near coil, and R.C. condenser, flat, and the small bypass condenser near the panel.



The positions of the fixed condensers



Completion of mounting the components

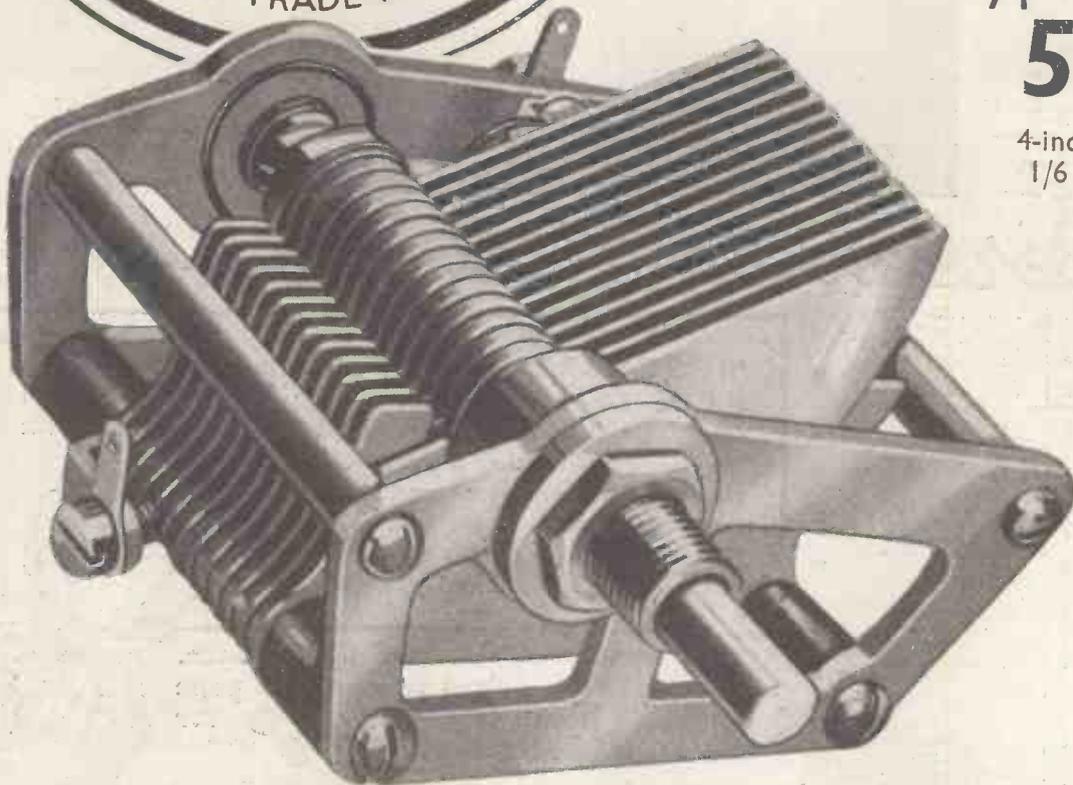
STEP 9.—Completion of Fixing. To finish the component fixing you have still to mount the three high-frequency chokes, the low-frequency transformer, and the terminal blocks. The aerial and earth block is at the right-hand side, the pick-up at nearly the centre, and the loud-speaker block on the left. Before attempting to start the wiring, put S.G. valve in its holder to see that the bulb does not foul the components, which may have been slightly inaccurately fitted. Behind the high-frequency choke used in the screen-grid anode circuit can be seen the tapping block associated with the inter-valve tuning coil. This is fitted by a screw going through a hole between the two sockets through the supporting bush into the baseboard.

(Continued on page 145)

A GREAT ADVANCE IN RECEIVER DESIGN



again!



Type JL6.

5/6

4-inch dial
1/6 extra

When you are buying the components for your "Melody Ranger," remember this: the tuning condensers used by "Amateur Wireless" themselves for the original model of this sensational receiver were J.B. type JL6. Build your "Melody Ranger" *exactly as the original*. Then you are certain of world-wide reception as good as the original's in all parts of the country. Make certain of fullest success—follow the specification and use J.B.

THE PRECISION CONDENSER
Specified in the "Melody Ranger"

Advertisement of Jackson Bros. (London) Ltd., 72, St. Thomas' St., London, S.E.1.

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The DIRECT

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EASY PAYMENTS



"The tests I have completed with this receiver during a tour of the country confirm my opinion that the "Melody Ranger" sets an entirely new standard in home constructor receivers for 1933."

S. RUTHERFORD WILKINS,
Designer of the
"Melody Ranger."



"I whole heartedly recommend the Melody Ranger to all seriously interested in Foreign programmes, and particularly to my Colonial friends for reception of the B.B.C. Empire broadcasts. Its extraordinary efficiency on all wavebands is all the more remarkable considering the low cost and simplicity of construction." DONALD P. MARCUS,
Managing Director, Direct Radio, Ltd.

A Personal Guarantee to you

	£	s.	d.		£	s.	d.
1 pair R.R. "Melody Ranger" coils with coupling links	1	10	0	1 T.C.C. .006-mfd. fixed condenser	2	0	0
1 aluminium panel 18in. x 7in. drilled	3	6		1 Ready Radio 1,000-ohm thermium resistance	10		
1 piece of foil, 18in. x 10in.	2	0		1 Ready Radio 30,000-ohm thermium resistance	10		
1 aluminium screen 9 1/2in. x 6in. drilled to specification	2	0		1 Ready Radio 40,000-ohm thermium resistance	10		
1 50,000-ohm potentiometer, Lewcos new type wire wound	3	0		1 Ready Radio 1-meg. thermium resistance	10		
2 T.C.C. 1-mfd. fixed condensers	5	8		1 Ready Radio 4-meg. thermium resistance	10		
1 Dubbler 1-mfd. fixed condenser, Type 9200	2	9		1 Vertical-mounting resistance holder	6		
2 J.B. .0005-mfd. variable condensers, Type J.L.6	11	0		1 Ready Radio 3-pt. switch	1	6	
1 Ready Radio .0003-mfd. special low minimum Micadl series aerial condenser	3	0		1 Ready Radio .00017-mfd. preset condenser	1	6	
1 Ready Radio .0003-mfd. mica-log condenser	3	6		1 Pair panel brackets	6		
2 Igranite Indigraph slow-motion dials	10	0		1 Ready Radio L.F. transformer 3-1	8	6	
1 Ready Radio Short-wave S.G. valve-holder	1	6		2 Ready Radio complete extension equipments with mounting blocks	2	0	
1 Ready Radio S.W. valveholder	1	3		2 Belling-Lee terminals, type 'R,' A and E.	5		
2 Ready Radio 4-pln valve-holders	1	0		11 Belling-Lee Mid-get wander plugs	1	10	
1 Wearite H.F. Choke, Type H.F.O.	6	6		2 Spade terminals	2		
1 Ready Radio "Melody Ranger" H.F. Choke	4	0		4 Sockets	2		
1 Igranite Short-Wave H.F. Choke	2	0		1 Piece ebonite, 3in. x 2 1/2in.	2		
1 T.C.C. .0001-mfd. fixed condenser	1	3		2 Belling-Lee terminal blocks with terminals	1	10	
				6 Yards flex-screws, wire, etc.	7		
				4 Valves to specification, PM12V, PM2DX, PM2DX, PM2A	2	2	3
				1 Direct Radio special "Melody Ranger" cabinet	15	0	

"IT'S GUARANTEED" by "Amateur Wireless," and the Direct Radio Kit is your guarantee for wide-world reception. Build the "Melody Ranger" with a Direct Radio Kit and if you find the slightest cause for complaint, we will not consider the purchase completed until we have made your "Melody Ranger" operate to your absolute satisfaction free of charge.



You want the best Kit at once. Complete Kit Prices on opposite page. We hold huge stocks for immediate delivery.

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WISE SPENDING — DISCRIMINATING SET

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RADIO FOUR WAVE BAND RANGER

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EASY PAYMENTS

KIT No. 1 (less valves and cabinet) £5 15 0 or 12 monthly payments of 11/-	KIT No. 2 (with valves less cabinet) £7 17 3 or 12 monthly payments of 15/-	KIT No. 3 (with valves and cabinet) £8 12 3 or 12 monthly payments of 16/6
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NOTE THE OUTSTANDING FEATURES

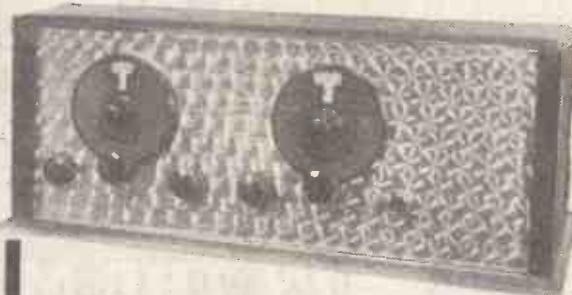
“THE GREATEST OF ALL ‘MELODY RANGER’ KITS”

(Technical Editor)

Study carefully the specification—only first-class components included, made by first-class manufacturers—the result: first-class performance on all wavebands.

1. Coils and short-wave accessories made by the firm recognised in the Trade as the experts in short-wave component manufacture.
2. T.C.C. and Dubilier fixed condensers—chosen for reliability.
3. J.B. short-wave condensers—the only condensers which will tune down to 18 metres.
4. Wearite long-wave H.F. choke gives amazing efficiency.
5. Igranac slow-motion dials and short-wave H.F. choke—short-wave components *de luxe*.
6. Mullard valves will treble all your signals.

SIEMENS 120-volt H.T. Battery, standard capacity	29 13 6
SIEMENS 120-volt H.T. Battery, power capacity	1 4 0
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CELESTION PPM Soundex Permanent Magnet Moving-coil Speaker, with input transformer	1 7 6
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BOWYER LOWE AED Mark III Pick-up	1 10 0
Volume Control	3 0 0
COLLARO Double Spring Gramo Motor Automatic Stop	1 13 0
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Overseas Customers

Direct Radio are making special arrangements for the dispatch of "Melody Ranger" kits to any part of the world. In addition to the kits specified on this page we are featuring a special **Overseas Kit** consisting of all necessary components as listed, Valves, Table-model cabinet with Bluespot 66R Loudspeaker Unit in special Colonial Cabinet, Batteries, Aerial and Earth, in fact everything necessary for a complete B.B.C. Empire Broadcast Receiving station for £15. Cable code word to order complete outfit: "Meloranger."

All goods expertly packed for export and insured.

TERMS.—Cash with order or alternatively deposit one-third total cost with order; balance payable on delivery. Postage or freight, and Insurance extra at cost.

BUT if you prefer a manufacturer's Cartoned Kit buy a Ready Radio "Melody Ranger" Kit officially approved by the designer S. Rutherford Wilkins World Tested fully guaranteed. Price £5 12 6 or on Easy Terms, 12 monthly payments of 11/3 Now in stock awaiting your order. Use Coupon below.



CASH, C.O.D., AND EASY PAYMENT ORDER FORM

To: Direct Radio, Ltd., 159 Borough High Street, London, S.E.1.

Please dispatch to me at once the following goods.....

for which (a) I enclose (b) I will pay on delivery (c) I enclose first payment of { Cross out line if not applicable }

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A.W. 28/1/33

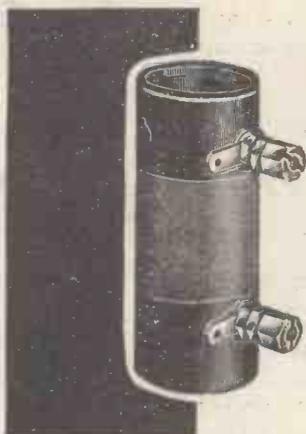
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Advertisers Appreciate Mention of "A.W." with Your Order

S. RUTHERFORD WILKINS SPECIFIES

RADIO IGRANIC DEVICES

IN THE MELODY RANGER



SHORT WAVE H.F. CHOKE

Specially developed for efficient operation on wavelengths of the order of 10 to 80 metres. Smooth reaction control is obtained over the entire range specified. Price 2/-.

"INDIGRAPH" VERNIER KNOB AND DIAL

Smooth in action and entirely free from backlash. Greatly simplifies tuning and calibration. Window permits names of stations and wavelengths to be recorded. May be illuminated from behind. Standard type giving reduction ratio of approx. 10 : 1. Price 5/-. Also other models.



S. Rutherford Wilkins who specifies the above components for the A.W. "Melody Ranger," is yet another famous set designer who pays tribute to the quality and reliability of Igranic Radio components.

Last year saw the introduction of a complete new Igranic range, which is proving increasingly popular with the experts. The home constructor, to obtain components of the highest quality and performance, can do no better than follow the example of the experts and specify Igranic.

Write to-day for fully illustrated Catalogue No. D. 182.

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IGRANIC COMPONENTS WILL BE THE MAKING OF YOUR SET

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

CVS-58.

STEP-BY-STEP BUILDING THE "MELODY RANGER" (Continued from page 140)



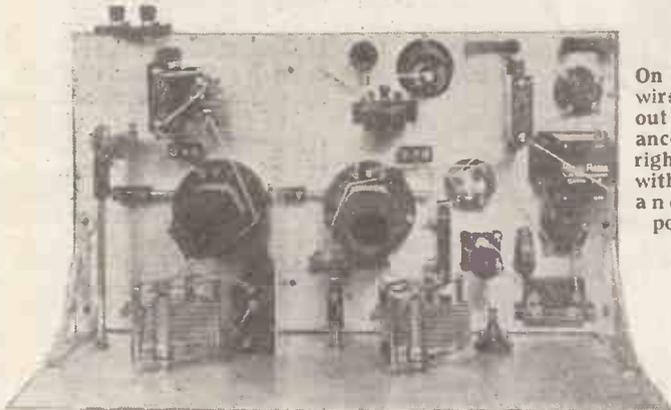
Making earth connection

STEP 10.—Wiring the earth connections. Note how the fixing screws are used to ensure this contact. First make a loop in the wire, take out the screw fixing the component, slip wire between the component and the baseboard, then the screw will go through the loop and so hold the wire in position in contact with the foil. Note detector valve holder fixing of low-tension negative wire to earthed foil.

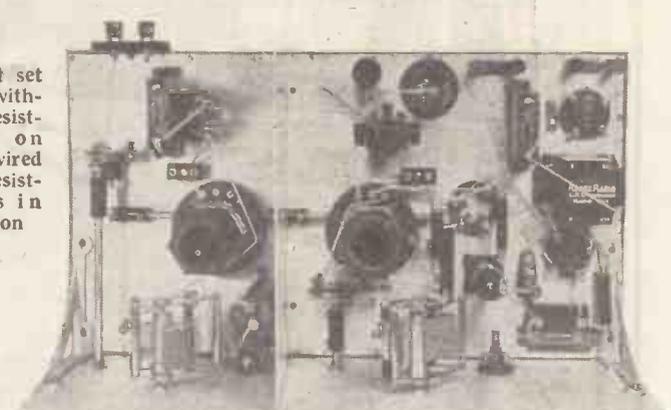


Fixing tapping block

STEP 11.—Fixing the tapping block. First cut the lengths of sleeving and wire. Then make the wire loops. Fix wires to the sockets under nuts and bend them in the right directions.



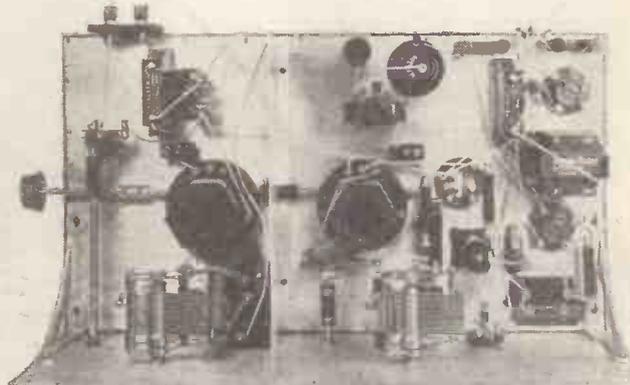
On left set wired without resistances, on right wired with resistances in position



STEP 12.—Here is the set wired up with the exception of the resistances and the battery leads. Note that even at this advanced stage in the wiring everything is very neat, and there is an absence of complication. The short wiring is essential for good results on the short waves.

STEP 13.—Here you see the positions of the fixed resistances, which complete the main part of the wiring. With the exception of the R.C. anode resistance, all the resistances are held in position by their wiring leads.

STEP 14.—Completed Set. The flexes for the battery connections complete the wiring. Three groups are arranged for neatness. The first comprises H.T.—, H.T. +2, H.T. +3, and H.T. +4. The second L.T. + and L.T.—. The third G.B. +, G.B.—1, and G.B.—2. Then the H.T. +1 and G.B.—3 are made as separate leads. The three groups emerge from their component fixings be-



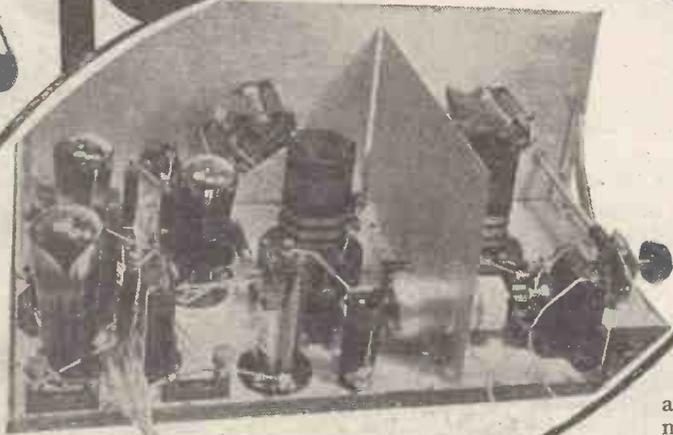
The completed "Melody Ranger"

tween the terminal blocks of the loud-speaker and pick-up. Note that the wave-change switch is extended through the side of the cabinet, so the extension rod has to be removed from the switch coupler before the set is finally put into the cabinet, then this rod is fitted to the coupler by pushing through the hole already made. Note the neat appearance of the wiring.

THE "MELODY RANGER" WILL BRING IN THE WHOLE WORLD

The MELODY RANGER

IT'S NEW
IT'S DIFFERENT
IT'S GUARANTEED



See how simple the "Melody Ranger" is to build

WE are happy in describing this new set to you because we know it is **one of the finest propositions ever offered to the home constructor.** We are confident that you will obtain a remarkable range of stations, not only on the medium and long wavebands, on which normal broadcasting is conducted, but on those fascinating short-wave bands below 100 metres.

FOUR WAVEBANDS WITH THE TURN OF A SWITCH

Here, for the first time in wireless history, is a set, aptly named the "Melody Ranger," covering short, medium and long wavebands with hitherto un-

dreamed of simplicity. In spite of its ambitious performance, the "Melody Ranger" is extremely simple to build and certainly no less simple to operate.

The "Melody Ranger" literally "puts a girdle round the earth." It culls melodies from the five continents with all the simplicity of tuning in the local station. We would stress these two outstanding features of the set—the phenomenal wavelength range and the simplicity of operating the controls.

To get down to brass tacks, the "Melody Ranger" is a four-valver. The first valve is a high-frequency amplifier. It is a screen-grid. More than that—it is a variable-mu.

VOLUME CONTROL WITHOUT DISTORTION

This means that the amplification before detection is fully under control. It means, in

DESIGNED
BY
S. RUTHERFORD
WILKINS

fact, that the volume can be controlled without any trace of distortion when the output of powerful signals is reduced.

The second valve is the detector. Into this circuit is introduced reaction for additional amplification. The third valve is a resistance-capacity-coupled low-frequency amplifier. The fourth valve is the power output stage, transformer coupled to the preceding amplifier valve.

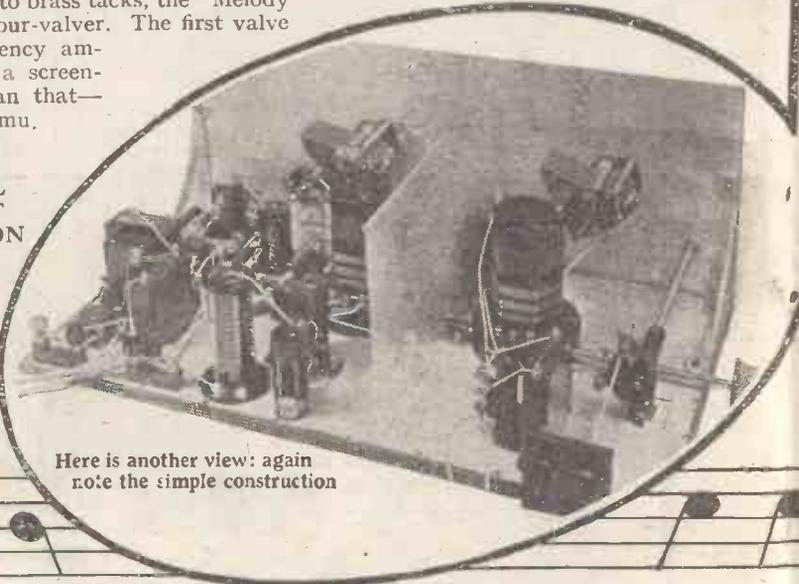
So in brief we have a straightforward sequence of valves, with an admirable control of high-frequency amplification and a great reserve of low-frequency amplification.

Into each of the four valve circuits we have introduced all the latest circuit ideas that we consider really do effect improvement in reception. Over and above all such minor circuit details we have the tuning coils, which, for the first time in home-constructor set design, cover four distinct wavebands by the single turn of a switch.

The first tuning circuit is, of course, for the aerial and the second is for the inter-valve coupling between the screen-grid valve and the detector. Separate tuning controls are provided for these two circuits.

Each coil—that is the aerial coil and the inter-valve coil—consists of self-contained four-wave units, with all the switch wiring done internally. From your point of view they are as simple to build into the set as one-waveband coils.

To simplify the operation still further, the two coil switches are "ganged," which



Here is another view: again note the simple construction

BUILD THE SET THAT WILL



COVERS 4 WAVEBANDS 13 TO 2,000 METRES

means that one knob works both coil switches at once.

A WONDERFUL CIRCUIT

Let us briefly run through the complete circuit (see page 135) as this gives a good idea of the great care that has been taken in the "Melody Ranger's" design.

About the variable-mu. This needs negative bias applied to the control grid for the control of the amplification. We get this through a potentiometer connected across the grid-bias battery. As the winding takes an appreciable current from the battery, it is essential to arrange to cut the "pot" out of circuit when the set is switched off.

long-wave choke's self-capacity would by-pass the extremely high frequencies of short-wave signals. The short-wave choke prevents this.

Now look at the coupling. You see it is a form of parallel-feed, with the tuned circuit going across the grid and filament of the detector. Note that the coupling condenser between the anode of the variable-mu and the grid of the detector valve is variable. This is an important feature, as it enables the selectivity of the whole set to be varied in a remarkable way.

Like the aerial-tuning circuit, the grid tuning of the detector has alternative coil tappings, either direct to the grid or, for greater selectivity, to a coil tap.

SINGLE REACTION ON ALL FOUR BANDS

Reaction is applied to this grid tuning in the usual way, with a reaction condenser in series with the reaction winding of the inter-valve coil. Note that the moving vanes of the condenser are earthed to prevent hand-capacity — most important on the short waves.

At every stage in the design of this set we have had to think of the all-wave requirements of the tuning. Thus you see the values of the grid leak and condenser are different from usual. We have a low capacity for the grid condenser, namely .0001

"I tested the receiver firstly in the early evening and later between half-past nine and half-past ten, and I was surprised to find that my total number of stations was over 110, ninety of these being definitely identified. Eleven of these were on long waves, ten on short waves, the remainder being on medium waves... even with an aerial around the picture rail I was able to hear such stations as Prangins (Geneva), six Atlantic 'phone stations, as well as numerous other Continental short-wave stations."

A. R. T.
Bristol Road, Birmingham.

This is done with a three-point switch, arranged in such a way that when the low-tension is cut out, so is the bias battery.

The tuning condenser across the aerial-tuning coil has its circuit completed through a 1-microfarad fixed condenser, in order to prevent the shorting of the grid-bias battery.

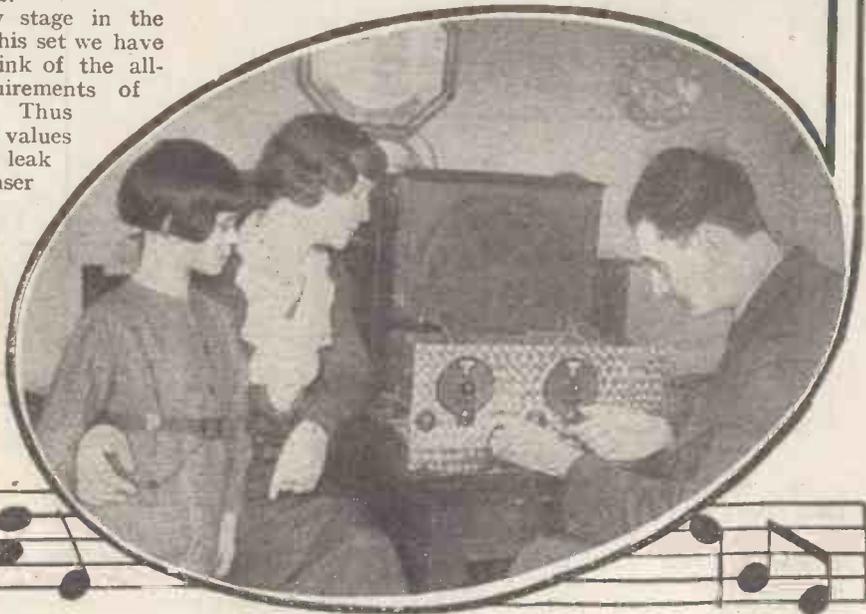
The aerial circuit is otherwise quite standard, but note that in addition to a pre-set type of aerial-coupling condenser the aerial-tuning selectivity is further governed by the position of the aerial lead on the coil—that is, it may be connected directly to the grid or to a tap on the coil.

Now for the coupling arrangement between the variable-mu valve and the detector valve. Look at the anode circuit of the variable-mu. There are two high-frequency chokes in series. The short-wave choke is near the anode and the long-wave choke between this and the high-tension supply.

On the short-wave tuning of the set the



Control is very simple, all four wavebands being covered by the turn of a switch

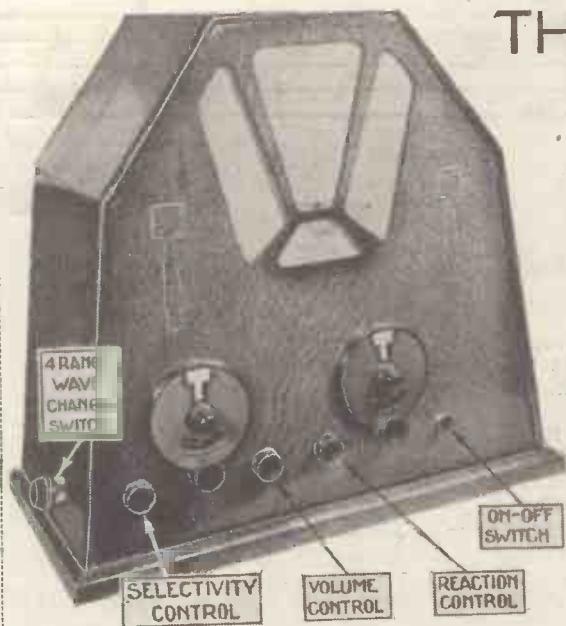


DO MORE THAN OTHERS



THE "MELODY RANGER" (Continued)

HEAR THE WHOLE WORLD WITH THE
"MELODY RANGER"



Here is the console model of the "Melody Ranger" with the controls indicated

microfarad, and a fairly high grid-leak value, namely 4 megohms. While the value of the leak does not appear to affect the quality on the medium waves, it has a marked effect on the amplification on the short waves.

Again demonstrating the all-wave nature of this "Melody Ranger" set is the unusual arrangement of the anode circuit of the detector. You know, of course, that in this circuit we have two currents, the high-frequency we wish to by-pass to earth or through the reaction condenser, and the low frequencies of the speech and music we wish to amplify in the low-frequency stages.

PROVISION FOR PICK-UP

Remember that we are dealing with very high frequencies on the short waves. The ordinary H. F. choke that works so admirably on the medium and long waves in acting as a barrier to the high-frequency current, is not so good at stopping the short waves. We have to use another method of preventing the high-frequency getting beyond the

coupled to the next valve, we have a 40,000-ohm resistance in series with the long-wave choke and the high-tension supply. The coupling condenser has a capacity of .006 microfarad and this with the 1-megohm leak gives us good quality.

The third valve is coupled to the power valve by the normal transformer method, but note that the primary circuit has full decoupling in the form of a 30,000-ohm resistance and a 1-microfarad condenser.

This third valve of the sequence has another function, which is to amplify the output from a gramophone pick-up. This is quite simply connected across the 1-megohm leak in the grid circuit. The high resistance of this leak does not

appreciably affect the action of the pick-up or of a 50,000-ohm potentiometer volume control connected across the pick-up.

With the pick-up interposed at this point in the circuit we get the full low-frequency amplification of the last two valves which, with most pick-ups, should be more than enough to load the output valve.

A SIMPLE LAYOUT

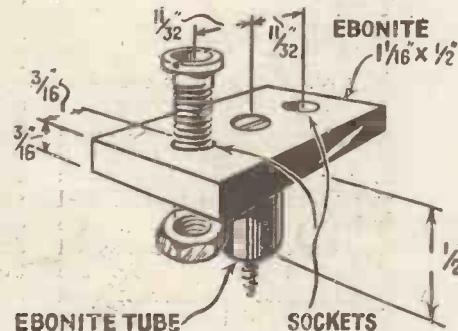
So much for the circuit of the "Melody Ranger." The layout of this circuit has been made as simple as possible. Bearing in mind the all-wave nature of the tuning, a truly remarkably simple layout has been achieved. In brief, we have a metal chassis, made up of a metal panel, which you can buy already drilled to take the panel controls, mounted at right angles to a baseboard covered with metal foil.

There is a small vertical screen mounted on the baseboard between the two tuning circuits. Through this screen projects the

or it can be housed in a handsome console type cabinet, with the controls projecting through the wooden front, with metal panel at the back.

THE WIRING GUIDE

The wiring up of this "Melody Ranger" is greatly simplified by our full-size blue-



Details of coil-tipping blocks

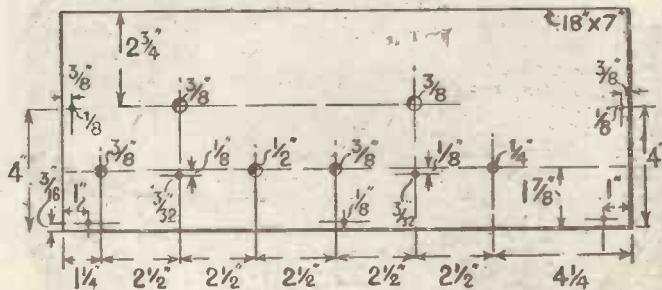
print, which for this set is still further augmented with a complete table of wire measures.

Each wire in the blueprint is numbered, as is usual in all our blueprints. Corresponding numbers will be found for the lengths of wire.

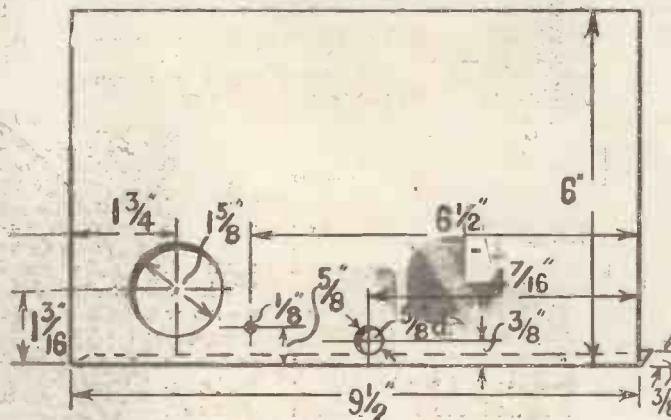
You will see that in addition to the wire lengths the amount of sleeving for each lead is also indicated, as well as the method of looping the bare wire ends projecting from each end of the sleeving.

WIRING

The wiring of the set is done entirely by means of covered lengths of tinned-copper wire secured under the terminals of the components. If you cross off each wire length as you actually make it in the set according to the blueprint there will be no chance of missing any lead.



Here is a dimensioned diagram of the panel for use if this is not obtained ready drilled



The screen is of the size shown above and drilled as indicated

anode. We use, in fact, a 1,000-ohm resistance, which provides us with a smooth and effective control of the reaction even on the shortest of the short waves we are dealing with.

As the detector is resistance-capacity

coil-changing switch rod and the screen-grid valve.

In another part of this issue we give full constructional details. The completed chassis can be placed in either a simple table cabinet with external accessories,

When the set is wired up the question of valves and voltages will have to be settled. For the "Melody Ranger" we recommend a PM12V variable-mu screen-grid, a PM2DX for the detector, a similar (Continued on page 158)

The BATTERIES for the 'MELODY RANGER'

LISSEN COILS, LISSEN BATTERIES, LISSEN ACCUMULATOR, LISSEN FIXED CONDENSERS, LISSEN PRE-SET CONDENSER



ARE LISSEN BATTERIES

Mr. Rutherford Wilkins used Lissen Batteries in his original "Melody Ranger." That is why Lissen Batteries are mentioned first in the specification!

Mr. Rutherford Wilkins used a Lissen Accumulator and a Lissen Grid-bias Battery, too—and you will see that they are first choice for the published circuit!

Mr. Wilkins also used Lissen Fixed Condensers and a Lissen Pre-Set Condenser—Lissen first choice again in the specification!

Mr Rutherford Wilkins

Never was specification more critical. These Lissen Batteries were chosen for their smooth and steady current. These Lissen Fixed Condensers used by Mr. Wilkins because of their exact values. Stick to Lissen for your "Melody Ranger" parts if you want the results Mr. Rutherford Wilkins gets.

CHOSE AND USED THE PARTS SHOWN BELOW IN HIS OWN MELODY RANGER



Lissen 4-Wave Range Coils ... Each 15/-

Lissen Pre-Set Condenser 2/-

Lissen Fixed Condensers ... Each 6d.

120-volt Lissen H.T. Battery 11/-

2-volt Lissen Accumulator 4/6

9-volt Lissen G.B. Battery 1/-

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OUR BROADCAST CRITIC

ON UNWISE BROADCASTING



JELLY
D'ARANYI

I DO not remember hearing a more fascinating drama than F. J. King-Bull's adaptation of the story by H. G. Wells called *The Country of the Blind*. That play completely held me. I felt I must listen to the end. My wife complained half-way that she did not like it, but I noticed that when I pretended to be willing to switch it off she protested. She, like myself, felt constrained to listen.

It was amazingly original and it seemed very natural. All we were expected to accept or take for granted was what the narrators, Harman Grisewood and Lilian Harrison told us. Personally I found it easy to accept the fact that this people had originally suffered from a disease which rendered all their children sightless. Once having accepted that, I found it easy to understand how difficult it would be for a visitor to their country to make them understand what the power of sight meant, especially as for some generations not a single person in that country had been able to see. The visitor, falling in love with a maiden of that land, was expected to have his eyes removed (as the Elders considered they were hampering his reasoning powers) or he had better escape. Escape probably meant death on the mountains, but he chose it.

Yes; it was all very convincing—too convincing by half. I stared into the fire (having turned the light out) and echoed the hero's thanks for the blessedness of sight. Then it suddenly occurred to me that I had heard Henry Ainley (I think it was he, but no matter) appeal for money for wireless sets—for *the Blind*. The thought struck me hard. This play would be torture to a blind person.

Those of you who heard *Wren* may remember a stuttering retainer in the retinue of Charles II. He actually existed, as a matter of fact, so I wrote him a part. Only for two minutes, did he play—but I had a deeply resentful letter from a stammerer! That taught me a lesson. Well, I only hope *The Country of the Blind* has not upset too many people. I think it rather unwise broadcasting.

The Bach Prom was an enormous success. Bach is the most popular composer in England to-day. It was all good, but I confess to being quite carried away by the playing of Adila Fachiri and Jelly d'Aranyi in the concerto for two violins and orchestra. How the Promsters yelled! (By the way, pronounce her *Yelly* and not like the wobbly stuff you eat in the summer—or is it winter?)

That terrific shout and laughter, about three minutes after they had finished, was

caused by a little comedy. It appears that the two sisters had returned again and again to bow their acknowledgments to the shouts of the Promsters. As the noise died down Sir Henry thought it was time to go and bring on Miss Jo Vincent, who was to sing the next item. As he approached the curtains the applause broke out afresh and the two violinists re-appeared. Encountering Sir Henry, they seized hold of him and dragged him back to bow with them. That caused the shriek you heard.

Roy Henderson sang the aria, "With mirth shall I be shaking" in a truly mirthful manner, bringing out all the fun Bach put into the song. All the same, I wish he had sung it to the other translation: "How jöyial is my laughter." Much nicer. Also the long syllables come on the *ah* in *laughter*, instead of the *a* in *shaking*. A hint for him for next time.

It is some time since I heard *Those Four Chaps*. Very good they were, too. The football commentary was quite amusing.

PROGRAMME POINTERS

Five minutes past nine on a Sunday evening has, for a long period, been a time when one can safely switch on and be sure of a good contrast of programme. If you have inclined towards light fare there has generally been Albert Sandler, or Tom Jones, or someone equally entertaining. These broadcasts have undoubtedly been very popular. If, however, your taste has gone deeper you have generally had the choice of a good symphony concert in which somebody has played a concerto, or else there has been chamber music and an attractive vocalist. It is not with any intention of finding fault on the least provocation that I complain of a recent Sunday evening's broadcasting which did not alternate in this satisfactory manner. Albert Sandler occupied one side of the programme, while the other was devoted to guitar solos and duets. However well these were played—they were admirably played, as it happened—I think the serious music-lovers were "done out" of their usual entertainment. On any other night of the week such alternating might have passed, but not on a Sunday night. One side should be "dead serious" and the other distinctly light.

I hasten to add that they must not do it again just yet; they must do something fresh. *No repeats!*

Rupert Hazell and Elsie Day were better than I have ever heard them. Miss Day's echo song was most attractive.

I make a rule of not reading radio criticisms in the evening papers of a show (already broadcast) to which I am going to listen at its second performance. The other night I glanced at a criticism over my neighbour's shoulder in the tube—a fatal thing to do. It was to the effect that: "The Old Pavoli" was mainly noise. In addition to this, two people asked me if I had heard it. They told me the same thing. Perhaps that was why I did not find it too noisy, though I must say I have never heard an old-time audience at a musical-hall make quite such a din.

Some of the turns were very true to life. I thought Vesta Tilley, George Robey, Lottie Collins, and Marie Lloyd were cleverly impersonated. How easily we were entertained in those days! I can well remember hearing "Break the news to Mother" being sung with half the audience weeping and enjoying it. I think Mr. Lance Sieveking is to be congratulated on his presentation of the show. In fact, to borrow Ashley Sterne's remark, he should be promoted to the full rank of Sieveking!

The final Prom of this short season was a cheerful affair. The Promsters were in good form. They yelled at everything and everybody. No doubt you heard them at the conclusion for at least ten minutes. Yet, I am told, long after the B.B.C. cut us off, they sang "For he's a jolly good fellow." It was only when Sir Henry beckoned to the band to disperse and the lights were lowered that the Promsters remembered they had homes.

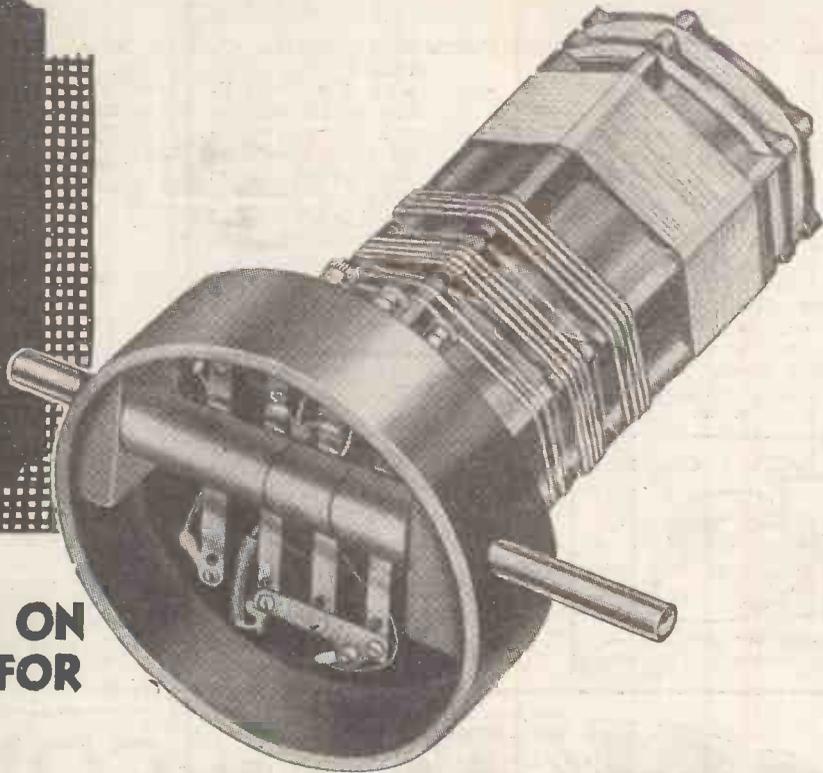
Did you like the Kodaly suite? You ought to see that performed! They import all sorts of strange-looking instruments. Part of it always forms one of the opening to "Melisande in the Wood"—only more so.

I think Florence Easton was unwise to sing "One Fine Day" in Italian! Why? The translation, for once in a way, is excellent. Everyone knows it in English and, for a Saturday night Prom, I think to sing it in Italian was—well, they all do it! Miss Easton sang an English ballad as her first encore, then resorted to German lieder for her second. Not too wise of her, surely?

WHITAKER-WILSON.

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12-34 METRES
27-84 METRES

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UNIVERSAL

200-555 METRES
900-2100 METRES

Mr. Rutherford Wilkins designs his "Melody Ranger" around this new component!

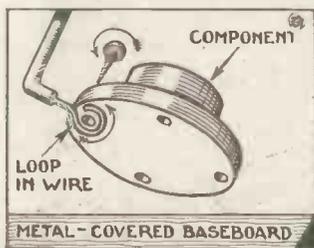
4 WAVE-RANGE COIL

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Radio Dodges for the 'Melody Ranger'

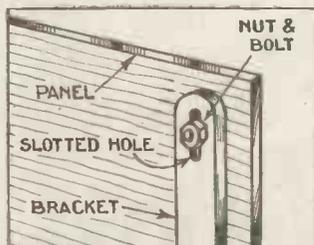
MAKING EARTH CONNECTIONS

IN most sets it is necessary to make some kind of earth connection to metal strip or foil on the baseboard. The general practice is to take a short wire from the terminal of the component to be earthed and to clamp this between the underside of the component and the metal-covered baseboard. To make a firm connection, twist the wire around one of the mounting screws. Then, as the component is clamped down, you will be sure that there is a positive connection to the metal.



IMPROVING PANEL BRACKETS

IT is a good plan to make U-shaped holes at the ends of panel brackets if the pair you are using are not already so constructed. This enables you to mount the brackets very accurately in position and to ensure that they are pressed firmly up against panel and baseboard when mounting the two at right angles. The tip is of particular value when a metal panel or baseboard is

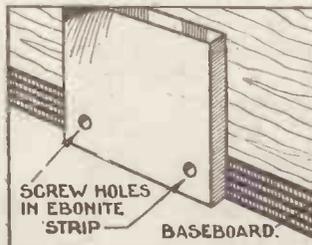


used. If there is any inaccuracy in the drilling you can correct for this simply by sliding the

bracket along a little, the U-shaped holes enabling this to be done.

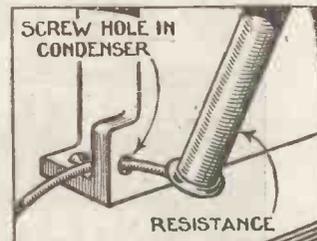
DRILLING TERMINAL BLOCKS

IF you drill your own terminal blocks, make sure that you do not get the screw holes too near to the lower edge. They should be arranged so that the



screws come more or less in the centre of the plywood when the terminal block is screwed to the baseboard. If the holes are too low or too high they will perhaps cause the plywood to be split when the screws are inserted.

ANCHORING THE LEADS
DON'T have too many loose leads in the set. Even flexes should be anchored where possible. It is often found convenient not to mount small parts, such as



grid leaks, in holders, but to wire them direct between various terminals. Even these short connecting wires should be anchored. You may find that it is possible to do this in many ways, as shown by the accompanying sketch. Here a condenser of the double-mounting type is used, and so there are two free holes
(Continued on page 154)

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FOR BEST POSSIBLE RESULTS

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SLEKTUN SUPER L.F. TRANSFORMER

The Transformer you need for best possible results. Specified by all leading set designers as the finest obtainable. Recommended for the "Melody Ranger."

Ratios:
2 : 1,
3 : 1,
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8/6



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Specially recommended for its exceptionally high inductance combined with low self capacity. A perfect H.F. Choke that is entirely free from dead spots and chokes efficiently from 30 to 2,500 metres. Its extremely low D.C. resistance effectively prevents voltage drop when used in the anode circuit of a valve.

4/-



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GREAT LISSEN CHART FREE TELLS EXACTLY WHAT TO DO WITH EVERY SINGLE NUT & SCREW

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To-day you can buy the LISSEN "SKYSCRAPER" KIT on Gradual Payment Terms. "Skyscraper" Chassis Kit, complete with Valves. CASH PRICE 89/6. Or 8/6 down and twelve monthly payments of 7/6.

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"Skyscraper" Kit complete with Walnut Cabinet and in-built Loudspeaker as illustrated, £6 5s. Cash. Or 11/6 down and twelve monthly payments of 10/6.

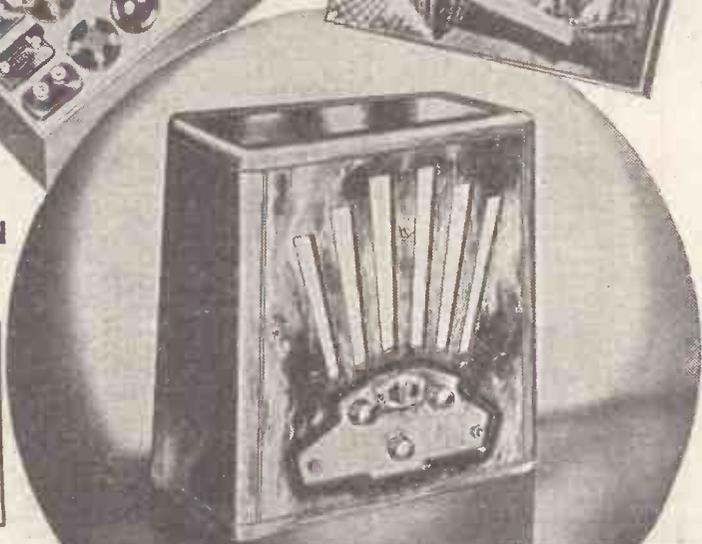
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"RADIO DODGES FOR THE 'MELODY RANGER'"

(Continued from page 152)

in the mounting feet, the condenser being mounted upright. The wire connected to the free end of the leak in contact with this condenser can be looped through the free hole. This keeps it in place.

METAL SCREEN EDGES

IF you are cutting your own vertical screen from aluminium foil, you will find that it is rather difficult to prevent the formation of a sharp edge if the foil is cut with scissors. A sharp edge is apt to be dangerous along the top of a screen, for if the hands are inserted into the set cabinet to make some circuit adjustment one may catch on the sharp edge and do damage. You will find it a good plan to bend over the edge of the foil in U-fashion, thus ensuring that the sharp edge is out of the way.

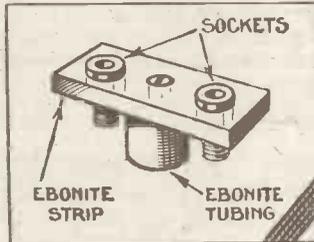
CLAMPING UNDER TERMINALS

IN the ordinary way it doesn't matter very much if the wire spreads a little when the terminal head is clamped down. This is always likely to happen if the wire is not put on the terminal shank in the right direction. A wire should always be looped in an anti-clockwise direction, so that it will tend to tighten as the terminal head is screwed down. When baseboard components are mounted so that their terminals are very near to a metal-covered

baseboard, the point is of particular importance, however. If the wire opens away from the terminal as the head is screwed down, it may easily make accidental contact with the metal foil and a short circuit—perhaps a dangerous one—will result.

MOUNTING CONNECTING STRIPS

WHEN small socket or terminal strips have to be mounted parallel with the baseboard and not at right angles, as is usually the case, you can



generally use the end of an insulated wanderplug as a "foot." The sketch shows how this is done. The mounting screw passes through the ebonite strip and through the centre of the wanderplug top. In this way the socket

strip is stood off a little distance from the baseboard and the shanks of the connections will not touch. In metal-covered baseboard sets, such as the "Melody Ranger," this is an advantage.

SECURING SCREENS

IN most sets vertical metal screens are attached to the baseboard, but are not fixed in any way to the panel. In metal panel sets you may like to make a neater job of the construction by fixing the screen also to the panel front. This can easily be done with a small bracket—a Meccano bracket for instance—one side of which is bolted to the panel and the other to the vertical screen. The bolt of this bracket on the panel front can be hidden by some other panel-mounted component.

SHORT-WAVE NOISES

ON the short waves even a small amount of dust in the moving parts of a set will cause scratching noises. It is of the utmost importance to keep short-wave and triple-wave sets absolutely free from dust between the condenser vanes and at the several other points where it collects.

A small feather or a pipe cleaner comes in handy and in a set such

as the "Melody Ranger," which has an excellent short-wave performance, it is advisable to do this dusting job periodically.

CALIBRATING A PRE-SET

THERE is no need to guess at the setting of a pre-set condenser as a small paper dial can easily be fixed under the clamping nut. A white dot should be put on the knob to give some idea of the condenser setting. Often one has to alter the value of a pre-set condenser when changing over from local to distant reception.

SEVERAL WIRES ON ONE TERMINAL

IF two or three leads are clamped under one terminal it is sometimes worth clamping them separately. Small nuts should be used to clamp the intermediate wires, the terminal head itself being used to secure the main lead or the flexible one, if there is one in the group.

PROTECTING FLEX LEADS

WHEN thin battery flexes are passed through holes in metal screens; there is the chance that the insulation may become frayed and a "short" may result. As it is not convenient to have very heavy wire for long battery flexes, the best thing is to provide additional protection for the wires, at the point where they pass through the screen. Slip a length of systoflex over each battery lead so that this will protect the battery wires against the sharp edges of the hole.

IT'S NEW — IT'S DIFFERENT —
IT'S GUARANTEED
"THE MELODY RANGER"

WEARITE COMPONENTS

A booklet titled "WEARITE COMPONENTS" is shown, along with several electronic components including resistors, capacitors, and a choke. The text on the booklet reads: "A booklet on London Wearite Components sets a new standard in the industry. The booklet is the only one of its kind." Below the booklet, several individual components are displayed, including a large cylindrical choke, a smaller cylindrical component, and various resistors and capacitors.

This WEARITE BOOK No. A.I. WILL HELP YOU SEND FOR IT TODAY

BEFORE you start "shopping" for your "Melody Ranger", or for any set, have this booklet, the A.I. beside you. Resistances, chokes, volume controls, mains transformers, switches, etc., they are all there—illustrated with full data—get your copy now.

HERE'S The WEARITE H.F.O.

-nothing else will do for your 'MELODY RANGER'

THE Wearite H.F. Choke is the result of much patient research. It is designed and built to cover from 10—2,000 metres without resonance peaks. Because of this, because of the name behind it, the designer of the "Melody Ranger" uses exclusively the H.F.O.

High frequency instability was the greatest difficulty to be overcome. The designer of the "Melody Ranger" tested and tested, and only the Wearite H.F.O. proved efficient. Don't jeopardise the quality and performance of your set, play for safety, use the designer's choice, the Wearite H.F.O. — — **PRICE 6/6**



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READY RADIO APPROVED AND GUARANTEED MELODY RANGER KIT

Complete Kit of tested and matched components. *Everything* you need to build the " Melody Ranger," including panel, ready cut and drilled, baseboard, all screws and wire. Jiffilinx for wiring—the handiest form of connection ever invented. Together with full instructions and full-sized official blueprint.

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Or by 12 monthly payments of 11s. 3d.

Handsome Walnut Consolette Cabinet £2 : 2 : 0

Handsome Walnut Consolette Cabinet, with Celestion Moving-coil Loud-speaker £3 : 3 : 0

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See also pages 156 and 157



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All genuine Ready Radio "MELODY RANGER" Kits are packed in this attractive carton with dust-proof cover. Look for it in your dealer's window.

READY RADIO MELODY RANGER KITS

Approved by

S. RUTHERFORD WILKINS

Guaranteed by

G. P. KENDALL, B.Sc.

Thank you for the opportunity of testing out the Ready Radio Kit of my latest all-wave set, the " Melody Ranger." I am glad to be able to pronounce it perfectly satisfactory.

The results on all wavelengths were quite up to the standard, and I am sure that everybody who builds the set from your kit will have complete satisfaction.

S. RUTHERFORD WILKINS.

Ready Radio "Melody Ranger" Kits contain only components tested and passed in the Ready Radio laboratories under my personal supervision.

Every kit is thus guaranteed to give the astounding results obtained by the designer.

G. P. KENDALL, B.Sc., Chief Engineer, Ready Radio.

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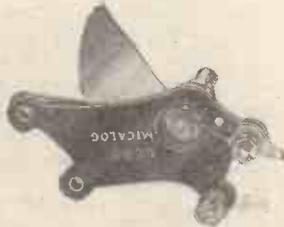
SPECIFIED COMPONENTS

for the

MELODY RANGER



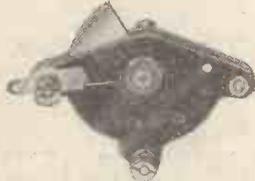
L.F. Transformer



Micalog Condenser



Short-wave Valveholder



Micadi Condenser



S.G. Short-wave Valveholder



Standard Valveholder



Short-wave Extension Equipment

The Ready Radio Components shown here are specified for the "Melody Ranger." Mr. S. Rutherford Wilkins has entrusted the most vital components in his wonderful receiver to Ready Radio—for our great experience in all-wave reception makes us pre-eminent in the design of all-wave components.

Don't be put off with inferior substitutes—insist upon Ready Radio Components and you will get designer's results.

Ready Radio Micalog .0003 Condenser	3/6
Ready Radio L.F. Transformer Ratio 3:1	8/6
Ready Radio Series Aerial Micadi Condenser (Special low minimum)	3/-
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Obtainable from all leading radio dealers throughout the country.

See also page 155.

READY RADIO COMPONENTS-MADE

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

READY RADIO COILS

Specially made for the "MELODY RANGER"

Our great experience in all-wave radio enables us to offer the finest coils for the "Melody Ranger." If you insist upon Ready Radio Coils you are assured of the best possible reception.

Their importance cannot be over-emphasised. The purchase of inferior coils can easily mean that you will miss many stations which would otherwise come in at full strength.

The coils cover a wave-range from 12 to 2,000 metres, and the special form of non-corrodible contacts make the switching absolutely foolproof and certain.

Every Ready Radio Coil is 100% efficient on all wavebands and is manufactured, tested and passed under the personal supervision of Mr. G. P. Kendall, B.Sc.

Obtainable from all leading radio dealers throughout the country.



SEE ALSO PAGE 155

30/- per pair

complete with full instructions

BY THE ALL-WAVE EXPERTS

READY RADIO LTD., EASTNOR HOUSE, BLACKHEATH, S.E.3. Phone: Lee Green 5678. Grams: "Readirad, Blackvil."

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

"THE MELODY RANGER"

(Continued from page 148)

valve type for the first low-frequency stage and a PM2A for the power output.

With these valves the voltages required for the high tension and grid bias will be as follows:—

H.T.+1, 60 to 80 volts; H.T.+2, 100 to 110 volts; H.T.+3, 70 to 100 volts, and H.T.+4, 120 volts.

For grid bias: G.B.—1, 1½ to 3 volts; G.B.—2, 4½ to 6 volts, and G.B.—3 (for variable-mu), 16 volts.

WAVEBAND SWITCHING

The operation of the "Melody Ranger" will be more fully explained in subsequent articles, but for the present it is important to know which wavelength ranges are covered by the four coil-switch positions. Looking at the set from the side of the cabinet where the switch knob is located, and turning in a clockwise direction, that is from left to right, the first position gives a wavelength range of 12 to 38 metres, the second from 22 to 90 metres, the third from 800 to 1,900 metres, and the fourth from 190 to 555 metres.

It will thus be seen that you go from ultra-short to short, then to long and finally to medium wavelengths.

The knobs on the front of the set are soon understood. From left to right we have aerial-coupling control (for selectivity), aerial tuning, volume control (for the variable-mu), reaction control, interval tuning and finally on-off switch control.

Remember that inside the set there are other semi-variable adjustments. The most important is perhaps the tapping on the grid circuits of the first two valves. For the short-wave ranges use the direct grid connections and for the medium and long waves try both direct and tapped connections. Again, there is the pre-set coupling condenser between the first two valves. For normal requirements use the maximum coupling.

Next week we shall go very fully into the operation of the "Melody Ranger." Meanwhile, those of you who assemble the set will be able to gain some idea of the truly remarkable performance that can be obtained on all wavelength ranges.

"THE 'MELODY RANGER' CIRCUIT MADE EASY"

(Continued from page 136)

The transformer coupling between the first low-frequency amplifying valve and the power output valve is fully de-coupled with a 30,000-ohm resistance (note the low value to ensure maximum high tension on the anode) and a 1-microfarad condenser.

The power output valve is of the three-electrode type, capable of handling the large grid-swings developed by the pre-

ceding three valves. No special output circuit is employed, as most speakers now incorporate some form of transformer.

Analysed in brief, then, the circuit of the "Melody Ranger" consists of a four-

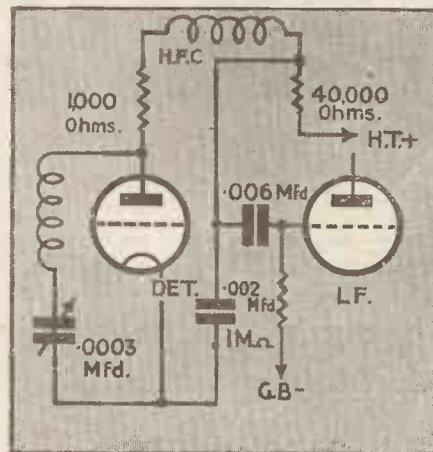


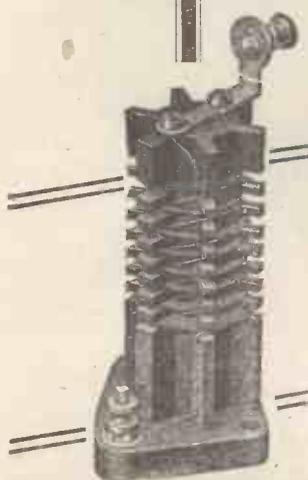
Fig. 5. A 1,000-ohm fixed resistance acts as a short-wave choke in series with the normal high-frequency choke in the anode circuit of the detector. Note the .002-mfd. by-pass condenser connected between the high-frequency choke and low tension

valve sequence, with variable-mu screen-grid, detector, resistance-capacity coupled low-frequency amplifier and transformer-coupled power output.

Around this simple sequence of valves we have built up a set that literally bristles with all the latest circuit improvements.

**"THE MELODY RANGER"
THE SET FOR YOU—IT GETS
MORE THAN THE OTHERS**

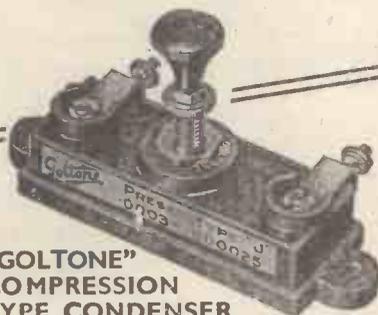
"GOLTONE" COMPONENTS AGAIN RECOMMENDED FOR THE "MELODY RANGER"



"GOLTONE" SHORT-WAVE H.F. CHOKE

Highly recommended for the "Amateur Wireless" "MELODY RANGER," and by the Technical Press. Valve-holder or baseboard mounting, R3/26

2/6 each



"GOLTONE" COMPRESSION TYPE CONDENSER

Panel or Baseboard Mounting as recommended for the "Amateur Wireless" "MELODY RANGER." A unique feature is that this Condenser can be mounted on the panel and adjusted from outside the set as with the ordinary controls. Type "J" 1/- each

FREE

1933 48 PAGE FULLY ILLUSTRATED RADIO CATALOGUE NOW ISSUED

GOLTONE Components are obtainable from all First-Class Radio Stores—Refuse substitutes—if any difficulty write direct.

Kindly mention "AMATEUR WIRELESS" when applying for Catalogue.

"GOLTONE" SUPER H.F. CHOKE

As recommended in the "MELODY RANGER," Inductance 10 to 2,750 metres. microhenries. 350,000 resistance 225 ohms. Self-capacity 4 to 5 mmfd. Price **4/6** EACH

Ward & Goldstone
PENDLETON. MANCHESTER LTD.

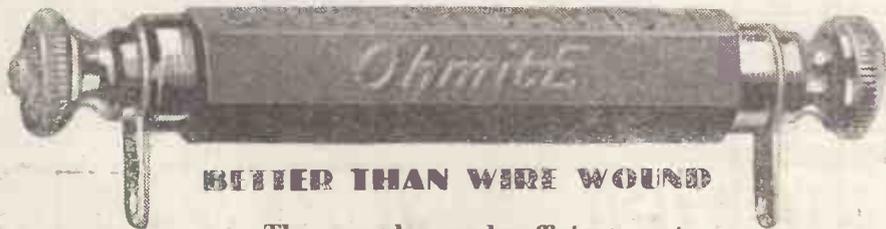
Graham Farish says :

MY NEW OHMITES ARE BETTER THAN EVER



1/6 EACH

because I have been able to make an improvement which makes all the difference. I keep pace with Time and embody in my components all that is newest and best. I have called in all the old pattern and have substituted this latest model OHMITE. It is now the very finest resistance that money can buy.



BETTER THAN WIRE WOUND

The popular and efficient resistances for all general purposes. All values 300 ohms to 5 megohms. 1/6d. each.

The "Melody Ranger" requires—
 one ... 1,000 one ... 30,000
 " ... 40,000 " ... 1 meg
 one ... 4 meg
 together with one vertical mounting holder.

Good as the Ohmite has always been the new improved type is even better. It carries more current with a generous margin of safety, and simply does not break down. Non-inductive, better than wire wound, it is unbreakable and *absolutely silent* in operation. Fitted with terminals, which obviate special holders as well as the disadvantage of soldering.

Fit the new OHMITE once and for all time.

Safe Maximum Current Carrying Capacity of "Ohmites"

Ohms	100° F. Temperature rise.		Ohms	Milliamps
	Milliamps	Ohms		
100,000	3.5	10,000	12.	
80,000	4.24	5,000	20.25	
60,000	5.	4,000	24.	
50,000	5.5	3,000	29.	
40,000	6.	2,000	35.	
30,000	6.75	1,000	40.	
20,000	8.			

HEAVY DUTY TYPE APPROXIMATELY DOUBLE

GRAHAM FARISH COMPONENTS

MASONS HILL, BROMLEY, KENT.

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



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

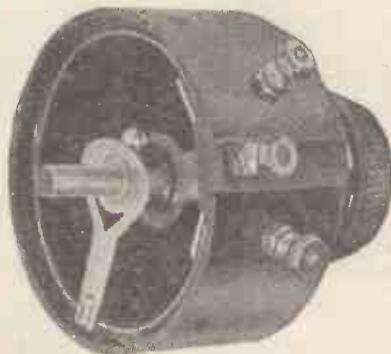
VARLEY POTENTIOMETER

THE word Varley is usually taken as a synonym for reliability, and we imagine this fact was in the mind of the designer of the new potentiometer which has recently been placed on the market. In construction this is of conventional form but attention has been paid to small details in order to give smooth operation and mechanical robustness.

The instrument is rather larger than usual, being 2½ ins. diameter and 1¼ ins. deep. The wire is wound round a fibre strip housed inside a bakelite moulding, contact being made by a simple slider of springy material. By the use of the fairly large size it is possible to use robust wire and there is reasonable prospect of a long life.

The resistance element is graded, as will be seen from the attached curve, so that the change in resistance is small at the

beginning of the scale and increases rapidly thereafter. The contact is smooth and silent; while a further useful point is that the operating spindle projects through the



The Varley potentiometer with the cover removed to show the construction. These potentiometers can be ganged

cover in a threaded end which enables the potentiometer to be linked up with other controls, if this is considered desirable. Altogether the component is a workman-like product.

W.B. JUNIOR SPEAKER

THE W.B. Junior Speaker is an interesting example of the way in which loud-speaker research has progressed. For some time we have been accustomed to the use of special types of cross or star shaped magnets cast in one piece and requiring somewhat special machinery to magnetise them. In this W.B. speaker this form of construction is abandoned altogether and a built-up structure is used having a U-shaped bar magnet. This is bolted on to a baseplate carrying the gap in which the coil moves. The magnet would seem to be extra strong, since the sensitivity of

(Continued on page 162)

2 GREAT FEATURES FOUND IN NO OTHER PICK-UP

MATCHED RESPONSE and PERMANENT VOLUME CONTROL

The Bowyer-Lowe Mark III Pick-up, as standard in many first-class Radiograms, is now offered by the famous Mail Order House of B. J. Heraud, Ltd. on the simplest monthly terms.

SEND FOR IT ON 7 DAYS' TRIAL

This Pick-up has been designed on the soundest technical lines to avoid the shortcomings of the average small moving-coil speaker. By employing a new principle of **MATCHED RESPONSE** it gives a natural effect not before obtainable. Moreover, the frequency response is from 25 to 6,000 cycles, thus it faithfully reproduces the entire range of the musical scale.



The British-made **WATES UNIVERSAL METER** is the only popular-priced instrument testing resistances as well as batteries, valves, circuit, and all components; 4 readings on one dial.

SEND ONLY 1/6 for 7 days' trial. If satisfied, complete purchase by 5 monthly payments of 2/6 (cash 12/6)

The **VOLUME CONTROL** situated in the base and operated by a knob on top of the pivot, is of log-law type, giving equal increase or decrease. Being wire wound it will, unlike the usual carbon or composition type, retain its efficiency unimpaired, indefinitely. The revolving head facilitates needle-changing. Supplied in Florentine Bronze finish with tone-arm rest, fixing screws, and full instructions. Send only 2/6 for 7 days trial. If satisfied pay further 2/6 at once, then complete purchase by 7 monthly payments of 5/-. (Cash, 35/-). Illustrated folder with full technical details, post free.

E. J. HERAUD, Ltd., Dept. AW.17, NUMBER ONE, EDMONTON, LONDON, N.18
 Branches: 78/82 Fore St., Edmonton; 77 West Green Rd., Tottenham;
 34 St. James St., Walthamstow; and 139 Hertford Rd., Enfield Wash.

THE OBVIOUS CHOICE!

THE CAMCO "EMBASSY" CABINET

FOR THE **MELODY RANGER**

A strikingly handsome cabinet, chosen by the designers for the "Melody Ranger" because of its graceful design and general utility. Takes up very little space. Strong shelf for batteries or eliminators, with space for speaker. Supplied already drilled for the "Melody Ranger."

Price : Oak, 35/-; Mahogany, 40/-.

When a substitute is offered, refuse same—and send your order direct.

FREE—Send for free Camco Cabinet Catalogue giving particulars of this and other cabinets, or see them all in our showrooms, open 9.15—5.45. (Sat., 12.30).

Post in ½d. envelope.

NAME.....

ADDRESS.....

14 A.W.

Carrington Mfg. Co., Ltd.
 Showrooms: 24 Hatton Garden, London, E.C.1.
 Phone: Holborn 8202.
 Works: South Croydon.

Graham Farish says :

YOU MUST SEE MY LATEST ACHIEVEMENT

The production of a Screened Choke became a vital necessity by the use of H.F. Chokes in conjunction with Screened Grid Valves in the modern circuits.

I deliberately set out to make the most efficient choke yet produced—the L.M.S. This combines the advantages of the expensive Binocular choke and the efficiency of the Screened Choke, but at a price within the reach of every constructor.

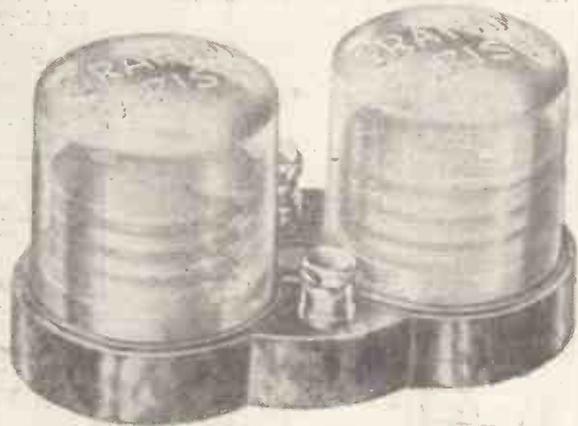
Independent technical experts confirm that this latest Graham Farish product achieves a higher degree of perfection than ever before attained.

Go to your dealer and ask him to show you the L.M.S. Choke.



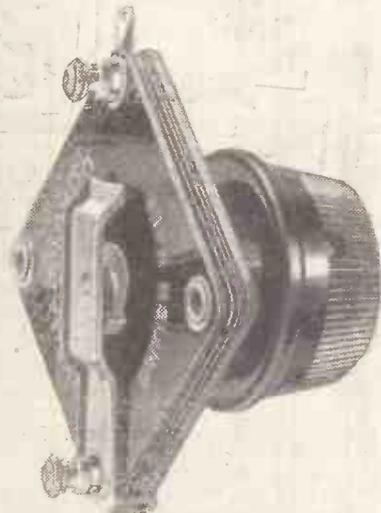
Graham Farish
LONG MEDIUM SHORT
BINOCULAR H.F. CHOKE
4/6
 EACH

The L.M.S. is silk wound and has a consistent high inductance on all wavelengths, whilst its capacity is negligible. Particularly suitable for H. F. Circuit where high efficiency is the first consideration.



Graham Farish
WIT-LOS
SOLID DIELECTRIC VARIABLE CONDENSERS
2/6
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A very carefully constructed instrument, compact in size and efficient in design, with accurately gauged bakelite dielectrics and solid brass pigtail connection to moving vanes. Made in all capacities up to .0005 mfd. in tuning, straight line capacity and differential types. Used by many leading manufacturers and specified in sets by famous designers. One hole fixing; supplied complete with terminals.



TO GET THE BEST FROM YOUR SET — EARTH IT WITH FILT

2/6

Especially suitable for the "Melody Ranger" one .0003 required

GRAHAM FARISH COMPONENTS

MASONS HILL, BROMLEY, KENT,

EXPORT OFFICE: 11/12, FENCHURCH STREET, E.C.3.

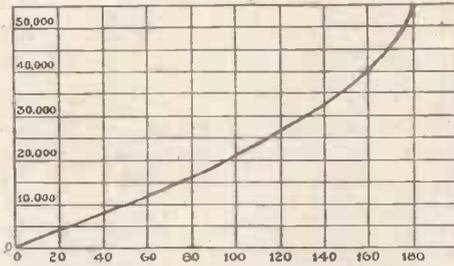
Don't Forget to Say That You Saw it in "A.W."

"WE TEST FOR YOU"

(Continued from page 160)

the instrument is quite up to standard. A cone of special "dead" paper is employed, suspended at the outer edge in the customary manner in a pressed steel housing, round the periphery of which is a felt ring for effecting a good airtight contact to the baffle.

An output transformer is mounted on the chassis, this covering a range of impedance suitable for all the usual output valves including pentodes.



This curve shows the grading of the Varley "pot" tested

The reproduction was good and free from any serious resonances and if mounted on a baffle of suitable dimensions the bass was well in evidence. Altogether it can be considered a very creditable production, having regard to the low price of 27s. 6d.

WATES REMOTE CONTROL

THOSE readers who like the use of remote control will be interested in the distance switch recently marketed by

Messrs. Wates Radio Ltd. The essential of success in a device of this kind is simplicity and this new component certainly complies with this requirement. A small solenoid attracts the plunger when the current is applied. On the end of this is a pawl which pulls round a ratchet as the plunger moves past. On the return stroke the pawl slips over the ratchet and does not move the wheel at all. Consequently every time the current is applied the ratchet wheel is moved round one notch.

There are four notches on the wheel and attached to it is a commutator having alternately a contact and an insulator. Two brushes rest on opposite sides of this wheel so that there is alternatively a circuit through the commutator and a disconnection.

In operation, therefore, it is only necessary to pass the current through the winding when the circuit will be changed either from contact to no contact or vice versa, depending upon its existing position. An ordinary flashlamp battery is all that is required to operate the device. The current taken is actually 1½ amps, but as this only flows for a short time the battery should last for quite a long period.

The commutator mechanism though simple appears to be quite effective. We

switched a mains set on and off a number of times without any trace of arcing or burning. The device, therefore, can be used with any type of set whether mains or battery and is comparatively simple to install.

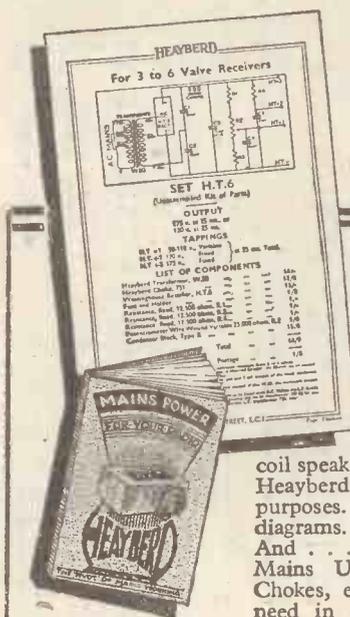


One of the new W.B. Mansfield Speakers —the Junior model

RESISTANCE KITS FOR THE "MELODY RANGER"

THE Radio Resistor Company of 1, Golden Square, London, W.1, are putting up a special kit of the five hand-tested Erie resistors specified for the "Melody Ranger." A feature of this kit is the inclusion of three hard brass links of very small dimensions to enable leads to be attached to these wire-ended resistances without the trouble of soldering. The complete kit in a neatly labelled carton costs 5s. 3d. and each can be obtained from any retailer or direct from the manufacturers.

**AMAZING PERFORMANCE,
BUT SIMPLE TO BUILD**
"A.W.'s" sensational new receiver,
the "Melody Ranger"



Take a leaf

out of the HEAYBERD HANDBOOK!

Do you want to know how to build a Mains Unit, a Battery Charger or a Unit for energising the field of a moving-coil speaker? Full details are given in the Heayberd Handbook of kits for many purposes. Seventeen different circuit diagrams. Hints and tips on servicing. And . . . complete details of the many Mains Units, Chargers, Transformers, Chokes, etc., available. Whatever your need in mains working—Heayberd the mains specialists can help you.

Remember—Heayberd components have been consistently specified by "A.W." and contemporary set designers.

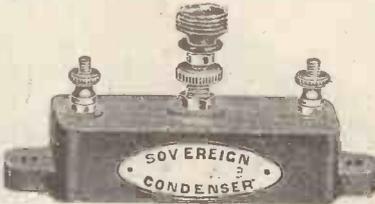
POST COUPON

I enclose 3d. stamps for fully illustrated and informative Handbook—"Mains Power for Your Radio," packed with useful hints, tips and diagrams for running the radio from the electric supply.

Mr.
Address.....
.....A.W.5

HEAYBERD
MONARCH OF THE MAINS.
10 FINSBURY STREET,
LONDON, E.C.2.
One minute from Moorgate Station.

IT HAD TO BE GOOD



EVERY SIGNAL RECEIVED BY THE "MELODY RANGER" HAS TO PASS THROUGH THIS COMPONENT

SO SOVEREIGN IS OFFICIALLY RECOMMENDED FOR "A.W.'s" GREATEST SET

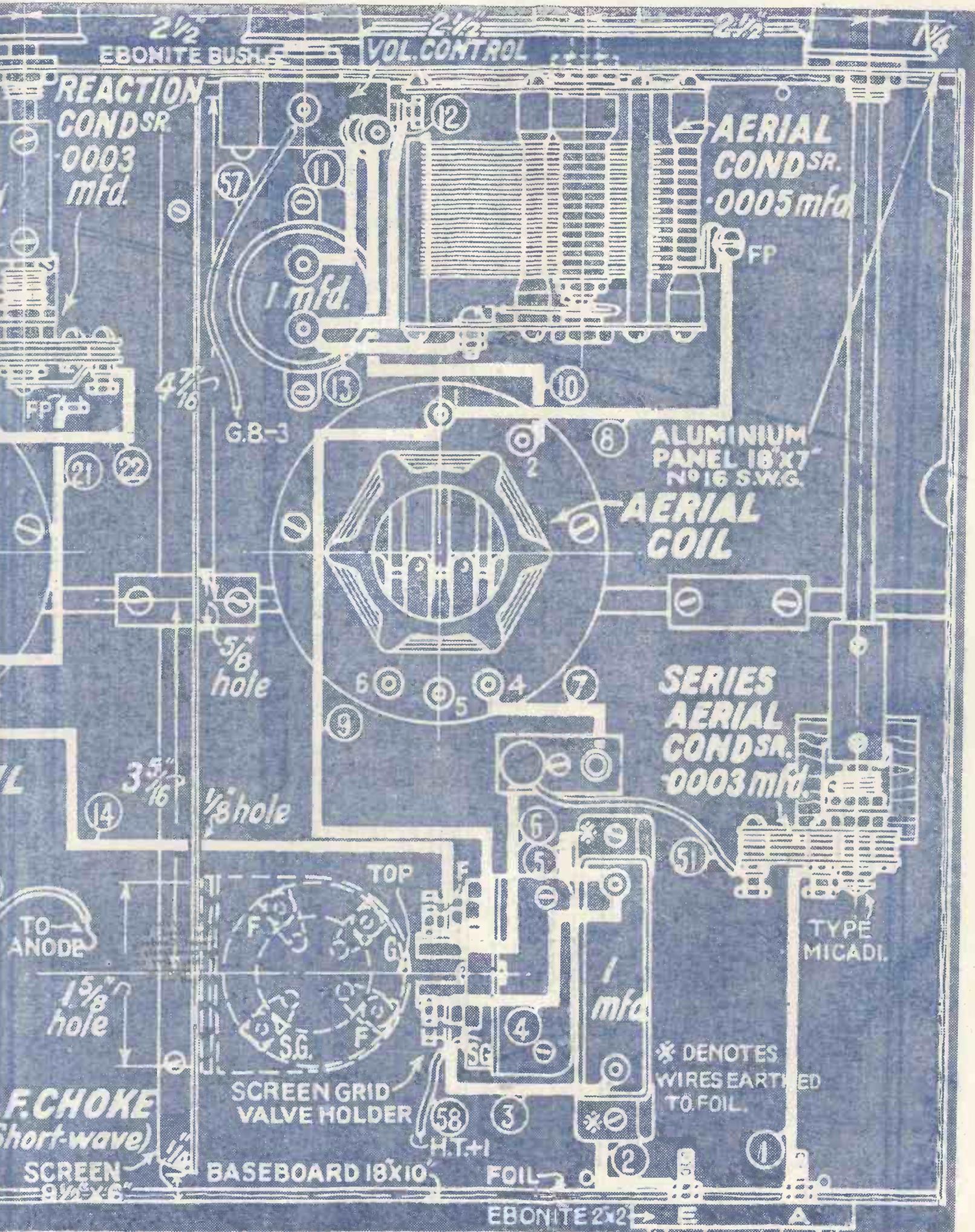
Sovereign manufacture a full range of components including Fixed Condensers, H.F. Chokes, Transformers, Resistances, etc., suitable for use in the "Melody Ranger." If you do not know the full range, send for the Sovereign Catalogue before building this set.

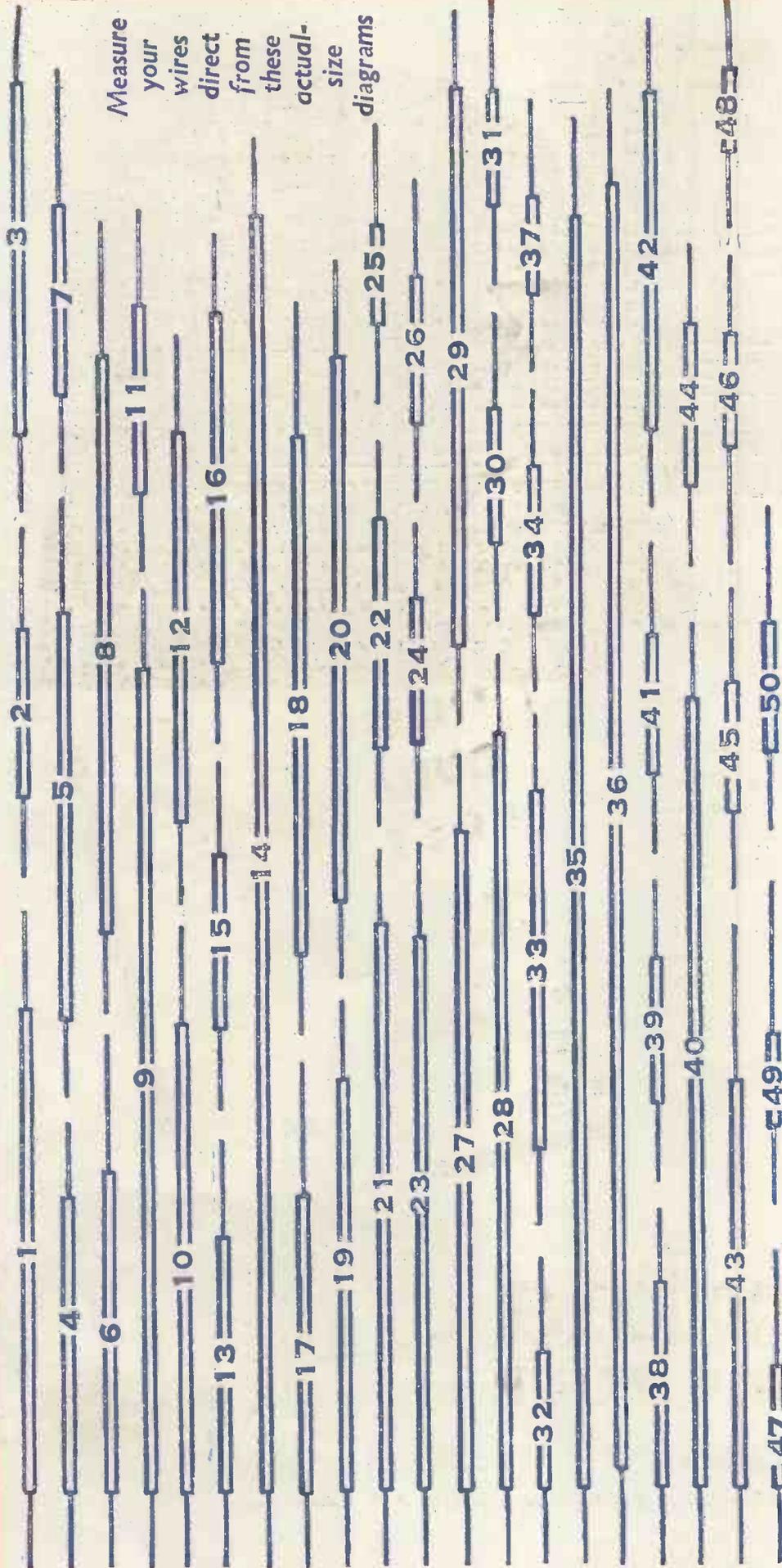
It is essential that the pre-set condenser in this set be accurate and stable, or the whole performance of the "Melody Ranger" is jeopardized. By using a Sovereign Pre-set Condenser (00017 mfd.) you completely eliminate all risk of this, carry out the designer's own recommendation, and save yourself money, without sacrifice to efficiency. The Sovereign Pre-set Condenser as recommended for the "Melody Ranger" is obtainable from all Radio Dealers, and costs only ...

1/3

SOVEREIGN
OF BRITISH MANUFACTURE
SOVEREIGN PRODUCTS LIMITED,
Sovereign House, Rosebery Avenue,
LONDON E.C.1.

In cases of difficulty send direct; also for Catalogue to Dept. A.W.1.





WIRES (ACTUAL SIZE) for the "MELODY RANGER"

ABOVE we show all the wires needed for the wiring up of the components of the "Melody Ranger." In addition, you will see that the exact lengths of sleeving for these wires are also given.

The wire to use is No. 20 round-tinned-copper, and with this use 1-millimetre insulated sleeving.

Round Loops.—The wire ends extending beyond the sleeving lengths vary according to the size of the loops to be made—roughly between 1/2 in. and 1 in.

All the wire shown outside the sleeving forms the actual loop—there is no spare wire.

U-shaped Loops.—Wires No. 2, 5, 43, 46, 47, 48 and 50 are not fully looped, as the connections are made by U-shaping the ends of the wires. The U-shaped wires are fixed

by the baseboard screws between the components and the foil.

Wire No. 49.—First take it round the high-tension-negative terminal and then on round the fixing bush of the three-point switch.

The pairs of wires No. 6 and 7, and 17 and 18 must be shaped before being fixed finally to the tapping blocks of the tuning coils.

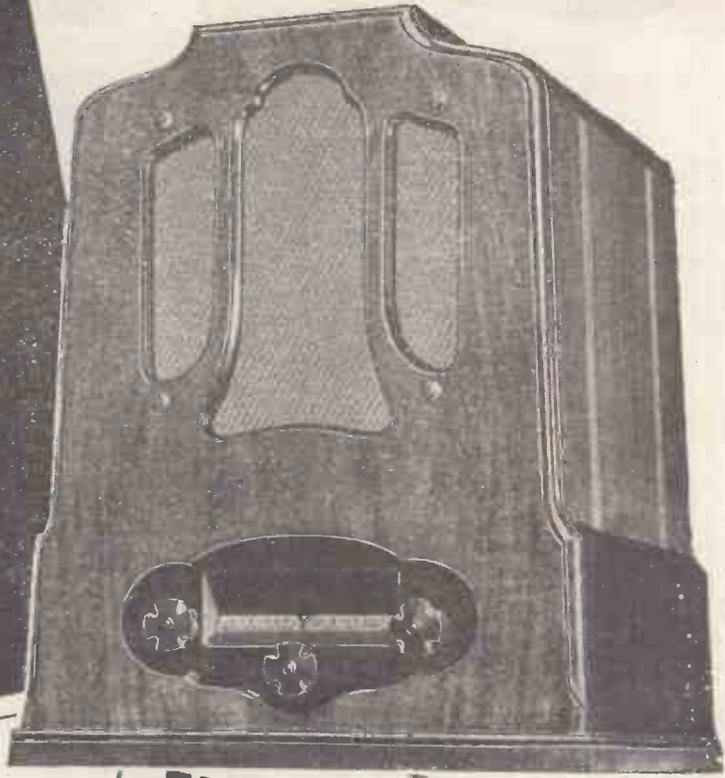
The resistances held by the wiring must be kept clear of the metal foil of the baseboard.

Wire No. 36.—If the sleeving of this wire is taken under the soldering tag of the L.F. valve holder to which wire No. 46 goes, and then bent up at right angles to the baseboard, the resistance will not short on to the foil.



THE NUMBERS ON THESE WIRES CORRESPOND WITH THOSE ON THE BLUEPRINT

You want
MELODY
and
RANGE



Home construction may not appeal to everyone. You may well prefer the finest Radio results ready for use without any trouble. In Columbia Radio you have perfection of melody, range, and absolute reliability.

Here, then, is a model many consider the ideal—the outstanding Columbia All-Electric Four. A luxury model in both performance and appearance, yet quite modest in price. An examination of the brief description given proves its power to meet the most exacting demands of the radio enthusiast. A demonstration—freely arranged—will convince you. It is a model well worth knowing better—fill in the coupon NOW.

Columbia

ALL-ELECTRIC FOUR

**THESE
 QUITE
 FREE**

(Write in block capitals.)

★ Please arrange a demonstration of Model 355, free and without obligation, in my home.

★ Please send me a free Magazine Catalogue of the 15 Columbia Models (£4. 7. 6 to 90 Gns.)

★ Cross out if not required.

Name _____

Address _____

Cut this out and post in an unsealed envelope bearing 3d. stamp to Columbia, 98/108, Clerkenwell Rd., E.C.1

A. W. 28/1/33

Model 355

Four valve. Band-pass tuning. Enormous but stable amplification. Reduction gear tuning. Same volume control for both radio and gramophone reproduction. Additional speaker terminals. Mains aerial device. Flood-lit scale calibrated in wave-lengths. Attractive cabinet. Marconi valves standard. Columbia Cradle Chassis.

33/- deposit & 27/3 monthly or 16 gns. cash.

IN MY WIRELESS DEN

WEEKLY HINTS -

CONSTRUCTIONAL



& THEORETICAL
By W. JAMES

USING A MAINS AERIAL

MANY commercial sets have a mains aerial. This may take the form of a connection from the aerial coil through a fixed condenser to one side of the primary winding of the power transformer.

The condenser used must be capable of standing the relatively high voltage to which it is subjected and a 1,000- or 1,500-volt D.C. test is usually applied to the type advised.

A capacity of from .0001 to .001, according to the aerial tuning coil, is used and the condenser must be a specially selected one and not an ordinary type.

The results vary according to the local conditions. In my own case, the results are quite good when the set is connected to one of the lighting points and poor when the plug is fitted in a power point. Results are found to vary widely even in the same district, due, I suppose, to differences in the wiring.

Another form of aerial consists of an insulated wire arranged with the wires of the flexible connecting cord joining the set and the electric point.

One end of this aerial wire is connected to the first tuned circuit of the set and the other end is, of course, left free.

Thus the mains cord has three insulated wires. Two of them are used to connect the mains plug and the set, while the third has one end joined to the first tuned circuit and the distant end is not connected. This form of aerial is fair and may provide all that is needed. You can easily try it and it may be good enough.

A third type of aerial consists of a few feet of wire arranged around the inside of the cabinet of the set. One end is joined to the first tuned circuit and the other end is insulated. This small aerial is also satisfactory on occasions and is easily tried.

GETTING MORE AMPLIFICATION

IT is possible to obtain very considerable amplification from the stage comprising the detector and its coupling to the grid circuit of the power valve.

I am not sure whether it is worth trying to obtain the maximum, however, as a circuit which is being pushed to the limit is usually not very stable and, further, may not give good quality.

You can use a detector valve having a steep slope and a medium impedance resistance-transformer coupled to the power valve. If the power valve is a small pen-

tode, it is easily overloaded and the tendency seems nearly always to be to over-run it.

The same circuit arrangement, but having a less effective valve, or one having a lower impedance, may turn out to be much safer. I know how one tries to obtain the maximum magnification from a given number of valves, but in practice it is not always wise to do this. If the low-frequency side is arranged to provide only a moderate amplification, the average results may be much better than when a high amplification is obtained.

A MATTER OF CONTROL

THE volume control in many sets is actually a potentiometer or resistance connected to one or more of the valves. It may have a straight winding, the winding of resistance wire being uniform along the length of the former which carries it.

Some types have a different winding, however, and are referred to as a graded pattern. The object of varying the winding is merely to obtain a more uniform variation in the output of sound from the set, by adjusting the magnification in a certain way.

Thus some controls have a logarithmic winding and a satisfactory uniform variation in the strength is obtained. It is necessary to connect the component the right way round or the right results will not be obtained, the decrease being too rapid instead of steadily falling off as the knob is turned.

PREH POTENTIOMETERS MEET EVERY KNOWN NEED

The new range of variable resistances has been designed to meet the demand for a component with a particularly silent and smooth movement.

The curve of the potentiometer is arranged "straight line," which gives a straight-line ratio between angular movement and resistance variation.

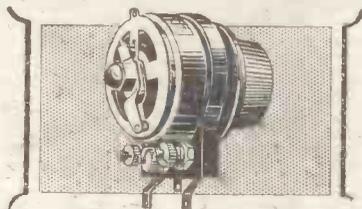
The resistances can be supplied with "straight line" or logarithmic curves according to requirements.

In resistances of a value more than 50,000 ohms, the guaranteed tolerances are -15 per cent. and +30 per cent. of the rated values. In the case of low-value resistances the corresponding guaranteed tolerances are + or - 10 per cent.

These components are also supplied with a combined switch, making an extremely neat and robust unit. The switch has a quick make-and-break movement and will handle 1.2 amperes at 250 volts without arcing.

Prices for your special requirements on application

Preh



POTENTIOMETERS AND RHEOSTATS

Preh Manufacturing Co., Ltd., Broadwater Road, Welwyn Garden City.

Manufacturers and Wholesalers only supplied.

Sole Sales Organisation: Harwell, Ltd., The Sessions House, Clerkenwell Green, E.C.1.

Phone: Clerkenwell 6905-6.

THE famous



BRITISH GENERAL TUNING UNIT

NOW REDUCED TO 10/6

Increased demand, enlarged turnover enables us to offer this popular tuning unit at this remarkable price. Cuts out coils. Covers all wave-lengths from 200 to 2,000 metres. Easy fixing; simple tuning. Free wiring diagrams supplied.

From all dealers or direct:

BRITISH GENERAL MANUFACTURING CO. LTD.,
Brockley Works, London, S.E.4.

BUILT TO LAST A LIFETIME

OSBORN RADIO CABINETS



Model No. 234.—Beautiful Queen Anne style Radio-gram Cabinet, 3 ft. 3 in. high by 2 ft. 6 in. wide by 1 ft. 6 in. deep. Takes Panel 18 in. by 12 in. or smaller. Ample room for any type of Gramophone Motor, including Garrard Automatic Record Changer and the largest E.T. and L.T. Batteries made. Accommodates 35 Records each side of set. If desired, you can have a Panel 27 in. long by omitting Records Storage. Height between baseboard and motor board, 12 1/2 in.

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'ASTRAL 3'

Showing the dignified 'commercial' appearance imparted by the handsome silver oxidised escutcheon of the Telsen 313 Disc Drive.

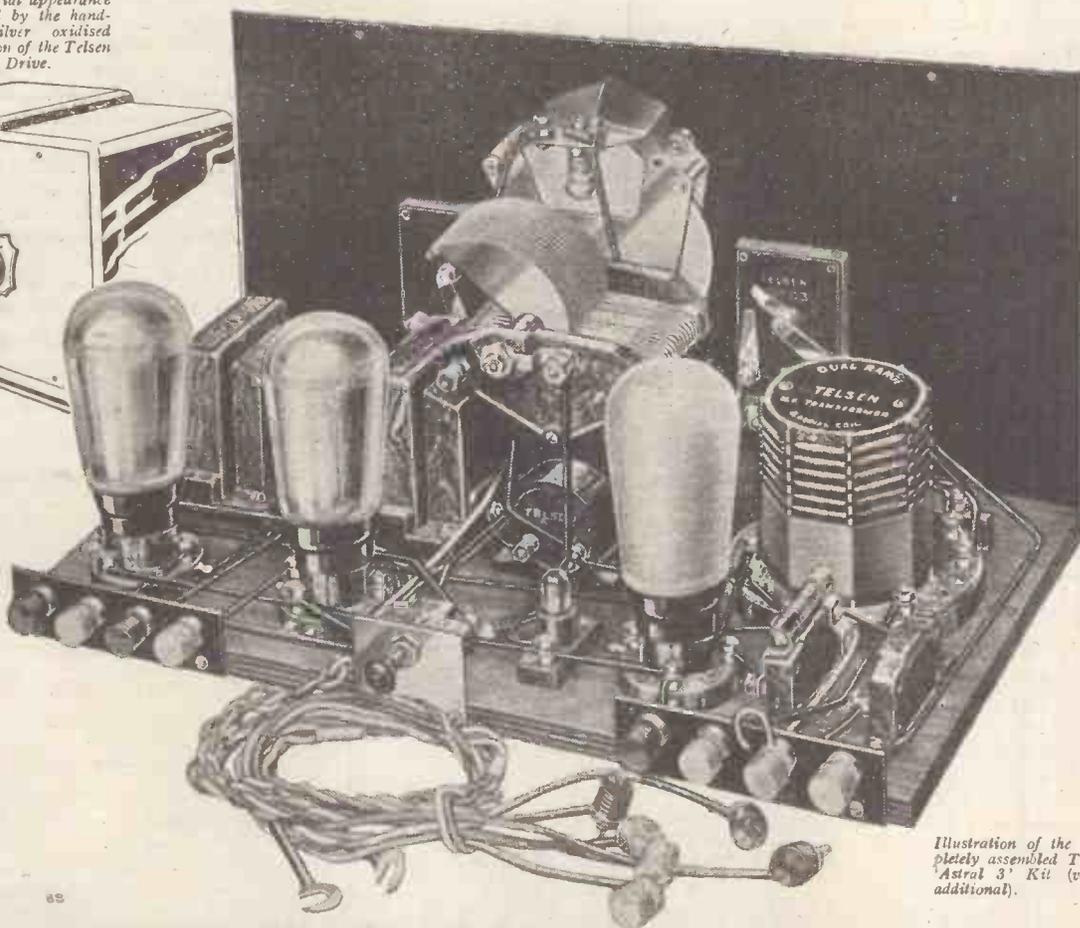
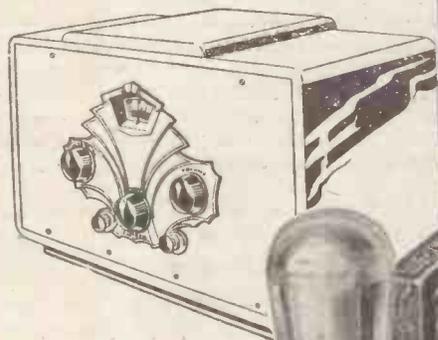


Illustration of the completely assembled Telsen 'Astral 3' Kit (valves additional).

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



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 note of a certain frequency Y, will show side-band frequencies $X+Y$ and $X-Y$.

G. F. (Glasgow).

Valve Standards

SIR.—We read with considerable interest, THERMION'S note entitled "Valve Standards" on page 46 of your issue of January 14.

As, however, we consider the paragraph is likely to give listeners an erroneous impression of the effect of reasonable departure from the published average characteristics of modern valves, we are tempted to comment at some length.

In the first place we admit that the values of mutual conductance quoted by THERMION all fall within our standard manufacturing tolerances, but as the result of considerable research and investigation, we have satisfied ourselves that no material advantage is gained by adhering to closer tolerances.

It is possible to compute mathematically and to confirm by experiment the difference in performance between two screen-grid valves of the same make and type, but having mutual conductances representing respectively the upper and lower limits of the manufacturing tolerances as represented by the figures which THERMION quotes. If two such valves were operated in conjunction with reasonably efficient tuned circuits, of the order of 100,000 ohms impedance, the difference in stage gain would be extremely small and would be of the order of 1 decibel only—an amount which cannot be distinguished by the ear.

In spite of the special precautions taken to maintain uniform physical dimensions of the electrodes of modern valves, a range of variation in characteristics inevitably occurs during manufacture, but we assure you that the working tolerances permitted in the final tests of all Mullard valves are sufficiently restricted to ensure no sensible difference between the performances of any valves falling within these limits.

The Mullard Wireless Service Co. Ltd. (London).

Hilversum Chimes

SIR.—Reading two letters printed on page 22 of "A.W." of January 7, "The Chimes from Hilversum," I can inform you that these are sent out at various times by the "V.A.R.A."—Vereeniging van Arbeiders Radio-Amateurs (Associa-

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.

A Speaker Hint

SIR.—Like many other wireless enthusiasts, I have now substituted my old cone speaker, which has given me such good service, for one of the latest moving-coils. My set is installed in a large cabinet, and the speaker was put on a baffle and screwed behind the fret.

I was not at all pleased with the results. Certainly I heard notes that were not noticed before, but I seemed to have lost that "brilliance" of tone which I was accustomed to get from my old Celestion.

After many experiments I am now getting reception which to my mind is as good as any I have heard. Perhaps other readers will be interested to know how I obtained it.

My cabinet is placed across the corner of the room, and about 2 ft. away. I have removed the back and suspended the baffle and speaker from the shelf at the rear with rubber cable, speaker pointing towards the wall. Results are now extremely good, and "boominess" and "resonance" have completely disappeared. The sound is nicely diffused through the room, and this is undoubtedly caused by the sound waves being thrown back by the angle of the wall.

J. K. (Birmingham).

Re "This Side-band Business"

SIR.—Your correspondent E. H. (West Norwood) has tried to make it clear that the B.B.C. experts are all wrong with regard to side bands. He states that "modulation is produced essentially by varying the intensity of the carrier wave." I may be wrong, but I think this should read, "modulation is produced by adding an audible frequency or frequencies to that of the carrier wave."

Light consists of a number of frequencies which can be split up into their respective bands by means of a quartz prism or spectroscope.

These frequencies gradually mingle into one another.

Take the light emanating from burning sodium and add to it (or modulate it with) a light from which all yellow has been extracted. Pass this modulated light through the spectroscope and the other bands will be seen on either side of the sodium bands.

In the same way the electro-magnetic vibrations of a wireless transmitter on a definite frequency X, when modulated by

tion of Workmen Radio Amateurs), the Socialist radio broadcasting association, one of the many parties that make use of either Hilversum or Huizen (at present using the Huizen station with the "A.V.R.O.," but called Hilversum in order to avoid mix-ups). The "V.A.R.A." seems to have a number of records of the various hours chimed by Big Ben and these are run off now and again according to Dutch time. What A. O. heard was the sound of traffic around Big Ben—this can be plainly distinguished. The "V.A.R.A." operates on fixed days, such as Wednesday, 8 a.m. to 12 p.m.; Friday from 8 to 12 a.m., 4 to 8 p.m., and 11 to 12 p.m.; Saturday, 8 a.m. to 12 p.m., and on Sundays generally from 8.30 to 10 a.m. and 5 to 8 p.m. All other days and hours are used by the "A.V.R.O." with the exception of Mondays, on which day a so-called general programme of "neutral" colour is broadcast, alternately with the "V.A.R.A." and "A.V.R.O."

The "Avro" always commences during the weekdays with the record "Happy Days are Here Again" and closes with the Dutch National anthem, "Wilhelmus." The "V.A.R.A." generally closes with some "red" music, hence A. O.'s remark on similarity to Moscow.

By the way, "P.H.O.H.I.," Philips' short-wave station, closed down on June 1, 1930, and re-commenced operations on December 24, 1932, but I don't think it is still on the old wavelength.

J. F. (The Hague, Holland).

Another Smash

SIR.—Here is an incident similar to that reported by "Puzzled" (Blackburn), "A.W." December 31, 1932.

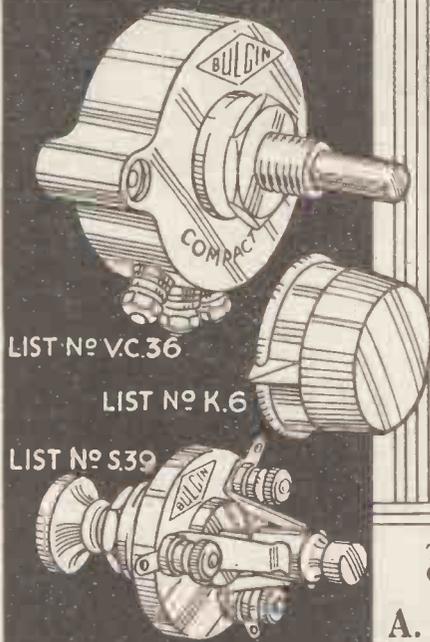
About two years ago an acquaintance arrived at our house about 11.30 p.m. with a four-valve portable. As our set was a modest two-valver he started to demonstrate his set. When he had had it going full strength for a few minutes, a loud crack was heard from the glass cupboard.

Upon investigating a glass cake stand was found with the top snapped off. Mystified, we tried to find how it had broken, but nothing had fallen and the stand was still in its usual place.

J. G. C. (Hull).

A popular Midland item is the miscellany entitled "Etc. . . . Etc." The new one—to be broadcast from the Midland Regional on February 18—consists of three items: negro spirituals from the Midland Studio Chorus, under the direction of Edgar Morgan; John Overton's "The Valley of Enchantment," presented by Edgar Lane, and a skit "Knocked 'em in the Charing Cross Road."

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In practically every popular circuit which has appeared you will find Bulgin Products incorporated, a sure indication that set designers have every confidence in recommending them. This splendid new receiver, "The Melody Ranger," incorporates a Bulgin Volume Control, specially chosen for lasting efficiency and compactness, and one of the famous Bulgin range of switches, which are renowned for their positive action and reliability.

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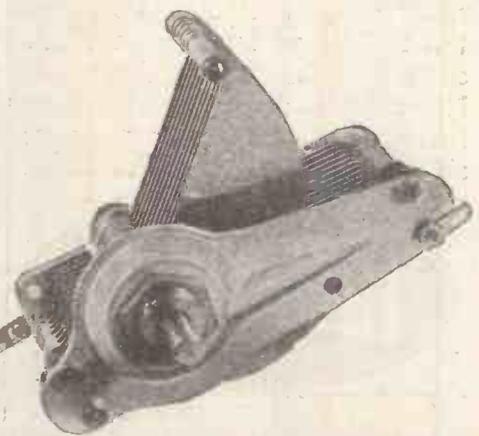
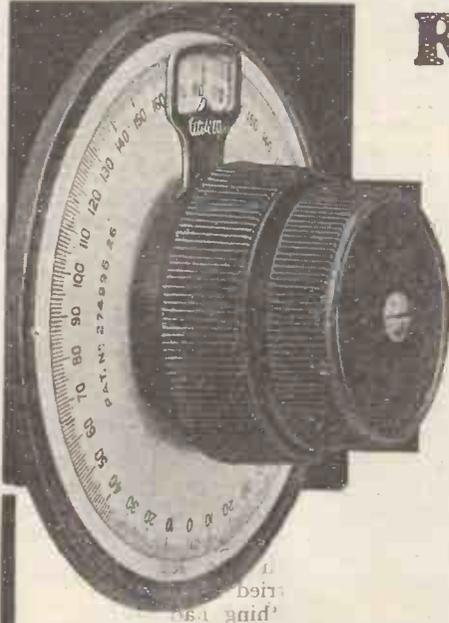
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Recommended for the 'MELODY RANGER'

For this wonderful set the designer has recommended two Utility .0005 Condensers and two Utility Slow-motion Dials.

Utility Condensers are as good as any available. The Utility S.M. Dials are the very best made and are absolutely essential for the set if you wish to get the full benefit of the short-wave side; ask any short-wave expert—they all use Utility S.M. dials. Normally one would expect to pay a little more for the finest slow-motion dial made, but in this special instance we are making a special price for the dials and condensers. We offer the complete kit of two .0005 condensers (185G) and two slow-motion dials (W181) for one pound.



A PAIR OF EACH FOR 20/-

Post free from us if your dealer cannot supply.

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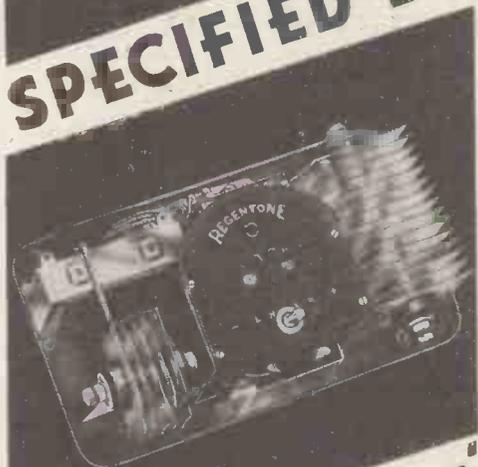
Bilmont

SETS OF THE SEASON

ATLAS LAMBDA BATTERY 3



SPECIFIED BY



AMATEUR WIRELESS

The designer of the "Melody Ranger" stakes his reputation on its success and chooses a Regentone Mains Unit. "I have officially specified your Mains Unit type W.I.C.," he writes. Type W.I.C. costs £3 10s. Other Regentone Mains Units (there's one for every battery set, to fit inside any portable) from 39s. 6d. or 7/6 down.



FILL IN THIS COUPON NOW

Please send me, FREE and POST FREE, full details of Regentone Mains Units.

Name.....

Address.....

REGENTONE LTD., Regentone House, 21 Bartlett's Buildings, Holborn Circus, London, E.C.4.
Telephone: Central 8745 (5 lines).

Northern Distributors: W. E. Beardsall & Co., Victoria Bridge, Manchester.

A NOTABLE addition to the growing range of worth-while battery sets is this Atlas three-valver, which I have just had the pleasure of trying out for an evening at my home in south-west London.

Situated, as I am, some twenty miles from Brookmans Park with a normal 60-ft. aerial and efficient earth, I am in a good position to test such a set, being sufficiently near to try the selectivity of the set and yet far enough outside the swamp area to get plenty of foreigners clear of the locals.

There must be thousands of listeners in much the same position as I am in relation to a B.B.C. regional. From tests of the

without any trace of overloaded power-valve distortion.

Driving this admirable little speaker is one of the most efficient three-valve chassis I have tried this season. The circuit is conventional, being a screen-grid of the variable- μ type, followed by a detector and a transformer-coupled power output.

High-efficiency aerial and inter-valve coils are used, and these are tuned by a two-gang condenser with a trimmer superimposed on the main control knob.

On the front of the cabinet are fitted the controls, which are remarkably easy to operate and few in number. The wave-change switch knob is on the left and the reaction on the right. Between these is the tuning knob and just above it is the tuning scale, which is marked in wavelengths.

Medium waves extend from 190 metres to 560 metres in graduated steps of 20 metres. This is an exceptionally wide tuning range and gives some idea of the efficiency of the tuning-coil design. The long waves go from 900 metres to 2,000 metres in steps of 100 metres.

At the back of the metal chassis inside the cabinet we find the aerial and earth connections. In addition, there are connections for a gramophone pick-up. Then, to one side is an aerial-coupling control, which comes in very useful in obtaining separation between foreigners uncomfortably close to each other.

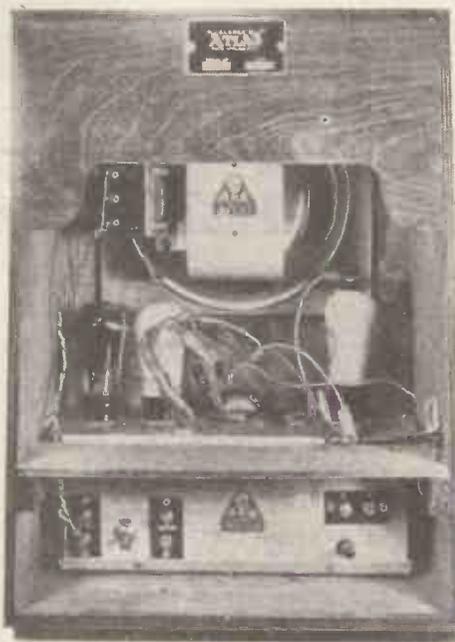
Economical Running

Now for the results of my tests: Firstly, I measured the anode current, having read the makers' claim about economical running. Believe me, the makers do not exaggerate. The total anode current is only 7 milliamperes. This, for such an efficient three-valver, is remarkable.

The output valve is an LP2, which, with 4½ volts grid bias and 120 volts high tension, provides ample volume. Of course, the volume you get from a set depends not only on the amount of power developed by the power valve, but on the sound output obtained from the speaker with a given power. That is where the Atlas speaker makes such a difference. The LP2 and the Atlas moving coil make an admirable combination.

The quality at the maximum permissible volume is good. There is a pleasing degree of bass and the top-note response is quite definite. The locals come through with a

(Continued on page 174).



The Atlas Lambda is of metal chassis construction and provision is made for a gramophone pick-up

Atlas set I can now add that there must also be thousands who would find this an ideal investment.

The set is of the table-cabinet type, with self-contained loud-speaker and batteries, needing only an aerial and an earth to complete the installation. The walnut cabinet is pleasingly designed with an open back to permit the bass notes to be brought out without "boom."

The loud-speaker is exceptionally good for such an inexpensive set, being the well-known Atlas moving-coil with permanent magnet. The sensitivity of this speaker is above the average, and accounts no doubt for the ample volume that is obtained

THE AERIAL WHICH MADE BROADCASTING POPULAR

We have sold our 7 MILLIONTH Aerial

The B.B.C. recently announced that the 5,000,000th licence had been issued. Our sales exceed 7,000,000 Aerials. This difference is accounted for by our exports to all parts of the world.

ANOTHER BRITISH RECORD FOR AN ALL BRITISH WORKS

This is equivalent to an express train travelling at sixty miles an hour for 55½ days, pounding its way from dawn to dawn, eating up miles represented by the 7,000,000 ELECTRON AERIALS sold. Seven million lengths, insulated with vulcanised rubber, covered with the finest quality braiding, heavily waxed and compounded. Proof against exposure, PROOF AGAINST LIGHTNING. The finest Aerial ever offered to the wireless enthusiast; no better Aerial has ever been produced. Ask your dealer for it.



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Replace your Aerial with the New SUPERIAL and

GET COVERED NOW
FOR THE £100 GUARANTEE AGAINST
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Fill in this form and post it with your empty SUPERIAL carton and our official cover note will be sent immediately.

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This Guarantee covers you for a period of 2 years from date of purchase.

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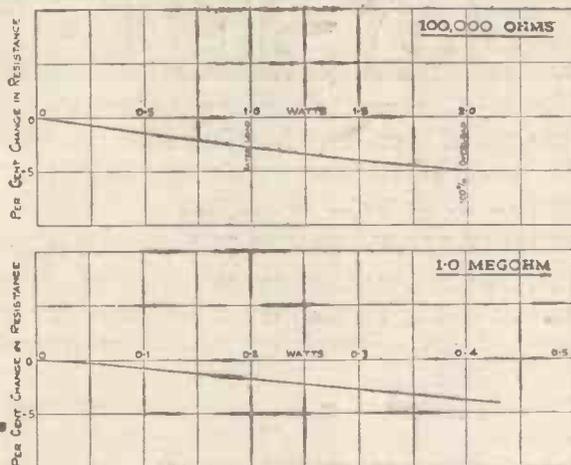
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**DUBILIER
TESTS No.1**



When tested with the rated load applied for 16 hours each day, the resistance value always comes back to the initial value after cooling. The "hot" resistance also remains constant over long periods.

You can ill afford to incorporate inferior Resistances in your set! Besides, it's not worth the risk when you can buy Dubilier



1 watt type, 1/-. 2 watt type, 2/-. 3 watt type, 3/-. R.9

Metallized Resistances and be certain of getting infinitely better results; results that leave no room for complaints or regrets, because Dubilier Resistances are subject to the most exacting tests before being released for sale.

Therefore when you are buying your Resistances for the "Melody Ranger" specify Dubilier. They are unive sally stocked by all Dealers.

**DUBILIER
METALLISED RESISTANCES**

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

"ATLAS LAMBDA BATTERY 3"
(Continued from page 172)

realism all too rare in battery sets. The next point that impressed me when testing this set was the wide spacing of the stations. Again I point to the good design of the coils. There is no doubt that the makers have achieved something out of the ordinary in these coils.

The selectivity is well under control. You can, by suitable adjustment of the input condenser, obtain Strasbourg clear of London Regional, and Scottish Regional came in absolutely without a trace of the local.

This unusual selectivity was obtained by reducing the input and increasing the reaction nearly to the maximum. The reaction is very smooth and you can go right up to the oscillation point without any "overlap" or "plopping."

The trimmer on the tuning knob works well, and keeps the condenser "in gang" over the whole of the wavelength ranges.

The volume from the local stations with

BRIEF SPECIFICATION.

Makers : H. Clarke & Co., Ltd.
Price : £9 15s., complete with valves and batteries.

Valve Combination : Screen-grid variable-mu (Osram VS2), detector (Osram HL2), and power (Osram LP2).

Power Supply : Self-contained batteries, comprising 120-volt high-tension, 4½-volt grid-bias, and 2-volt accumulator.

Power Consumption : 7 milliamperes total anode current with maximum high tension and grid bias.

Type : Table-cabinet set with permanent-magnet moving-coil loud-speaker.

Remarks : A fine value-for-money battery set giving exceptional performance in range and tone.

the reaction at zero overloaded the power valve, but this was put right when the input condenser control was set towards its minimum. With maximum input and maximum reaction such stations as Brussels No. 2 fully loaded the LP2 power valve, with the result that full volume was obtained from a large number of foreign stations.

On the long waves there are also plenty of stations, Radio Paris being almost as strong as the locals, and quite clear of all trace of Daventry National.

SET TESTER.

John Foulds, the composer, visits Birmingham on January 30, to conduct the Philharmonic String Orchestra in a new suite of his own, entitled "Hellas."

The Welsh Interlude for West Regional listeners will be given by the Rev. Gwilym Owen on January 30.

The Cathedral Quartet gives seven songs from the Midland studio on February 1. This quartet was among the first artistes to appear before the microphone in Birmingham.

Owing to the special demand of the "Melody Ranger" upon our space in this issue we regret that we have been compelled to curtail some of our regular features.

SHORT-WAVE NOTES

By SHORT-WAVER

SHORT-WAVE reception in the north of England appears to be infinitely better than that to which I have been accustomed in the south. I was most surprised to find that in Glasgow, Zeesen could be received at full loud-speaker strength with the reaction set at zero. This does not indicate very much, but really, the signal strength was excellent, though the tuning was inclined to spread. I noticed during the course of the week that Zeesen was coming in at enormous strength in Scotland and the north of England, whereas in London the signal strength has been R7 or 8, which is just about normal.

San Sebastian

A new station I have not heard before on a wavelength of 43 metres is San Sebastian EAR262, which was using the wavelength of Madrid, 110. Here again signal strength was abnormal, being R9 without any difficulty. For the first half of the week conditions have not been too satisfactory, some of the usual familiar stations could be heard, but towards the end of the week I found it possible to receive at least seven stations on the 50-metre band, which is distinctly good for this time of the year.

On Sunday afternoon, Bucharest could be heard testing on 50 metres, signal strength was about R7 and the reproduction excellent. I am given to understand that the 13.97 Empire transmitter is not yet in operation, but I should be glad to know if any readers have heard some of the preliminary tests.

The Atlantic 'phone stations are coming in usually well and I have heard quite a number of French commercial telephony stations which are apparently testing with South America. The English amateurs on both the 70- and 80-metre bands do not appear to be very active; in contrast to this one can hear at least a dozen French amateurs without any difficulty.

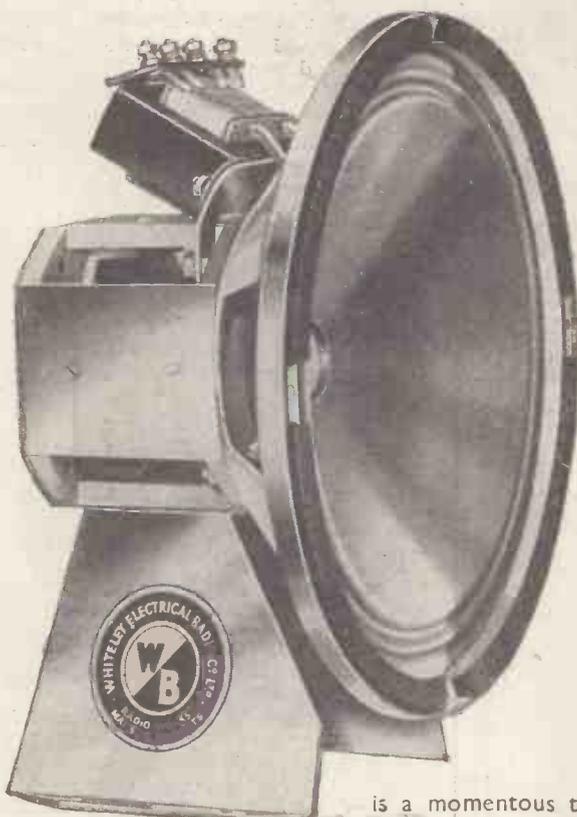
I have noticed during the course of the last ten days or so during my wanderings around the country that the average reader takes little or no interest in the length and efficiency of the aerial. It seems to be quite general for those living near a powerful station not to use an external aerial in any way, but to erect a very poor substitute of perhaps 15 or 20 ft. of wire around the picture rail. Usually they convert their receiver to short-wave working and are very disappointed with the results. In a lot of cases the detector grid circuit is so heavily damped because of the inefficient aerial that the receiver refuses to oscillate, even should they be able to obtain results of a kind they are disappointed because American and other long-distance stations cannot be received on the loud-speaker.

It is absolutely essential that the aerial on short waves be reasonably efficient and if an external aerial cannot be erected, then by all means use one indoors, but see that it is kept away from the wall.

Why it is SPECIFIED

for the

'MELODY RANGER'

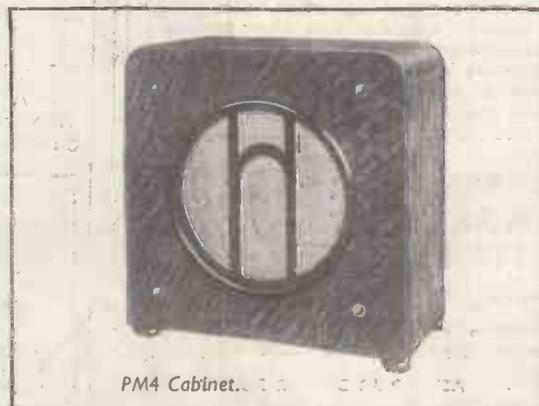


The new MANSFIELD MAGNETIC SYSTEM

"Mansfield Senior" PM4 Chassis 42/-, complete with tapped transformer. Handsome Cabinet in Oak to suit, 25/-.

is a momentous thing—it gives greater power from a smaller magnet. It makes possible in a moderate priced moving-coil speaker a performance at least equal to very high priced instruments. It allows the use of a heavy steel framework without magnetic loss; the "Mansfield" magnet cannot lose its magnetism. The magnetic flux is concentrated where the work is done instead of being diffused over the whole system. The magnet is 30 per cent. more efficient than good cobalt steel of same weight and 10 per cent. more efficient than chrome steel of three times the weight. Write for leaflets and HEAR it at your dealer's; you will be AMAZED

"MANSFIELD" Permanent Magnet Moving-Coil SPEAKERS



PM4 Cabinet...

A revolutionary development!

Whiteley Electrical Radio Co., Ltd., Dept. A, Radio Works, Mansfield, Notts.
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EPOCH

ARE NOT ORDINARY MOVING COIL SPEAKERS

Backed by years of experience and research, ahead of other makes, each model of Epoch Speakers is definitely superior to others in its price class.

Take another example, the

Super Junior Model P. M. M. C. LOUDSPEAKER



It looks almost identical with many others, but examine it more closely. Note that it has a high content cobalt steel (not low content cobalt or chrome or tungsten steel) magnet, a heavy gauge frame, an 8½ in. diaphragm (not 7½ in. or 6 in. or 5 in.), a specially impregnated coil system (not just shellacked or varnished wire), a specially moulded cone (not ordinary paper or buckram), an input transformer with 5 scientifically graded ratios—altogether a superior specification. Now compare its performance, not only with speakers near its own price, but with those costing pounds more, and you will note a perfection far above its own class for tone, accuracy and sensitivity—

A MASTER SPEAKER AT ITS PRICE **27'6**

Complete with 5-ratio Transformer. Or in handsome, polished, solid oak cabinet, 40/-

ASK YOUR DEALER FOR IT

Write for full particulars or call for a demonstration.

EPOCH RADIO MANUFACTURING Co. Ltd.,

Exmouth House, Exmouth St., London, E.C.1. (at the junction of Rosebery Avenue and Farringdon Road).

Phone: Clerkenwell 6666.

R.I. DI-FEED TRANSFORMER

THE fact that new and improved L.F. transformers are still being produced proves that one cannot yet write *finis* to transformer design.

A very interesting new L.F. transformer has been produced by Radio Instruments, Ltd. This is known as the Di-feed. It



The new R.I. Di-feed transformer, suitable for the "Melody Ranger"

is small and neatly constructed, and has an excellent performance factor. It is quite suitable for incorporation in the new "A.W." receiver the "Melody Ranger," and builders of this fine set may care to incorporate the Di-feed advantages in their new outfit.

I.C.S. WIRELESS COURSES

RADIO enthusiasts who want to widen their wireless knowledge have an excellent opportunity to do so in the wireless courses conducted by the International Correspondence Schools, Ltd. Included in the I.C.S. range are courses dealing with the installation and servicing of sets. There is an operating course and also a course of wireless salesmanship. Further details can be obtained free on mention of "A.W." from International Correspondence Schools, Ltd., Department 36, International Buildings, Kingsway, W.C.2.

Mr. H. E. Balch will have something of interest to say when he gives a talk to the Western Region on "The Caves of Mendip" on February 8.

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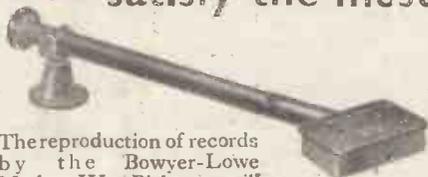
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NEW 1933 PERMANENT MAGNET SPEAKER No. 99PM.

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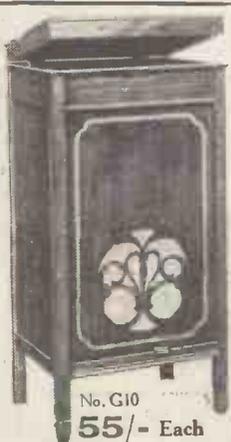
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Broadcasting Stations classified in order of wavelengths. For the purpose of better comparison, the power indicated is that of the carrier wave.

Metres	Kilo-cycles	Station and Call Sign	Power (Kw.)	Metres	Kilo-cycles	Station and Call Sign	Power (Kw.)	Metres	Kilo-cycles	Station and Call Sign	Power (Kw.)
13.97	21,470	Davenport (GSH)	15.0	283	1,058	Magdeburg	0.5	472.4	635	Langenberg	60.0
16.88	17,770	Davenport (GSG)	15.0	283	1,058	Stettin	0.5	480	625	North Regional	50.0
19.737	15,200	Zeesen (DJB)	8.0	284.7	1,053	Radio Lyons	1.0	483	621.1	Ivanovo	
19.82	15,140	Davenport (GSF)	15.0	286	1,049	Montpellier	0.8			Vosnesensk	20.0
25.28	11,865	Davenport (GSE)	20.0	288.5	1,040	Bournemouth	1.0	488.6	614	Prague	120.0
25.4	11,810	Rome (ZRO)	15.0	288.5	1,040	Plymouth	0.12	495.8	605	Trondheim	1.2
25.53	11,750	Davenport (GSD)	20.0	288.5	1,040	Scottish National	50.0	501.7	598	Florence	20.0
31.25	9,598	Ljssbon (CTIAA)	2.0	291	1,031	Vilpuri	13.0	509	590	Brussels (No. 1)	15.0
31.3	9,585	Davenport (GSC)	20.0	293	1,022	Kosice	2.5	509	590	Astrakhan (RV35)	10.0
31.31	9,580	Radio Nations	20.0	293.7	1,021.5	Limoges (PTT)	1.0	511.8	586	Tartu	0.5
31.38	9,560	Zeesen (DJA)	8.0	296.1	1,013	Hulzen	20.0	518.6	578.5	Vienna	15.0
31.51	9,520	Skamleback	0.5	298.8	1,004	Tallin	11.0	525.3	571.1	Riga	15.0
31.55	9,510	Davenport (GSB)	20.0	301.5	995	North National	50.0	532.9	563	Munich	60.0
32.26	9,300	Rabat	0.5	304.3	986	Bordeaux (PTT)	13.0	537.6	557.9	Palermo	3.0
43.75	6,865	Radio Nations	20.0	306.8	978	Zagreb (Agram)	0.75	542	554	Sundsvall	10.0
46.6	6,438	Vitus/Paris	0.3	307.5	975.8	Falun	0.5	550	545	Budapest (1)	18.5
48.2	6,202	Moscow	12.0	308.1	973.4	Vitus-Paris	1.0	559.7	536	Kaiserslautern	1.5
49.4	6,070	Rome (tests)	15.0	309.9	968	Cardiff	1.0	559.7	536	Augsburg	0.3
49.4	6,070	Vienna (UOR2)	2.0	312.8	959	Cracow	1.5	559.7	536	Tampere	1.0
49.59	6,050	Davenport (GSA)	20.0	313.9	955.6	Genoa (Genova)	10.0	563	533	Wilno	16.0
50.0	6,000	Moscow	20.0	315.8	950	Marseilles	1.6	566	530	Hanover	2.0
52	5,769	Prague	0.5	318.8	941	Naples (Napoli)	1.5	572.6	523.9	Grenoble (PTT)	2.0
207.3	1,447	Serling	0.2	318.8	941	Sofia (Rodno)	1.0	574.7	522	Ljubljana	5.2
207.5	1,445	Perz	3.0			Radio	1.0	575.2	521.4	Freiburg	0.25
209.7	1,430	Magyarovar	3.0	319.7	936	Dresden	0.25	680	442	Lausanne	0.6
211.3	1,420	Newcastle	1.0	321.9	932	Goteborg	10.0	720	416.6	Moscow (RV2)	20.0
212.8	1,410	Antwerp	0.4	325	923	Breslau	60.0	742.6	494	Novosibirsk	6.0
214.3	1,400	Aberdeen	1.0	328.2	914	Poste Parisien	60.0	748	401	Ostersund	0.6
214.3	1,400	Warsaw (2)	1.9	331.8	904	Milan	50.0	759.5	395	Geneva	0.6
215.5	1,392	Chatelineau (EL)	2.0	334.8	897	Poznan	1.9	779.2	385	Petrozavodsk	
217.1	1,382	Konigsberg	0.9	338.2	887	Brussels (No. 2)	15.0			(RV29)	20.0
217.1	1,382	Brussels (Conf.)	0.25	341.7	878	Brunn (Brno)	35.0	825	363.6	Sverdlovsk	36.0
218	1,373	Salzburg	0.5	345.2	869	Strasbourg (PTT)	11.5	833	360.1	Hester Airport	5.0
219.9	1,364	Beziery	0.5	348.2	861.5	Leningrad (RV70)	15.0	845	355	Budapest (2)	3.0
223.2	1,344	Swedish Relays	—	348.6	860.5	Barcelona (EAJI)	8.0	848.7	353.4	Rostov (RV12)	20.0
224.4	1,337	Cork (6CK)	1.2	352.1	852	Graz	7.0	857.1	350	Leningrad	100.0
252.2	1,331.7	Fecamp	10.0	355.8	843	London Regional	50.0	882	340	Saratov (RV3)	20.0
227.4	1,319	Flensburg	0.5	360.5	832	Muhlacker	60.0	937.3	320	Kharkov (RV4)	20.0
230.6	1,301	Malmo	1.2	363.4	825.5	Algiers (PTT)	16.0	967.9	310	Alma Ata (RV60)	10.0
232.2	1,293	Kiel	0.25	365.5	820.7	Bergen	1.0	1,000	300	Moscow	
233.4	1,285	Lodz	2.2	366.3	819	Fredriksstad	0.7			(Old Kom.)	100.0
236	1,270.9	Kristiansand	0.5	368.1	815	Bolzano	1.0	1,034.5	290	Kiev (RV9)	100.0
236.2	1,270	Bordeaux (S.O.)	2.0	368.1	815	Helsinki	13.2	1,043	287.6	Tiflis (RV7)	100.0
237.9	1,261	Nimes	0.6	369	813	Seville (EAJ5)	1.5	1,071.4	280	Scheveningen	
238.9	1,256	Nurnberg	2.0	369.3	812.1	Radio LL (Paris)	1.0			Haven	10.0
240.1	1,249	Stavanger	0.5	372.2	806	Hamburg	1.5	1,093	277	Oslo	60.0
241.3	1,243	Liege	0.3	376.4	797	Scottish Regional	50.0	1,105	271.2	Minsk (RV10)	35.0
242	1,238	Belfast	1.0	381.7	788	Lvov	16.0	1,153.8	260	Kalundborg	7.5
244.1	1,229	Basle	1.0	385	779	Radio Toulouse	60.0	1,168	257	Taschkent (RV11)	25.0
245.9	1,220	Berne	0.5	385	779	Stalino (RV26)	10.0	1,191	252	Luxemburg	100.0
245.9	1,220	Cassel	0.25	388.5	772	Archangel	10.0	1,200	250	Istanbul	5.0
245.9	1,220	Linx	0.5	389.6	770	Leipzig	75.0	1,209	250	Reykjavik	16.0
245.9	1,220	Swansea	0.12	392	768	Archangel	10.0	1,229.5	244	Boden	0.6
247.7	1,211	Trieste	10.0	394	761	Bucharest	12.0	1,237	242.5	Vienna Exp.	3.0
249	1,205	Prague (Stranice)	5.0	398.9	752	Midland Regional	25.0	1,260.5	238	Bakou	35.0
249.5	1,202.6	Juan-les-Pins	1.0	403.8	743	Sottens	25.0	1,304	230	Moscow (T.U.)	100.0
250	1,200	Radio Schaeerbeek	0.3	408.7	734	Katowice	12.0	1,348	222.5	Motafa	30.0
251.2	1,194	Barcelona (EAJ15)	6.0	413.8	725	Athlone	80.0	1,390	217.4	Novosibirsk	
253.4	1,184	Gleiwitz	1.0	416.4	720.5	Radio Maroc				(RV6)	100.0
255	1,175	Toulouse (PTT)	5.0	419.5	715	Berlin	6.0	1,411.8	212.5	Warsaw	120.0
256.7	1,168	Horby	10.0	425.5	705	Madrid (Espan)	2.0	1,445.7	207.5	Eiffel Tower	13.5
259	1,157	Frankfurt-a-M.	17.0	425.5	705	Madrid (EAJ7)	3.0	1,481.5	202.5	Moscow (RV1)	500.0
261.6	1,147	London National	50.0	430.4	697	Belgrade	2.8	539	195	Ankara	7.0
263.8	1,137	Moravsko-Ostrava	11.0	431	696	Parade (CTIGL)	1.5	1,554.4	193	Davenport (Nat.)	30.0
265.7	1,129	Lille (PTT)	1.3	435.4	689	Stockholm	55.0	1,600	187.5	Irkutsk (RV14)	10.0
267.1	1,123	Valencia	8.0	441.2	680	Rome (Roma)	60.0	1,620	185	Norddeich (KVA)	10.0
267.8	1,120	Nyiregyhaza	6.0	447.1	671	Paris (PTT)	7.0	1,634.9	183.5	Zeesen	60.0
268.3	1,118	Bremen	0.3	449.7	667	Danzig	0.5	1,675	179	Kharkov	25.0
269.4	1,112	Bari	20.0	451	666.5	Odessa (RV37)	20.0	1,725	174	Radio Paris	75.0
270	1,112	Salonica	1.0	453	662.2	Agen	1.0	1,796	167	Lahti	54.0
271.2	1,106	Cointe-Leige	0.3	453.2	662	Madona	35.0	1,875	160	Hilversum	8.5
271.4	1,105	Rennes	1.3	453.2	662	Klagenfurt	0.5	1,935	155	Kaunas	7.0
273.7	1,096	Turin (Torino)	7.0	455.9	658	San Sebastian		2,000	150	Craciunelu	1.0
276.5	1,085	Heilsberg	60.0			(EAJ8)	3.0	2,625	119	Konigschwuster-Hausen (press)	20.0
279.7	1,072.4	Bratislava	14.0	459	653	Beromuenster	60.0	2,650	113	Eiffel Tower	15.0
281	1,067	Copenhagen	0.75	465.8	644	Lyons (PTT)	1.6	2,900	103.5	Konigschwuster-Hausen (press)	15.0
282.2	1,063	Lisbon (CTIAA)	2.0	472	635.6	Tiraspoli	10.0				
283	1,058	Innsbruck	0.5								
283	1,058	Berlin (E)	0.5								

The Sunday afternoon concert for Midland listeners on February 12 is by the Studio Orchestra, directed by Frank Cantell.

The Palmer Trio of Leicester instrumentalists joins forces with Bertram Newstead in a recital from the Midland Regional studio on February 15.

Mabel France has written a St. Valentine's Day play for Midland Children's Hour. It will be heard on February 14.

On the Midland Regional transmitter a coming big musical event is the relay from Birmingham Town Hall on February 16, of the City of Birmingham Orchestra's concert, with Albert Sammons as the "star."

WHEN SUBMITTING QUERIES

Please write concisely, giving essential particulars. A Fee of One Shilling (postal order), 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 telephons 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.

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of 5 as recommended
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Osborn Baffles

I HAVE just had details of the Osborn Super Acoustic baffle boards. Certainly a very good idea for speakers. The boards are available in various sizes: 18 in. by 18 in. up to 36 in. by 36 in. Any hole will be cut free, so you can definitely fit your speaker to a baffle having the correct opening. Details and a sample through my catalogue service. **932**

Preh "Pots"

Have you had the latest literature on the new Preh potentiometers. These handy little "pots" are arranged so that there is straight-line ratio between angular movement and resistance variation. They are made in all sizes, and special "pots" can be made up for special requirements. **933**

The W.B.'s.

Both the large and small W.B. speakers with the new magnet system seem to be very popular. A cabinet model, the Mansfield Junior, of the smaller chassis, has just been produced. Full details free through my catalogue service. **934**

For the "Ranger"

Are you interested in a new mains unit? I see that the designer of the "Melody Ranger" has definitely specified the Regentone W.I.C. unit for the new set. This is only one of the wide Regentone range, and through my catalogue service you can get details of all the units, A.C. and D.C. **OBSERVER 935**

GRIPSO
MIDGET
WANDER PLUG
THE PATENT SIDE SPRING
STRONGLY GRIPS ANY SIZE
BATTERY - 12 TITLES
THE GRIPSO COY.
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CONSTRUCTOR KIT

WITH LISSEN COILS

Complete Kit as listed less Valves and Cabinet

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FOR

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(Carriage Paid)

(DOWN and 11 monthly
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Contains these fully Guaranteed Parts

	£	s.	d.
2 LISSEN "Universal Four Range" coils complete with two couplers and extension rods...	1	10	0
2 BELLING-LEE marked spade terminals			4
2 G.E.G. 1-mfd. fixed condensers		4	0
1 DUBILIER 1-mfd. fixed condenser, type 9200		2	9
1 GOLTONE .0001-mfd. fixed condenser			5
1 GOLTONE .002-mfd. fixed condenser			5
5 ERIE resistances as specified		5	0
1 GRAHAM FARISH resistance holder			6
2 IGRANIC Indigraph S.M. dials, type VINIL	10	0	
1 KEYSTONE .0003-mfd. variable condenser		3	0
1 KEYSTONE standard H.F. choke		3	6
1 KEYSTONE short-wave H.F. choke		2	0
1 KEYSTONE 3-point switch		1	0
1 LEWCOS 50,000-ohm potentiometer		3	0
1 LEWCOS H.F. choke, type M.C.		2	6
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1 SLEKTUN Colt type L.F. 3-1 transformer		4	9
2 SOVEREIGN terminal blocks		1	0
2 WAVEMASTER .0005-mfd. var. condenser		9	0
1 W.B. screen-grid valve holder		1	0
2 4-pin valve holders		1	0
1 Pair panel brackets		2	0
2 Complete extension equipments and brackets		2	0
2 Marked terminals			4
11 Marked wander-plugs		1	4
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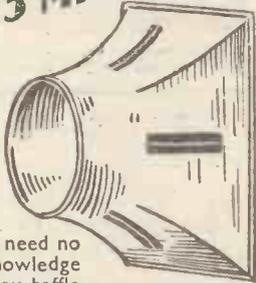
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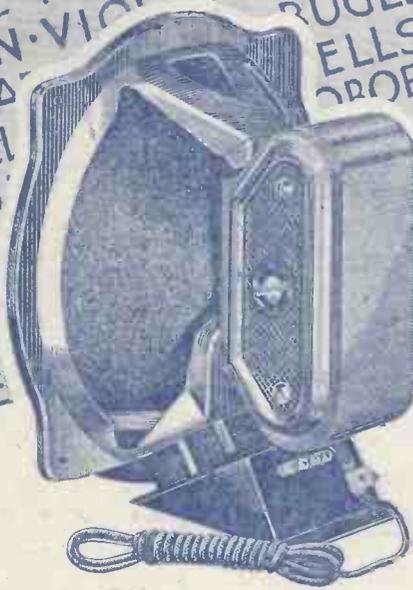
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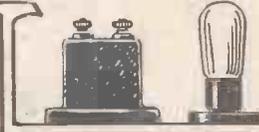
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Is Your Set at Concert Pitch?

THIS is an article for idealists—for those who would like to know how to keep their sets up to that pitch of perfection obtained when the set was first installed.

Sad, but true, to relate, most sets in use to-day are very much below concert pitch, even assuming they were properly "tuned up" when first installed.

Yet it is not difficult to keep your set working week after week, even month after month, at a pitch that will give you constant satisfaction.

The Secret Revealed

The secret is in paying attention to the points in the wireless installation that deteriorate from the moment the set is put in.

If we go through these points you will at least know what you are neglecting. And you will, we suggest, then have sufficient knowledge to keep your set up to concert pitch. Which is an ideal we can all aim at, even though the majority inevitably fail to attain it!

Possibly you will be annoyed if we once again stress the need for renewing the high-tension battery. Yet there is no doubt that this business of keeping in use a run-down high-tension battery is the most frequent and the most widespread source of sets working below concert pitch.

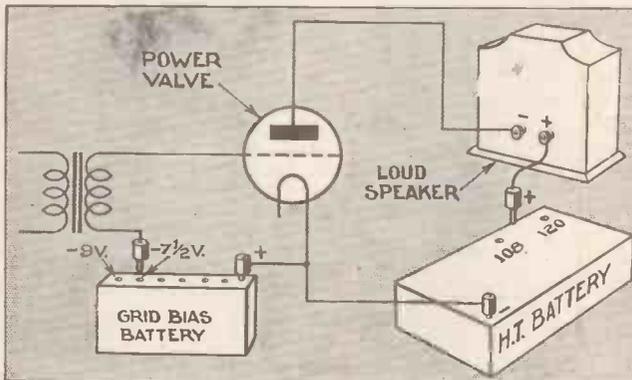
From the moment you put in a new high-tension battery that battery's days are numbered.

To some extent it depends on how many hours a day you use the battery how long it lasts. For the usual two or three hours a day, with say a three-valver, the standard-capacity type will not give really satisfactory service for more than two months.

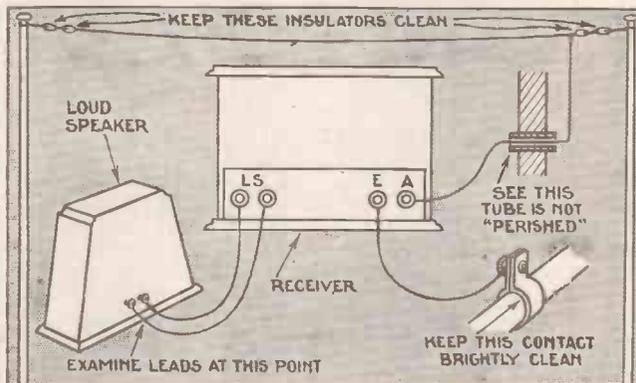
Adjusting the High Tension

Meanwhile, it will be necessary to make certain adjustments if you are to maintain the set's performance. If you have a 120-volt high-tension battery you might try running it at 108 volts and adjusting the grid bias accordingly.

When the battery has dropped in voltage you can increase the maximum to the 120-volt tap-



The heart of your set is the valve of each stage. Here you see how a valve gets its anode voltage from a high-tension battery and its grid-bias voltage, which is intimately connected with the high-tension supply, from a smaller battery called the grid-bias battery. When the positive voltage of the high tension drops with battery age you must remember to reduce the negative bias on the grid



Vulnerable points in the externally-connected accessories of the receiving installation are indicated in this diagram. Watch the aerial system for leakage and inspect the earth for faulty contact every few months. Beware of worn loud-speaker leads—they cause crackles!

ping, thus maintaining something like a constant value of undistorted volume during the whole of the useful life of the battery. With 108 volts you can get very nearly as much undistorted output as with 120 volts.

Another way to maintain the quality is to keep your eye on the grid-bias plugs. As the maximum voltage drops the grid-bias requirement will be less. Drop down 1 1/2 to 3 volts after, say, six week's use.

Grid-bias Batteries Wear Out!

There is a quite mistaken idea among non-technical listeners that the grid-bias battery lasts for ever.

The idea is due to the knowledge that this little battery takes no current. True enough. But if you leave any dry-cell battery on a shelf doing nothing—delivering no current—it will run down of its own accord within, say, nine months.

Although the grid-bias battery is literally living a shelf life when installed in your set, its life is nevertheless limited. Renew the grid bias at least once a year and for safety every six months.

Many sets run down the high-tension battery sooner than need be just because the grid-bias battery is worn out and is not, therefore, restricting the anode current of each valve.

The plugs on the ends of battery leads are another very frequent cause of sets falling below concert pitch. This is particularly true of accumulator lead connections, which tend with time to become corroded.

Checking Valve Life

Next to batteries the valves of your set are most likely to cause indifferent results. The trouble is, of course, that there is no well-defined point at which you can appreciate that the efficiency of the valves has deteriorated.

The best plan is to mark the valve bulbs with a little slip telling you the date of purchase. Then you can check up roughly how many hours the valves have been in action when you come to track down the cause of lost efficiency.

(Continued on page three)

THIS WEEK'S SPECIAL ARTICLES

"IN SERIES" AND "IN PARALLEL" Page Six

HINTS ON THE VARIABLE-MU VALVE

Being a further instalment of the "Build As You Learn" series, by Percy W. Harris.

Pages Two and Three

WHAT QUALITY REALLY MEANS

Being this week's instalment of the Elementary Wireless Course, by J. H. Reyner and the "A.W." Staff.

Pages Four, Five, and Six

PERCY W. HARRIS'S "BUILD AS YOU LEARN"

THIS week I do not propose to give you any constructional work to do. There are two reasons for this. Firstly, almost every week recently you have had some expenditure on the set, and after all, even small sums add up! Secondly, there are a number of matters about which I think you require information, although the constructional work concerned has already been done.

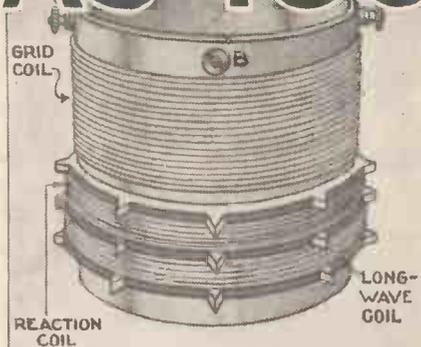
For example, last week I left you querying the reason for the introduction of the new 1-microfarad condenser in the lead coming from the second coil to the switch.

This is not a question I expect all readers of this series to be able to answer right away, as to do so requires the ability to read a circuit diagram and to trace out theoretical as well as practical connections. Do not think, then, that if you cannot answer this question after puzzling over it that you have not paid full attention to my previous lessons!

Read All The Supplement

You should, however, be able to answer it if you have studied the rest of the supplement each week, for in the other portions dealing more with theoretical matters, conventional diagrams and circuits have been dealt with much more fully than I, personally, have been able to do in what is primarily a constructional series.

I will first try to explain the problem without recourse to diagrams, simply by considering fundamental principles. You will remember that we have two tuned circuits, each consisting of a coil and a condenser, the top of the first coil being joined to the grid of the screen-grid valve and the bottom of the first coil to its filament (that is, prior



In this week's instalment of his series PERCY W. HARRIS deals with practical points to watch when using the variable-mu type of screen-grid valve for high-frequency amplification. Particular attention is drawn to the circuit of the potentiometer needed to vary the grid bias of this valve.

to the introduction of the special grid bias).

In the second coil the top has been joined to the grid condenser of the detector valve and the bottom to filament. Each coil has consisted of two parts joined together—the medium- and the long-wave winding.

When the Waveband is Changed

In order to switch the set from the long to the medium waveband, we have short-circuited the long-wave winding, and similarly whenever we have been listening on the long waveband we have disconnected the short circuit.

To short-circuit this winding we must take out a lead from the top of the long-wave winding and another lead from the bottom and bring these two leads together in the switch. As, very

conveniently, the bottom of each of the two coils is joined to the same wire (the negative filament and earth lead), we need have three leads instead of four when we wish simultaneously to switch or short-circuit the long-wave windings on both coils.

This fortunate state of affairs enables us to use a simple three-point switch, thereby saving both complication and expense.

The Best-laid Plans—!

When I started to plan out the arrangement for the insertion of the grid bias between the lower end of the coil and the filament, I intended to insert it next to the negative filament of the screen-grid valve, shunting it as explained last week with a 1-microfarad condenser. Naturally before doing any constructional work in changing over the receiver, I checked over the diagram to see if anything else required attention.

I then observed that our simple switching scheme tended to upset my calculations. It was easy to see that if I inserted grid bias between the bottom of the coil and the negative filament, there would be a complete short circuit of the grid-bias battery whenever we short-circuited the two long-wave windings.

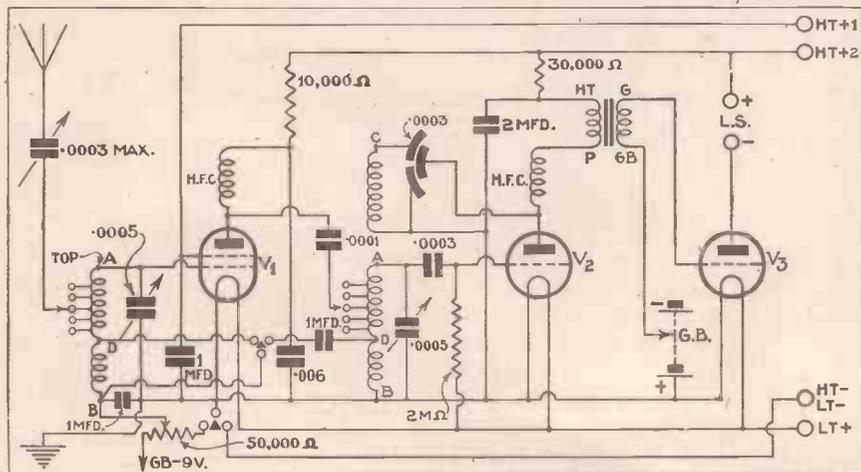
If we consider the positive of the grid-bias battery to be connected to the negative of the screen-grid valve and the negative of the bias battery to the bottom of the coil, we shall see that there is a path from the negative of the bias battery up through the long-wave portion of the coil, along the switch lead to the switch and down to negative again.

From the Junction Point

From this point of junction at the switch contact another lead goes along to the second coil, through the long-wave winding to negative. Thus there is a direct metallic path from the negative of the grid-bias battery through the coils and switch round to the positive of the grid-bias battery connected to negative low-tension.

Finally, I overcame the difficulty by making the connections as shown this week, inserting a 1-microfarad condenser to the lead coming from the switch of the second coil. This condenser gives a negligible opposition to high-frequency currents, but is a complete barrier to direct current.

While it gives a short circuit for high-frequency current or an easy alternative path through it instead of through the long-wave winding, it prevents the short-circuiting of the battery to which I have referred.



Here is the complete theoretical circuit diagram of the latest version of the "Build As You Learn" screen-grid three-valver. Note specially the modifications in the high-frequency part of the circuit to take the variable-mu type of screen-grid valve

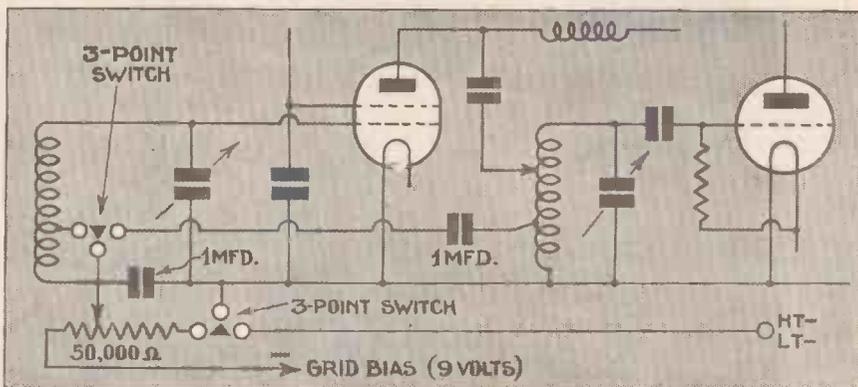
Practical Hints on the "Variable-mu"

There is in theory a disadvantage in this arrangement, as a slight coupling between the first two circuits is thereby given, but in practice its effect is negligible. Of course, in a commercial set it is usual to build the coil switching into each coil separately and to operate the two switches by some ganged control, so that our present trouble could not arise.

Problems of Set Design

It is, however, a useful and illuminating example of the problems arising in set design when it is desired to change from one circuit to another. It also teaches the lesson that a circuit change which may be good in one set may be thoroughly bad in another!

Next week I want to deal in detail with many of the letters I have received from readers who have been building this receiver in its several modifications. May I say at once how much I am gratified by the letters of appreciation and how delighted I am to hear that



From this detailed circuit diagram of the high-frequency and detector portions of the screen-grid three-valve you should be able to understand how the three-point switch is used to cut out the grid-bias battery when the set is not in action. Note carefully the 1-microfarad fixed condenser between one point on the three-point switch and the wave-change switch point of the detector grid coil

these lessons have been the means of starting on set construction many who have not hitherto tried their hand at it? It has also been very gratifying to find that a large number of readers who have already built many sets have found the articles of value to them in their work.

THOSE PICK-UP TERMINALS

MANY of the latest sets, in fact nearly all the factory-built jobs, provide two terminals at the back of the instrument marked "Pick-up." Sometimes they are marked "Gram," but whichever it is their function is the same, namely, to enable you to make use of the amplifying portion of the set to amplify the voltages set up in an electric sound-box or pick-up.

Usually, in conjunction with these two terminals or sockets there is a radio-gram switch on the front of the set. Often the gramophone facility of the set is switched in by the same knob that changes the wave-band ranges of the tuning coils.

What you have to do, therefore, is to adjust the combination switch knob until it is at the "gram" position and then the two terminals at the back become operative.

The Detector Amplifier

If you then connect a pick-up to these terminals it is probable that the detector valve of the set will amplify the voltages developed in the pick-up.

The reason for this is that in moving the combination switch knob to the gram position you alter the detector connections, cutting out the high-frequency stages, if any are included, and at the same time applying negative bias to the grid of the detector, so that it acts as a low-frequency amplifier.

Sometimes the volume-control

knob of the set actually works on two separate controls inside the set, one acting when the set is used for radio and the other coming into action only when the pick-up is in use.

This arrangement, while very convenient, is, perhaps, more the exception than the rule. If the volume control of the set works only for the radio function, it will usually be essential to connect some form of external volume control to the pick-up. This can be a potentiometer with a resistance not less than that of the pick-up.

A POINT ABOUT SELECTIVITY

IN the old days of wireless the question of selectivity used always to imply the cutting out of the local station so that a more distant station could be heard without interference from the local.

Nowadays selectivity has come to mean a much greater ability on the part of the tuning circuits. They must be capable not merely of cutting out the locals when a foreign station is wanted, but of cutting out the foreigners when the locals are wanted.

This change in the selectivity problem is due to the very great increase in the power of the broadcasting stations. After dark many of the foreigners produce in this country field strengths as great as, if not greater than, the strength of some of the B.B.C. stations in our own country.

IS YOUR SET AT CONCERT PITCH?

(Continued from page one)

About 1,000 hours is given by most valve makers as the really useful life. Often this is greatly exceeded, but it is more luck than judgment that this should be so.

The power valve is the one that seems most prone to "go off." Certainly this is the valve that affects the quality most.

Next on the list of sources of deterioration we would place the aerial and earth system. The aerial tends to become such a fixture that you are apt to overlook the fact that its electrical efficiency is being attacked all the time.

How Aerials Lose Efficiency

The most frequent causes of indifferent aerial are dirty insulators and worn lead-in wires.

Look at both every three to six months.

Similarly with the earth. Many listeners seem to think that because they use an indoor earth, that is an earth made to a main water pipe, there is no need to attend to its contact.

Actually, there are probably as many poor indoor earths as buried earths.

The listener with a buried earth is more likely to attend to it than the listener with the water-pipe earth. Keep the contact between the clip and the pipe efficient by rubbing them both with a piece of emery paper.

Inside the set there is not much to deteriorate apart from

the valves we have already mentioned. One point should be carefully watched—the gang condensers.

Often weakness in reception, noticed some time after the set has been installed, can be traced to mis-ganging of the tuning.

Small changes in the aerial's electrical characteristics may easily upset the load conditions of the aerial-tuning circuit and this will entail slight re-trimming on a gang condenser.

Watch that Loud-speaker!

The loud-speaker, when it is an external one, can often cause loss of efficiency. The magnetism may be weakened, so causing loss of volume.

The connections between the set and the loud-speaker should be inspected from time to time, as the constant friction between the leads and the terminals to which they are connected often leads to faulty or indifferent contact.

Next Week:

AERIAL AND EARTH EXPERIMENTS YOU CAN TRY.

WHAT MAKES A SET A "RANGER"?

Two articles specially written for beginners which will be included in next week's Wireless-Made-Easy Supplement.

ELEMENTARY WIRELESS COURSE FOR BEGINNERS

What is this talk about quality?

At the transmitting studio we have air vibrations—sound waves—picked up by the microphone and transformed into electric currents. These in their turn generate wireless waves, which are picked up by the receiver, where the speech currents “dismount” and hurry along to the loud-speaker, where they finally set up air vibrations.

These currents have had a long journey, and they may, and often do, arrive rather the worse for wear! If this is so, the sound waves produced by the loud-speaker are not quite the same as the original sound waves in the studio. We say that the reproduction is unnatural or that the *quality* is poor or distorted.

I don't quite see why there should be any distortion.

Probably not, because so far we have neglected this aspect of the question altogether. In actual practice distortion creeps in at every stage of the journey, from the microphone to the loud-speaker, and the subject is a most important one.

There are two ways in which the quality may be spoilt. The first is by losing, on the journey, some of the vibrations which were present in the original sound waves. The second is the exact opposite, that is, the introduction of extra vibrations which were not present in the original.

For the present we will confine our attention to the first effect only, and one of the chief offenders in this direction is the loud-speaker itself.

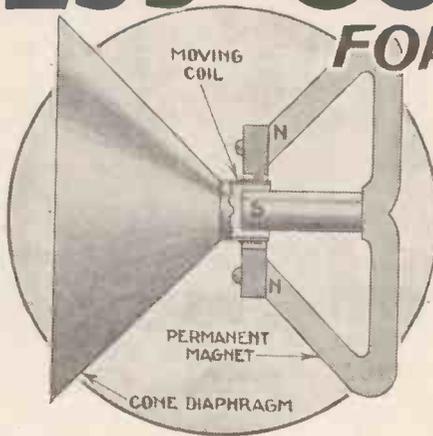
Take the horn-type of speaker, for example. As I told you last week this will not reproduce the bass frequencies satisfactorily (unless it is made very large) so that our reproduction is lacking at once.

What do you mean by bass?

The low-frequency vibrations in music that is, the deep tones, are called the bass, while the high notes (upper frequencies) are called *treble*.

Then what happens if you leave out the bass?

The quality sounds thin or high-pitched. Suppose you consider a man who has a deep resonant voice. His speech will be made up of a mixture of various frequencies, but there will be a large proportion of vibrations in the region of 100 to 200 cycles per second. If we reproduce this through a loud-speaker which does not amplify or radiate the *bass* frequencies properly, then all we shall hear is the middle and upper frequencies.



Surely if you leave some of the vibrations out the speech will not be intelligible?

That depends on how much you leave out. Unless you leave out a really large proportion, the speech will be reasonably intelligible, although it will

WHAT LOUD-SPEAKER QUALITY REALLY MEANS

This week J. H. Reyner and the "A.W." Staff explain in simple language just what quality of reproduction means. Many unsuspected sources of signal distortion occur in the average wireless set, as you will appreciate after reading this article.

not have the rich quality of the original speaker's voice.

It will, in fact, sound as if somebody quite different was speaking to us, so that although we have been able to understand we cannot claim to have reproduced the voice faithfully.

Is only bass affected?

By no means! There is an equal tendency to lose the upper frequencies if we do not take care. A serious loss of these frequencies above about 2,000 vibrations per second affects the intelligibility of the speech even more than a loss of bass.

For one thing, the “s” sounds are lost, and all the “p” and “t” sounds become mixed up. Consequently the speech is very difficult to understand, particularly if it is in a foreign tongue. So, you see, we want both bass and treble to be faithfully reproduced if the result is to sound natural.

What about music?

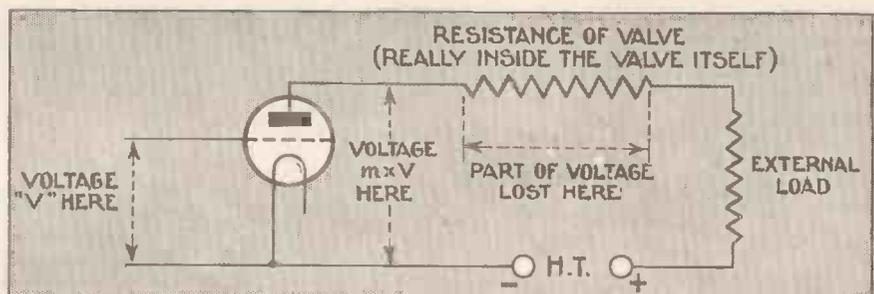
The problem here is even more difficult. The vibrations from a double bass or an organ go down to well below 50 vibrations a second, while it is necessary in order to obtain the distinctive quality of violins or woodwind instruments, such as clarinets and oboes, to reproduce frequencies of 5,000 vibrations per second and even more. This is really a very wide frequency range, and it is only within the last few years that we have been able to reproduce all the frequencies satisfactorily.

Is that due to improvements in loud-speakers?

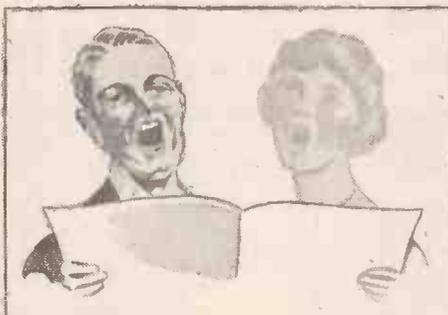
Partly, but the loud-speaker is not the only source of distortion. Another considerable source of loss is to be found in the unequal amplification of a valve at different frequencies.

Why should the frequency affect the amplification?

To answer that question we must discuss the process of amplification more closely. Suppose we consider a simple valve circuit. We apply our voltage across the grid and filament, and in the anode circuit of the valve we have either a resistance or a transformer or some device of this nature, across which we develop magnified voltages because of the amplification factor of the valve. Now let us work out just how much magnification we get.



This simple theoretical diagram may help you to understand the action of a valve when it is actually working in the set. Note that the voltage is applied across the grid and filament and appears in an amplified form across the anode and filament



We show above the effect produced when treble and bass notes are lost in the broadcasting process. On the left you see how the man, shown faintly indicates loss of bass notes. At the centre you see how the woman, shown faintly, indicates loss of treble notes. On the right you see how, when both man and woman are in full outline, a "balanced" reproduction is obtained

Is it not equal to the amplification factor of the valve?

No, because we are unable to use all the voltage developed. There is a very simple way of looking at a valve. If we have a certain voltage applied across the grid and filament, then inside the valve itself we have *m* times this voltage, *m* being the amplification factor of the valve.

For example, if we apply 1 volt across the grid to filament of a valve having an amplification factor of 15, then in the anode circuit we have 15 volts developed.

That is what I meant.

Not so fast! This voltage is used up in driving current round the whole anode circuit which includes the valve itself. Now the valve, as you know, behaves like a resistance, so that we have really an oscillating voltage forcing current first through the valve resistance and then through the external resistance, or impedance, whatever it may be.

What do you mean by impedance?

It is a term we use to refer to circuits containing inductance or capacity as well as resistance. If you try and force a current through a resistance, it resists the movement of the electrons. Hence the name.

As you know, a coil also opposes the movement of electrons and so does a condenser. Consequently a circuit containing a coil or a condenser impedes the flow of current, and we therefore call it an impedance to distinguish it from a simple resistance.

For the sake of simplicity, let us consider a resistance in the anode circuit. You will see that the total voltage we develop is split across the valve resistance and the external resistance, so that we are only able to use a portion.

Some voltage is lost in the valve?

Yes. The voltage we use is directly proportional to the ratio of the external resistance to the total resistance.

For example, if the valve resistance and the external resistance are equal, then the external or load resistance is half the total resistance, and we develop half the theoretical voltage. Thus if we have 15 volts developed in the anode

circuit, we only obtain 7½ volts across our load resistance ready to pass on to the next valve.

That seems rather a lot to lose.

It is a little more than necessary, but we rarely get more than 70 or 80 per cent. out of the valve under average conditions, and quite often we obtain considerably less. We can of course increase the effective amplification slightly by increasing the value of the load resistance, but this can only be carried out up to a point, because resistance in the anode circuit has the effect of reducing the high-tension voltage applied to the valve.

Why should it do that?

Because the steady anode current which is flowing through the valve has also to flow through the resistance, and in doing so produces a voltage drop. Suppose for example that the valve passes a current of 2 milliamps and that the resistance in the anode circuit is 30,000 ohms, then we shall obtain a voltage drop of

$$30,000 \times 2/1000 = 60 \text{ volts.}$$

(We divide the 2 milliamps by 1,000, you remember, to convert it to amperes.)

If the high-tension voltage originally was 120 volts we have thus only 60 volts actually on the valve, and this is one of the limitations of the resistance coupling method.

What alternative is there to resistance coupling?

We can use either choke or transformer coupling. Suppose we consider choke coupling first. In place of the resistance we have an inductance. The resistance of an inductance coil will only be quite small, perhaps a few hundred ohms, so that practically the whole of the high-tension voltage is applied to the valve itself.

But surely that won't give any amplification?

You mean because there is only 200 ohms resistance in the anode circuit as compared with several thousand in the valve. I agree it looks like it at first sight, but you must remember that when we are amplifying we are dealing with oscillating currents, and although the resistance of the choke is quite

small its impedance to an oscillating current may be quite large.

I am afraid I do not quite follow that.

It is a point of view which we have not stressed before, but it is really quite simple. If you apply a varying voltage across an inductance coil, the current which flows will also be varying, and this will cause rapid variations of the magnetic field.

As you know, a magnetic field objects to being pushed about, and it will do its best to check the current.

You remember we discussed this point when we considered H.F. chokes. We saw there that if the oscillations were of really high frequency, the choke acted as an almost complete barrier because the back e.m.f. developed in opposition to the applied voltage was so large.

That is what you mean by the impedance of the choke?

Yes. You see, therefore, that a choke may only have a small resistance, but it can have quite a large impedance to the oscillating current which the valve is amplifying.

In fact, we can quite easily arrange that its impedance is several times as large as the internal resistance of the valve, so that practically the whole of the voltage developed in the valve circuit is applied across the external load.

We can obtain the full amplification factor?

A very large percentage of it, something between 90 and 95 per cent.

Surely that makes the system much better?

We certainly obtain more amplification, and we can go one step farther. We often do not use the voltage developed across the choke as it stands, but place another coil of wire on the same former and use the voltage developed across this secondary coil. This gives us the conventional L.F. transformer which we have already considered briefly, and by this means we can obtain a total amplification three or four times as great as that of the valve itself.

(Continued on page six)

“In Series” and “In Parallel”

These two expressions are constantly cropping up in the conversation of wireless enthusiasts. The article below helps to show the beginner the essential difference between two components in series and in parallel, the examples being condensers and resistances

TWO of the most commonly used expressions in wireless are “in series” and “in parallel.” Do you know the difference between the two?

There is all the difference in the world in a wireless sense, as we hope to show in this short article.

Let us take two simple condensers as an example of connection in series and in parallel. We might as well choose two condensers of the fixed capacity type, such as are commonly used in many parts of the average wireless set.

One of these condensers, for the sake of argument, has a capacity of .001 microfarad. The other has a capacity of .002 microfarad.

Connected “In Parallel”

Now let us connect these two condensers in what is called parallel.

This means that, assuming one terminal of each is called A and the two remaining terminals are called B, the two As are joined together and the two Bs are similarly connected.

A, then, forms one end of the parallel arrangement and B forms the other end. The diagram makes all this perfectly clear.

The point of interest now is the capacity of the parallel arrangement of the two condensers. Is it now more or less than the capacity of the separate condensers?

Always it is more when two condensers are connected in parallel. In fact, the total capacity of the parallel arrangement is the sum of the individual capacities.

In this particular arrangement the total capacity is therefore .001 plus .002 microfarad, which is, of course, .003 microfarad.

Increasing the Capacity

Connecting condensers in parallel therefore enables us to increase the total capacity. It does not matter how many such condensers we may connect—the total of the capacity is the sum of the separate capacities.

Now look at the arrangement of these same condensers connected in series.

This means that, with ends A and B as before, B of one is connected to A of the next, leaving an A and a B for the connections of the series arrangement.

Is the total capacity now more or less than the capacity of either of the condensers?

Always, when condensers are connected in series, the total capacity of the series arrangement is less than the capacity of the smallest individual capacity.

Before Working It Out!

So, before you even trouble to work the capacity out, you know that the total capacity of the two condensers shown connected in series is less than .001 microfarad, less, that is to say, than the capacity of the smaller of the two condensers.

So in our example we get that C, the total capacity, equals .001 multiplied by .002, which is .000002, divided by .001 plus .002, which is .003, making the answer .000002 divided by .003, which is .002 divided by 3, which is approximately .0007 microfarad.

You will see that this final total capacity is less than the capacity of the smaller of the two capacities—smaller than .001 microfarad.

You very seldom come across

When resistances are connected in series the total resistance is the sum of the separate resistances.

As in our diagram you will see that the total resistance of the 100,000-ohm resistance and the 50,000-ohm resistance is 150,000 ohms, which is all very simple, isn't it?

When Resistance Is Lowered

Now what happens when resistances are connected in parallel? Just the opposite of condensers in parallel; in fact, just the same as condensers in series. That is, the total resistance of resistances in parallel is less than the resistance of the smallest of the resistances.

In a way, this is easy to see. Take the point of view of a current arriving at the point A of the parallel-resistance arrangement. This current has two paths to go through instead of one. In fact the current divides, some going through one and some through the other.

Obviously, it is less difficult for this total current to go through two paths than through one. However high the resistance of one may be the total resistance effect must be lower when there are two resistances offering a “through-way” for the current.

Finding the Total Resistance

The formula for just two resistances in parallel is as for two condensers in series.

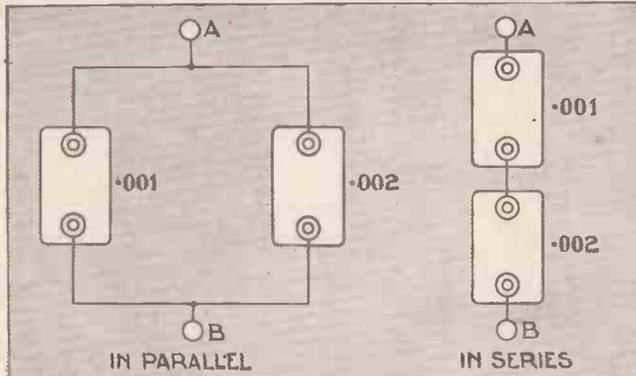
That is, the total resistance R equals 100,000 multiplied by 50,000, which is 5,000,000,000 divided by 100,000 plus 50,000, which is 150,000, making the answer 5,000,000,000 divided by 150, which is approximately 33,333,333 ohms.

Elementary WIRELESS COURSE
Continued from page five.

I suppose a transformer is always used?

It is very popular, but it is not employed universally because it has one serious defect. The impedance of a choke or a primary coil of a transformer is not always the same. It varies according to the frequency of the currents being amplified, and this causes the amplification of the valve to vary, as I mentioned at the beginning of the article.

However, I think we must leave the discussion of this transformer till next week.



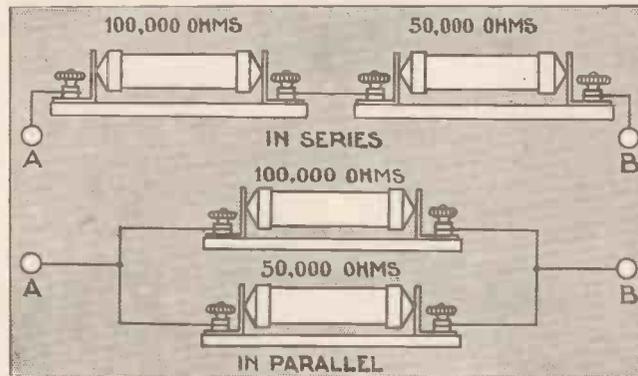
On the left you see two condensers connected in parallel. As later explained, this means that the total capacity across AB is the sum of the two capacities. On the right you see these same condensers connected in series. Here the capacity across AB is less than the capacity across either of the two condensers

How, then, do we find just what is the capacity of this series arrangement? It is not so simple as for the parallel idea although for just two condensers there is a fairly easy sum that even the beginner can work out.

Here it is: The total capacity

more than two condensers connected in series, so for the present we will not bother with the more complicated formula.

Consider now the question of resistances in series and parallel. Referring to the lower diagram, you will see that connecting



Resistances are often connected either in series or in parallel. At the top of this diagram you see two resistances in series, which means that the total resistance across AB is the sum of the two resistances. At the bottom of the diagram you see the same two resistances in parallel, which means that the total resistance across AB is less than the resistance of either of the two resistances

of two condensers in series is found by first multiplying the two capacities together, and then dividing this by the sum of the two capacities.

resistances in series means the same physical relation between the two units as for condensers but it is important to understand the electrical result is opposite.

Using Your Batteries Correctly

Choosing the "H.T.B."

A HIGH-TENSION battery composed of standard-sized dry cells is only suitable for sets in which the total anode current taken by the valves does not exceed about 6 milliamperes. For bigger currents—say up to 15 milliamps.—a battery composed of double-capacity cells should be used. If the total anode current consumed is even greater than this, a treble-capacity type of battery is needed.

Beginners should remember that the current-delivering capacity of the battery depends on the size of the individual cells, while the total voltage depends on the number of these cells connected in series.

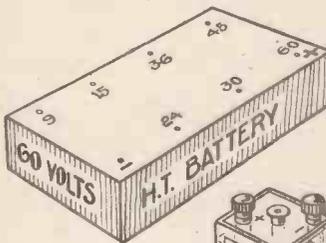
Thus a 60-volt dry battery of the big capacity or "super-power" type (as it is sometimes called) is of much bigger dimensions than a 60-volt battery of the standard-capacity type; the number of cells is the same, but their size and current capacity are greater.

A double-capacity battery costs more than a standard-capacity one at the outset, of course, but it is far more economical in the long run, if the set takes a fairly big current.

A standard-capacity battery will deliver currents greatly in excess of 10 milliamps., but when the cells are subjected to this heavy strain their useful life is shortened so disproportionately that constant replacements are necessary.

Date Your Batteries!

Some listeners make a point of marking on the labels of new H.T. and G.B. batteries the date that they were put into use. The idea is a good one, as it helps you to judge whether you are getting a proper span of useful life from your H.T.



Here are the three batteries needed for operating a wireless set. (Top) A high-tension battery consisting of dry cells in series. (Left) A smaller edition of the high-tension is the grid-bias battery. (Right) The low-tension accumulator, a two-volt cell for heating the valve filaments

batteries, and serves as a reminder to replace G.B. batteries periodically.

Checking Accumulator Discharge

If you are in any doubt as to whether your accumulator is being charged properly, it is a good plan to check up the discharge occasionally by keeping a record of the number of hours the accumulator will work the set on one charge.

You can then compare the result with the theoretical number of hours' working that the cells should give when correctly charged. This number can easily be worked out by adding up the filament current in amperes consumed by each valve in the set, and dividing the total into the ampere-hour capacity of the accumulator.

Readings with a high-resistance voltmeter when the cells or battery are disconnected from the set, or the latter is switched off, are likely to give a very misleading indication of voltage.

An exception to this rule may occur, however, in the case of a cheap voltmeter (having a comparatively low resistance) when used for testing H.T. batteries. If the resistance of a meter is low, it takes a heavy current from the battery, and this may be equal to or greater than the load imposed on the battery when the set is actually working.

A reading "off load" may conceivably, in these circumstances, give a truer indication of the actual state of the battery under working conditions than a reading "on load," because the heavy current taken by the meter, plus that taken by the

its correct strength by adding a small quantity of acid. Careful testing with a hydrometer is necessary to ensure that the electrolyte is brought up to the correct specific gravity.

A Safeguard Against Acid

As there are often traces of acid on the exterior of an accumulator when it is returned from the charging station, the cell or battery should never be placed directly on a polished table or other delicate surface. A simple safeguard is to stand the accumulator on a thick sheet of glass, or on a glass-topped or rubber tray.

In view of the destructive nature of accumulator acid, it is a good plan to keep a little ammonia or soda handy to neutralise any of the electrolyte that may be accidentally spilt when handling accumulators.

Testing for H.T. Leakage

Very few listeners nowadays trouble to pull out the high-tension wander-plugs after switching off a set; and theoretically, of course, there is not the slightest need to do so, because switching off the L.T. current stops the electron emission from the valve filament and consequently interrupts the flow of anode current also.

Provided that there is no accidental leakage, therefore, it is quite unnecessary to disconnect any of the H.T. leads when "closing down" the set for the night.

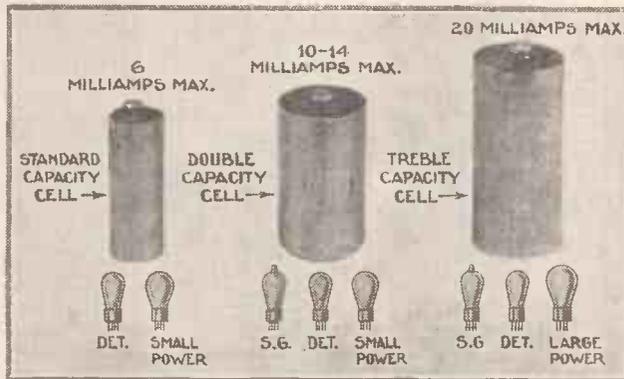
On the other hand, if there is any serious leakage (due to faulty by-pass condensers, etc.) the current drain from the H.T. battery when the set is not in use may be quite appreciable.

To ascertain whether any such leakage is occurring it is necessary to connect a sensitive low-reading milliammeter in each of the H.T. positive leads in turn when the set is switched off. If the meter needle indicates any perceptible flow of current, steps must be taken to trace the fault.

A "G.B." Warning

Most listeners know that the grid-bias plugs should on no account be removed from the battery sockets while the set is in operation; it should always be switched off first, as the great increase in anode current (especially in the case of a large power valve) consequent on disconnecting the grid-bias is highly detrimental to the high-tension battery, and also to the valve itself.

However carefully one remembers this rule in regard to the actual G.B. plugs, it is easy, in forgetful moments, to overlook the fact that any disconnection (Continued on page Eight)



There are three different sizes of high-tension battery for use with wireless sets. This diagram is reproduced to remind beginners that a set taking much more than six milliampères of anode current cannot be run from the small standard-capacity battery

Keep Terminals Clean

Accumulator terminals should be kept clean and free from corrosion. If sulphate forms, it must be scraped off, the terminals wiped with a rag dipped in ammonia, and then the metal surfaces smeared with a trace of vaseline. Do not overdo the vaseline, however, or it may prevent proper metal-to-metal contact being obtained.

Lead-coated spade tags are useful for L.T. leads, as they resist the corroding effect of creeping acid. Crackling or loud "sizzling" noises in reception are often traceable to poor contact between the L.T. leads and accumulator terminals, usually due to corrosion; hence the importance of keeping the connections "clean."

Load Voltage Readings

As a general rule the voltage of accumulators and batteries should always be measured when the cells are "on load"—that is, connected up to the set and actually delivering current to the valves.

set, would be likely to place such a strain on the battery that its voltage might drop temporarily to a rather misleading extent.

"Topping-up"

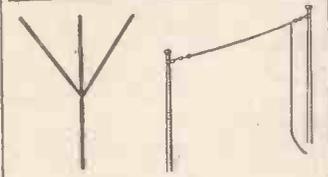
If you charge your own accumulators at home, remember to top-up the acid solution when evaporation has caused it to fall below the correct level. Tap water should never be used for this purpose; only distilled water is suitable.

Even if you do not do your own charging, you may find it necessary to top-up the cells occasionally if that has been inadvertently overlooked at the charging station, or if the accumulator has been standing for a long time in a hot room.

To make up for the loss due to ordinary evaporation, only distilled water should be added; new acid is not required. But if the gassing of the cells causes a slight leakage or spray of acid solution through the vent-hole, a small amount of acid is lost in course of time.

In that case it may be necessary to restore the solution to

Hints and Tips



AERIAL

The symbol for an aerial is shown on the left, and a typical single-wire aerial is pictured on the right

PROTECT THE LEADS

THE small wires which are fitted beneath the base of many speakers to make contact with the coil windings or with the input transformer may fray against the metal edges of the chassis. Protect them by slipping short lengths of insulated tubing (as used for set wiring) over the wires.

TUNING IN

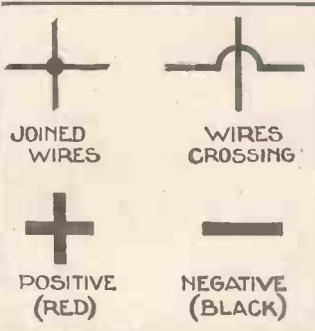
NOTHING very difficult about that. It means what it says. By adjusting a knob on the set you alter the tuning. When this action results in the reproduction of a station you have tuned it in. On the other hand when you lose a station you have tuned it out!

LIGHTLY-DAMPED AERIAL

DOES not refer to an aerial that has kept out of most of the rain! Damping has electrical meaning. Like a high resistance in series with the aerial or a low resistance across it. Both cause a draining of energy—damping. An efficient aerial with little damping is "lightly damped."

RISK OF BREAKAGE

PARTICULAR care should be exercised in making connections to the terminals of high-frequency chokes, wire-wound potentiometers and volume controls, and other similar components which contain a winding of fine wire. Some manufacturers join the ends of this fine wire direct to the terminals and one may easily break the wire in tightening up the terminal head, unless great care is taken. Even when the ends of the windings are con-



nected to soldering tags on the stems of the terminals, breakage may occur through the tag rotating a little as the terminal-head is tightened up. It is advisable, therefore, prior to mounting such components in the set, to tighten up the terminal nuts or screws very carefully, so that they will not tend to rotate and break the fine wire when the terminal-heads are subsequently screwed home in wiring the set.

H.F. BIAS

IN the ordinary link band-pass circuit there is a large fixed condenser of (as a rule) .05 microfarad on the earth side of the circuit, and this is shunted by a fixed resistance.

One end of this resistance is usually connected to L.T. negative to complete the grid return circuit, but if you want to put extra negative bias on the S.G. valve, you will find it very easy by making a simple alteration to this part of the wiring. Instead of connecting the end of this resistance to low-tension negative, take it to the negative terminal of the bias battery. The positive terminal of the battery is of course connected to L.T. negative. This will not upset the band-pass action.

EASIER TUNING

IN a straight set you can always simplify the tuning without actually ganging the circuits together. If the knobs of the various tuning circuits are made concentric, by using one of the special dials, such as the

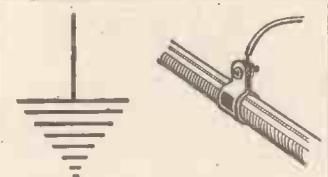
Lissen tuning control dial, very rapid adjustment is possible. If you have an aerial and H.F. circuit, for instance, a concentric dial can be used so that there is no need to have trimming condensers, for any correction can be made, by individual adjustment of the two knobs.

LOCAL-DISTANCE SWITCH

FOR big sets it is worth while having two values of series aerial condenser "on tap." In this way the set can be rapidly adjusted for local or distant reception, the selectivity varying accordingly. The best plan is to have two values of series aerial condenser connected together and to the aerial terminal of the set. The outer terminals are then connected to the two poles of a double-pole low-loss switch, the moving contact of which is connected to the aerial. In this way, at the touch of a switch, the series aerial capacity, and therefore the selectivity, can be regulated.

SHORT-WAVE REACTION

IN a short-wave set, the value of the detector voltage is generally very critical. In fact, if you have a variable voltage control for this tapping on a mains unit (or if a potentiometer is used for the detector tapping on an H.T. battery), delicate control of reaction can be effected. This is a reaction control which is absolutely devoid of hand capacity, and if you are troubled with threshold howl in a short-waver you will



EARTH

The earth connection is shown in symbol form on the left and as a water-pipe contact on the right

find it worth while making delicate alteration of the detector voltage.

LABELLING LEADS

HAVE you ever wanted a set of battery-cord labels in a hurry? Here is a speedy way of labelling. Obtain a few blank labels from the chemist, cut into strips about 3/4 in. long and 1/4 in. wide. Stick these on the flex and print the appropriate letters on with ink. Now give them a coat of cellulose varnish and you have a set of labels nearly as good as the real thing.

PUTTING ON PLUGS

HOW do you put your plugs on? The correct method is as follows. Undo the coloured top and loosen the locking ring. Now bare the ends of a piece of flex and slip the top over it. Bend the flex at right angles for about 1/4 in. and slip into the barrel of the plug and through the hole provided at the side. Now screw down the locking ring with a pair of pliers and cut off the ends of the flex. The braiding should be pulled down over the outside of the plug and the top screwed down. Plugs put on like this will last a long time without fraying.

DRILLING TERMINAL BLOCKS

IF you drill your own terminal blocks, make sure that you do not get the screw holes too near to the lower edge. They should be arranged so that the screws come more or less in the centre of the plywood when the terminal block is screwed to the baseboard. If the holes are too low or too high they will perhaps cause the plywood to be split when the screws are inserted.

USING YOUR BATTERIES CORRECTLY

(Continued from page seven)

in the grid circuit of a valve is liable to have the same effect as pulling one of the bias plugs out.

For example, when the grid of a power valve is connected to the slider of a potentiometer volume control connected across the transformer secondary, the grid-bias is applied to the valve by way of the potentiometer resistance and the slider.

If, therefore, the slider fails to make proper contact with the resistance, due to a fault in the volume control, the grid-bias may be interrupted, causing an excessive flow of H.T. current in the anode circuit.

Dont's for Battery Users

Don't allow an accumulator to stand for long periods in a discharged condition.

Don't short-circuit a battery with a piece of wire in order to

judge, by the spark, how much "juice" is left in the battery!

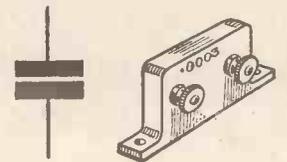
Don't forget that an accumulator, in spite of its somewhat misleadingly robust appearance, is really a delicate appliance in some respects, and should be treated carefully.

Mind the Damp!

Don't leave H.T. dry batteries in a position where they are exposed to heat or damp; if possible, arrange them so that air can circulate freely around their outer cases.

Don't connect a new H.T. battery in series with an old one that is causing crackling noises and has a high internal resistance.

Don't expect a small-capacity high tension battery to work a set that takes more than six milliamperes of anode current.



FIXED CONDENSER

Here on the left you see the symbol for a fixed condenser. A typical fixed condenser is shown on the right