Amateur Wireless. November 12, 1932

FREE ART SUPPLEMENT—STEP-BY-STEP GUIDE

EVERYBODY'S BUILDING THE NEW CENTURY SUPER

IDEAL ISSUE for BEGINNER AND ENTHUSIAST

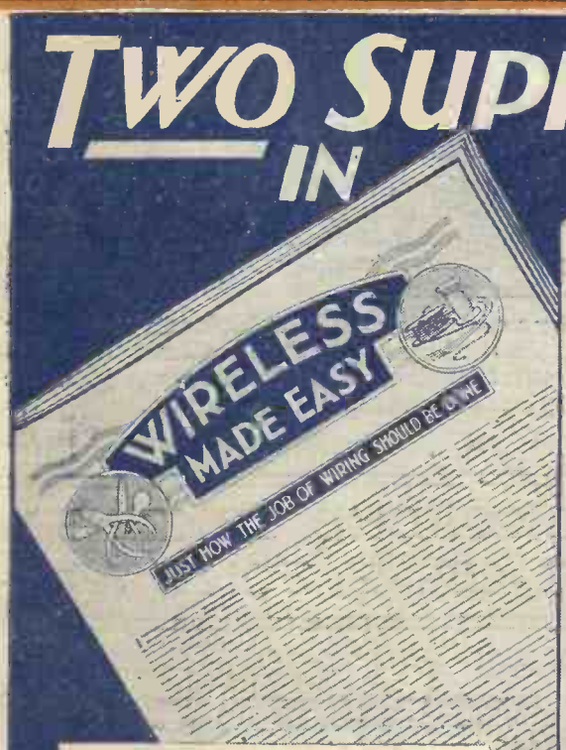
Amateur Wireless

and Radiovision

Every Wednesday 3d

Vol. XXI. No. 544 Saturday, November 12, 1932

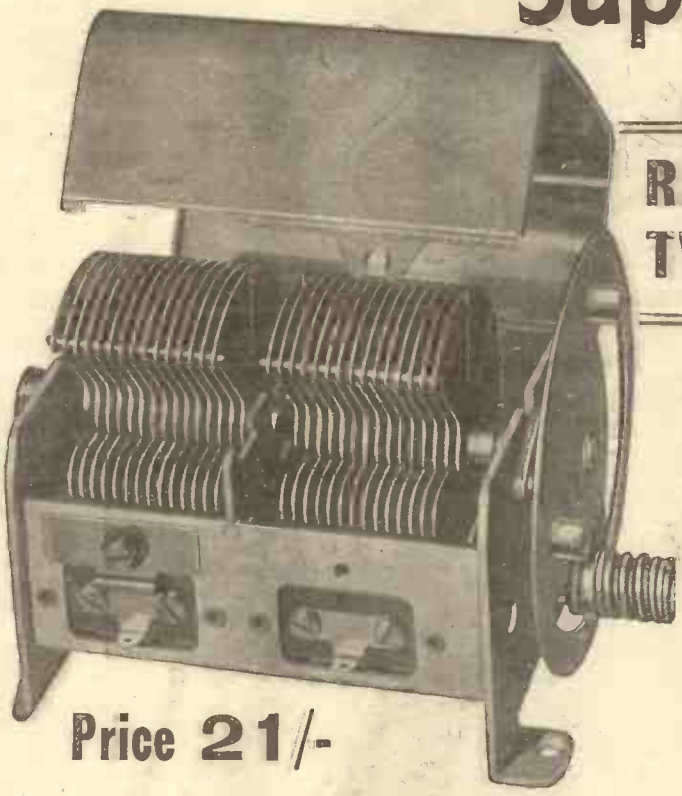
TWO SUPPLEMENTS IN THIS ISSUE!



"Amateur Wireless" Every Wednesday

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

SPECIFIED for the "NEW CENTURY" Super Radio-Gram



Price 21/-

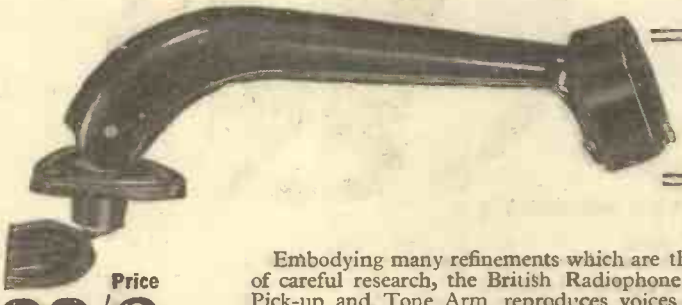
RADIOPHONE UNI CONTROL TWO GANG CONDENSER (Type 458)

Once again a British Radiophone Condenser has been selected for a new Radiogram.

The British Radiophone Uni-Control Two-gang Condenser is designed so that the variable air dielectric trimming condenser belonging to the section nearer the dial can be adjusted from the front of the receiver.

The rotating spindle of this trimmer is brought through the main spindle and its adjusting knob is mounted concentrically with the main operating knob. This permits very accurate trimming and enables maximum signal strength to be obtained with the minimum of trouble.

The other section has a mica dielectric trimmer which can be pre-set in the usual manner, and the condenser is supplied complete with Escutcheon Plate, Disc Drive and Cover, the scale being marked in wavelengths and degrees.



RADIOPHONE COMBINED PICK-UP & TONE ARM

Price 22/6
Pick-up Rest 1/6

Embodying many refinements which are the outcome of careful research, the British Radiophone Combined Pick-up and Tone Arm reproduces voices and music with utmost fidelity.

This component is cased in moulded bakelite finished in black or brown, and objectionable resonances are eliminated owing to its robust construction and careful design.

The output shows an ample degree of sensitivity, is crisp and free from coloration and needle scratch.

Because the head is fixed at the correct angle, record wear is minimised, and light damping and good tracking is ensured. Full fitting instructions included.

RADIOPHONE

THE BRITISH RADIOPHONE, LTD., ALDWYCH HOUSE, ALDWYCH, W.C.2

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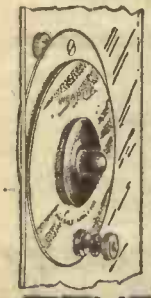
The Famous WEARITE OT2 INTERMEDIATES specified for the NEW CENTURY SUPER

The very heart of a super-het. is in its intermediates—upon them the set's efficiency depends—and the designers have specified Wearite.

Prompted by the experience of past triumphs, including the original "Century Super"—with a knowledge of the careful and exclusive tests which every OT2 undergoes before release—the designers pinned their faith in the perfect functioning of their set to these coils. To ensure results as the authors intended you *must* use the Wearite OT2's.

Before you start building write for a copy of the new Wearite Booklet No. A.1.



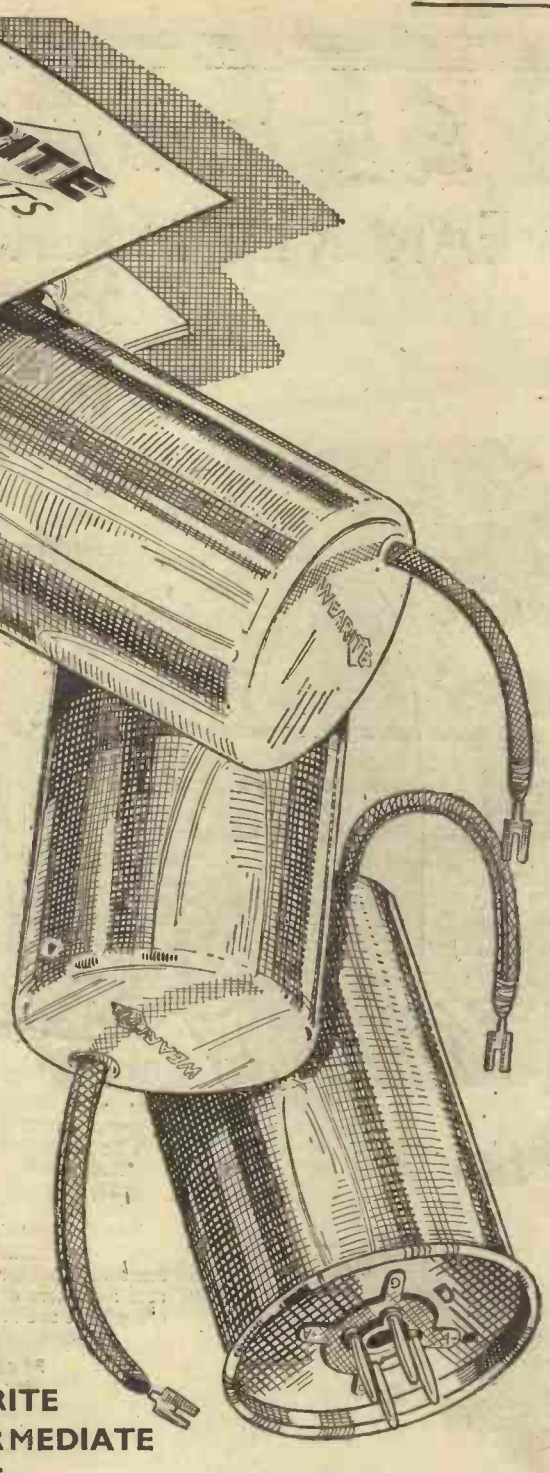
THE WEARITE STICK-ON SELECTIVITY CONTROL AND AERIAL LEAD-IN fits any window—no holes—no tools. For use with any receiver.

PRICE 1/- COMPLETE With aerial anchoring block 1/6

OTHER WEARITE PARTS FOR THE "NEW CENTURY SUPER."

One 50,000-ohm Potentiometer (Q.V.C.) combined with switch (G.40). Price complete, 6/6
Eight Four-pin and One Five-pin Valve Holders (S.1). Price ... ... 1/- each
One Super-het. Choke (H.F.S.). Price 4/6
One 20,000-ohm Resistance (2 watt) (R.D.). Price 2/-
One 50,000-ohm Resistance (4 watt) (R.D.). Price 2/9

AND A GOOD EARTH TUBE, USE THE WEARITE "NO TOOL" EARTH TUBE PRICE 3/6



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PRICE 10/6 each

WEARITE COMPONENTS

COUPON

Please send me a copy of your latest illustrated Booklet (A.1) dealing with the full range of your components.

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Address.....

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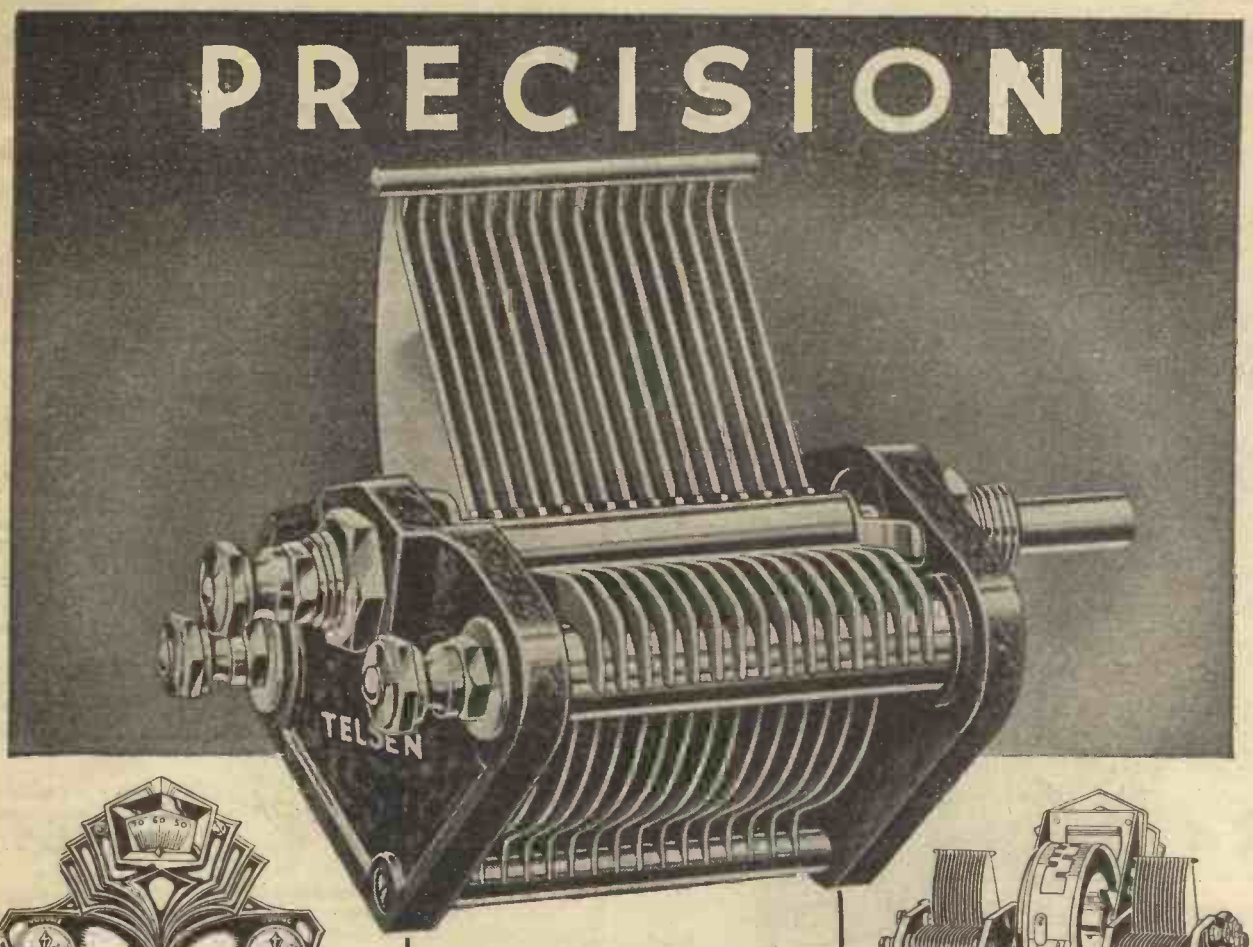
Messrs. Wright & Weaire, Ltd.,
740 High Road, Tottenham, N.17.
Telephone: Tottenham 3847/8 and 3015.

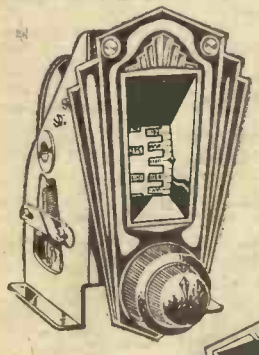
♡1639

PRECISION



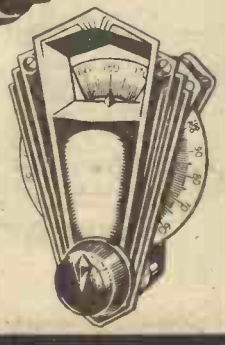
TELSEN TELORNOR

An illuminated Disc Drive embodied into an unusually handsome silver oxidised escutcheon plate, complete with artistically grouped Volume, Tuning, On-Off, and Push-Pull controls **7/6**



TELSEN DRUM DRIVE

Embodies numerous refinements, including cord drive and rocking stator trimmer. An extra scale, graduated for wavelength tuning, is supplied free of charge . **8/6**



TELSEN ILLUMINATED DISC DRIVE.

Fitted with handsome silver oxidised escutcheon plate and incorporating an improved movement, making for delightfully easy tuning . . . **3/6**

TELSEN LOGARITHMIC CONDENSER

The Telsen Logarithmic Variable Condenser is a component whose precision, allied to its sturdy construction, ensures years of faithful service. The sturdy frame is braced by three solid pillars, and the vanes clamped at three points, making distortion impossible. The rotor is also built into a rigid unit and the vanes held at both ends, generous bearings preventing backlash or endplay.

Cap. .00025	**4/6**
Cap. .00035	**4/6**
Cap. .0005	**4/6**
Cap. .0005 (left-hand movement with trimmer) ...	**5/-**
Cap. .0005 (right-hand movement with trimmer) ...	**5/-**

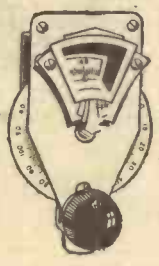
TELSEN
RADIO COMPONENTS

TELSEN DRUM DRIVE AND CONDENSER ASSEMBLY.

A complete drum drive and ganged condensers tuning unit, with a handsome escutcheon finished in oxidised silver. An extra scale (marked in wavelengths) is supplied free **17/6**

TELSEN SMALL FRICTION DISC DRIVE.

A low priced disc drive for auxiliary controls. It is extremely robust and may be used for main tuning condensers where considerations of space make it desirable . **2/6**



TELSEN SLOW MOTION DIAL.

(Black or Brown Bakelite)

Made with a gear ratio of 8-1, the disc being graduated from 0-100 in both directions. Supplied complete with instructions for mounting on all panels up to 3/16" thick . **2/-**

TELSEN RADIO COMPONENTS ARE 100% BRITISH

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

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

FOR EVERY SET — *there's a*

PILOT AUTHOR KIT

CASH — C.O.D — or H.P.

EVERYTHING RADIO

CASH, C.O.D. or H.P.

CARRIAGE PAID TO YOUR DOOR

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

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

Balance in 11 monthly payments of 8/3.

LISSEN "SKYSCRAPER 3" KIT with Lissen Valves, Walnut Cabinet and special Balanced Armature Loudspeaker. Cash Price £6/5/0. Carriage Paid. Balance in 11 monthly payments of 11/6. — Send 11/6 only

READY RADIO "METEOR" S.G.3. Three-valve screened-grid receiver, with valves, cabinet, and permanent-magnet moving-coil speaker. Covers short, medium, and long waves without coil changing. Cash Price £8/17/6. Balance in 11 monthly payments of 16/3. — Send 16/3 only

TELSEN "JUPITER" S.G.3. Complete kit, less valves and cabinet. Cash Price £3/17/0. Balance in 11 monthly payments of 7/-. — Send 7/- only

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

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

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

BLUE SPOT UNIT AND CHASSIS, Type 99 P.M. Including matched transformer. Cash Price £2/19/6. Balance in 11 monthly payments of 5/6. — Send 5/6 only

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

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

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

SONOCHORDE PERMANENT - MAGNET MOVING-COIL SPEAKER, with universal input transformer. Cash Price £1/12/6. Carriage Paid. Balance in 5 monthly payments of 6/-. — Send 6/- only

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

GARRARD JUNIOR "B" SPRING MOTOR. Complete with turntable. Cash Price £1/13/6. Carriage Paid. Balance in 5 monthly payments of 6/1. — Send 6/1 only

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

NEW CENTURY SUPER

As described in "Amateur Wireless" October 29, 1932.

These are the Parts the Author used

	£	s.	d.
1 J.B. Unitune 2 twin gang .0005 variable condenser		18	6
1 J.B. Nugang semi-screened single .0005 condenser		9	6
1 Bulgin 50,000-ohm potentiometer and switch, type VS36		5	6
3 Wearite intermediates, type OT2, with pigtails	1	11	6
1 Lissen ganged oscillator and band-pass coils with switch	1	10	0
8 Telsen four-pin and one five-pin rigid type valve holders		7	0
2 Dubilier 1-mfd. and one .02-mfd., type 9200, fixed condensers		7	6
3 Lissen fixed condensers, .0001, .0002, and .001 mfd.		1	6
1 Graham Farish 1-meg. and one 2-meg. grid leak		2	0
1 Telsen coupling unit, 10-1 ratio		12	6
1 Sovereign .0003-mfd. pre-set condenser		1	3
1 Slektun super-het high-frequency choke		5	0
2 Sovereign terminal blocks		1	0
4 Belling & Lee marked terminals			10
9 Clix marked wander plugs		1	1½
2 Belling & Lee marked spade terminals			4
1 Ready Radio fuse and holder			1 0
2 Graham Farish Ohmite 20,000-ohm and 50,000-ohm resistances		3	0
1 Peto Scott aluminium bracket			6
Connecting wire, screws, sleeving, etc.		1	6
KIT "A" CASH or C.O.D.	**£**	**7.0.0**	
Peto-Scott 16 in. by 8 in. oak-faced ply panel ready drilled	£	s.	d.
		2	0
Peto-Scott 16 in. by 10 in. foil-covered ply baseboard		2	6

KIT A DELIVERED * CARRIAGE PAID ON FIRST PAYMENT OF 12/9

Balance in 11 monthly payments of 12/9

IMPORTANT

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

KIT "A"

Complete kit of Author's first specified components as listed, excluding panel and foil-covered baseboard.

Cash or C.O.D. Carriage paid. **£7.0.0** *or 12 monthly payments of* 12/9

KIT "B."—As Kit "A," WITH oak-faced ready-drilled panel, foil-covered baseboard, and valves. Cash or C.O.D. (Carriage Paid), £11/5/6, or 12 monthly payments of 20/9.

KIT "C."—As Kit "A," WITH oak-faced ready-drilled panel, foil-covered baseboard, valves, and cabinet. Cash or C.O.D. (Carriage Paid), £12/0/6, or 12 monthly payments of 22/3.

STRUCTAKIT for the new CENTURY SUPER

Containing RED TRIANGLE, first quality, 16 in. by 8 in. ready drilled ebonite panel, PETO-SCOTT ⅜ in. foil-covered non-warping ply baseboard, necessary fixing screws, insulated connecting wire and twin flex for building PANEL ASSEMBLY of NEW CENTURY SUPER.

Cash or C.O.D. 7/6 Postage 6d. extra.

NEW CENTURY SUPER RADIOGRAM

Parts Specified by the Designers.	£	s.	d.
1 Cabaret Clockwork Motor, with Turntable	1	15	0
1 British Radiophone Pick-up	1	4	0
1 Bulgin Radio-gramophone Switch		2	6
1 Colvern 50,000-ohm Volume Control		5	6
1 Bulgin Dual Needle-Cup		2	6
1 Peto-Scott Adaptagram Cabinet	3	3	0
1 Peto-Scott Adaptagram Ready Drilled Baffle-board		3	6
1 Clix Wander-plug (G.B.—3)			2
Screened Connecting Wire, Screws, Flex, etc.			8
1 Rola Permanent-magnet Moving-Coil Speaker, type F5PMP	1	12	6

CASH or C.O.D.

Carriage Paid

£8.9.6

Or 12 monthly payments of **15/6**

SEE PAGE 1081 NEW CENTURY RADIOGRAM CABINET

STOP PRESS OFFERS

CELESTION P.P.M. MOVING-COIL SPEAKER, for standard or pentode output valve. Cash or C.O.D. £2/7/6. Carriage Paid. Balance in 11 monthly payments of 4/5. — Send 4/5 only

R & A "CHALLENGER" P.M. MOVING-COIL SPEAKER, Cash or C.O.D. £1/15/0. Carriage Paid. Balance in 5 monthly payments of 6/6. — Send 6/6 only

BAND-PASS H.F. UNIT

As described in this week's issue.

KIT "A" Author's Kit of Parts, including ready-drilled panel, but less valves and cabinet. Cash or C.O.D. Carriage Paid. **£3:0:0** Or 12 monthly payments of 5/6.

Any parts supplied separately. Orders over 10/- sent Post and C.O.D. Charges Paid

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THE NEWS RADIO & RECORDS

INCREASED VOGUE OF THE "TWO IN ONE" INSTRUMENT

Wireless and Gramophone Combined

Every day more homes are being won over to the radio-gramophone. Many have wanted wireless, and yet been reluctant to do without the same quality of reproduction for records. In the radio-gramophone they have both, it is the best thing of all for modern records, because it gives *electrical* reproduction of *electrical recording*.

Never before has it been possible to get the best out of your records. With this instrument a choice is offered of the world's finest broadcast programmes or a concert of one's own choosing. All at a price very little higher than that of an ordinary wireless set. One switch controls long and medium wave wireless, and the gramophone too.

Ready to play, records or radio

"TRUE TO LIFE" TONAL QUALITY

One of the most deservedly popular radio-gramophones to-day—one which has, in fact, created a vogue of its own—is the "His Master's Voice" Transportable Radiogram, priced at 25 guineas, or by Hire Purchase. It is a four-valve (including rectifier) wireless set, capable of giving a great variety of programmes, with a tonal quality absolutely 'true to life' on radio and records. To help in the attaining of such a high standard of performance, only the finest valves would do—hence the use of Marconi Valves.

First Records of New B.B.C. Symphony Orchestra

Adrian Boult (*Photo 'Sasha,' London*)

The issue of the first recordings of the new B.B.C. Symphony Orchestra conducted by Adrian Boult, is an event of outstanding interest to all music lovers. The recording too, is fully worthy of them—displaying in point of fact, a beauty of tone and a realism, which will prove to be something entirely new in the experience of gramophone enthusiasts.

Symphony No. 8 in F Major, Op. 93 (Beethoven) DB1764-6, 6/- each

Funeral March—(*Chopin, arr. Elgar.*) DB1722, 6/-. *The new B.B.C. Symphony Orchestra, conducted by Adrian Boult.*

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

Noel Coward Himself — in "Words and Music"

Only Noel Coward, playwright and composer, can deal so frequently and freely with sentiment without once becoming "sentimental"; and only Noel Coward, actor and singer, can "put over" his own delicious and piquant numbers with all their delicate shades of wistful sentiment and gentle irony. He has never done a more brilliant piece of satire than "Mad Dogs and Englishmen."

Let's say goodbye—Mad Dogs and Englishmen. Noel Coward B4269, 2/6

The Party's over now—Something to do with Spring. Noel Coward. B4270, 2/6

"Words and Music" Medley. Raie da Costa. B4268, 2/6

Noel Coward (*Photo Dorothy Wilding*)

"Words and Music" Selection. New Mayfair Orchestra C2463, 4/-

Mad about the boy — The Younger Generation. Ray Noble and His New Mayfair Orchestra B6238, 2/6

Famous Tenor delays homeward dash to U.S.A. to make these records

RICHARD CROOKS' FIRST ENGLISH RECORDING

Richard Crooks

On his way back from Switzerland to the United States, Richard Crooks, the New York Metropolitan Opera Star, was prevailed upon by "His Master's Voice" to rearrange his time-table especially in order to make his first recording in England. Had he not been able to fit in this visit, music lovers in England would have been deprived of some of the finest vocal records ever made. Even then, there was only time to make one master record of each, instead of the usual three.

Gipsy Moon—Just to linger in your arms. Richard Crooks DA1283, 4/-

Tell me to-night (Film "Tell me to-night")—Only my Song. Richard Crooks DA1284, 4/-

AMAZING BOY PRODIGY

Plays Elgar Concerto, conducted by the composer himself!

Yehudi Menuhin (*Photo Alban, Paris*)

Recently at the "His Master's Voice" great recording studios at St. John's Wood, there was witnessed a wonderful collaboration of youth and age. The occasion was the recording of the Elgar Violin Concerto, played by Yehudi Menuhin and conducted by the composer himself. This rendering is now released and undoubtedly offers yet another masterpiece for the collector of immortal music in recorded form.

Concerto in B Minor, Op. 61. Yehudi Menuhin and the London Symphony Orchestra, conducted by Sir Edward Elgar.

DB1751-6, 6/- each. *Album No. 164.*

(Prices do not apply in Irish Free State)

No. 544. Vol. XXI. NOVEMBER 12, 1932

Amateur Wireless & Radiovision

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

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

NEWS & GOSSIP OF THE WEEK

OUR SPECIAL SUPPLEMENT

EVERY issue of "A.W." now contains a special eight-page supplement for beginners, but this week we are breaking new ground and, we hope, making new friends, by presenting a special supplement, printed in photogravure, and of outstanding interest to home set builders.

THE DROITWICH AERIALS

THE high-capacity aerial needed to give good quality from the new super-power long-wave station to be built at Droitwich to replace the Daventry National station will be supported on three or four masts. From one of these masts will hang the two sections of the aerial destined for the new Midland Regional transmitter which, readers will recall, is to be built at Droitwich at the same time as the long-waver.

WEST NATIONAL'S WAVELENGTH

LISTENERS, particularly in the west of England, will be very surprised to hear that the B.B.C. has decided to synchronise the new West National station, now nearing completion at Washford Cross, with the London National station on 261 metres. Originally, it was intended to synchronise with Scottish National on 288.5 metres. It has since been decided that, as the relays, including Bournemouth, must remain on this wavelength, it would be impracticable to have West National on 288.5 metres, as this would greatly restrict the present station's service areas.

THE EMPIRE STATIONS

A B.B.C. engineer, recently returned from Daventry, describes the layout of the new Empire stations as being very similar to a regional centre such as Brookmans Park. That is to say, the two sets of units are arranged one on each side of the building, with the control table in between and the control panel at one end. Components of each transmitter are housed in four cubicles faced with polished black slate. There are no spare valves on view, as their presence would involve stray capacity and inductance effects that would be harmful on short waves.

CONTROLLING WAVELENGTHS

AN important part of the Empire station transmitter is the quartz crystal equipment controlling the master oscillator valve. There is, we hear, a crystal for each wavelength to be used.

The young idea! Kiddies at a Nunhead school are being made radio-minded and are encouraged to build telephone and radio apparatus; they are here seen taking down dictation on the 'phone.

IN THIS ISSUE.

FEATURES YOU SHOULD NOT MISS

- Our Special Home-constructors' Gravure Supplement.
- The Special Eight-page Beginner's Supplement.
- The "New Century Super" as a Radio-gramophone.
- How to Make Your Set More Efficient and Selective.

A BUMPER NUMBER AT THE USUAL PRICE!

HARD HITTING AT MADRID

WHETHER it is the atmosphere of the bull fights we cannot say, but there have undoubtedly been hard words—and blows—at the Madrid Conference. The B.B.C. representative, Mr. L. W. Hayes, is so far unscathed, and he reports that the squabbles now extend over the whole wavelength band from 200 to 2,000 metres. Mr Hayes has already been at Madrid for seven weeks but he is implored to stay another four. Meanwhile, there is plenty of "sob stuff" emanating from shipping interests, who maintain that the safety of passengers at sea should come before entertainment requirements. We think the ships ought to be made to scrap obsolete apparatus, anyway, and to make way for broadcasting as much as possible.

EFFECT OF THE EQUINOX

MANY complaints from the west of England have been lately received by the B.B.C. over loss of strength on Daventry National. A lot of static inter-

NEXT WEEK: ANOTHER BEGINNER'S SUPPLEMENT AND A LOW-COST THREE-VALVER

NEWS & GOSSIP OF THE WEEK—*Continued*

ference is also reported. This revives the old theory that the Autumn Equinox, the seasonal change in the weather, has a pronounced effect on radio waves, particularly on the long waves.

THE EMPIRE WAVELENGTHS

WAVELENGTHS for the various aerials used at the Empire station at Daventry have now been decided as follows: Australia, 25.6 metres; India, 17, 25 and 32; South Africa, 14 and 32; West Africa, 32 and 48; Canada, 19, 32 and 48.

AERIALS LIKE CURTAINS!

THE layout of the aerials for the Empire stations consists roughly of a radiating curtain with a reflecting curtain behind. The elements of each curtain are vertical copper wires, each being about half the wavelength to be transmitted. There are six omni-directional aerials, and these, naturally, have no reflecting curtains.

BOTH WAYS TO THE ANTIPODES

THERE is an interesting point about the radiation and reflection units fitted up for the Australian contact of the Empire service. The units have been made *reversible*, so that the signal beam can be sent either way round the earth. The idea is to maintain a reliable contact at all times.

THE NEW DRUMMER

LAST week we mentioned some impending changes in Henry Hall's dance band. By the time this is read these changes will have come into effect with a new drummer, a new saxophone player and a new trumpeter. The name of the new drummer is L. L Bermon. A novel method was adopted during the audition of the new drummer and the new vocalist. Both were tried out during actual broadcasts in the afternoon National dance-music period. This enabled Henry Hall—and no doubt many of his pet advisers—to hear what the newcomers sounded like at the loud-speaker end of the business.

PIRATES IN SCOTLAND

THE Post Office authorities are in the midst of a big drive in Glasgow to secure 100,000 licences. At the moment the total is around 93,000, with an increase during the past fortnight of no less than 3,000. Possibly the fact that detector vans have been operating in the area is not without significance in this respect! The staff on this work, it is announced, is being doubled immediately.

THE PRINCE AT BROADCASTING HOUSE

WHEN the B.B.C. broadcasts its music-hall vaudeville show on November 15, during birthday week, the Prince of Wales will be present in the "B.A." vaudeville studio at Broadcasting House. We understand that he will broadcast a short message to listeners. Sir Gerald du Maurier will also be present at this broadcast, and will be responsible for a short appeal on behalf of theatrical charities.

GALAXY OF STARS

FOR the broadcast vaudeville on November 15, at which the Prince of Wales will be present, the B.B.C. has engaged a remarkably strong caste. It includes Marion Harris, George Seversky, Jack and Claude Hulbert, Jeanne de Casalis, Gillie Potter, Clapham and Dwyer, Cicely Courtneidge, Bill and Elsa Newell, Leslie Hutchinson, Florence Desmond and Henry Hall and the B.B.C. Dance Orchestra.

A reader from Troon writes: "I received eighty stations on the set ('New Century Super') last night."

Another reader, from Maryport, says: "I have given the set a good test before writing you and it is all you claim it to be. Stations simply roll in, selectivity knife-edge, quality good, volume plenty."

AFTERNOON VARIETY

B.B.C. PROGRAMME officials are considering a proposal to have a short variety period of about a half-hour's duration for afternoon broadcasts. A start of this idea will be made on the Saturday of Christmas Eve, when a vaudeville programme will be broadcast from 2 to 2.30 p.m.

ANOTHER PLAY BY WHITAKER-WILSON

SO great has been the success of Whitaker-Wilson's chronicle play, *Sir Christopher Wren*, that the B.B.C. has now decided to produce his latest play, *Mozart*. Whitaker-Wilson describes this as "a drama of life, in which some real-life scenes are re-enacted, such as where Beethoven plays before Mozart." Joseph Haydn is one of the characters, which will be played by the author himself. The play will be produced by Val Gielgud the week before Christmas.

FIRST PROGRAMMES

A SPEECH will inaugurate the new Empire service on December 19. It is not yet known who will deliver this speech but there is the possibility that H.M. the King will do it. If the King prefers to wait until Christmas for his message to the Empire it is likely that the Director-General will open the stations. After the speech there will be light music, probably records, and a Blattnerphone recording of a Vernon Bartlett "Way of the World" talk. During the first few months the programme side of Empire broadcasting will not be representative of what the B.B.C. has in mind for the future. Just at first it will be mainly a question of getting things right technically, and then, when the medium is satisfactory, the programmes will develop.

Following the programme, "In Memoriam," on Armistice Day, November 11, compiled by E. A. Harding and Val Gielgud, the B.B.C. will transmit at the close of the programmes that evening Laurence Binyon's impressive "For the Fallen." Sir Edward Elgar, who composed the music, will conduct.

The police van fitted up with radio gear for communication with Scotland Yard was kept busy in London during the unemployed demonstrations, for the regulation of traffic and police. The transmitter is seen working here

How I Improved Range and Selectivity

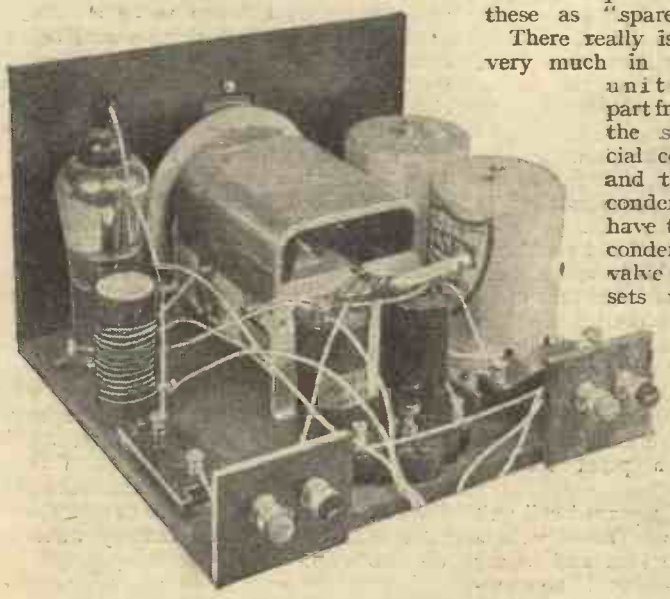
A reader describes a simple unit which he made up to add more "punch" to his set and improve selectivity. It is a band-pass tuned H.F. stage, and he describes it fully so that you can make up a similar unit

IT was during the summer that I first thought I'd try to get more "punch" out of my kit set, and I actually knocked up three boosters which I thought would do the trick. That was before I tried a circuit with band-pass tuning and so I wasted several months before I got something that was satisfactory.

A "Booster"

Now I have made up a booster which I want to describe for you, as it cured all the troubles I had with my own set and, from talking with friends, my kit set troubles appeared to be the same as most people's.

My kit set is quite a good one, although it is now about a year old. It has a screen-grid valve, but no modern ideas like band-passing. That was really why I thought I would make a unit to add in front of the set. Last winter I had a lot of fun with the kit set when it was first new, and stations used to roll in. Then the summer came, and it was difficult to get stations that I thought many times of scrapping the set and making up a new AMATEUR WIRELESS outfit. It was only that I didn't want to spend too much money on wireless that I decided instead to make up a unit to my own design. I'm so pleased with it that I shall now be able to keep my original set for another year at least.



This is the add-on unit which when coupled to an existing set converts it to band-pass tuning and acts as a station booster

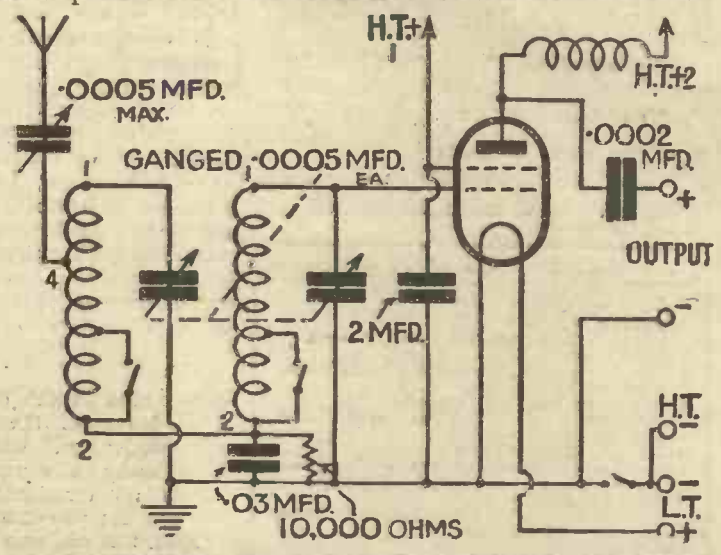
The Parts

I made up my unit chiefly from old parts I had on hand. As a matter of fact I had to buy a special band-pass coil and the two-ganged condenser. I dare say there are some keener experimenters than myself who will even have parts like these as "spares."

There really isn't very much in the unit apart from the special coils and the condenser. I expect most people have things like terminals, fixed condensers, H.F. chokes, and valve holders, taken out of old sets which have since been scrapped.

The first boosters I made up myself were, I now find after I have got good results with this unit, a bit too fantastic. I don't claim any credit for the circuit of my unit, and I don't even know that it is new. The real credit, I think, is due to the band-pass tuning. I followed the circuit given by the coil-makers for the band-pass business, and added on to the tuning circuit an ordinary screen-grid valve to add more punch to the set.

My first unit was made up with an old piece of a wooden box as the baseboard and with some ebonite from an old set for the front; but when I thought I'd photograph and describe it for other AMATEUR WIRELESS readers I remade it with a new panel and baseboard. That's why it looks tidy, even if not professional!



The "professional" version of the circuit used by our contributor for the booster

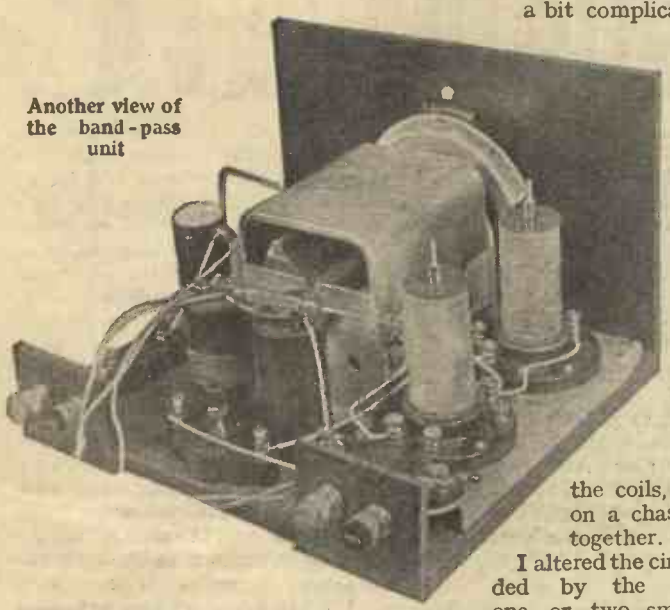
Tried as a Hook-up

Anyway, whether you make up the gadget from scraps or from new material, I think you ought to keep the size about the same as in my unit. I tried the arrangement as a hook-up first of all and it whistled badly until I spaced the parts more to the positions shown in the photograph. Therefore, I should think that if you tried to cramp the parts together any more than they are, the thing wouldn't tune properly. I found that it was difficult to get proper band-pass tuning, when the wiring was

"HOW I IMPROVED RANGE AND SELECTIVITY" (Continued)

untidy and the H.F. choke and valve put too close to the coils and condenser.

I am no expert on band-passing, but I had at least found that there should be a sharp tuning hump, if the circuit is band-passing properly. You don't get that hump if you have untidy wiring, as I did when I first tried the unit.



Another view of the band-pass unit

How the Unit is Made

There's really not much to talk about in telling you how to make the unit, because the photographs show you just where to mount the parts. I don't believe in constructional tricks. I just screwed the parts down and wired them up.

The bandpass circuit looks a bit complicated when you come to draw it up in the proper theoretical way. All the same, I didn't have the slightest difficulty in following out the wiring from the folder which you get with the ganged-coil unit. The two coils are really quite separate, but there aren't many wires to put in place as the coils, being mounted on a chassis, are ganged together.

I altered the circuit recommended by the coil-makers in one or two small ways. For instance, I used a pre-set condenser instead of the fixed .0001-microfarad condenser which they specify. I did that because my kit set used to tune very broadly and I wanted to fit a variable aerial condenser, so that I could try different values to get the right sharpness of tuning.

The one part of the circuit I *didn't* alter was the band-pass coupling. The coil makers recommend a .03-microfarad fixed condenser with a 10,000-ohm leak connected across it. I used one of the new stand-up type .03 condensers, which I happened to have handy and connected the leak directly across its terminals, without any extra wiring. As you can see from the photographs, this makes a neat job, *and I found that it was fatal to have a lot of loose wiring in this part of the circuit.* The circuit simply didn't band-pass properly, if there was too much wiring, which I suppose resulted in extra capacity all over the unit.

I wasn't really sure whether I *could* add a band-pass circuit like this to an ordinary screen-grid valve. So I tried it first of all in the hook-up fashion, before screwing the parts down. I forgot to put a fixed condenser between the screening grid and earth and I found this essential, although I believe if there is plenty of high-tension available for the screening grid, this condenser isn't always essential. It's a point for the experts to decide!

When I first bought the ganged coil unit I didn't know that it was fitted with a L.T. switch. It's a fine idea and in my unit it makes the wiring easier. The wave-change switch of the coils turns the whole unit off. It saves having an L.T. switch on the panel. I had three spare L.T. switches, but didn't want to complicate the wiring by carrying a couple of leads to the panel, just for the sake of an on-off switch.

When I had wired up the band-pass coils and condenser, I began to be a little bit afraid that the whole thing would be too complicated, so I deliberately went out of my way to make the screen-grid valve circuit simple.

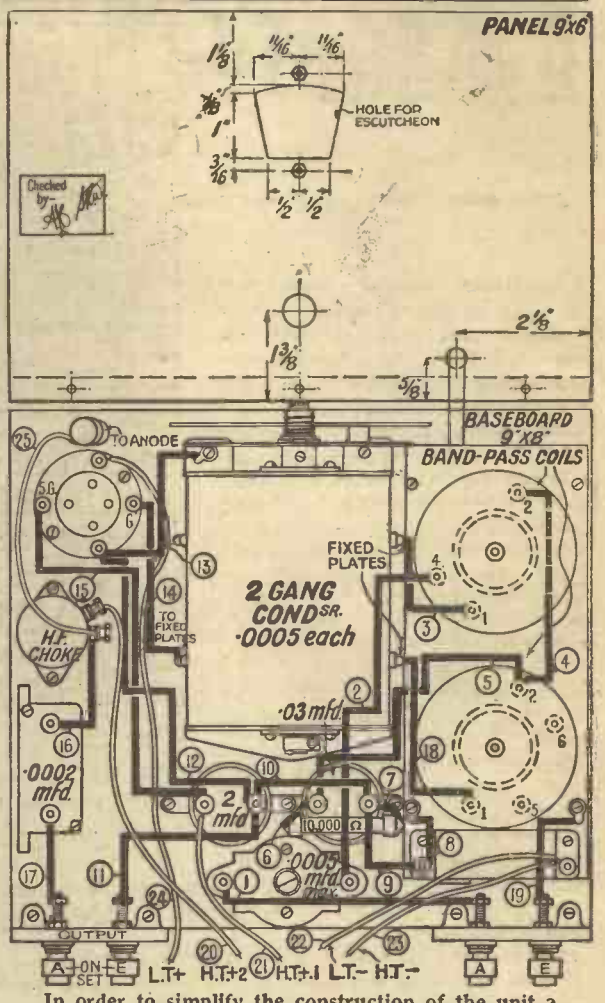
All there is, you see, is an H.F. choke, and a .0002 microfarad condenser in the wire linking the unit with the set.

The finished edition of my unit has lengths of wire going to the batteries of the kit set. But I decided on two terminal blocks for the aerial and earth wires. Don't do without these terminal blocks, as if you take loose leads to the unit and from the unit to the set, you may find that it doesn't work properly.

Of course, I could have dispensed with one high-tension lead by connecting a screening grid through a resistance, so that it took its H.T. from the anode lead. Later on I may try this, but if you are making up the unit I advise you to stick to my original plan and have separate battery wires for the anode and grid.

The anode wire goes to the 120-volt battery tapping, and the screening grid tapping goes to some other point on the

(*Continued on page* 1064)

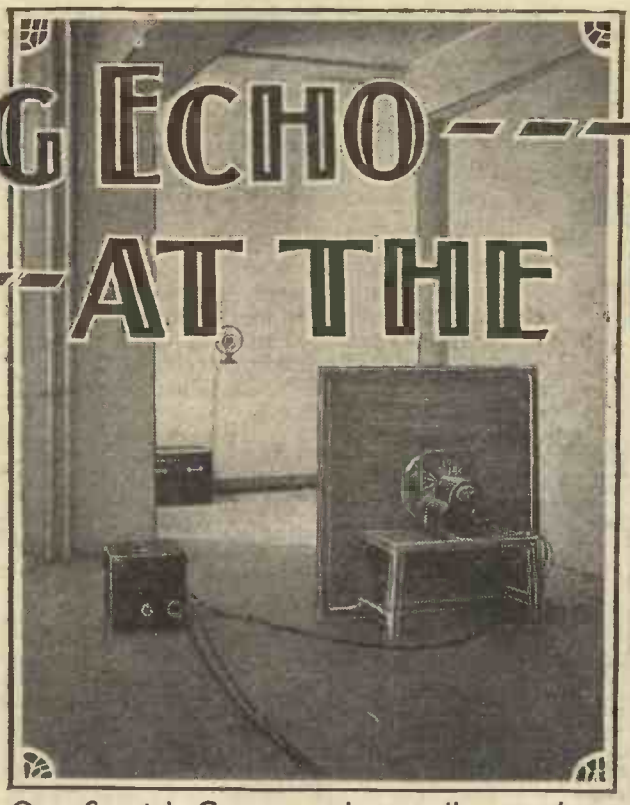


In order to simplify the construction of the unit a scale plan with all the wiring clearly shown is given above

COMPONENTS REQUIRED FOR THE BAND-PASS UNIT

EBONITE PANEL
1—9 in. by 6 in. (Peto-Scott, Becol, Permcol).
BASEBOARD
1—9 in. by 8 in. (Peto-Scott, Ready Radio, Clarion).
BAND-PASS COIL ASSEMBLY
1—Dual-gang, combined with on-off switch (Lissen).
VARIABLE CONDENSER
1—Twin-gang .0005-mfd., with panel trimmer (British Radiophone, J.B., Polar, Utility).
VALVE HOLDER
1—4-pin (Telsen, W.B., Lissen, Igranic, Benjamin, Wearite, Lotus).
H.F. CHOKE
1—(Varley "Junior," Lissen, Telsen, Igranic, R.I., Wearite, Ready Radio, Slektun, Bulgin, Climax).
CONDENSERS
1—.03-mfd. non-inductive (Dubilier, type 9200).
1—2-mfd. (Dubilier, type 9200, T.C.C., Lissen, Telsen, Ferranti, Formo).
1—.0002-mfd., fixed (Lissen, T.C.C., Telsen, Dubilier, Graham-Farish).
1—.0005-mfd. max. pre-set (Igranic, Formo, Sovereign, Lissen, Goltone, Varley, Colvern).
TERMINALS
4—marked Aerial, Earth, Output —, Output +, (Belling-Lee, type M, Clix, Eelex, Bulgin).
RESISTANCE
1—10,000-ohm (Dubilier 1-watt metallised, Graham-Farish, Erie).
TERMINAL BLOCKS
2—(Sovereign, Belling-Lee, Lissen).
WANDER PLUGS
3—marked H.T.—, H.T.+1, H.T.+2 (Belling-Lee, Clix, Eelex).
SPADE TERMINALS
2—marked L.T.—, L.T.+ (Belling-Lee, Clix, Eelex).
ANODE CONNECTOR
1—Screen-grid (Belling-Lee, Eelex).
SUNDRIES
Three yards thin flex (Lewcoflex).
Connecting wire and sleeving (Lewcos or Jiffilinx).
ACCESSORIES
1—Valve (Mullard PM12 or PM12A, metallised).
1—Cabinet (Peto-Scott).

FAKING ECHO AT THE B.B.C.



Our Special Correspondent tells you how the B.B.C. engineers manufacture artificial echo in the transmission of radio plays and of special orchestral broadcasts.

YOU can't believe all you hear, even in B.B.C. broadcasting! I don't say this in any disrespect to the B.B.C., but rather in admiration for the B.B.C. engineers who can manufacture echo for the superimposing on music and radio plays, so that listeners hear a combination of echo and real broadcast.

The new echo-rooms at Broadcasting House enable any degree of echo to be heard in connection with music and plays. The effect is sometimes uncanny. Echo adds to the realism of music, up to a point, and it also enables the B.B.C. play producers to get the effect of actors talking in a huge hall, when actually they are speaking before the "mike" in a small studio.

Some of the Broadcasting House studios are big, and there is plenty of echo. The big concert hall has the greatest echo of any of the Broadcasting House studios. The vaudeville and dance-band studios run it fairly close, there being more echo in the former than in the latter.

For special effects the reverberation time of even the concert hall is not great enough. In the concert hall it takes just under two seconds for any sudden sound to die away to inaudibility. In the vaudeville studio it takes about a second. This is the reverberation time, or what the average man calls echo.

Some of the studios have absolutely no echo at all. Two of the studios on the sixth and seventh floors, for speech and radio plays, are like this. They are absolutely dead.

And yet the B.B.C. can fake echoes so that an actor talking in, say, the 6c studio (which has no echo at all) sounds as though he is addressing a large gathering in the Queen's Hall. Echo can be added to music in just the same way, so that a small orchestral combination in the 8A military band studio sounds like a "Proms" broadcast.

Sequence of the Microphones

How is it done? The pictorial strip at the bottom of this page shows the sequence of the microphones, amplifiers, and loud-speaker used in "echo making." The echo rooms in Broadcasting House are in the basement, sandwiched in between the staff cloak room, the battery room, and the carpenter's shop. They are plain stone rooms in which the only furniture consists of a microphone, a couple of amplifiers, and a moving-coil speaker.

The artistes speak or play in one of the upstairs studios. For the purpose of echo making it is better for the original broadcast to take place in a "dead" studio, devoid of echo, for then the manufactured echo can be added just as the music controllers or play producers wish, without confusion with the studio's natural echo.

The microphone is connected direct to one of the amplifiers in the control room on the eighth floor, but the wires pass through a potentiometer which acts as the echo control. If no manufactured echo is needed, the potentiometer knob is turned so that the studio "mike" is connected direct to its land-line amplifier. Immediately the echo is needed, the potentiometer is turned back and part of the output is switched through to a two-valve A.C. amplifier in the echo room connected to a moving-coil speaker. At the other end of the echo room is a second microphone connected to another type "A" amplifier.

This is where the echo is made, owing to the natural resonance of the echo room. The reproduced music or speech, plus a great deal of echo, is picked up by the second microphone and sent back along the microphone wiring to the control room, to be "mixed" with the original signal in any desired proportion.

The old type of switch gear previously used in echo manufacture at Savoy Hill has been scrapped. The new potentiometers are quick-acting.

An actor can read out a continuous speech before the microphone and single

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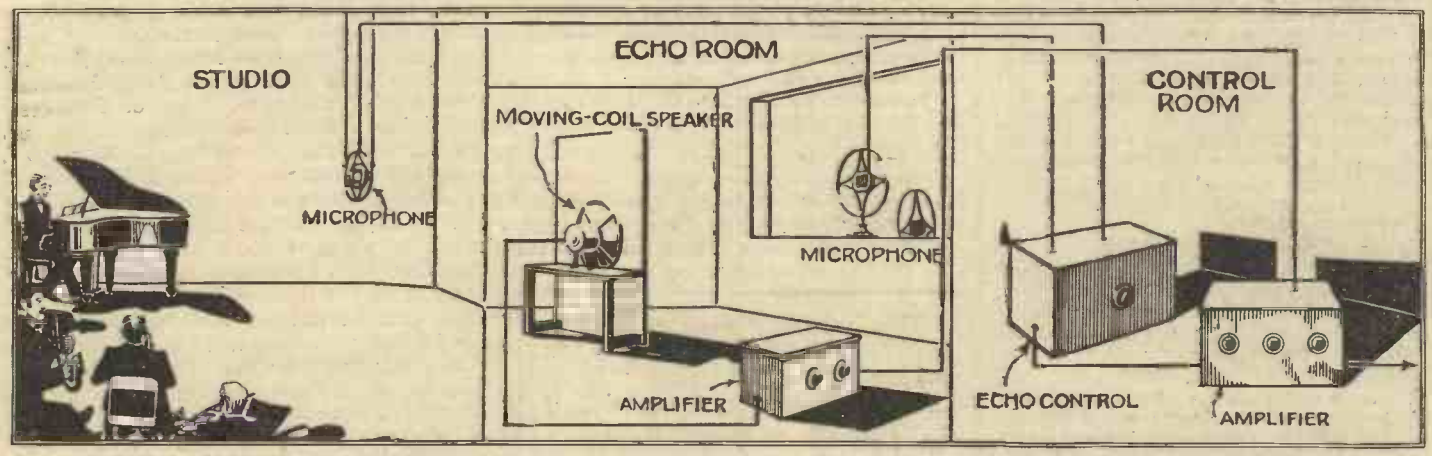
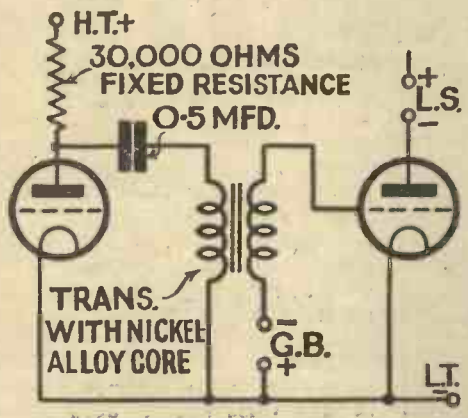


Here is the sequence of the microphones, speaker and amplifiers used in faking echo. A full explanation is given in the text

WHAT IT IS FOR

PARALLEL-FEED COUPLING

THE main object of a parallel feed in low-frequency transformer coupling is to stop the direct current from the high-tension supply from flowing through the primary winding of the transformer.



The standard connections for parallel-feed are shown above. Note that a fixed condenser is connected in series with the primary winding

Why, you may ask, must we prevent the anode current flowing through the primary of one transformer and yet allow this to happen with the primary of another? The answer is that some transformers have special alloy cores instead of stalloy stampings.

The iron core of a transformer has a great effect on the performance. Should the core become what is termed "saturated" the inductance of the primary winding around the core will be greatly reduced.

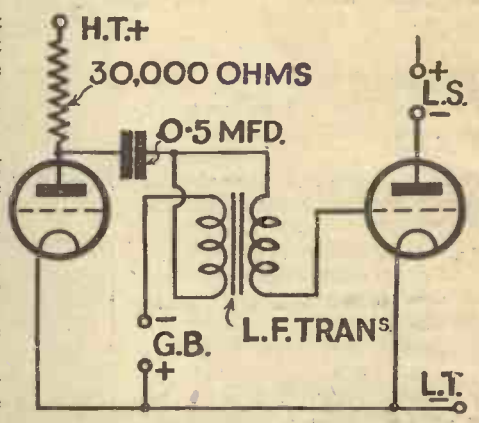
Saturation of the core is brought about by passing too much current through the primary winding. The effect of a reduced primary inductance, as caused by core saturation, is loss of quality in the amplification.

One of the easiest ways of preventing core saturation is to prevent any of the anode current passing through the transformer. Then only the low-frequency current, of an alternating nature, will flow through the primary and as this will have a very small value, the high inductance will be maintained and the quality will be unimpaired.

The method of diverting the high-tension from the transformer is quite simple. In the anode circuit, in which we should normally insert the primary winding, we put a resistance. The anode of the valve thus gets its potential through the resistance, though as some of the voltage will be dropped across the resistance it is advisable to keep down the value to about 30,000 ohms.

The anode of the valve is then connected to the primary winding through a fixed condenser, which if sufficiently large will effectively pass all the low frequencies but will of course act as an absolute barrier to the anode voltage.

Sometimes the resistance-fed transformer is connected so that an increased step-up is obtained, by connecting the primary in series with the secondary, thus increasing the ratio of primary to secondary turns.



With parallel-feed coupling it is possible to gain a greater step up ratio by connecting as shown above, with the primary winding in series with the secondary

HOTSPOT.

OUR LISTENING POST

By JAY COOTE

FURTHER investigation shows that the powerful Russian transmission now heard on Leningrad's former wavelength—namely, 1,000 metres—is not that of the Old Komintern station, but "Moscow" (Trade Unions), previously on 1,304 metres. A few nights ago I picked up a call and an announcement in French to the effect that if, as one of thousands of listeners, I cared to let the Soviet authorities know how I received the broadcast I would be rewarded with a picture postcard, or something or other of equal value! So now you know. From what I learn, however, tests by the Moscow-Noghinsk 500-kilowatter will be made shortly on 1,481 metres. To secure a favourable channel for this super-power transmitter, various alterations are being made in the wavelengths of the Russian stations; so we may have to identify them all over again.

Radio Luxembourg

Radio Luxembourg, although ready to start up, has not yet fixed a definite date for its formal opening; apparently strong protests have been lodged by aviation authorities regarding its proposed use of the 1,200-metre channel. In the meantime, you may hear more tests carried out on wavelengths round about this prohibited area, as when I tuned in Radio Luxembourg towards lunch time a few days ago, I found the transmission on 1,250 metres; previously it had been on 1,190 odd metres.

Leipzig also is operating nightly on 389.6 metres, and has handed over its former channel to the new 17-kilowatt station built for the Frankfurt-am-Main service. Please alter your logs accordingly. Within the next few days you may hear tests on 532.5 metres by the 60-kilowatt transmitter recently completed at Erdinger Moos to broadcast the Munich programmes. There again signals should be good, as both transmitter and aerial are results of considerable experimenting on the part of the constructors. Much is expected from this latest design in broadcasters.

If you are a late-bedder or an early riser you may be rewarded by searching for a few South American broadcasts which just at present are being logged by listeners in these Isles. They are all situated at Buenos Aires, namely, LS9, La Voz del Aire (215.8 m.); LS6, Radio Bernotti (222.2 m.); LS8, Radio Sarmiento (243.9 m.); LS2, Radio Prieto (252.1 m.); LS5, Estaçion Rivadavia (270.3 m.); and LR9, Radio Fenix (291.3 m.). In these notes I have previously mentioned LR4, Radio Splendid, and LR3, Radio Naçional, but during the last fortnight it is the broadcasts on the lower wavelengths which have been most heard. As a rule, these studios put out their calls pretty frequently, and announcements are usually made in both Spanish and English.

Finally, in addition to the special programmes which the B.B.C. propose to offer us during their birthday week, I hear that on November 14 Berlin will take part in the celebrations by giving us a light opera potpourri entitled *Halloh, London! Hier ist Berlin* (no translation necessary). It will be broadcast from the Berlin Funkhaus and the orchestra will be conducted by Eduard Kuenneke, a composer of tuneful musical comedies and operettas. On Saturday, November 19, you will also hear a relay of Paul Whiteman's Band from the United States.

This issue of "Amateur Wireless" is published on a WEDNESDAY and in future "Amateur Wireless" will be on sale EVERY WEDNESDAY.

"FAKING ECHO AT THE B.B.C."

(*Continued from page* 1041)

sentences can be selected by the play producers for the superimposing of echo! One moment the actor can sound as though he is talking in a tank, and the next moment there is no echo at all, so that he appears to be in the open air.

The effects studio where the bangs, hoots, and crashes are produced for synchronising in radio plays, is treated to have no echo at all. Loud crashings in the effects studio sound thus like a dull thud. But by the time the play producer has switched the noise through the echo room circuit, one would imagine that a world-chaos had arrived, and that the whole of Broadcasting House had fallen down.

What is troubling the play producers at present is the narrow volume limit. Even the loudest noise cannot be too loud. The dials of the programme meters, which are watched during echo manufacture, are calibrated from 1 to 7 and all sounds must be kept within these volume limits. The softest sound must not cause the needle to move below 1 on the scale, nor the loudest to make it jump above 7. "Loud noise" in broadcasting is thus only a matter of graduation. The echo control engineers have to be very quick with the potentiometer knobs to get a true-life effect.

On Your Wavelength!

A BIG FAMILY

IT is most appropriate that the five-million licence mark should have been reached just before the B.B.C.'s tenth birthday, and this achievement will add to the cheerful atmosphere of the celebrations. What astonishing progress in ten years! When the old 2LO came into action there were not more than about 30,000 licences in the country; now nearly half the homes of Great Britain are licenced to receive the broadcast programmes. Rather better than every tenth member of our population—men women, and children—is now a licence holder, a proportion which beats even that of the U.S.A.

HOW MANY MORE?

SOME years ago, when the two-million mark was reached, there were many who prophesied that we were nearing the saturation point and that no further important increase could be looked for. Since then we have merrily added another three millions, and the curve, to use a valve term, shows no signs of reaching its upper bend. Just how far can we go before it begins to flatten out? The total number of homes in our country is about eleven and a quarter millions at the moment, though this number is increasing steadily. At a guess, I should say that the probable saturation point lies somewhere between seven million and eight million licences. I believe that we shall go fairly quickly up to the six-million mark and that the curve will then rise rather less steeply.

THOSE BIG CONDENSERS

I MAY have been particularly unlucky, but I have had quite a bit of trouble in the last eighteen months or so with condensers of capacities between 1 and 4 microfarads of the paper dielectric type. One of these I luckily tested out after buying it and before putting it into use. When 100 volts were applied to its terminals there was a steady current of rather more than one milliampere! It was, of course, immediately replaced by the makers. Another broke down badly after less than a week's work and the third was the one responsible for the noisiness in my big set. This one had been in use for rather more than a year, I admit; but the life of condensers should be much longer than this. It isn't as if I used a very high H.T. voltage. In every case the supply was not from the mains, but from a 180-volt accumulator high-tension battery. Nor, I may mention, were any of these condensers used in the plate circuit of a pentode valve.

FOR NEW READERS

MANY new readers who are undergoing their initiation into the delightful pastime of long-distance listening have probably been puzzled of late by the behaviour of their sets. A station is tuned in and found to be coming through splendidly. In a few moments its fine, manly voice gets smaller and smaller. It may even be reduced to complete silence. Heavens! Have the batteries run down? Has the mains voltage dropped? Has a transformer burnt out? Has one of the valves thrown up the sponge? No, for hardly have you leapt to the set with a vague idea of doing something about it than the signal begins to return to its first fine strength. It goes on building up and may become presently so overpowering that the reaction knob has to be turned in one direction and that of the volume control in the other. There is nothing to be alarmed about. You are simply experiencing the unpleasant phenomenon known as fading, and nothing that you can do will have any effect upon it, for it is due to causes outside your set.

AND NOW THE OLD HAND

IN the course of a long experience I can never remember fading having been quite so marked as it is at the time of writing. As a rule, it affects only rather distant stations and chiefly those occupying wavelengths in the lower half of the medium waveband. Long-wave stations are usually held to be practically immune from fading. Just now, though, even the most powerful stations on the medium waves are suffering on many nights, and fading has been very bad right up at the top of the band. On the evening before these notes were written, for instance, Budapest was varying from enormous volume to something very near silence. Stranger still, some of the long wave stations have suffered to a certain extent, but the most curious thing of all is that quite distinct fading has been noticeable upon one's local high-power station at a range of only fifteen miles!

THE ONLY CURE

THE only cure for fading is to be found in automatic volume control, which will one day be incorporated in every receiving set intended for the reception of distant stations. At present it is to be found in only a minute percentage of our sets. Automatic volume control is obtained by the use of the variable-mu valve for high-frequency amplification purposes. You know that the amplification given by these valves varies according to the amount of negative grid bias; the stronger the bias, the less the magnification and vice versa. A special control valve is used which regulates the grid bias in accordance with the strength of the incoming signal, increasing it as the signal waxes and decreasing it as it wanes. The net result is that, though signal strength may be going up and down, the output from the loud-speaker remains constant.

The only drawback to the use of automatic volume control is that, though the wanted signal may fade, the unwanted atmospherics, mush, and background noises don't. Hence, as the amplification is automatically varied, you have the impression that, though the signal remains steady, the "noises off" show a rhythmic increase and decrease in strength.

A PRETTY PROBLEM

SOME years ago one of the Big Noises in wireless delivered himself, half in jest, of the opinion that it would be no bad thing if wireless receiving sets contained about one valve per mile of distance between the transmitting and the receiving station. His idea was, of course, that the less you press your valves, the better, on the whole, is the quality. But one valve per mile is going a little bit too far, as I realise, at the present time. When my eight-valve super-het is in use I have rather better than one valve per two miles for the reception of B.P., which is fifteen miles away from me. To turn down the set sufficiently for a 50-kilowatter at a range of fifteen miles takes a bit of doing, believe me! In fact, I have had to fit two separate volume controls, and even they do not suffice by themselves. The first consists of variable grid bias up to 18 volts negative on the high-frequency valve; the second volume control turns down the wicks of the intermediate-frequency valves. But to prevent the loud-speaker from being blown up I have to turn the frame aerial to its minimum position; that is, at right angles to an imaginary line between me and B.P. These three expedients altogether suffice to tame the London Regional and National sufficiently, and I think that you will agree that my valves are working well within their powers.

SUPER-HETS AND TONE CONTROL

MENTION of my big super-het. reminds me that I fitted it recently with a tone-control transformer with splendid results. This particular super-het is an especially selective one; for this reason I used to cut too much bass with it. I have tried in the past various kinds of fixed tone correctors, with fairly good results, but the variable corrector is really a revelation. I had not realised before that some stations require more or less tone correction than others—nor, in all probability I suppose, had you. This is not a question of sideband cutting through ultra selectivity; it occurs because the engineers in charge of the control-rooms of stations hold widely differing views on the subject of tone-balance. Thus one station's transmissions may give a good deal more weight (or a good deal less) than another's to the bass. With fixed tone control you have the impression that the quality of the transmissions varies a great deal; but when you have tone control adjustable by the mere twiddling of a knob you find it possible to obtain the same tone-balance

On Your Wavelength! (continued)

from most of them. I can honestly say that my pleasure in listening to foreign stations has been enormously increased by the use of the tone-control transformer in both super-heterodyne and "straight" receiving sets.

WHO DID IT?

THERE was quite a pother in some of the lay papers over the recent jamming of Moscow's transmission. What happened was that as soon as Comrade Somebody or other advanced to the microphone to deal with his English postbag a constant note with considerable power behind it was sent out flat on Moscow's frequency. To vary the proceedings, strings of "vics" were sent out instead of the constant note, and there were brief intervals during which the transmitter was presumably listening to discover what point had been reached in the Russian broadcast. As soon as the postbag business was finished the jamming ceased and reception was once more possible. Nobody seems to know who did it. The B.B.C. referred inquirers to the G.P.O. and the G.P.O. sent them on to somebody else. I won't express any opinion on the ethics of the business; speaking, though, as a wireless man, I can testify that the jamming was very effectively done, whoever was responsible.

SETS OF YESTERYEAR

WHILST still lost in admiration of the neat and compact layout of the "New Century Super," I had occasion to visit a friend whose enthusiasm for wireless dates, like my own, from a time many years before the beginning of the era of broadcasting. I took with me a copy of AMATEUR WIRELESS and we spent some time discussing the beauties of the design. Then he remarked: "A bit different, isn't it, from the big sets of just a few years ago? I have still got one which I built when it was the very last thing in efficiency in its day. It's up in the lumber room; let's go and have a look at it." We went. From beneath a collection of the kind of things that you do find in lumber rooms we extracted a gigantic cabinet. "This," said my friend, "was the very finest thing in six-valve sets but a few years ago." He produced a foot rule and we measured it. The cabinet was 42 in. in length (forty-two!) by 12 in. from front to rear and 10 in. in height. The full-sized layout plan of the "New Century Super" goes comfortably into a double-page of AMATEUR WIRELESS. To give a full-sized plan of this old set it would have needed to continue over no less than six pages, and even so its full depth from front to rear could not have been fitted in. Yet the "New Century Super" contains the same number of valves and its efficiency is, of course, vastly greater.

WE HAVE MOVED FORWARD!

THE chief reason why modern sets are so much more compact is that we have realised the importance of two factors. The first is decoupling; the second is screening. In the bad old days we found it necessary to place our high-frequency coils or transformers the best part of a foot apart in order to produce anything like stability—and even then it often wasn't *very* like it. On the L.F. side of the set we used to keep components at literally arm's length, not realising that our troubles were due more to back-couplings than to what we were pleased to call interaction. In modern sets we make full use of screening on the H.F. side and decoupling where necessary. Comparatively few L.F. transformers or chokes are screened at all nowadays, but, thanks to the intelligent use of decoupling devices, we can pack them almost as closely as potatoes in a barrel without any evil effects.

THE BLATTNERPHONE

THE five-fold relaying of programmes to the Empire will be accomplished by means of the Blattnerphone, an ingenious machine which has already done splendid work for the B.B.C. In case you have forgotten what it is, the Blattnerphone records from a single item to a complete programme upon a thin steel tape. The method is quite different from that of the gramophone recorder, for the tape is not cut by a stylus or "played" by a needle and pick-up. During the recording process, the tape is magnetised with varying intensity over its whole length; it contains, in fact, a magnetic record of whatever takes place before the microphone in the studio. Complete programmes have already been "canned" in this way for re-transmission, and a running commentary on the Derby was sent out from G5SW by means of the Blattnerphone tape for the benefit of Australia, hours after the race itself had been run. Blattnerphone tapes, once magnetised, can be used over and over again.

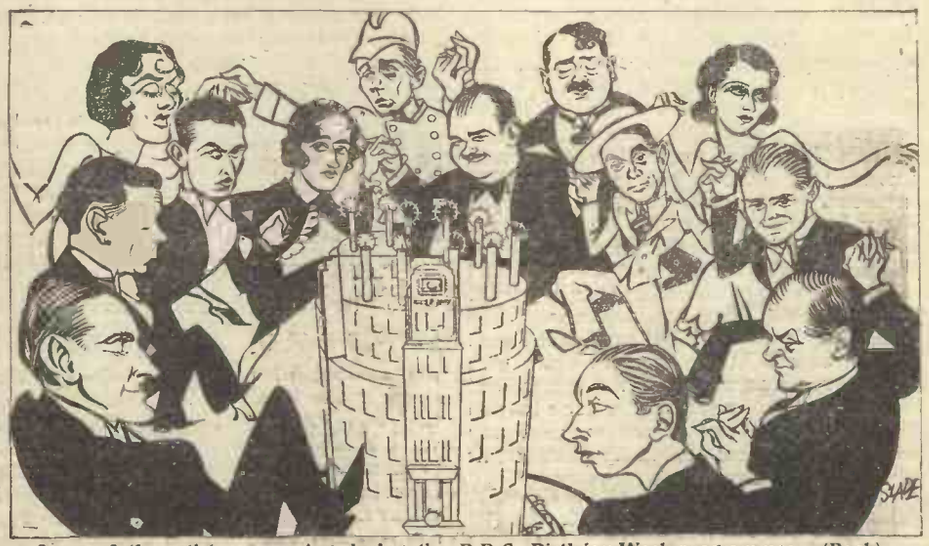
WET "STATIC"

A FRIEND of mine, who lives on a high spot of ground near an open common, tells me of a curious experience he had during the recent stormy weather. One wet evening, his set, without apparent reason, suddenly developed a type of low-frequency disturbance not unlike motor-boating. He switched off the aerial and re-tuned the set on the earth lead (which ran inside the house to the nearest water-pipe). The disturbance at once disappeared, though it came on again as soon as the set was switched back to the outside aerial. This lasted for about ten minutes, after which the receiver settled down to quiet behaviour even on the outside aerial. It was all rather mysterious, but, after thinking the matter over, it occurred to the victim that the disturbance must be due to raindrops falling on the outside aerial. If the drops were formed, or passed through, a highly charged area they would bring down with them small charges of electricity, and such of these as fell directly on the aerial might well set up intermittent surges of current, sufficient to account for the temporary disturbance.

AERIAL ELECTRICITY

WITHOUT prejudice, as the lawyers say, I think this is a very likely explanation, particularly as the first valve was a detector. It is certainly true that raindrops falling on to an aerial from a thunder-cloud will induce quite a heavy charge, as I have more than once both seen and heard a stream of small sparks passing across the plates of a series tuning condenser during such a storm. Generally speaking, I prefer to earth the outside aerial when thunder is about, and to work from an inside wire or frame aerial, neither of which can possibly produce any alarming symptoms. THERMION.

IN THE B.B.C. BIRTHDAY PROGRAMMES



Some of the artistes appearing during the B.B.C. Birthday Week programmes. (Back), Cicely Courtneidge, Horace Kenney, Billy Bennett and Jean de Casalis. (Front) Jack Hulbert, Leonard Henry, Maurice Winnick, Rae de Costa, Paul Whiteman, Cl lie Potter, Marius B. Winter, Peter Dawson and Claude Hulbert

ARE OUR L·F· TRANSFORMERS GOOD ENOUGH?

In this article J. H. Reyner raises an interesting point regarding present-day transformers

A FRIEND of mine remarked the other day that he could not observe the difference between a "good" transformer with an excellent response curve and a "poor" one with a curve like the proverbial camel's hump. This vague general statement served to start the train of thought suggested by the title of this article.

The performance of a transformer is, of

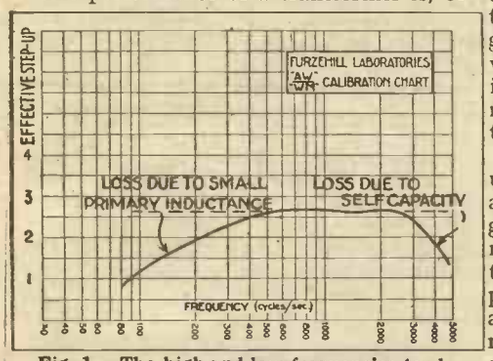


Fig. 1. The high and low frequencies tend to be lost with a transformer, unless special precautions are taken

course, linked up very closely with that of the rest of the set. If the loud-speaker is a poor one and is badly matched, then the substitution of a really good transformer for a poor one will produce no audible improvement, but the modern loud-speaker is capable of reproducing a much more extended frequency band than the older types and it is no longer possible to adopt this line of argument. The improvement in loud-speakers is calling for better transformers once again.

Let us analyse the transformer for a moment. It consists of two windings wound round an iron core. Through one of these windings—the primary—we pass the currents from the detector valve. The secondary winding is provided with several times as many turns as the primary, so that the voltage developed is several times as great, giving us a "step-up." Thus the voltage which we apply to the output valve is not merely that from the detector, but is multiplied by the effective step-up ratio of the transformer.

This step-up is, in fact, the reason for using a transformer at all. It increases the amplification of the set and consequently gives us louder signals. The step-up is roughly proportional to the number of turns on the secondary, relative to the primary. If the secondary has four times as many turns as the primary, the step-up ratio will be about 4 to 1. It will not be exactly this figure for two reasons. In the first place the transformer has to amplify currents of various frequencies, so that the conditions under which the transformer is used are continually changing. This results in a loss of the low and high frequencies so that normal performance is only obtained about the middle of the frequency scale.

The high frequencies are lost because of the self capacity of the windings. This acts like a condenser connected across the secondary which shunts the currents and prevents the full voltage from being passed on to the grid of the next valve. In the middle and low frequencies this shunting effect is not serious, but it causes a considerable loss of the upper notes unless proper precautions are taken.

The amplification of the low frequencies depends on the inductance of the primary winding. Unless this is sufficient the detector valve will not supply its full voltage to

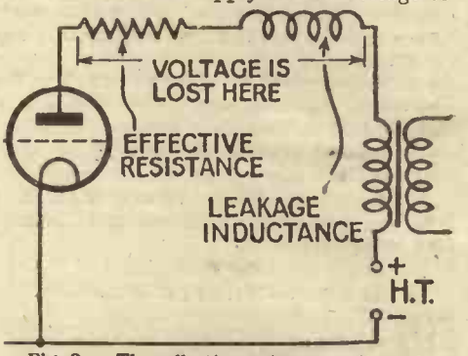


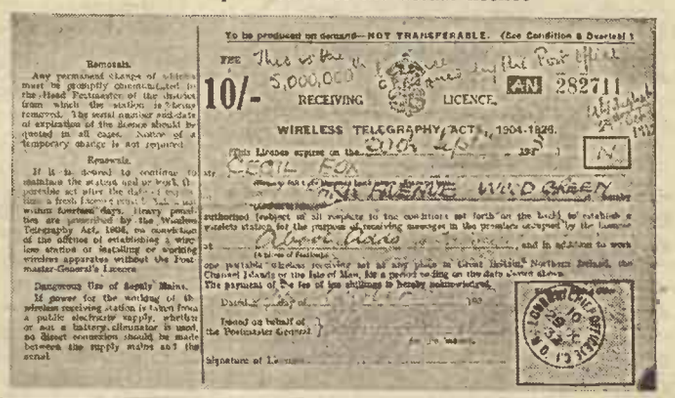
Fig. 2. The effective primary voltage is only a fraction of the voltage supplied to the valve

the transformer and a drop in amplification again results. These two effects are both illustrated in the curve of Fig. 1 which is an actual response curve taken on a typical inexpensive transformer. The loss of amplification is very evident at both ends of the scale and the modern loud-speaker would be quite able to notice the difference between this transformer and a good one.

(*Continued on page* 1062)

THE FIVE MILLIONTH LICENCE !

Mr. Cecil Fox, the London listener who took out the five-millionth wireless licence, is here seen "taking delivery" of his licence at the General Post Office, London. Below is the reproduction of the actual licence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CECIL FOX

authorised (subject as to all matters to the conditions set forth on the back) to establish a wireless station for the purpose of receiving messages in the premises occupied by the Licensee

at

and in addition to work

one portable wireless receiver set at any place in Great Britain, Northern Ireland, the Channel Islands or the Isle of Man, for a period not exceeding one month from the date hereof.

The payment of the fee of ten shillings is hereby acknowledged.

Dated

Issued on behalf of the Postmaster-General

Signature of Licensee

SETS OF THE SEASON

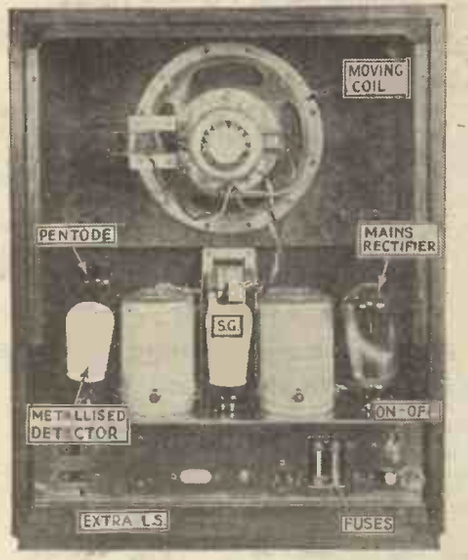
MACNAMARA "GOLDEN VOICE" RECEIVER

RIGHT away let me say that the name of this set is more than justified. The "golden-voice" reproduction we have heard so much about has certainly been achieved. To those who know the difficulties of getting a really full tone from a table cabinet, due to restricted baffle area, will be amazed, as I have been, at the richness and depth of the bass delivered by the energised moving-coil loud-speaker in this new product of the Telsen factories.

It is not just "sales talk"—the golden voice is there for all to hear. The designers are to be praised for having found a cabinet that is at once attractive in appearance and capable of doing full justice to the loud-speaker.

What surprised me almost as much as the depth of the bass was the extraordinary amount of volume that could be handled without any trace of distress. Altogether, on the score of output, this Macnamara set is as good as anything I have ever heard in the three-valve line, and is much above the average.

The cabinet of the model I tested was the de-luxe type, but I think it is a fine idea to



The Macnamara receiver has many unique features which make it outstanding and the set caters for either beginner or expert

market this set with a plain oak cabinet at a lower price for those who want to put the chassis in cabinets of their own.

The chassis is chromium-plated throughout. It is surely unique in this? On the top we find the three receiving valves, the rectifier valve for the mains, and the two screened coils, which have a ganged wave-change switch operated on the front with the other controls.

Now about these controls: Here again the makers have shown an intimate touch with present-day conditions in the ether, and, what is equally important, they have rightly visualised two types of listener—the listener who knows nothing of radio and has little *finesse* with knob twiddling, and the more informed listener who knows all about the inside of the set.

For each class of set user this new set admirably caters. While the veriest novice would be able to bring in, say, a dozen foreign stations without being able to help himself, the slightly more technical operator, by a nice sense of balance between aerial input and reaction boost up, would add very greatly to this log, and bring up the total to as much as thirty stations, all clear of each other, and reproduced on the self-contained loud-speaker with full volume.

How, then, is this wonderful flexibility of control obtained? Strange to say, not by any revolutionary technique. What the makers have done is to utilise a phenomenon that ought to be widely known, but isn't.

If you reduce the input to the screen-grid valve and make up the strength of the wanted station by increasing the reaction, you get better selectivity. That is the simple fact the makers have taken full advantage of.

The aerial input is varied by a series condenser, which, at the last section of its travel towards maximum, brings in a cut-out switch, so that the condenser is "shorted."

Reaction, so essential in a three-valver, not only for getting volume on the distant stations, but for the selectivity aid just mentioned, is wonderfully smooth in this set.

Tuning is done very sensibly with a two-gang condenser with variable stator movement on the aerial condenser section. The main tuning is done on the large knob, which rotates the two rotor plate sections of the gang condenser, and also an illuminated tuning scale marked in medium and long wavelengths.

The trimming is done by a super-imposed knob on the main tuning knob. This auxiliary control works an ingenious "shadow" effect on the dial, and indicates how the adjustment is going in terms of the wavelength settings.

The circuit of this admirable set is quite a straightforward arrangement of three valves. Loose coupling for the aerial; high-frequency transformer between the screen grid and detector valves; parallel-fed low-frequency transformer; pentode output. Such are the main items of the circuit.

At the back of the chassis there are all the odds and ends that go to make a really finished set. Pick-up sockets; provision of mains aerial; for an external loud-speaker; double-fuse protection for the mains; safety mains plug; hum adjustment for noisy mains; simple plug-and-socket adjustment for the mains voltage.

In my tests in South London I used a 60-foot aerial on a 205-volt A.C. supply. I noted how subdued was the mains hum. Nothing could be heard of the hum during reception and only a faint noise was produced when the set was de-tuned from actual signals.

On the mains aerial I got amazingly good results from the foreigners. At least twenty-five stations came in at full strength.

Selectivity is very much in the hands of the operator. Called the separator, the aerial-input condenser exerts a great influence on the ability to separate adjacent stations. I got the new high-power Leipzig station clear of Toulouse—takes some doing, that! And just as easily that very difficult pair of stations, Post Parisien and Breslau, were quite clear of each other.

London Regional had a two-channel spread each side of it. I was able to get Strasbourg quite clear of the home station, and Scottish Regional, the other side, was without a trace of the London station.

On the long waves I got eight stations at good strength.

SET TESTER.

BRIEF SPECIFICATION:

Makers: The Telsen Electric Co., Ltd.

Price: 15 guineas, with figured-walnut cabinet, or 12 guineas with plain cabinet.

Valve Combination: Screen-grid high-frequency amplifier (Mazda ACS2), detector (Mazda AC2/HL), and pentode (Mazda AC/Pen), with mains rectifier (Mazda UU120/350).

Controls: Single main-tuning knob, with super-imposed trimmer. Separator control, with cut-out at its maximum. Wave-change switch. Reaction control. Mains on-off switch at back.

Type: Table-cabinet mains set with self-contained energised moving-coil loud-speaker.

Remarks: One of the finest all-electric three's yet tested. Remarkable depth of bass and immense volume without distortion. Flexibility of operation a great feature.

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1 J.B. Unitune twin-gang .0005-mfd. variable condenser, ...		18	6
1 J.B. Unitune single .0005-mfd. variable condenser.		9	6
1 Bulgin 50,000-ohm potentiometer and combined switch type V836		5	6
3 Wearite super-het intermediates with pigtails..	1	11	6
1 Set Lissen ganged oscillator and bandpass coils and combined on-off switch	1	10	0
8 Four-pin and 1 five-pin valve holders		4	8
2 Dubilier 1-mfd. condensers, type 9200		5	6
1 Dubilier .02-mfd. fixed condenser, type 9200 ..		2	0
1 T.C.C. .0001-mfd. fixed condenser		1	3
1 T.C.C. .0002-mfd. fixed condenser		1	3
1 T.C.C. .001-mfd. fixed condenser..		1	6
1 Erie 1-megohm grid leak		1	0
1 Erie 2-megohm grid leak		1	0
1 R.I. Parafeed low-frequency coupling unit ..		11	9
1 Sovereign .0003-mfd. pre-set condenser		1	3
1 Ready Radio high-frequency choke		5	6
2 Sovereign terminal blocks..		1	0
4 Belling-Lee terminals, marked: Aerial, Earth, L.S.—, L.S.+			10
9 Belling-Lee wander plugs, marked: G.B.+, GB.—1 G.B.—2, H.T.—, H.T.+, H.T.+1, H.T.+2, H.T.+3, H.T.+4		1	2
2 Belling-Lee spade terminals, marked L.T.—, L.T.+			3
1 Sheet aluminium foil, 16 in. by 10 in.		1	6
1 Ready Radio fuse and holder		1	0
1 Erie 20,000-ohm fixed resistance		1	0
1 Erie 50,000-ohm fixed resistance		1	0
1 Aluminium bracket			3
6 Yards flex			4
6 Mullard valves: PM12 Met., 2 PM12V Met., 2 PM1HL Met., 1 PM22A..	4	1	0
RADIOGRAM COMPONENTS			
1 Collaro B.30 clockwork gramophone motor with turntable and automatic stop	1	15	0
1 Bowyer-Lowe A.E.D. Mark III gramophone pickup	1	10	0
1 Bulgin radio-gramophone switch.. ..		1	9
1 Lewcos 50,000-ohm volume control potentiometer		3	0
1 Special "159" radio-gramophone cabinet ..	3	10	0
Carried forward	£17	18	9

	£	s.	d.
Bought forward	£17	18	9
1 Belling-Lee wander plug, marked G.B.—S, 1 length of screened connecting wire and 1 yard thin flex (Lewcoflex)			9
1 Epoch Twentieth Century permanent-magnet moving-coil loud-speaker	1	15	0
	£19	14	6

KIT RG1 (Full kit with all radiogram accessories, but excluding valves and cabinet). **£12:3:6**
Or 12 monthly payments of £1:4:0

KIT RG2 (As R.G.1, but including valves) **£16:4:6**
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KIT MODEL 2 (With Valves less Cabinet) **£11:1:0**
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1 Oldham L.T. accumulator, type 0.50			*9 0*
1 Atlas H.T. unit, type A.K.260		*4*	*10 0*
1 Epoch Twentieth Century moving-coil loud-speaker		*1*	*15 0*
1 Selectanet indoor aerial			*2 6*
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1 "Cop" lightning arrestor and lead-in tube ..			*2 6*
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R. & A. Victor Super Permanent-magnet moving-coil speaker chassis, £3 10 0. Or 10 monthly payments of 7/9.
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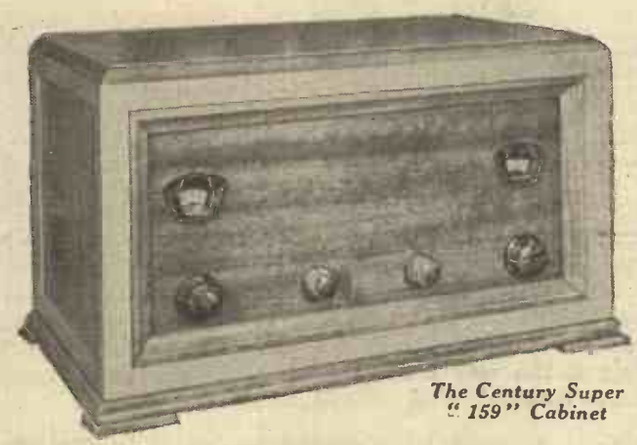
R. & A. Super Challenger permanent-magnet moving-coil chassis, £1 15 0.
W.B. P.M.4 Super permanent-magnet moving-coil chassis, £2 2 0.



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EPOCH 99K Super de Luxe permanent-magnet moving-coil chassis £7/7/0. Or 12 monthly payments of 13/9.
EPOCH A.2 Super Dance Orchestra Model speaker, £3/3/0. Or 10 monthly payments of 7/-.
Note.—All moving-coil speakers incorporate input transformers and can be supplied with special "159" walnut cabinet, 25/- extra.
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BLUESPOT 100U Super inductor chassis, £1/12/6.
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COLLARO B.30 Super automatic stop double spring gramo. motor, B.30, £1/13/-.

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	s.	d.
1 Drilled ebonite panel, 9 by 6 in ..	2	6
1 Baseboard, 9 by 8 in, Easyfix	1	0
1 Lissen dual-gang band-pass coil assembly combined with on-off switch ..	17	6
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1 4-pin valve holder		6
1 Varley "Junior" H.F. choke	3	6
1 Dubilier .03-mfd. non-inductive condenser, type 9200	2	0
1 Dubilier 2-mfd. condenser, type 9200..	3	9
1 T.C.C. 0002-mfd fixed condenser, type "S"	1	3
1 Sovereign .0005-mfd max pre-set condenser	1	6
4 Belling-Lee terminals, marked: A, E, Output +, Output—		10
1 Erie 10,000-ohm resistance	1	0
2 Sovereign terminal blocks	1	0
3 Belling-Lee wander plugs, marked: H.T.—, H.T.+1, H.T.+2		6
2 Belling-Lee spade terminals, marked: L.T.+, L.T.—		4
1 Belling-Lee screen-grid anode connector		4
3 Yards thin flex (Lewcoflex), connecting wire and sleeving..	1	0
1 Mullard valve, PM12	16	6
1 Cabinet	15	0

£4 - 8 - 6

	£	s.	d.
Kit Model 1 (less Valves and Cabinet).	2	17	0
Or 8 monthly payments of		8	0
Kit Model 2 (with Valves, less Cabinet)	3	13	6
Or 10 monthly payments of		8	0
Kit Model 3 (with Valves and Cabinet)	4	8	6
Or 10 monthly payments of		10	0

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Kit 2 (with Valves, less Cabinet), £5/18/3. Deposit 15/-, and 11 monthly payments of 10/6.
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METEOR S.G.3 MODEL "A" (with Valves, Cabinet and Moving-coil Speaker), £8/17/6. Or 12 monthly payments of 17/-.
METEOR S.G.3 Model "B" (complete kit with Valves only), £5/7/6. Or 12 monthly payments of 10/6.
KENDALL-PRICE S.G.4 (complete kit with Mullard Valves and "159" Cabinet), £7/10/0. Or 12 monthly payments of 14/-.
KENDALL-PRICE A.C. MAINS UNIT. Complete kit with Mullard Valve, £6/12/2. Or 12 monthly payments of 12/6.
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Yorkshire owner's tribute to efficiency of the Cossor Melody Maker

DONCASTER
1st October, 1932

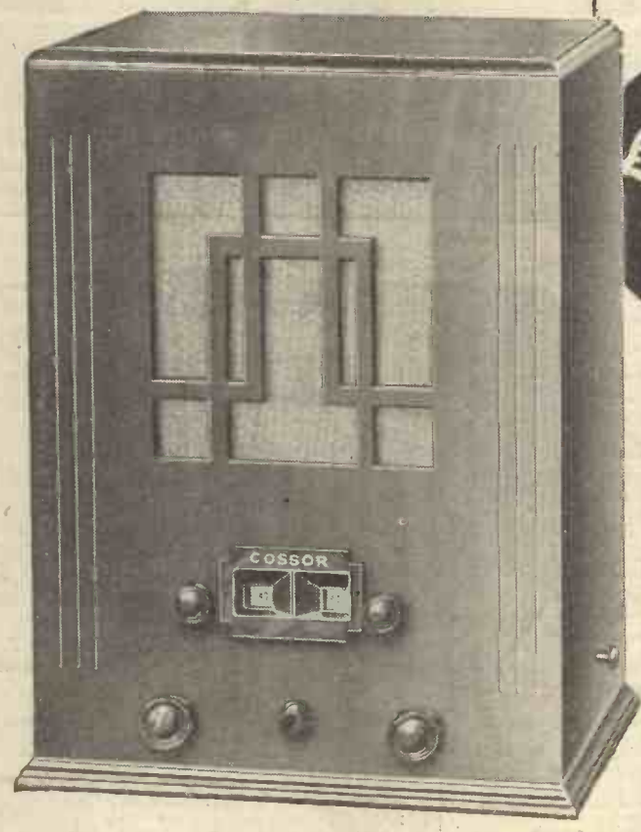
Dear Sirs,

"I cannot say how pleased I am with the performance of your Model 335—range, volume, tone, selectivity are all that can be desired. Rome, Radio Paris, Berlin and stations ***all round the dial come in at full loud speaker strength.*** *I have had more expensive radio but my 335 is the best I have had yet. Without doubt it is the finest value for money radio on the market."*

Yours truly,

*Signed*_____

The original of the above letter may be inspected at our Head Office: Cossor House, Highbury Grove, London, N.5.



PRICE £7·17·6

BATTERY MODEL 335

with Self-Contained Loud Speaker

Kit of Parts includes Cossor 220 V.S.G. Variable-Mu Metallised Screened Grid, Cossor 210 H.L. Metallised Detector and Cossor 220P. Output Valves; Individually Shielded Coils, Cossor L.F. Transformer: All-Metal Chassis and all parts for assembling the Receiver as illustrated; handsomely finished cabinet 18½ in. high, 13½ in. wide, 10½ in. deep and 10 in. Balanced-Armature Loud Speaker with rear adjustment. Provision is made for fitting Gramophone Pick-up Socket and Plug. Price

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ALL-METAL CHASSIS

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All-Electric Models for A.C. Mains only: 200 to 250 volts (adjustable). 40-100 cycles.

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(*Strike out type not required.)

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A.W. 12/11/32

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THE B.B.C PRODUCTIONS DIRECTOR SPEAKS OUT

"I Want some Plays" . . . . "I Want Comedies" says Val Gielgud in an interview with Whitaker-Wilson

Val Gielgud, the Productions Director of the B.B.C., who is responsible for radio plays, comedy and vaudeville

VAL GIELGUD is the easiest person in the world to interview. He is easy because he is definite. "What do you want me to tell you?" he asked. I told him I wanted him to speak his mind on the subject of dramatic productions.

"I want some plays," he began. I thought that highly dangerous. "Surely you get enough sent in?" I suggested. "Forty a week, but rarely do I find one up to standard." "That comes of raising the standard," I said. "I think I *have* raised the standard, and now I have to keep it up," was his reply. "Look here, you have listened to more plays than most people. You must have done, as critic to AMATEUR WIRELESS. You must admit that we have put on some really good shows recently, such as *The Matterhorn, Waterloo, Bread, Conversations at the Dance*, and your own *Wren*."

I agreed. *Bread* I have always considered one of the best short plays I have ever heard.

"Very well," said Gielgud. "We are not going to dry up, even if I have to rely on translations from Italian novels; but that is just what I do not want to do. You know as well as I do that it is not every play that can be adapted for the microphone. Stage plays and microphone plays have very little in common. The trouble is that half the plays I get have been the round of the West End theatres and have been rejected. The authors seem to think that we thrive on what the theatres don't want. It is a mistake, I assure you."

The Right Type of Comedy

"I want comedies," he continued. "As many as I can get, but I do *not* want these broadly funny plays. The sort of humour that needs a comedian comically dressed up and the usual stage surroundings is no good to me. The lines *must* be delicate such as those in——"

"*To See Ourselves*," I suggested.

"Exactly! There was not a broad line in that play, which happens to be an adaptation. It was not written for the microphone."

"You are definitely against broad humour, then?"

"Decidedly—for this purpose. You yourself have said (in your notes in AMATEUR WIRELESS) that you could have laughed had you someone else to laugh with. You have been hard on some of the vaudeville comedians for humour that could only legitimately belong to the music-hall stage. Very well. You can take your own words and apply them to the situation we are discussing. I have to cater for someone *who may be alone in the house*, sitting in an easy chair, smoking a pipe. He thinks he will listen to the play I give him. As it is labelled a comedy, he expects to be amused. If I give him something with the knock-about comedian style of humour he won't even smile, though he would roar his head off *at the same thing* if he were at a theatre with a thousand others to roar with him.

"It is useless to suggest that the wireless audience is the largest conceivable. It is nothing of the kind. It is the *smallest*. From our point of view it is often like a theatre with only one person sitting in the stalls. Broad humour is not going to entertain anybody *when he is alone*. I am confident that the only humour that I can deal with successfully by wireless transmission is the delicate humour that makes a man chuckle to himself as he listens. Unfortunately, that is where the shortage occurs."

Effects and Plays

"Of course, the effects help a great deal."

"Most certainly they do, but a play that depends on the effects department is doomed to failure from the beginning. The lines must be there and the plot must be easy to follow. You cannot expect people to listen to a muddle. If the play has a purpose—like *Bread* had—you must not rely on the *purpose*. You must have some good, strong thought behind it.

"I think half the trouble lies in the fact that people do not listen carefully enough."

"Then it is our business to see that they are compelled to listen. One of my greatest fears is the man who listens to a play and washes the dog at the same time. That is not giving me a fair chance. If I undertake to provide the right thing, the listener must do his bit."

"People do not realize what it means to put on a play. I tell you I am *proud* of my department and have no hesitation in saying so. Some of our plays—take *Conversations at the Dance*—presented real difficulties owing to so many studios being used and so many different effects being brought into play. This department exists for solving those problems. As Productions Director here, I have set before me an ideal; Radio Drama must be a real thing. It can only be real if and when the listener realises that we are seriously engaged in trying to make it real. He must do his part if we are to succeed.

"I am personally keen on Shakespeare for the wireless."

"Shakespeare? Of course you are. My opinion is that Shakespeare *wrote* for the wireless, only he did not know it. He depended on his *lines* for his effects, which brings us back to the place from which we started."

The Effects Department is an important factor in the broadcasting of a play, but if the play is to be successful too much reliance must not be placed on it

TUNING THE "NEW CENTURY SUPER"

Helpful hints and tips, by W. James, on working a super-het and taking full advantage of the wonderful performance of a set of this type

Mr. James, who collaborated in the design of the "New Century Super" giving it a final check

WHEN first trying the "New Century Super" you will be struck by the ease of tuning in spite of the extremely good selectivity. There are two tuning controls.

The first is for tuning the aerial circuit to the wanted station. This control has an auxiliary tuner, there being the two circuits of the band-pass coil. No attempt need be made to gang these two circuits, for although a two-gang tuning condenser is used and the coils are matched, it is easier to tune in a station roughly and then to adjust the auxiliary tuning condenser if this is necessary.

Using the Pre-set

The trimming condenser attached to the back half of the two-gang unit is therefore unscrewed and left. In the aerial circuit is a pre-set condenser. If the knob of this is unscrewed, its capacity will be reduced to the minimum. The coupling of the aerial will then be the minimum. Tuning will be as sharp as possible, but the input to the set will be reduced.

When, on the other hand, the pre-set condenser is adjusted to its maximum capacity, the input to the set is likely to be too great. At the same time the tuning will be broader. It is therefore possible to vary the results by adjusting the pre-set condenser and in order to obtain the most satisfactory results the set should be tested with this pre-set condenser adjusted to various capacities.

You will probably find, when your aerial is a large one, that the condenser can be set about half way. If, on the other hand, the aerial is on the small side more capacity can be used.

I prefer the best possible aerial on the grounds that the ratio of signal strength to noise is usually greater than when a small aerial is used. There may be a local condition which would upset this theory, but as a rule a large aerial is the better.

You can cut down the input by adjusting the pre-set condenser. The second tuning condenser is connected to the oscillator and is used to tune this circuit to a frequency above or below the frequency of the incoming signal.

The difference is that of the middle frequency of the amplifier. For example, if this is 126 kilocycles, then the oscillator must be tuned 126 kilocycles away from the incoming signal. You do not have to worry about this, of course, as all that you must do is to adjust the oscillator until a signal is heard.

Tune Carefully

Now do not make the mistake of tuning hurriedly. Nothing is gained by moving the dials quickly. The best plan is to move the controls very slowly indeed. Then you are not so likely to pass over a station.

You can build up the strength of a weak station by using the volume control and the auxiliary control of the aerial circuit condenser. Often the volume control will have to be used to reduce the strength of a signal. Always try reducing the strength by adjusting the volume control and then tuning the oscillator and aerial circuits. The station will then be brought fully into tune, and the interference will be in minimum.

If on the other hand full volume is obtained and the tuning condensers are not accurately adjusted to the station, traces of interference may creep in. These remarks should be particularly noted, as it is surprising how many people fail to tune properly.

One of the charms of a good super-heterodyne receiver is the *ease* with which stations are received. But although it is easy to receive stations it is advisable to tune properly and the set can be mastered in a few minutes.

In order to obtain the maximum sensitivity the various high-tension voltages should be adjusted about the values given last week. There are slight differences in components, and in the wiring, with the result that it will pay to adjust the voltages.

Adjusting the High Tension

Tune in a *weak* signal and then experiment. You may notice no difference if testing with a strong signal. So have as weak a signal as possible. Tune it as accurately as possible and then try the effect of applying different high-tension voltages. The volume control is connected to the multi-mu screen-grid valves.

It is advisable to have this full on or practically so when testing in order that these valves may be adjusted to the most sensitive state for receiving weak signals.

Tuning in a large number of stations is a matter of spending time, and it is surprising how many hours can be spent in bringing in the numerous stations within the range of the set. Many readers will probably have suitable valves to hand, even though they are not the particular valves mentioned last week. If they have characteristics like those specified then they may be used.

The multi-mu screen-grid types must be fitted in the intermediate frequency amplifier. These valves have characteristics suitable for grid bias control such as is included in this set, and good results would not be obtained by fitting the ordinary screen-grid valves.

A pentode output is used, and the question may be asked whether a triode power valve will be satisfactory instead of the pentode. The results will not be quite as satisfactory. For one thing, the quality will not be as good and secondly there will be a loss in sensitivity. But still, a triode could be used if these points are remembered. There will then be a spare high-tension lead, H.T.+3.

Testing the "New Century Super" in the North of England

A MODEL of the "New Century Super" supplied complete by Direct Radio, Ltd., was taken for a test in the West Riding district of Yorkshire—some twenty miles east of the Northern Regional transmitter.

The first impression justified the well-known slogan of "One station for every degree of the dial." Making allowance for interference and a natural slight spread on the higher powered stations, this slogan is certainly an apt description of the "Super's" performance in the North. A short test brought in a host of foreigners, including French, German, Italian, Spanish, and Russian.

No attempt was made to keep a detailed log, as in the short time available for testing the "New Century Super" there was no opportunity for definitely logging the call signs and announcements of some of the fainter stations heard; only an account could be kept of the total bevy of stations.

One or two late sittings showed that America was "on tap"—if not every night, at least on every occasion that the set was given a test.

In ordinary working a striking feature was that the usual bugbear of super-hets—second-channel interference—was entirely absent. Some idea of the "Super's" capabilities can be gauged from the fact that during the preliminary try out, which took only a little over an hour, forty stations were logged on the medium waves and eight on the long. Of course, this log was considerably extended in later trials.

Mühlacker could be cleared from London Regional and Königswusterhausen from Daventry. Need more be said for selectivity?

A further test report of the "New Century Super" is given on page 1076

OUR BROADCAST CRITIC on MISCHA ELMAN

Mischa Elman, the famous Russian violinist

MISCHA ELMAN was once regarded as a prodigy. He was born in Russia in 1891, and made his début in St. Petersburg (as it then was) in 1904 at the age of thirteen. I heard him for the first time in 1905.

Prodigies are rare, of course. Most of them die in their early twenties. Occasionally it does happen that a prodigy stands up against the unnatural intellectual power and goes on like anyone else. Mischa Elman has been fortunate in this respect. He has matured and has contrived to keep up his strength as well. Thus we have the pleasant experience of hearing him at forty-one playing with the ripeness of sixty.

His playing in Queen's Hall last Wednesday must have taken listeners by storm. Never has Tchaikovsky's gorgeous violin concerto received such treatment. I have spoken to more than one violinist since, and this opinion has been emphatically substantiated.

At that same concert Adrian Boult succeeded in producing a remarkable performance of César Franck's D Minor symphony. Perhaps you will remember I suggested (when it was done at a Prom.) that you should look out for it.

NON-STOP VARIETY

On the whole, I was disappointed with the non-stop variety show. It all seemed forced to me, somehow. Nobody was very funny. Olive Groves, by the way, should not attempt character songs. This is the first time she has done it. I hope it will be the last. She has an exceedingly attractive voice. I thought she sang Roger Quilter's "June" delightfully, but I quailed in horror when she "went comic." To begin with, her songs and lyrics were not comic—not even remotely so. It is unwise to try that sort of thing when you happen to have a voice. Leave it to those who have no voices. All through her character-singing, good notes, properly produced, kept squeezing their way through and spoilt the illusion.

◆ ◆ ◆

The Hon. Harold Nicholson talked sound sense to his Lowbrow Listener. He told him he was lazy—mentally inert. He told him that he was arrogant and that he took every opportunity of scoffing at people who attempted to use their brains. That is the sort of gospel I like to hear a man preach. I am very definitely on the side of the man who tries to understand good music and art generally. These talks may do some good.

◆ ◆ ◆

I was greatly interested in *Nor'-West*. I have always considered Mr. du Garde Peach the best of our microphone playwrights. I have not forgotten his *Bread* yet. *Nor'-West*, however, was not quite up to his standard. All the craftsmanship was there and the lines were sound all through, but I thought he relied too much on the effects department. Not that I should ever discourage that excellent department! The effects improve every time I hear them. Still, plays must not depend too much on what effects provide. Perhaps Peter Creswell was a little too zealous and too determined to make the play real and full of life. I must say it held me to the end.

◆ ◆ ◆

Jack Hulbert and his Follies seemed to me to be much the same as they were the last time I heard them. Both Jack and Claude were funny—they generally are—but some of the show bored me a little. The six-minute review was the best; though not new to me, it seemed quite fresh. I have heard worse, certainly. I hope the good brothers will concoct an entirely new show on the same lines—but with *perfect* lines throughout. It does not do to let any show down, even for two minutes.

◆ ◆ ◆

I was pleased with the string Serenade later that evening. Short programmes of good string music—as opposed to actual chamber music, which is above the average listener—do a great deal of good. I am convinced of that. If only those who are really trying to improve their knowledge of music could realise the value of these programmes (which might be loosely termed "Mediumbrow"), I am sure they would obtain a great deal of aesthetic pleasure from them.

◆ ◆ ◆

May I urge you to follow these "Consider Your Verdict" series? I recommend them as pleasant brain exercises; also they teach you a little about the law.

I listened with the greatest interest to the action for damages for trespass to land. It has always been a matter of surprise to me that the notices (which used to be more common than they are to-day) to the effect that "Trespassers will be Prosecuted, *By Order*" were obeyed because people thought they really could be prosecuted for trespass. It always has been a fact that, unless damages can be proved, any owner bringing an action for trespass gets very little out of it.

This particular case was very well thought out. It was so naturally put before us, as members of the jury, that it might have actually happened. That, of course, is the charm of the whole idea; the cases seem real and not manufactured for purposes of entertainment.

I wonder what your verdict was? Personally I thought that the plaintiff weakened his case by deliberately waiting to spy upon these young lovers who were on his land. On the other hand, the young people certainly put themselves within reach of the law in a technical sense.

◆ ◆ ◆

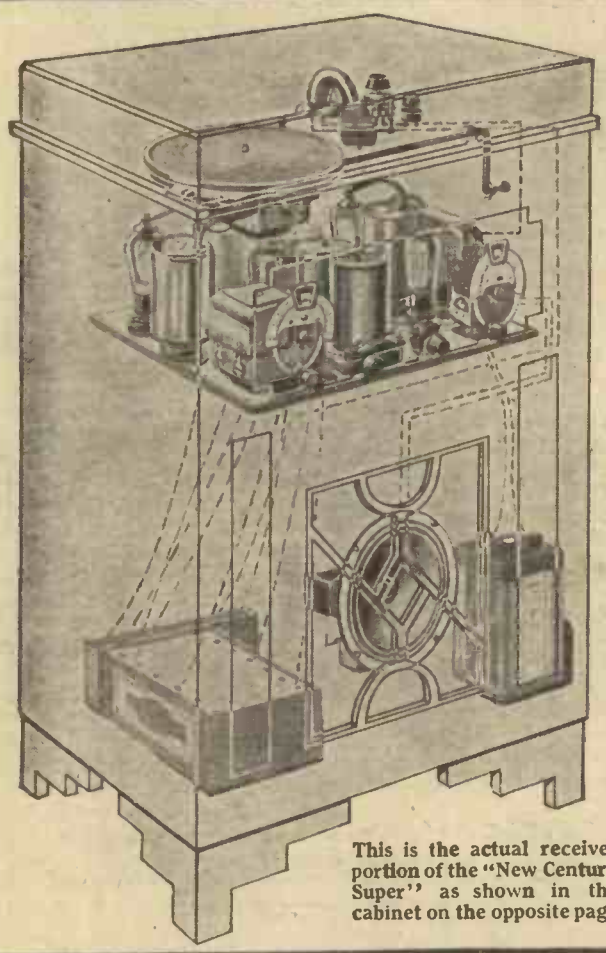
The Wireless Singers occupied the half-hour between 5.30 and 6 on Sunday evening. I thought I had never heard them sing better. Their really soft passages were most attractive in the madrigals. Stanford Robinson's "Weep You No More, Sad Fountains" was a worthy setting to well-known words. Some of his harmonies pleased me greatly. The last song, "Blue-Eyed Spring," produced a somewhat strange effect on my ears. The tonality was so queer that I began to think the choir was singing in one key and the soloist in another. It could not have been so, really, but it had that effect.

WHITAKER-WILSON.

PROGRAMME POINTERS

The idea of the Non-stop Variety shows is undoubtedly good so long as the pace does not appear forced. I was not particularly keen on the one I heard this week, but I point to the value of having items in vaudeville timed. It is not very complimentary to vaudeville in general or to any one of them in particular that I suggest the method be made a general rule. My idea is that while vaudeville is so patchy, and while so much "truck" is broadcast to fill spaces between the few good items we get, it is not a bad idea to have it timed so that listeners can switch off while items are in progress which they know they will not enjoy. It is very sad to make such suggestions, but surely we have had enough proof of the fact that the vaudevilles are merely a succession of items, some good and some not at all good. The vaudevilles have improved lately, on the whole, and I am sure every effort is being made to bring them up to a high standard. On the other hand, there are still many artistes who fail us time and time again. The remedy lies in the hands of the vaudeville department. When the shows are good all through there will be no need to time the programmes; until they are good all through perhaps it is not unreasonable to make the suggestion.

The NEW CENTURY RADIO-GRA



This is the actual receiver portion of the "New Century Super" as shown in the cabinet on the opposite page

This fine set can be conver simple addition of a few c radio-gram cabinet, it make ture. The accompanying a the few alterations enablin obtained with the "

THE "New Century Super" makes an excellent radio-gram. The receiver unit has such an excellent performance that you will not be disappointed with the radio side of the instrument. The low frequency side of the "Super" is designed to give good quality and a useful output, so that excellent record reproduction is assured.

The set can be used in a complete radio-gramophone cabinet, as shown by one of the accompanying photographs. This is the best way to make use of the "Super" as a radio-gramophone, for it results in a fine piece of furniture, as well as a high-performance receiver and electric gramophone. But if you want to use an ordinary acoustic gramophone, with a pick-up fitted on a tone arm, and with the "Super" housed in its own table-type cabinet, then you can simplify construction, at least so far as the cabinet work is concerned. The "Adaptagram" cabinet shown can be bought ready made, so that you need not bother yourself with woodwork. The "New Century Super" slides into its own compartment in the cabinet, the speaker and batteries are housed below, and the radio-gramophone equipment, turntable, pick-up, volume control, and switch are fitted on the motorboard. The "Adaptagram" cabinet is of a modern design in keeping with the general design of the "Super."

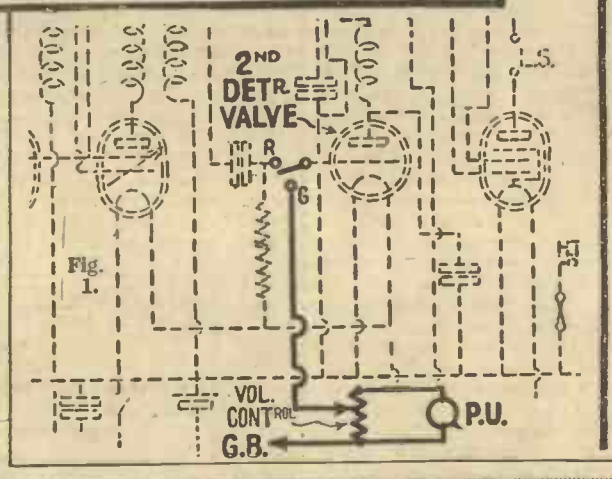


Fig. 1.

The Motor-board Arrangements

A brief description of the motor-board equipment will be given, so that no matter whether you use a console type of cabinet, such as the "Adaptagram," or a small radio-gramophone table cabinet, you can complete the motor-board equipment.

The motor board must be drilled for the gramophone motor, the pick-up, radio-gramophone change-over switch, and the gramophone volume control, if you decide to fit this latter component on the board instead of on the front of the cabinet. A clockwork gramophone motor is specified, but those who are working the "New Century Super" from the mains can, of course, use an electrically-driven turntable. You must then take particular care to keep the motor wiring well away from any of the set leads, for fear of induction.

Both the pick-up and motor are supplied with drilling templates, so that the mounting centres for these parts can be gauged. If the pick-up is mounted correctly, it will have a practically negligible tracking error, but if you simply guess at the right position

EXTRA COMPONENTS FOR THE "NEW

GRAMOPHONE MOTOR (Clockwork)
1—With turntable (Cabaret).

GRAMOPHONE PICK UP
1—(British Radiophone, Lissen, Bluespot, Clarion, H.M.V., B.T.H., Marconiphone, Harlie).

RADIO GRAMOPHONE SWITCH
1—(Bulgin, Ready Radio, Tunewell) or
1—Double-pole change-over Switch (Wearite).

VOLUME CONTROL
1—50,000-ohm potentiometer (Colvern, Varley, Bulgin, Lissen, Watmel, Lewcos).

THE "NEW CENTURY SUPER" WAS DESIGNED BY THREE LEADING

SUPER AS A AMOPHONE

rted into a radiogram by the omponents. Housed in the s an excellent piece of furni- rticle tells you how to make g record reproduction to be New Century Super."

for the pick-up boss, with respect to the turntable spindle, you will probably result in a considerable tracking error and record wear will be accentuated.

Needle bowls can be mounted on the motor board and it is a good plan to put the waste needle bowl right underneath the pick-up head in its position when moved away from the record, so that the waste needles can be dropped straight out of the pick-up grip into the bowl.

Volume Control

The photographs of the turntable equipment show that the radio-gramophone change-over switch and volume control are mounted close to the pick-up arm. When the volume control is close to the pick-up, the grid leads are kept as short as possible which is always an advantage. If the cabinet is not too big, however, you can, if you wish, mount the volume control on the side of the cabinet, still keeping the leads from the pick-up to the control and from the control to the set short, direct, and well spaced away from any of the set wiring.

There is not much point, however, in having a radio-gramophone change-over switch on the cabinet front or side, and in any case this would mean extending a considerable amount of wiring.

Switching

There are two ways of fitting a radio-gramophone change-over switch, and these are shown by the circuits Figs. 1 and 2.

In both cases the system of changing over from radio to gramophone is the same, and the difference is in the filament switching.

If the "New Century Super" is used more often for radio than for gramophone, it is hardly worth the complication of fitting a double-pole double-throw switch to cut out the unused detector oscillator and high-frequency valves when the set is used as a gramophone amplifier. A simple single-pole double-throw switch then suffices to change over the grid connections. This scheme is shown by Fig. 1.

For long periods of gramophone working it is inadvisable to run the four valves before the second detector stage, as they are not serving any useful purpose in the gramophone circuit. Only the second detector and pentode output valves are used for gramophone amplification. Fig. 2 shows the scheme of connections for a double-pole double-throw switch to cut out the filament circuit of the first detector, oscillator and H.F. valves when the "New Century Super" is used as a gramophone amplifier.

The difference in the filament connections between Fig. 1 and Fig. 2 is small and neither arrangement necessitates any extensive alteration of the set's wiring. The main difference is in the type of switch needed.

The grid connections with both switches are very simple. The grid of the second detector is taken to the centre point of the double-throw switch. One point is taken to the .0002-microfarad grid condenser, and when the switch is clicked over to this position the "New Century Super" works in its ordinary way as a radio receiver. The other side of the double-throw switch is taken to the pick-up wiring and volume control. The other side of the volume control is taken to an additional tapping on the grid-

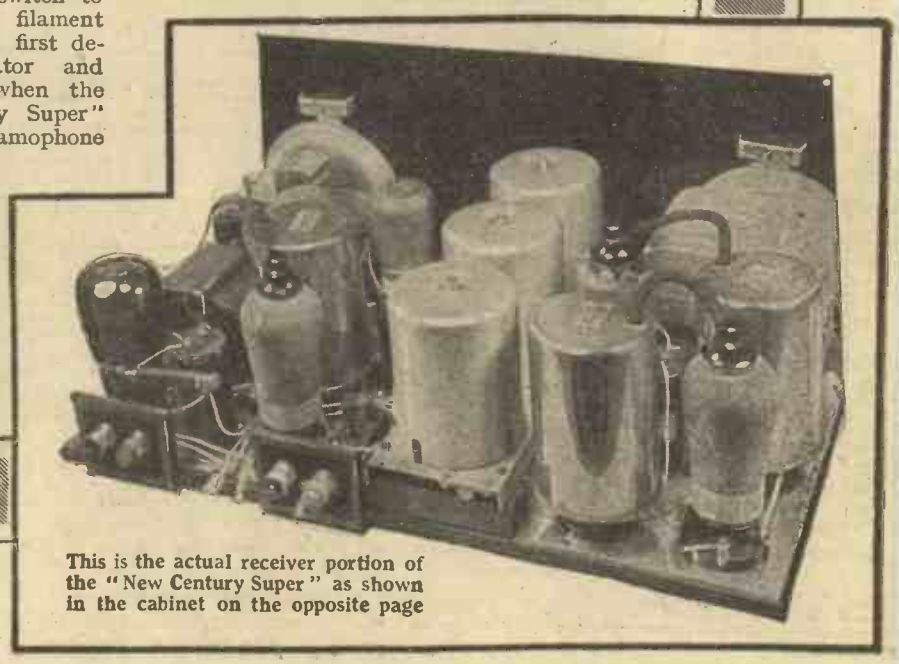
"CENTURY SUPER" RADIOGRAM

CABINET

1—Special radio-gramophone (Peto-Scott "Adaptagram").

SUNDRIES

1—Wander plug, marked: G.B.—8 (Clix, Belling-Lee, Eelex.)
1—Dual needle bowl (Bulgin).
1—Length of screened connecting wire (Goltone).
One yard thin flex (Lewcoflex).
1—Permanent-magnet moving-coil loud-speaker (Rola, type F5PMP).



This is the actual receiver portion of the "New Century Super" as shown in the cabinet on the opposite page

EXPERTS—W. JAMES, PERCY W. HARRIS AND RUTHERFORD WILKINS

"THE 'NEW CENTURY SUPER' AS A RADIOGRAM"—Continued

bias battery. A 50,000-ohm potentiometer is used as the gramophone volume control (which is quite a separate control from the radio volume control) and one terminal of this is connected through a flex lead to the grid-bias battery tapping.

Here is a rear view of the "New Century Super" Radiogram which shows how the set and accessories are fitted

In working, this tapping should be tried in first the 1½-volt negative tapping and then in the 3-volt position. A small amount of bias is needed to enable the PM1HL detector to work efficiently as the first stage of the gramophone amplifier. The normal bias on the pentode output is sufficient, of course.

The Rola speaker recommended is fitted with a tapped input transformer. Thus no special output circuit is needed in the "New Century Super." This console-type speaker can be fitted into the "Adaptagram" cabinet. If an external speaker is used, then it may be advisable to have an output unit, especially if the external speaker has not its own input transformer.

With the independent radio and gramophone volume control fitted to the radio-gramophone addition of the "New Century Super," the user has a fine control of performance, both on radio and gramophone working. The 50,000-ohms radio-volume control enables the signal to be magnified enormously if this control is set at maximum and by turning the control to minimum, the local station can be brought down to comfortable volume.

The gramophone control, in just the same way, enables record reproduction to be obtained at anything from a mere whisper up to the full volume output of this fine set.

Designed by three experts, the "New Century Super" is the best that you can build.

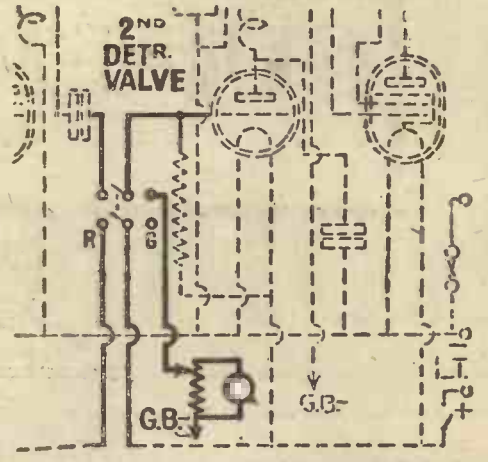
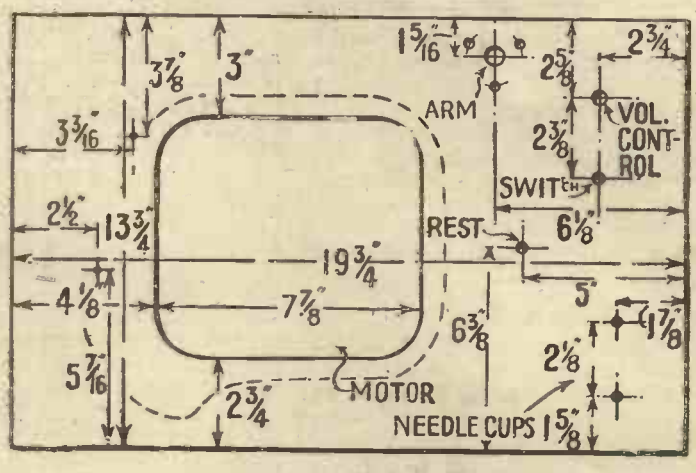


Fig. 2. Complete radiogram switching which cuts out the valves not in use

A broadcast of Hereford's most famous industry, the making of cider, is included in the Midland Regional programme on November 24, when a relay will be taken from the famous cider factory in the county.



Dimensioned diagram of the motor-board

The parts which you will need to build the "New Century Super" Wireless Receiver

VARIABLE CONDENSERS
1—Twin gang .0005 (J.B., Unitune 2 type D, or British Radiophone, Polar, Utility).
1—Single .0005 (J.B., Nugang type A1, semi-screened, or Polar, Utility).

COILS
3—Super-het intermediates (Wearite, type OT2).
1—Ganged oscillator and band-pass coils with on-off switch Lissen).

TRANSFORMER
1—L.F. coupling unit (Telsen 10-1 or Lissen, Siektun, Bulgin, Igranic, Varley, Ferranti, Lotus, Goltone, Tunewell, Formo).

H.F. CHOKE
1—H.F. choke (Siektun Super-het or Ready Radio, Climax, Graham-Farish, Tunewell, Wearite, Telsen, Goltone, Lissen).

PRE-SET CONDENSER
1—.0003 max. Sovereign or Lissen, Formo, Telsen, Varley, Igranic).

FIXED CONDENSERS
2—1-mfd. (Dubilier, type 9200).
1—.02-mfd. (Dubilier, type 9200).
3—One .0001, one .0002, and one .001 (Lissen or Dubilier, T.C.C., Telsen, Goltone, Sovereign, Graham-Farish, Franklin).

RESISTANCES
2—One 1-meg. and one 2-meg. grid leak (Graham-Farish "Ohmite," Lissen, Erie, Telsen, Goltone. Dubilier, Tunewell).
2—One 20,000-ohm and one 50,000-ohm resistance (Graham-Farish, "Ohmite," or Lissen, Erie, Telsen, Goltone, Dubilier, Tunewell).

VOLUME CONTROL
1—50,000 potentiometer and combined switch (Bulgin V.S.30).

VALVE HOLDERS
9—Eight four-pin and one five-pin (Telsen, Lissen, W.B., Goltone, Bulgin, Ready Radio, Lotus.)

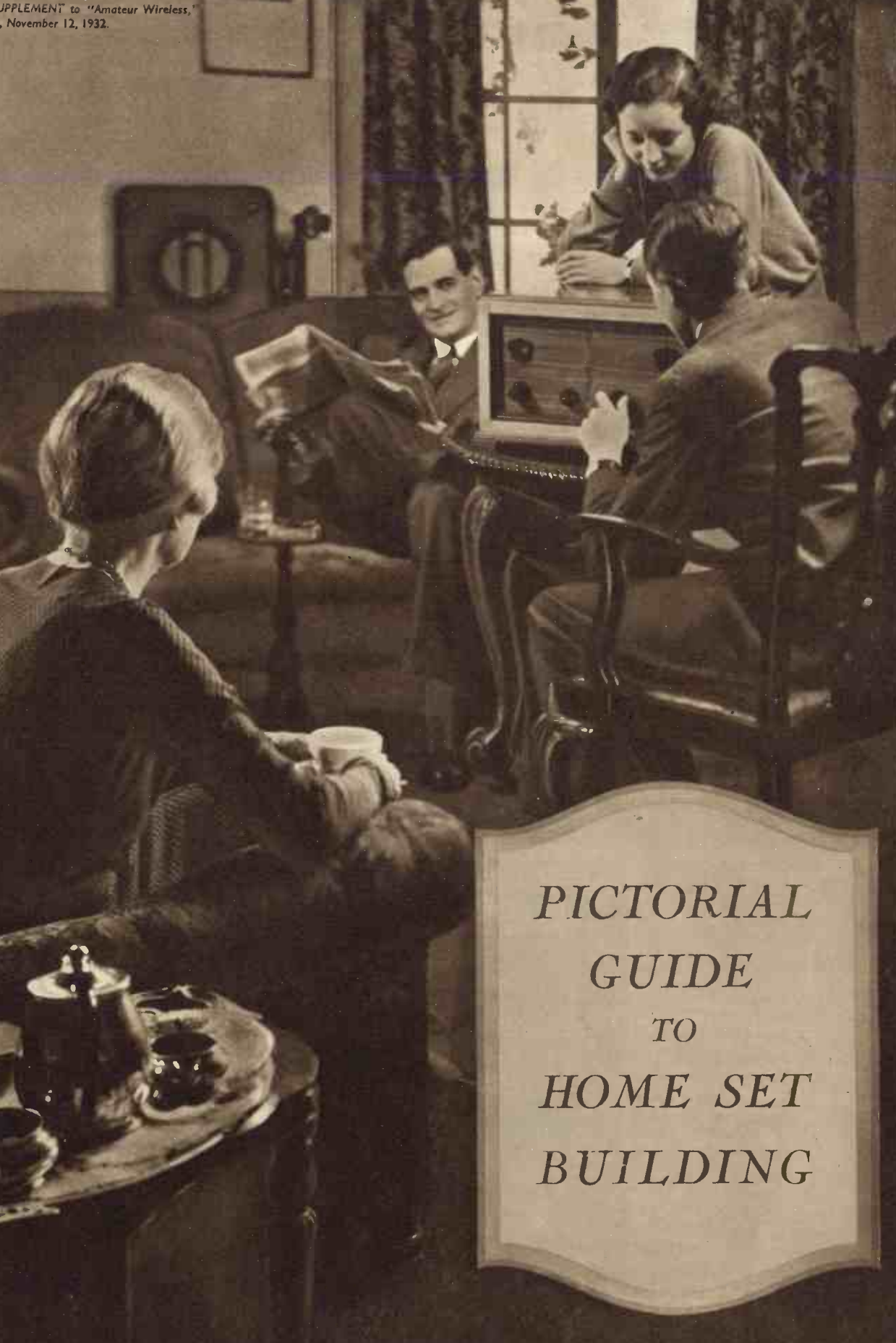
TERMINAL BLOCKS
2—Sovereign or Lissen, Goltone, Telsen.

TERMINALS
4—Marked Aerial, Earth, L.S.+, L.S.—, (Clix, or Belling Lee, Eelex).
9—Wander plugs marked G.B.+, G.B.—1, G.B.—2, H.T.—, H.T.+, H.T.+1, H.T.+2, H.T.+3, H.T.+4 (Clix, Belling Lee, Eelex).
2—Spade terminals marked L.T.—, L.T.+ (Clix, Belling Lee, Eelex).

SUNDRIES
6 yds. connecting wire and sleeving (Lewcos or Jiffilinx).
One piece of aluminium foil 10 ins. by 10 ins. (Peto-Scott).
Six yards thin flex (Lewcoflex).
Fuse and holder (Ready Radio, Lissen, Bulgin, Belling Lee).
One aluminium bracket. (Peto-Scott).

RECOMMENDED ACCESSORIES FOR TABLE MODEL
Cabinet with baseboard, 16 ins. by 10 ins. and panel drilled to specification (Direct Radio).
Cabinet Loud-speaker (W.B. Mansfield or Blue Spot, Lissen, Epoch, R. & A., Celestion Igranic.
120-volt H.T. battery (Lissen Power type, or Drydex, Oldham, Ever Ready).
16-volt G.B. battery (Lissen or Drydex, Pertrix, Ever Ready).
2-volt accumulator (Lissen, Exide, Oldham, Pertrix, Ever Ready).
H.T. unit (Atlas A.K.260 or Ekco, Regentone, Lissen, Climax, Heayberd).
One coil aerial wire (Electron).
Earthing device (Graham-Farish "Filt").

RECOMMENDED ACCESSORIES FOR CONSOLE MODEL
Cabinet (Camco "Windsor," Myers-Hunt "Whitehall-de-luxe.")
Chassis loud-speaker (Rola F5PMB or W.B., Sonochorde, R. & A., Epoch, Lissen, Blue Spot, Ormond, Igranic).
Batteries, accumulator, H.T. unit, and aerial and earth equipment as for Table Model.



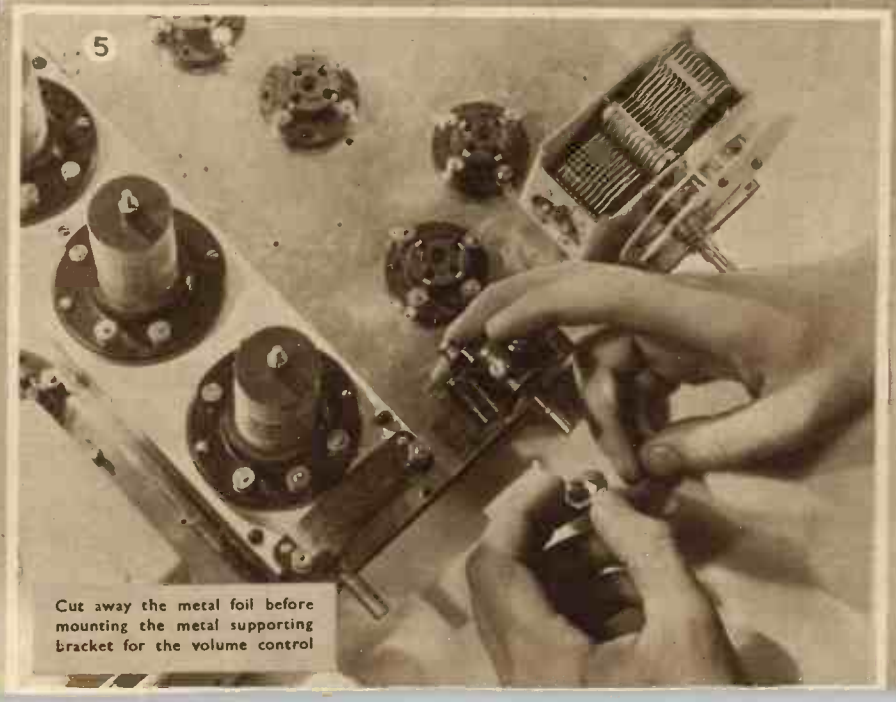
PICTORIAL GUIDE TO HOME SET BUILDING

STEP-
DEMONS
THE "N

1 Use the full-size print as a template for fixing baseboard parts. Place print as shown, pricking through holes with awl

2 When fixing valve holders, make sure the grid and anode sockets are the correct way round to keep the leads short

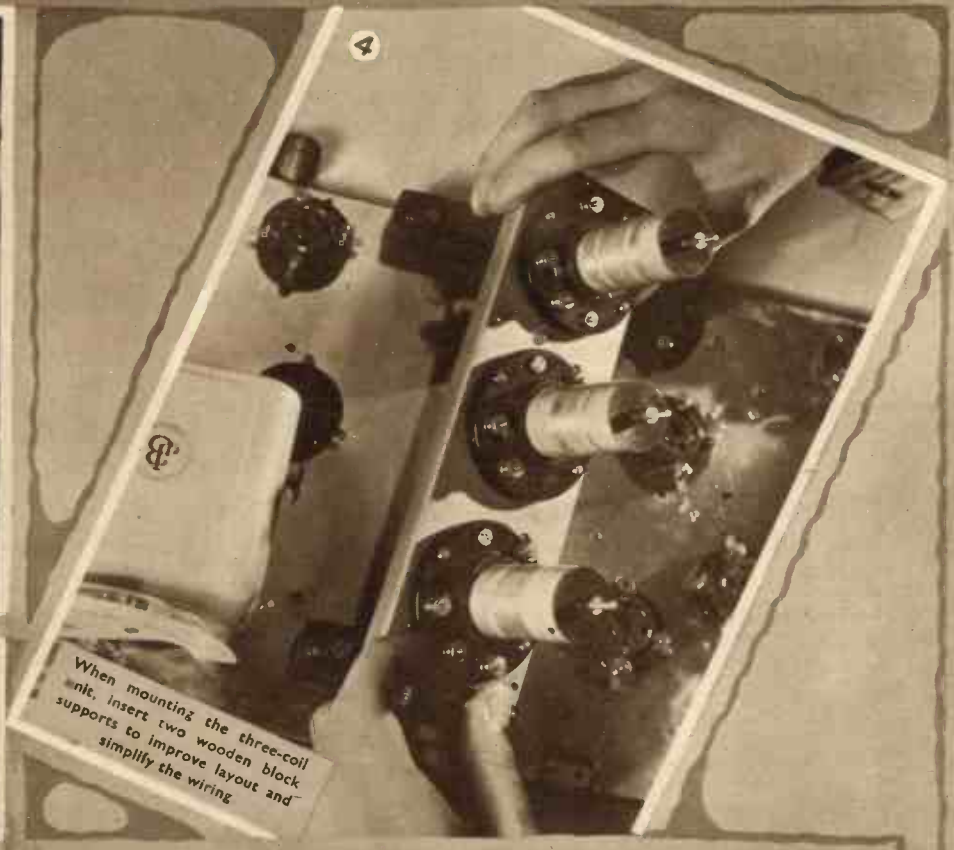
3 Before fixing the oscillator condenser cut away metal foil round feet on baseboard to avoid earthing



5 Cut away the metal foil before mounting the metal supporting bracket for the volume control

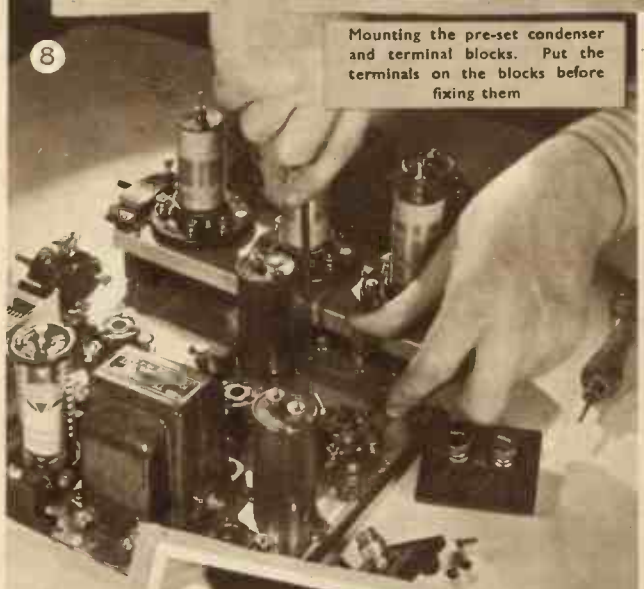
6 For position of the coupling u fitted towards the end of the carefully prick through the f size print

-BY-STEP PICTORIAL
STRATION OF BUILDING
EW CENTURY SUPER"

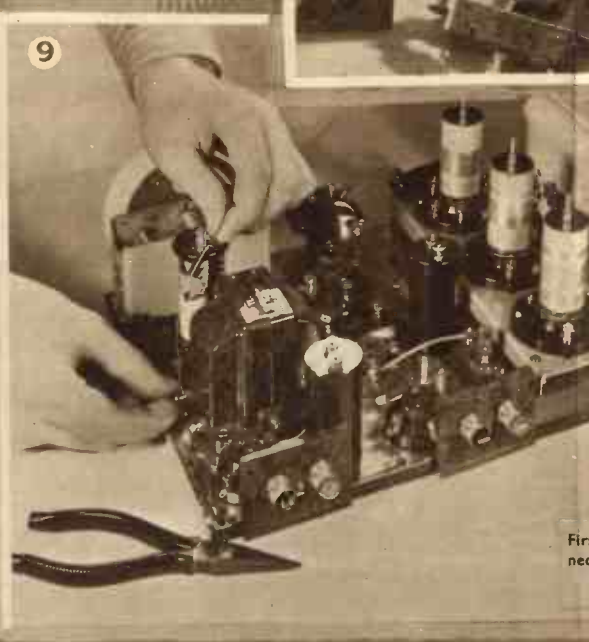


When mounting the three-coil unit, insert two wooden block supports to improve layout and simplify the wiring

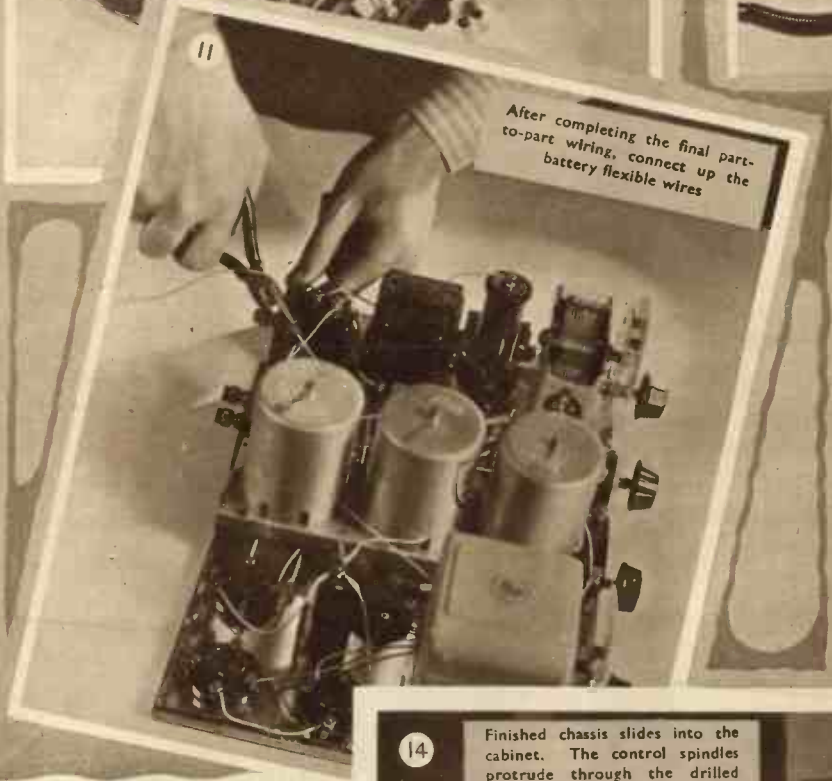
Take care that the foil does not bulge and thereby short-circuit the fuse or choke



8 Mounting the pre-set condenser and terminal blocks. Put the terminals on the blocks before fixing them



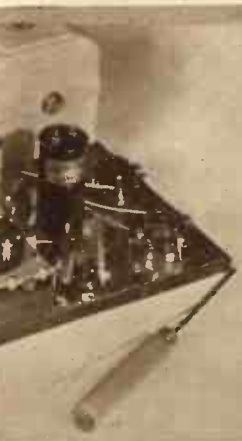
9



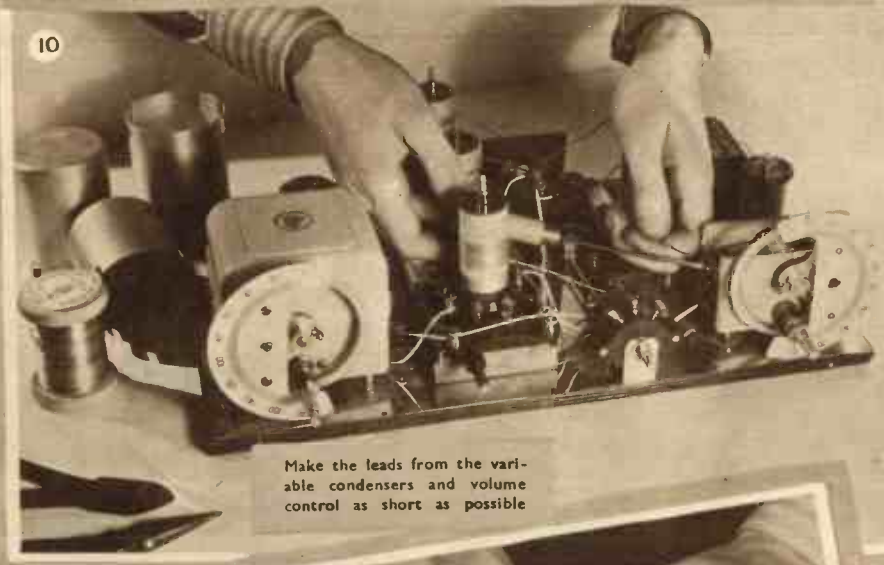
11 After completing the final part-to-part wiring, connect up the battery flexible wires

12

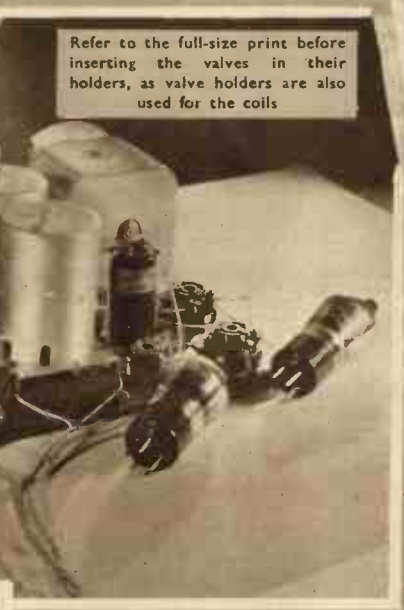
14 Finished chassis slides into the cabinet. The control spindles protrude through the drilled panel to take the knobs



st step in wiring—make the connections for the valve holders, coupler, and choke



Make the leads from the variable condensers and volume control as short as possible



Refer to the full-size print before inserting the valves in their holders, as valve holders are also used for the coils

The final connection is the securing of the coil pigtails to the variable-mu valves

POINTS TO WATCH WHEN BUILDING YOUR "NEW CENTURY SUPER"

TO tack down the metal foil is an easy job if you use gimp pins. Drive them in every 2 in.

The metal foil must be cut away from the fixing bushes of the oscillator condenser and the volume control, otherwise they will be shorted to earth and the set will not work.

Take care when making the counter-sunk holes under the baseboard for the condenser fixing that these are not too large, or the fixing screws will go right through the wood.

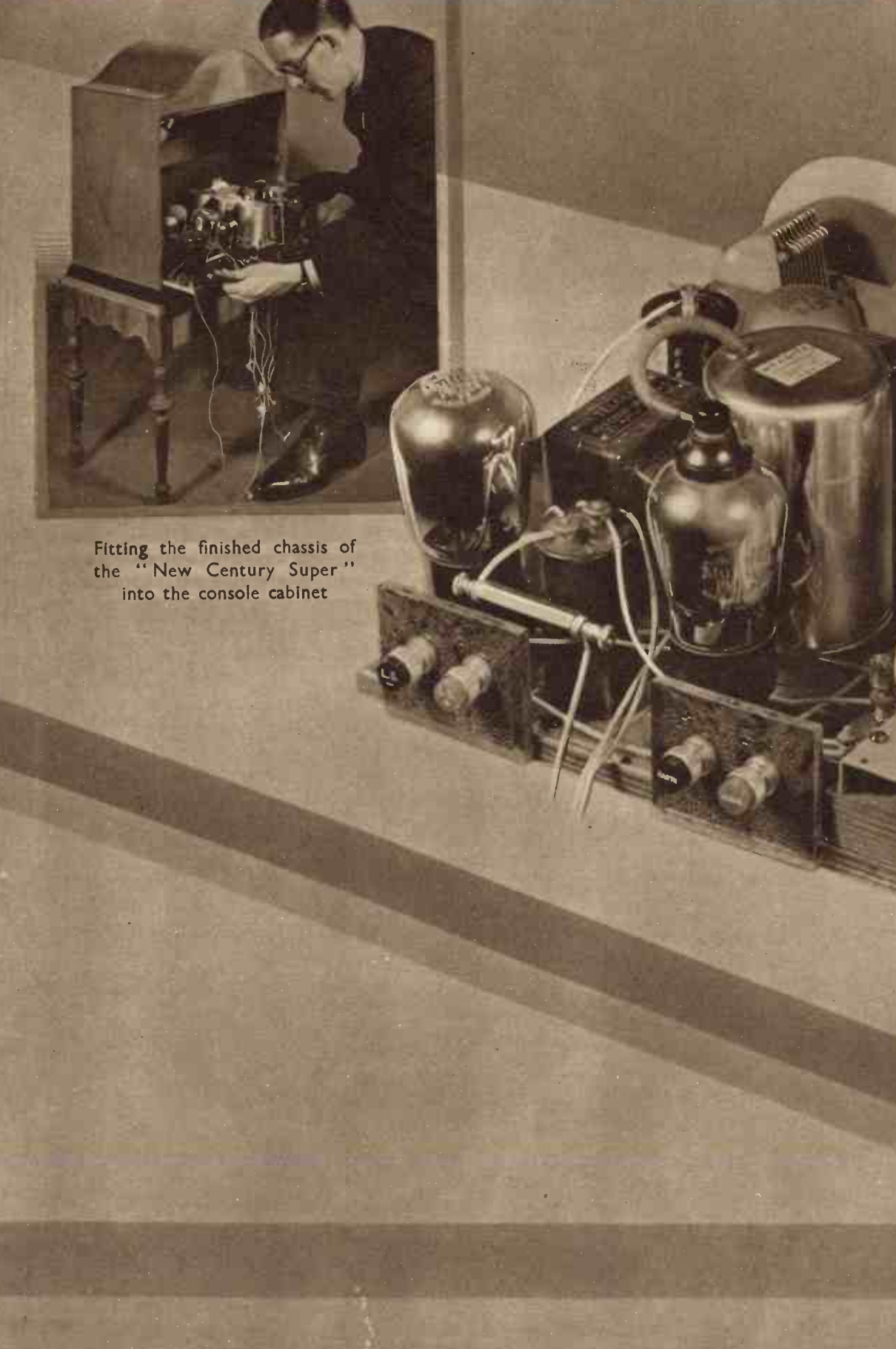
Make a point of cleaning the metal foil around the fixing screws of the three-coil unit, otherwise you may get a bad contact; these screws are used as earthing points.

For the component fixing you can use ½-in. and ¾-in. round-head black screws of No. 4 gauge. These will avoid chipping the bakelite mouldings of the components.

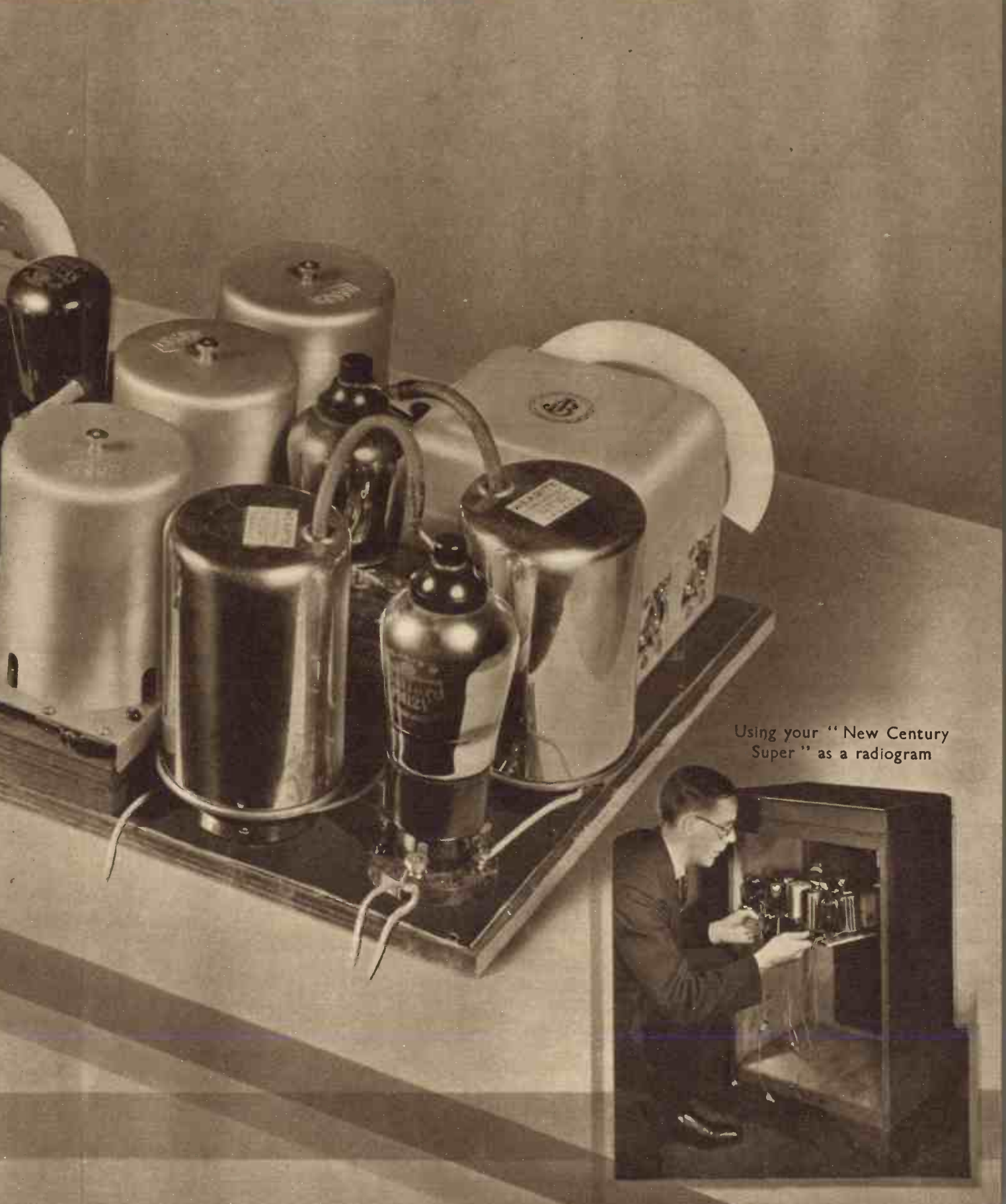
Note that when wiring up the components the full-size print gives the order of wiring.

Do the wiring with No. 20-gauge round-tinned-copper wire, with 1- or 2-millimetre insulated sleeving.

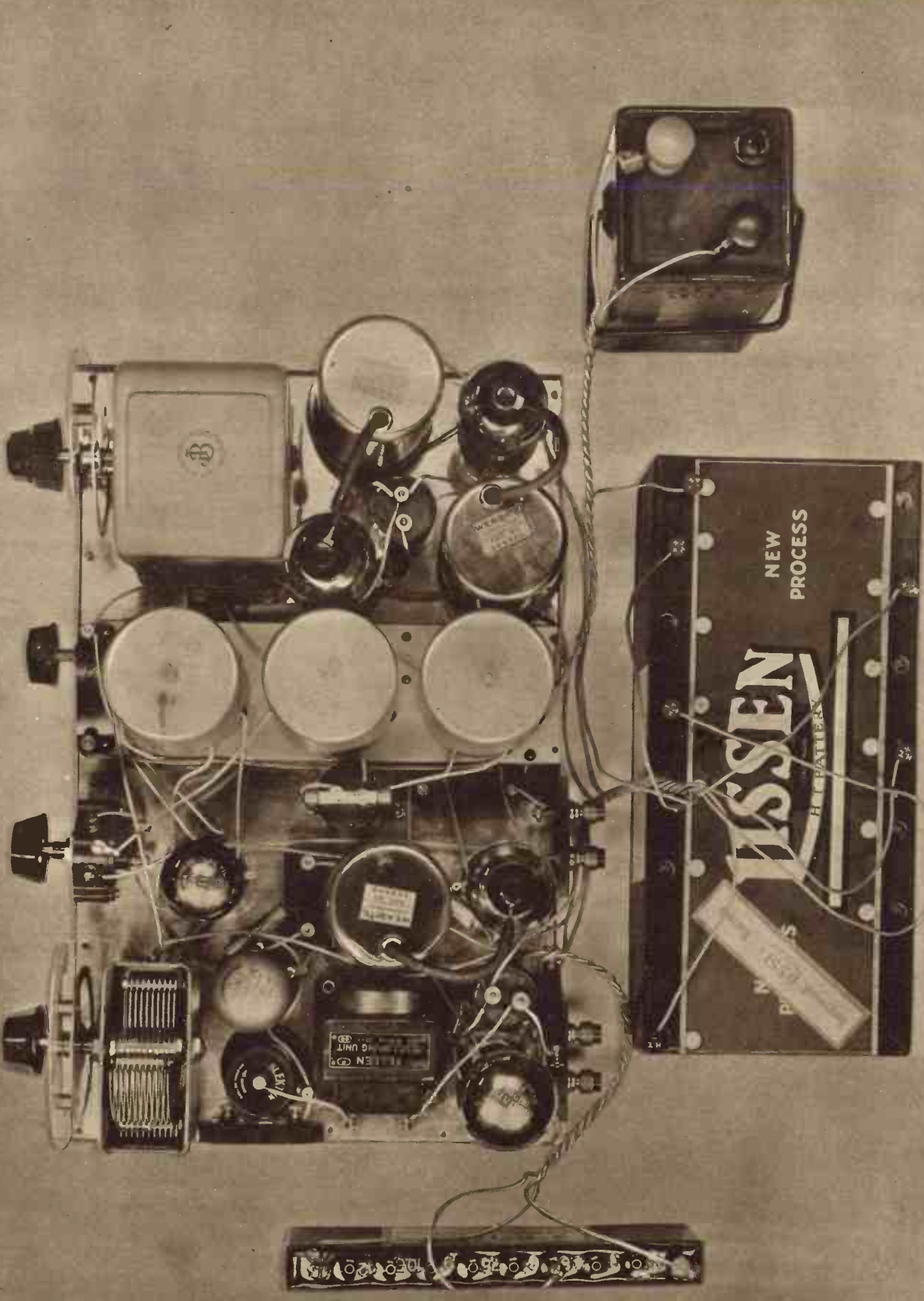
The full-size print referred to in the above instructions is a blackprint, issued free with "Amateur Wireless" dated October 29. Readers who prefer to work with a blueprint can obtain it by sending 1s. 6d. to "Amateur Wireless," 58-61 Fetter Lane, London, E.C.4.



Fitting the finished chassis of the "New Century Super" into the console cabinet



Using your " New Century Super " as a radiogram



This large scale view shows the actual high-tension and grid-bias tappings that must be used to ensure highest efficiency when working the "New Century Super."

SPEAKER STATIONS

first try-out of the wonderful

SKYSCRAPER

Lissen have made the building of the Skyscraper extremely simple for you. Elaborate care has been taken to ensure your success by giving—in the Skyscraper Constructional Chart—such detailed instructions and such profuse illustrations that everybody, with no technical knowledge or skill at all, can build it quickly and with complete certainty of success.

You buy the Lissen Skyscraper Kit complete with valves—a Lissen Metallised S.G., a High Mu Detector, and a Lissen Economy Power Pentode Valve, and the price is only 89/6. Or you can buy the Lissen Walnut Consolette Skyscraper Cabinet and Loud-speaker combined as illustrated. It holds all batteries, and accumulator and loud-speaker as well. It makes everything self-contained. A special Pentode Matched Balanced-armature Loud-speaker of great power is supplied with the cabinet, and the price of the Skyscraper Kit complete with valves and this cabinet and loud-speaker is only £6 5s.

The most complete and compact receiver as well as the most powerful set you can possibly build for yourself! Ask your dealer for your FREE copy of the Skyscraper Chart, or post coupon below.

COMPLETE IN CABINET WITH LOUDSPEAKER £6·5s

GREAT LISSEN CONSTRUCTIONAL CHART FREE

ASK YOUR DEALER OR POST THIS COUPON

COUPON

To LISSEN LTD., Dept. A.W.11, Worple Rd., Isleworth, Middlesex

Please send me FREE copy of your 1/- Skyscraper Chart

Name .....

Address .....

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 Lightning Puzzle

SIR,—Several weeks ago my home was struck by lightning, the charge coming down one of the chimneys and jumping across from the fireplace through the floorboards on to the electric-light point in the room below. It seems that part of the charge went along the neutral wire through the fuse box to earth (of course blowing all the fuses) and the other charge went down an extension wire feeding the "mains" wireless set (Ether Searcher, 1931). The H.T. unit is fitted with input fuses, and both of these were blown, but when these had been replaced the set refused to function on the H.F. side. On testing the S.G. valve I found that the filament was intact, but it refused to pass any H.T. current, and so I have come to the conclusion that the cathode must have lost its emission through receiving a heavy charge from the earth.

I thought that it might be of interest to your readers, and should welcome any opinions as to what did actually happen. I would mention that all this happened one night when the aerial was earthed and the set was not being used.

V. B. (Ashford).

The New Patents Act

SIR,—The letter from E.C.A. relating to the New Patents Act should not be allowed to pass without comment. In the first place, his statement that there is to be no extension of the Official search is inaccurate. The search has already been enlarged, and the area of investigation will be systematically extended as time goes on.

In the second place his opinion that patents granted in Germany and the United States have a higher reputation than British patents is not founded on fact.

W. T.

Modern Dance Music

SIR,—I have read with interest the letter on "Syncopation" sent by the "Not Crazy People" of Woking.

When they refer to the murdering of modern dance music, I hope they are not confusing "syncopation" with "hot music" as played by some of the negro dance bands.

I presume they realise that "syncopation" was introduced into dance music to prevent the plain music from becoming monotonous, but at the same time not disturbing the rhythm of the tune.

Many *modern* people will agree that dance music would soon lose its attraction if it were played without syncopation.

As people have changed with the times, dance music has done likewise, but it is apparent that the "Not Crazy People" have yet to do so.—A MODERN SYNCOPATOR (North Woolwich).

Praise for the "Century Super"

SIR,—With reference to H S.R.'s letter it is more apparent to me every day lots of folk have missed the best in radio—"The Century Super." Aberdeen is receivable down here, and the Scottish "twins" are overpowering.

Let's hope these unfortunate ones will remedy their past mistakes and build the "New Century Super," then they will realise what modern radio reception is.

H. W. (Llandudno).

The First Portable Super-het

SIR,—In your paper of October 29 I notice a letter from Electrical Devices Co. (London), contesting the statement that the Gramophone Co. had the distinction of being the first concern to introduce a portable super-heterodyne receiver.

As far back as February, 1927 the writer designed an 8-valve portable super-heterodyne for the Radi-Arc Electrical Co. of Bennett Street, Chiswick, and this set was, if I remember right, very favourably reviewed by your papers of that time.

This set was self-contained and was very popular at that time, and was shown at the Radio Show of that year.

HARDY ELECTRIC LTD. (London, W.)

A Newcastle Grouse

SIR,—In your issue of October 29, you published a letter from an Aberdeen listener (H.S.R., Aberdeen) calling attention to the woes of listeners in that part of Scotland.

As a Newcastle listener I can safely voice the same opinion in regard to the Newcastle station. The shortish wavelength is certainly *not a success*; in fact to thousands it is worse than that, it is a calamity. Crystal sets are now a complete washout, and hundreds of valve sets (many expensive all-electric modern 3- and 4-valve sets) are unable to tune in to this station.

As in Aberdeen, we can only get the Regional stations with a tremendous amount of fading; foreign stations are our chief source of amusement. In a densely populated district like Tyneside it seems a great shame that conditions are so bad. However, the B.B.C. says that it *should* be all right, so that settles it.

T. C. A. H. (Newcastle-on-Tyne).

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.

"ARE OUR L.F. TRANSFORMERS GOOD ENOUGH?"

(*Continued from page* 1047)

There is, however, a further serious discrepancy. This particular transformer was rated to have a 3½ to 1 step-up. In other words, the secondary had 3½ times as many turns as the primary. Yet it will be seen that even at the maximum point the actual step-up is only 2.6, and that at the low and high frequencies it is much less. Hence, we are not only losing in quality, but the actual signal strength is suffering.

The explanation of this effect involves transformer theory and is a little complicated. The loss arises from two factors. One is the resistance of the windings, which is usually neglected, but is quite important, and the second is the leakage between the windings, i.e. the fact that the magnetic field produced by the primary does not all affect the secondary, so that some is wasted.

These effects may be represented by a resistance and choke in series with the transformer primary as shown in Fig. 2, from which it will be clear that the full voltage from the detector valve is not applied to the transformer, a good deal being lost on the way. We can minimise this loss by reducing the resistance and leakage inductance of the windings, but this again costs money.

Our design is thus a matter of compromise between cost and performance, and the point at which the compromise is adopted depends on the other factors in the circuit, principally the loud-speaker. As already mentioned, loud-speakers are developing so rapidly that some improvement in transformers is becoming necessary, and our old ideas require modification. The introduction of parallel-fed arrangements is a step towards providing the better response required without too much additional expense.

The second question, that of the actual step-up, as compared with the turns ratio, however, is one which still seems to merit attention. It would appear, therefore, that the time is ripe for better quality transformers. With the improvement in our knowledge of the subject it should now be possible to provide a really good curve with a high step-up at a cost not seriously in excess of the present prices and the results will certainly justify the extra few shillings.

High Tension Current FOR A HALF-PENNY A WEEK!

That's all your H.T. current costs from this Lissen H.T. Power Unit

Low first cost is practically your only outlay because the cost of running a Lissen Eliminator is so small that your meter will hardly register the current it takes. No current from any eliminator is smoother or more silent than the current of a Lissen Eliminator. No eliminator output is more constant, none is so free from hum. Every Lissen Eliminator will deliver—

20mA Output in perpetuity—

sufficient H.T. current to feed the largest receiver, with the biggest power valves you are ever likely to use.

Large smoothing chokes—big condensers—no chance of motor-boating. Decoupling arrangements incorporated in every eliminator—you connect the Lissen Eliminator almost as you would an H.T. battery. Everything has been thought out for you—you simply put the eliminator in. Lissen have made eliminators safe by totally enclosing all the current-carrying parts in high-grade insulating material—see also the thickly insulated "cab-tyre" flex.

Yours *for* 5/- DOWN

From the four types of Lissen Eliminators mentioned on this page you can choose one which exactly suits your set. The type you want is easy to choose. Your dealer will help you, or write direct to factory.

Every Lissen Eliminator is available for a small initial payment and easy gradual purchase terms.

D.C. MODEL "A"

100/110, or 200/250 volts. Cash price **27/6**. Or 5/- down and 5 monthly payments of **5/6**.

D.C. MODEL "B"

100/110, or 200/250 volts. Cash price **39/6**. Or 5/- down and 8 monthly payments of **5/-**.

A.C. MODEL "A"

100/110, or 200/250 volts. Cash price **60/-**. Or 5/- down and 10 monthly payments of **6/6**.

A.C. MODEL "B"

100/110 or 200/250 volts. Cash price **75/-**. Or 5/- down and 10 monthly payments of **8/-**.

LISSEN

D.C HIGH-TENSION A.C POWER UNIT

Set builders will be interested in this description of a wide range of components embodying many novel features

POPULAR components such as the Filt in the Graham Farish range are causing so much favourable comment that the interest in other components of the range is apt to be overshadowed.

It may, therefore, happen that there are some newcomers to radio who do not know that Messrs. Graham Farish make a very wide range of home-constructor parts of all kinds. Even keen radio fans may not have met some of the latest additions to the range.

Four favourites, the Audion R.C. unit, vertical holder for leaks and chokes, valve holder and one of the wide range of Lit-loss variable condensers

A large number of the new Graham Farish parts are shown by the accompanying photographs. These illustrate some old favourites, such as the Gard lightning protector and the Ohmite fixed resistance.

Ohmite Resistances

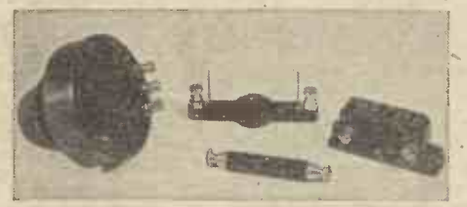
The Ohmite resistances were among the first composition types to be introduced and were certainly the first reliable components of this type. Composition resistances previous to the introduction of the Ohmite types had been looked upon with a certain amount of suspicion. The precision construction and exact ratings of the Ohmite resistances showed how useful this type of component can be. The new Ohmite resistances are available in a very wide range.

The Gard lightning protector is a worthy companion to the Filt percolative earth and the combination of these two components results in an efficient and safe aerial-earth arrangement.

Among the new parts are the Litloss variable condensers (solid dielectric) and the Megite potentiometer-type volume controls. An idea of the value offered in connection with the Lit-loss condensers can be gauged from the fact that these low-loss solid dielectric variables are obtainable at only 2s., in types suitable for tuning or reaction control. The Megite potentiometers, real precision jobs, cost only 3s. 6d., for types up to 25,000 ohms.

Useful Fixed Condensers

The value offered in small moulded bakelite parts is exceptional. A really well-made four-pin valve holder costs only 6d. It is a low-loss component with ample contact area for the pins. Fixed condensers with tested mica insulation cost only



(Left to right), one of the many Megite potentiometers, grid leak holder. Ohmite resistance and a typical Graham-Farish fixed condenser with flat or vertical mounting

1s. for all capacities up to .004 microfarad, and 1s. 6d. for those up to .01 microfarad. These fixed condensers are provided with special moulded fixing brackets, so that they can be mounted flat or vertically, which is a handy point in construction.

The Graham Farish vertical holder (another component which is exceptional value for 6d.) is a similar aid in construction as it enables any Graham Farish Ohmite or Megite leak, or any similar small component with end caps to be stood in a vertical position, and the connection made to the base by a second terminal.

The finish of all the Graham Farish parts is exceptional and the mechanical details of the moving parts are such as to satisfy the most discriminating set-builders.

St. John Ervine's play, *The Ship*, which is to be broadcast from Manchester on November 14, has been chosen especially for inclusion in the Birthday Week programmes.

A chocolate worker from York will describe a day in his life in a talk from the Leeds studio on the North Regional wavelength on November 14.

The first part of the Liverpool Philharmonic Concert is to be relayed to North Regional listeners on November 15. Sir Thomas Beecham will conduct the programme, which is purely orchestral.

Henry Holst takes his part in the Birthday Week programmes when, on November 15, he is to give a violin recital of works by contemporary composers on the North Regional wavelength.

The soloists in an orchestral concert on November 16 for North Regional listeners are Rispah Goodacre, the Sheffield contralto, and Stephen Wearing, the Liverpool pianist.

The Graham Farish "Filt" percolative earth needs no introduction; nor does the Gard lightning protector, shown on the right of this photograph. In the centre are an H.F. choke and capped-type grid leak

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"HOW I IMPROVED RANGE AND SELECTIVITY"

(*Continued from page* 1040)

battery. With the screen-grid valve I am using, I find I need 90 volts on the screening grid lead; but you had better try different values for yourself as it makes a lot of difference to the "punch" you get out of the valve.

Well, now just a word about fitting the unit to the set. If you have an old set which is going to be rebuilt, then you can build the unit complete in the new set. But if (as in my case) you are only making up the booster because you want to avoid rebuilding the old set, then you should fix the unit at the side of the set's box, so that you won't need long wires.

You simply take the aerial and earth wires off the set and fit them to the booster. The booster is connected up to the set with very short wires. You must do this; if you have trailing wires you will get rid of all the "punch" that the screen-grid valve is creating.

Of course, you will have to tune the unit at the same time as the set. I found that it took me about half an hour to get used to matching up the dial readings. It depends very largely on how you adjust the pre-set condenser. My aerial is a fairly big one and I find that if the pre-set condenser is screwed down too far the unit doesn't band-pass properly and I don't get very startling selectivity.

But when I slack the pre-set condenser off to about half-way, and adjust the booster carefully, at the same time as I tune the set, I get Rolls-Royce results.

A friend of mine copied my booster, but at first he was disappointed with the results because he didn't bother about the series aerial condenser, and also because he forgot that there was a series aerial condenser in his old set. I think you will always find it worth while connecting a piece of wire across the terminals of the existing pre-set condenser, if you have one.

ARTHUR FALLS.

GANG-CONDENSER MOUNTING

Here is a detail to be noted in connection with ganged condensers. The L-shaped feet supporting this chassis are adjustable for

height. Both end feet must be set to exactly the same position, for otherwise there will be a constant strain on the chassis

---

The Merseyside Military Band is to take part in the North Regional programme on November 18.

WE TEST FOR YOU

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

LISSEN LOW-FREQUENCY CHOKE

A NEATLY made low-frequency choke which we have tested this week is the one recently placed on the market by Messrs. Lissen. This choke is conventional in appearance and is housed in a small moulded bakelite case which is finished a mottled maroon in colour. Holes are provided to facilitate baseboard mounting, and two terminals complete with terminal tags are mounted on the casing near the base.

The choke is rated to have an inductance of 60 henries with 10 milliamperes direct current in the winding. The measured inductance was approximately 128 henries with no direct current, this falling to about 85 henries at 2 milliamperes, and then dropping much more slowly until the value of 60 henries at 10 milliamperes was reached. The D.C. resistance of the choke is approximately 1,600 ohms.

This choke should prove quite satisfactory in use as an inter-valve coupling choke. As a smoothing choke the resistance is rather high, but the choke is obviously not intended for such purposes.

Lissen general-purpose low-frequency choke

The overall dimensions of the choke are approximately 2½ in. by 2¼ in. by 3 in. high.

MELLOTONE PERMANENT NEEDLE

THERE have been many attempts to produce a gramophone needle which does not require to be changed. The difficulty is to obtain a satisfactory compromise between a hard needle which will not wear out too quickly and one having sufficient softness to avoid tearing up the record.

The Mellotone Permanent Needle is an ingenious attempt to overcome the difficulty. It is made of solid gold tipped with a special material in a rather similar manner to the ordinary fountain pen nib. It is claimed that if this needle is mounted in a pick-up or sound box and is first "run in" on an old record that it can then be used indefinitely without changing.

We found that the running-in was very essential since there is distinct wear on the record for the first four or five times of playing. After this the needle behaved

(*Continued on page* 1068)

"WE TEST FOR YOU"

(*Continued from page* 1066)

very satisfactorily for some hundreds of playings. We used it for some months and there was no noticeable record wear during that period. The point appeared to remain quite good as the high frequencies were still well reproduced.

It is essential, however, that the needle shall not be removed from the pick-up. If this is done it must again be run in on an old record until it settles down again.

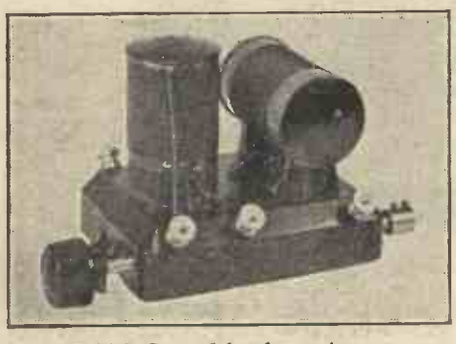
BRITISH GENERAL BAND-PASS TUNER

THE band-pass tuner still continues to be very popular, and we were interested to receive from The British General Manufacturing Co. one of their latest forms of band-pass tuner. This is a very compact device measuring only 3½ in. by 2¾ in. by 3 in. high. The arrangement of the coils is somewhat unconventional, the two short-wave sections being arranged at right angles to one another but a little off centre so that there is a small coupling between them. The long wave sections are wound on slotted formers carried underneath the base moulding.

The tuners are designed for use with an external condenser normally of .04 microfarad capacity. One of the various non-inductive condensers now on the market should be used for the purpose. A simple but effective rotary switch is carried underneath the base and serves to change over the connections from one waveband to the other. It is noteworthy that this firm has continued the practice which it adopted last season of changing over the aerial tapping on both wavebands so that the best conditions may be obtained in each case.

We were very impressed by the performance of these coils on test. Not only was the signal strength excellent, being little below that of a single coil, but the tuning was particularly sharp. Used with a full outdoor aerial only six miles from Brookmans Park we were able to cut out the transmissions of both stations in less than 10 degrees and obtain several other stations in between. North Regional was received quite comfortably in daylight, which indicates that this selectivity has not been obtained at the expense of signal strength.

In point of fact we measured the selectivity at various wavelengths and found that it was reasonably constant over the whole scale so that there is clearly a happy balance between the inductive coupling due to the relative positions of the coils and the capacity coupling provided by the external condenser.



British General band-pass tuner

There is an anode model which is useful for high-frequency coupling. This is generally similar to the aerial model, but the tapping point is taken approximately mid-way up the coil. Two such coils can be linked together so that one switch operates both wave-changes, and such a combination gives a particularly selective receiver.

A final feature is that the coils sell at 9s. 6d. only, which is very little more than one pays for a single coil these days. We can recommend them to those users who want to obtain selectivity without much trouble.

The second Subscription Concert of the Belfast Philharmonic Society, which will be relayed from the Ulster Hall on November 25, will be notable for the appearance of Elizabeth Schumann.

With a view to minimising disturbance to reception by sets situated closely to the Edinburgh tram lines, the city's transport manager, working in conjunction with the Metropolitan Vickers Company, has evolved a specially designed choke coil to be fitted on the trams. One or two trams have now been fitted experimentally with the appliance, and definite tests are being carried out.

From a French paper's programme of relays from other countries: "B.B.C. Dance Orchestra; Chef d'orchestre, sir Henry Hall."

Graham Farish says

IT COSTS ME MONEY

It costs me literally thousands of pounds to tell you about my products. My business instincts, my Scottish caution tell me it would be money wasted to exaggerate my claims. That's why you can safely follow my recommendation to try G. F. Components. Believe me, you'll find them a step ahead of any you've tried before.

Graham Farish OHMITE RESISTANCES

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

1'6 EACH

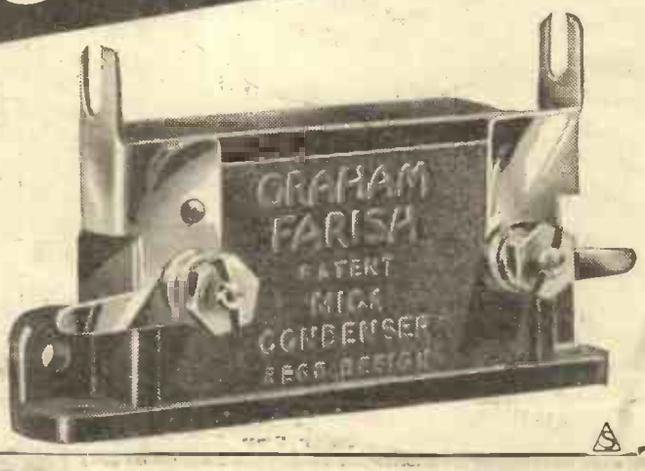
BETTER THAN WIRE WOUND

Graham Farish FIXED CONDENSERS

In a complete range of capacities, upright or flat mounting. Registered design No. 723271. Every condenser is tested on 750 volts D.C. The capacities are accurate within fine limits, and every condenser can be thoroughly relied upon.

.00005 mfd. to .004 mfd. 1'-

.005 mfd. to .01 mfd. 1'6



GRAHAM FARISH COMPONENTS

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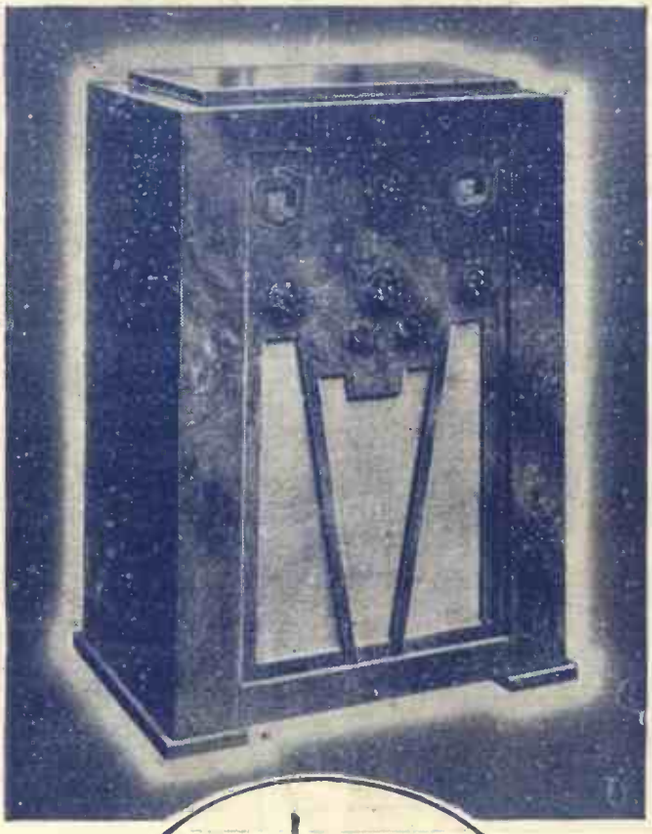
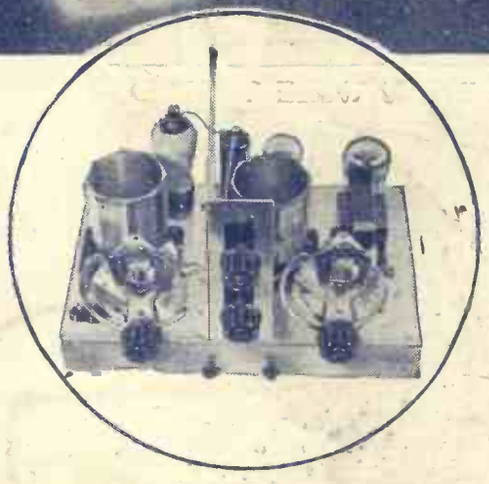
METEOR S.G.3





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Free Post coupon now and we will send you a sixpenny 20-page book, written by Mr. G, P, Kendall, B.Sc, It tells you all about the Meteor S.G.3 and 303 and contains complete instructions, plans and photographs showing how to build these wonderful sets.

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Please send me a free copy of the **Meteor S.G.3** and **303** Book and tell me about your **Registered Users' Scheme.** I enclose 1½d. stamp to cover postage.

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IN MY WIRELESS DEN

WEEKLY HINTS — CONSTRUCTIONAL & THEORETICAL

BY W. JAMES

WHEN BATTERIES GIVE TROUBLE

A HIGH-RESISTANCE high-tension supply is likely to give trouble. The ordinary dry battery has a reasonably low resistance when new, but after it has supplied the set for a while its resistance increases.

As the battery supplies current to all the anode circuits of the set, it follows that because of the resistance they may be coupled. The word may is used because, if each supply to the set is de-coupled, the circuits will not be coupled by the resistance.

If, on the other hand, the circuits of the set are not properly de-coupled there will be trouble. The trouble may not be very apparent when the resistance of the battery is not very great, but the chances are that the stability and the quality have suffered to some extent. In bad cases a howl may appear or the set may oscillate at low-frequency (motor-boating). The quality will be poor when the set is on the point of being unstable.

As a rule a 2-microfarad condenser connected between the positive and negative helps matters, but for the best results the circuits of the set should be de-coupled. A few resistances and condensers will effectually de-couple the circuits and enable more consistent results to be obtained.

NOISY CONDENSERS !

A CONDENSER that is satisfactory from the electrical and mechanical points of view for tuning over the normal broadcast bands may be troublesome for short wavelength work.

Noise is the thing to avoid. When some tuning condensers are adjusted a noise is heard. This may be traced to a poor contact between the rotor vanes and the rotor terminal.

A friction contact is usually not satisfactory. There must be a suitable pigtail connection. Then again, the slow motion drive must be sound. Any looseness is bound to give trouble and it is, of course, necessary to avoid slipping or backlash. The drive must be positive and earthed as a rule.

A SUPER-HET ADVANTAGE

ONE of the things which I like about the super-heterodyne type of set is the certainty with which considerable magnification can be obtained.

The ordinary set, with its reaction control, requires a certain amount of skill in order to obtain the best from it. The super has no reaction control and the magnification obtained depends upon the circuits. It is possible, naturally, to adjust the circuits so as to obtain the maximum amplification, but then the circuits are left alone and only the tuning controls are used.

Reaction introduces a variable factor. Some people can use the reaction control to obtain fine results, but others seem not to be able to manage the tuning so well. The result is that the same set in the hands of various people puts up varying performances.

This is not true to anything like the same extent of a super. The tuning is relatively so easy that the operation is quickly mastered. A super-heterodyne set is no more difficult to build than an ordinary set, and I anticipate that when it is realised what a fine set the "New Century Super" is it will be built by many readers.

MAINS VALVE L.T.

A.C. mains valves are designed to be heated with current at four volts. In practice the voltage actually applied may be a little above or below this if only on account of the variations in the pressure of the mains from normal.

A voltage of slightly over four is not likely to reduce the life of a mains valve. But if the voltage is, say, 4.5 or more it should be expected that the valve will have

(*Continued on page* 1074)

This is the Dubilier Type 9200 non-inductive Condenser which has been specially designed for by-pass purposes in H.F. circuits. It has a working voltage of 250 D.C. peak and the capacities specified in the New "Century Super" are

One .02 Mfd. Type 9200 - - - Price 2/-
Two .1 Mfd. Type 9200 - Price 2/9 each

The following Condensers and Resistances are also specified

One .0001 Mfd.	Type 670 - -	Price 1/-
One .0002 Mfd.	Type 670 - -	Price 1/-
One .01 Mfd.	Type 670 - -	Price 2/-
One 20,000 Ohms	One Watt -	Price 1/-
One 50,000 Ohms	One Watt -	Price 1/-
One 1 Meg.	Grid Leak -	Price 1/-
One 2 Meg.	Grid Leak -	Price 1/-

CHOSEN FOR DEPENDABILITY & ECONOMY

BRITISH MADE DUBILIER

DUBILIER CONDENSERS RECOMMENDED EXCLUSIVELY for the NEW "CENTURY SUPER"

There is no alternative for Dubilier Condensers; the designers of the New "Century Super" realised this and specified Dubilier exclusively.

Don't ruin the performance of your set by using condensers of questionable quality. Dubilier have brought condenser dependability within the reach of everyone. The Dubilier range meets every constructor's demands. It includes the condensers you need *at the prices you want to pay.*

Build your New "Century Super" with Dubilier Condensers and Resistances and be assured of the finest results.

DUBILIER CONDENSER Co. (1925) LTD.
DUCON WORKS, VICTORIA ROAD, NORTH ACTON, LONDON, W.3

DUBILIER CONDENSERS

IN MY WIRELESS DEN

(*Continued from page* 1072).

a life of below normal. Now a transformer is used between the mains and the circuit.

If this is a good component it will give four volts when supplying the valves. The voltage across the heater winding will be more than this when no valves are connected, but if the transformer is a well-designed job the pressure will not be much over four volts.

A cheap transformer will give much more than four volts, however, and the point is that if this cheap transformer is not designed to give exactly four volts at the current load, the valves may be over-run. A good transformer would be satisfactory for supplying, say, three or four valves, as the voltage would not vary much.

DOES YOURS DO THIS?

IT is surprising for how long a good condenser will hold a charge.

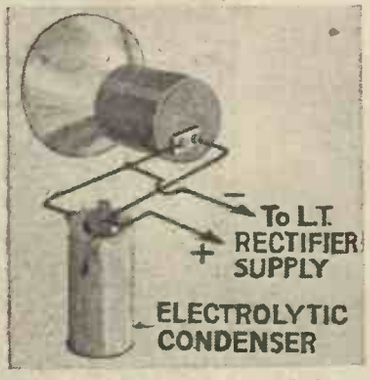
If you connect a paper condenser of, say, 2 microfarads to a 120-volt battery and then remove it, you can get a strong spark by touching the terminals with a screwdriver. Leave a charged condenser for twenty-four hours and if it is a good one a strong spark will still be obtained.

If the condenser has a slight leak some or all of the charge will disappear. This may seem at first sight to be a considerable disadvantage, but it may not be so. A slight leak may do no harm at all. The leakage current is very slight and is not enough to worry about, so far as the actual current passed is concerned.

It depends upon where the condenser is used. In the case of a coupling condenser in a resistance amplifier, for example, a leak might introduce noises and affect the working. Yet a by-pass condenser may have a slight leak and not cause the least trouble. It is advisable that a grid condenser should have a very high value of insulation resistance as a leak may cause noises, but a filter condenser having a slight leak may be quite satisfactory.

HUMMING MOVING COILS

An energised moving-coil speaker will hum loudly if the current supply to its magnet system is not free from ripple. When a mains-driven moving coil is worked through an L.T. rectifier, it is sometimes a help to put an electrolytic



condenser across the magnet windings to cut out hum. The connections for a smoothing electrolytic condenser are shown by the sketch. You must keep the polarity right or the electrolytic condenser will become a path of low resistance and will need to be "re-formed"

The opening of the Herefordshire County Week series of broadcasts for Midland Regional listeners begins on November 21, with remarks by J. S. Arkwright, Chief Steward of Herefordshire. This will be followed by an historical phantasy—"Hallowe'en at Hereford."

The first industrial relay in the Herefordshire Week will be broadcast in the Midland Regional programme on November 22, from a farm near Hereford. Although it has been difficult to arrange appropriate noises to illustrate the talk to be given by Mr. W. G. C. Britten, special arrangements have been made which will be revealed at the time of the broadcast.

It should be noted that in the Wright and Weaire announcement on page 959 of "A.W." for November 5, the price of the super-het type choke was given as 6s. 6d. This should be 4s. 6d.

The first demonstration set designed to use Ostar H.V. valves has been lost or stolen from the car of one of the British representatives. The British representative of Ostar valves is particularly anxious to trace this set, which is built entirely with special components unobtainable in this country, and any information should be addressed to Mr. Eugen Forbat, 1 Rosebery Avenue, E.C.1.

J. GODCHAUX ABRAHAMS MAKES A FURTHER TEST OF THE "NEW CENTURY SUPER"

AS promised last week, I have carried out a second test of the "New Century Super," not so much with the object of demonstrating the ease with which Continental and other transmissions may be logged, but to try out the circuit in regard to the capture of broadcasts which, in most instances, are found difficult by the average listener.

"SEARCHING" TESTS

Much depends, obviously, even in the case of the "New Century Super," on the care with which a set is tuned; but in this instance the controls at our disposal are such that little expert knowledge is required. Within a very short time you will get the "feel" of these three important knobs and will quickly realise how much can be achieved by a judicious handling of the reaction-cum-volume control and trimmer, or compensator incorporated with the aerial tuner. The actual search is made by slowly turning the oscillator (right) condenser; with the least reaction you will find the set alive from the start and the successive "zips" you hear as the dial is twirled will give you the position of each carrier wave.

Through an oversight, I forgot to affix an aerial at the start and was only using a short rubber-covered lead from the set to my test bench; it was barely three feet in length, yet I logged transmissions from four B.B.C. stations, Poste Parisien, Rome, and Nurnberg before discovering the omission.

I set myself out, on this second test, to carry out the separation of tricky transmissions, such as Königswusterhausen, Warsaw, and Lahti on the long waves, and Mühlacker-London, Bordeaux-Lafayette, North National, etc., on the medium band.

5-KILOCYCLE SEPARATION

As regards the first named, there was no difficulty in getting the German clear of both Daventry National and Radio Paris, and Warsaw was received without any interference from Motala, but this success was not achieved with Eiffel Tower. There is, as you may see from the list of broadcasting stations published weekly in AMATEUR WIRELESS, only 5 kilocycles separation between the Frenchman and the Pole, and, consequently, such a performance could not be expected. Fortunately, as a rule, FL closes down early. Lahti could be heard faintly in the intervals of Radio Paris and Huizen; here again we have only 7 kilocycles separation either way. Other long-wave stations were tuned in with ease.

At times the Breslau broadcast was free from all twitter, but at others it suffered from the presence of Poste Parisien. There is presumably 9 kilocycles between them, but over-modulation on the part of the latter might be the cause of the trouble. Much better results were obtained in the case of Bratislava, Heilsberg, and Turin, all of which, apparently, were strictly on their wavelength, and Gleiwitz and Horby were well heard while London National was working. Leipzig could not be cleared where I carried out the test, but at a greater distance from Brookmans Park this might be done.

In future you will be able to obtain "Amateur Wireless" on Wednesdays.

I have always found that if a receiver on trial in London shows a good performance, considerably better results can be obtained from it in less congested and more favourable localities. Notwithstanding the fact that in my area I still feel the swamping effect of the Brookmans Park giants, no difficulty whatsoever was experienced in separating Mühlacker from London Regional, and such broadcasts as those from Hilversum, North National, Goteborg, Breslau, Brussels No. 2, Brno, and Strasbourg; Hamburg, Scottish Regional, Rome, Paris PTT, Beromuenster; Langenberg and North Regional could be tuned in individually, providing judgment and care were used; except, now and then, in some instances, of a slight background twitter, the transmissions were clearly received.

A MOST EFFICIENT SET

Of the more distant and lesser heard stations, I logged Palermo, Riga, Belgrade (faint), Madrid (EAJ7), and, before this station was on the air, Moscow Stalin on the same wavelength. Bergen and Algiers when working at the same time were located, but inseparable; later, when the Norwegian station closed down, Algiers was received at readable strength on the loud-speaker. As a final test, towards 2 a.m. I tried again for transatlantic signals. Apparently conditions were unfavourable for the capture of North American broadcasts, but I logged two concerts from Buenos Aires—namely, on 303 and 316 metres—identified as LR4, Radio Splendid, and LR3, Radio Nacional. Faint music was also picked up on 423.5 metres, but could not be recognised.

My second test has amply confirmed my original opinion of the "New Century Super"; it is undoubtedly one of the most efficient sets AMATEUR WIRELESS has offered to its readers.

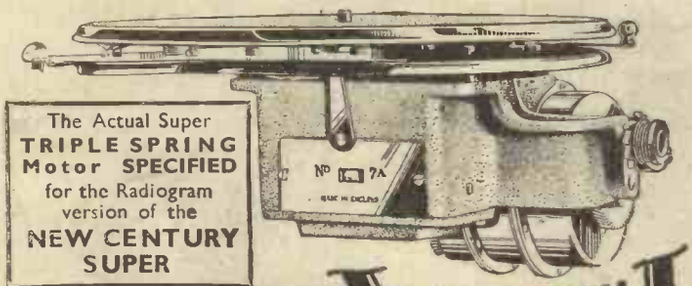
AN UNUSUAL CIRCUMSTANCE . . .

The closing down of one of the largest gramophone factories in the world enabled us to purchase these Super Triple Spring Gramophone Motors. Identically similar to those in use by the B.B.C. at Broadcasting House, they will play four 10-inch or three 12-inch records at one winding. The remainder of the stock is now being offered to readers of "Amateur Wireless" at only a fraction of the original list price. This may be your last opportunity. Send your order quickly, or write for illustrated leaflet.

SPECIAL OFFER to "A.W." Readers

The Finest Spring Motor in the World.

Made by GARRARD



The Actual Super **TRIPLE SPRING Motor SPECIFIED** for the Radiogram version of the **NEW CENTURY SUPER**

List Price £4:1:3 *OFFERED AT* **B54**

CARRIAGE PAID

This Super Triple-spring Motor embodies three distinct spring drive units and is thus three times as powerful and long-running as ordinary single-spring motors. Fitted with motor plate, speed regulating lever, safety friction clutch, 12-inch turntable, winding handle, and automatic brake. All bright parts heavily nickel-plated. All working parts totally enclosed. Silent running, silent wind.

Postal Order and Money-Orders should be crossed and Treasury Notes sent by registered post.

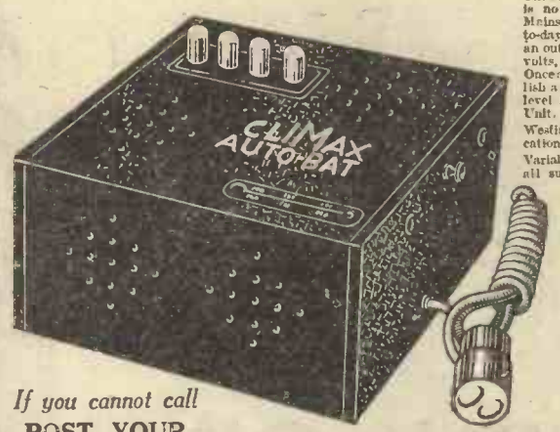
CABARET ELECTRIC CO., 170, Vauxhall Bridge Road, London, S.W.1. and 238, High Street, Lewisham, S.E.13.

SELFRIDGE'S

Special offer of a limited number of the

CLIMAX AUTO-BAT

150 VOLTS AT 20 M/A



The makers claim that there is no other British A.C. Mains Unit on the market to-day, capable of giving an output of 20 m/a. at 150 volts, at a similar price. Once again Selfridges establish a new record low-price level for a reliable Mains Unit.

Westinghouse metal rectification.

Variable voltage switch for all supply voltages from 200 v. to 250 v. (40-100 cycles), or 100 v. to 125 v.

Three tappings: 60/75 v., 80/100 v., and 120/150 v.

20 m/a. maximum anode current at maximum voltage.

Dimensions: 6¼ in. by 5½ in. by 3¼ in.

Metal case fitted with earth terminal. No live parts exposed and no possibility of shock.

Complies with all I.E.E. Regulations.

If you cannot call **POST YOUR ORDER** *You are assured of every satisfaction. Order early, quantities are limited.*

Originally Priced **52/6**

SELFRIDGE'S PRICE 40/-

USED IN THE B.B.C. STUDIOS

Every Ounce Of Efficiency from your Loudspeaker

Obviously this is the aim of every listener who is any judge of quality.

Designed on a principle which has been adopted by the B.B.C. in its own studios, the Howe Box Baffle definitely eliminates boominess and speech distortion due to resonance.

The complete Kit ready for fitting into your existing cabinet costs 20/- including Royalty, or with a Knockdown Cabinet, 30/-.

The Baffle can also be supplied complete in Cabinet ready for use from 35/-.

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F. McNEILL & Co., Ltd. (Radio Dept. 4) **Lamb's Passage, Bunhill Row, E.C.1.**

EARL HAIG'S BRITISH LEGION APPEAL FUND

Legion Work during the past 11 years has included:

£3,534,349 spent in relieving distress (3,568 voluntary benevolent committees).
2,166 families assisted to emigrate.
£75,000 spent in Housing Scheme for disabled.
£163,443 advanced to finance employment schemes.
Sanatorium and Training Settlement maintained for tuberculous (total population 70).

NOV 11TH

REMEMBRANCE DAY

Thousands of men placed in employment annually.
270 disabled men permanently employed making poppies.
16,909 men set up in business.
£75,893 granted to St. Dunstan's to help blinded men.

1932 is a very difficult year for the men who served 1914-18, so **PLEASE PAY VERY GENEROUSLY** for your Poppy on **REMEMBRANCE DAY—NOVEMBER 11**, and if possible send a donation. Poppy Day Donations should be sent to Capt. W. G. Willcox, M.B.E., Organising Secretary, Earl Haig's (British Legion) Appeal Fund, 26 Eccleston Square, London, S.W.1.

THE "GEORGE WASHINGTON" PICK-UP

30/-

You know the story of George Washington, but whether there is any truth in it or not we are unable to say. What we can vouch for, however, is the fact that our Mark 111. Pick-up always tells the truth.
With no minor resonances to add coloration, the reproduction from the record is a faithful replica of the original recording, and if you appreciate music, this is the pick-up you must have.

Send for catalogue. **Bowyer-Lowe & A.E.D. Ltd.** Diamond Works, Brighton.

IS YOUR LOUD-SPEAKER WORTHY OF YOUR SET?

Read all about Modern Loud-speakers in the BIG SUPPLEMENT in the

WIRELESS MAGAZINE

NOVEMBER ISSUE

Now On Sale, of all Bookstalls and Newsagents

148 PAGES, USUAL PRICE 1/-

AN IMPORTANT ACCUMULATOR DEVELOPMENT

A member of our technical staff describes a new type of low-tension accumulator

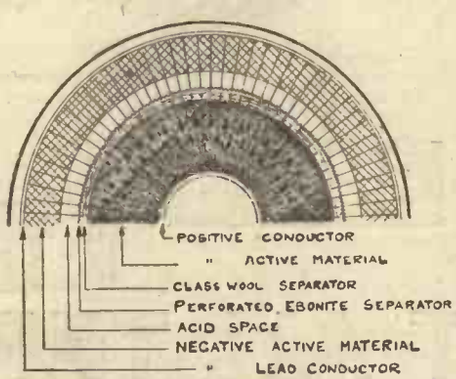
A Block accumulator in its bakelite case

WE have got so used to the usual construction of the familiar low-tension accumulator that it is refreshing to be able to comment on a real step forward, as exemplified by the latest cell designed and marketed by Block Batteries, Ltd., of Abbey Road, Barking.

You know that in the normal construction of an accumulator, lead grids are used as a basis for the plates, though they are so much "dead weight" so far as the action of charging and discharging is concerned. These grids are filled with the active materials.

It has long been recognised that, while the fundamental action of the lead-plate accumulator is so sound that it could hardly be improved upon, the actual construction has been in the nature of a compromise. When the accumulator is working the action between the plates is not entirely uniform, and there is a tendency for a great part of the current to flow between the lead portion of each set of plates.

Among the most eminent of the people concerned with the design of accumulators is Mr. Leonard Fuller, of Fuller accumulator fame. He has been working on battery design all his life. His father before him was in the same line. And his grandfather was an associate of Michael Faraday. It is this Mr. Fuller who, in conjunction with Block Batteries, Ltd., has now developed the new type of accumulator that is claimed to overcome all the constructional defects of the standard type of accumulator.



Part section of Block accumulator showing how the current passes at a uniform rate through lead oxides. The fine lines illustrate the current flowing through the central positive lead conductor to the outside negative lead conducting container

The basic idea in the new accumulator is quite simple—like all good ideas. You take a tubular length of lead for the centre of the cell, and make this the positive terminal; around this a shell of active material; then comes the separator medium consisting of glass, wool, and an outer covering of perforated ebonite.

The container is made of lead and, with an inner coating of active material, forms the negative plate. Between the negative plate and the central positive plate there is a space for the acid electrolyte.

So you see the idea is to make all the material used in the construction *active*.

The result is that, for a cell no larger than the normal 40-ampere-hour type, you get a total capacity of 80-ampere-hours, or just double the normal.

Later we hope to receive one of these new cells for test in the usual way. Meanwhile we can summarise the points claimed by the makers.

(1) The chief weight of the battery is in the active material. (2) The active material has a high capacity due to the uniformity of the chemical action during charge and discharge. (3) The charge is held for a long time owing to small local action.

(4) Cell gives twice the capacity per pound of total weight. (5) Only half the weight per ampere hour, therefore only half the size. (6) No plates or grids to buckle. (7) Construction makes the cell practically unbreakable.

Some Notes on Present-day Short-wave Conditions

AROUND THE SHORT-WAVE DIAL

By SHORT-WAVER

VARIABILITY appears to have been the main feature during the past week; reception could not be relied upon to be the same two days running. W3XAL, the experimental station at Boundbrook, New Jersey, operating on 16.87 metres, should be searched for between the hours of 1 and 4 p.m.; 20 kilowatts are used and on most evenings reception is quite good, there being no static and very little fading.

On 16 Metres

The various Atlantic 'phone stations on the 16-metre band come in at extraordinary volume, but unfortunately, in some cases, interfere with W3XAL. DJB, at 2 o'clock in the afternoon, was nearly inaudible, but gradually increased until about 4 o'clock was approximately R8. I discovered this week that DJB on 19.73 metres and DJA on 31.38 metres operate simultaneously after 4 p.m., DJB closing down at 5 p.m. This is a very sound arrangement, for when signal strength decreases on the lower wavelength, the higher wavelength station can be tuned in and the programme received satisfactorily.

During Sunday afternoon the harmonic of Rome on approximately 24 metres came through infinitely louder than the fundamental, but after dark the 48.2-metre signal was much stronger.

Radio Colonial is a most reliable station and I should imagine would be very well received in the French colonies. During the past week it has always been R8 during daylight.

VK2ME Sydney was heard very well indeed on Sunday morning between 6 and 8, although signal strength decreased after 7.30. During the afternoon about 3 o'clock it was received again, but the announcements were in the main part inaudible. The morning transmission was quite interesting and was more like a "Christopher Stone gramophone recital." Some excellent records were broadcast;

(*Continued on page* 1082)

including one by Reginald Foort and several others of our leading dance bands.

More Australians

During the next few weeks listeners may have an opportunity of picking up Australia quite regularly as it is more than probable that VK2ME will be broadcasting during the morning as well as on Sundays; this will be for the duration of the Test Matches. Ia m given to understand that the Australian beam station may be also in operation.

On Friday evening for the first time for a long while, Zeesen was so strong that it practically obliterated W2XAF. Luckily, as it closed down at 11 o'clock, this did not matter very much.

Skamlebaek on 31.51 metres carried on until midnight relaying music from Copenhagen and it was rather too close to W2XAF to be pleasant. It was transmitting from 2 p.m. until midnight and in the early afternoon was quite a strong signal.

W8XK on 48.86 metres undoubtedly is the best station at the present time, and it has been receivable on the loud-speaker every night for the last ten days.

WHEN SUBMITTING QUERIES

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

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

The designing of apparatus or receivers cannot be undertaken.

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

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

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

POST CARD

POSTCARD RADIO LITERATURE

GET THESE CATALOGUES *FREE*

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

Choose Your Coils

IS it to be super-het coils, band-pass coils, or dual-range tuners? You will find plenty of coils of all types from which to make your choice in the new Wearite booklet. Coils are made specially for certain "A.W." sets, such as the Percy W. Harris "Mascot." Wearite make some fine short-wave coils, which are also described in the new book. **877**

Fotos Variable-mu Valves

There are some variable-mu screen-grid valves in the new range of Fotos A.C. jobs. I have just received a folder of the latest types and I think this is a handy list to have for reference when valve buying. **878**

Micromesh

A detector valve having an amplification factor of 80, a mutual conductance of 8, and an impedance of 10,000 ohms, is in the new Micromesh range. Standard Telephones and Cables, Ltd., have sent me a folder which gives details of this detector and other Micromesh valves. **879**

Choose Your Kit

A handy pocket-sized book of Ready Radio kits and components has just come to hand. The kits include the "303" and the Meteor S.G. Three, while the components range from the dual-wave coil unit down to the handy Jiffilinx wiring. **880**

A New Aerial

A folder has been issued describing the Garthbe'k aerial, which does not need a mast and which can be fitted by means of a bracket to a chimney stack or to the side of a high wall. The folder shows how the aerial is fitted. OBSERVER **881**

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General Correspondence is to be brief and written on one side of the paper only. All sketches and drawings to be on separate sheets.

Contributions are always welcome, will be promptly considered, and if used will be paid for.

Communications should be addressed, according to their nature, to The Editor, The Advertisement Manager, or The Publisher, "Amateur Wireless," 58-61 Fetter Lane, London, E.C.4.

BROADCASTING STATIONS

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

Metres	Kilocycles	Station and Call Sign	Power (Kw.)
19.737	15,200	Zeesen (DJB)	8.0
20.64	14,530	Radio Nations	20.0
25.4	11,810	Rome (2RO)	15.0
25.53	11,751	Chelmsford (G5SW)	16.0
31.25	9,598	Lisbon (CTIAA)	2.0
31.51	9,520	Skamleback	0.5
31.38	9,560	Zeesen (DJA)	8.0
32.26	9,300	Rabat	0.5
40.3	7,464	Radio Nations	20.0
43.75	6,865	Vitus/Paris	0.3
50.0	6,000	Moscow	20.0
58	5,172	Prague	0.5
198.5	1,510	Riga (test)	16.0
206	1,460	Antwerp	0.4
207.6	1,445	Seraing	0.2
209.7	1,430	Magyarovar	1.5
211.3	1,420	Newcastle	1.0
214.3	1,400	Aberdeen	1.0
214.3	1,400	Warsaw (2)	1.9
215.6	1,391	Brussels (Conf.)	0.25
217.1	1,382	Königsberg	0.9
218	1,373	Salzburg	0.5
219.4	1,376	Béziers	0.5
224.4	1,337	Cork (6CK)	1.2
225.2	1,332	Fécamp	10.0
227.4	1,319	Flensburg	0.5
230.6	1,301	Malmö	1.2
231.1	1,298	R. Wallonia	0.3
232.2	1,292	Kiel	0.25
233.4	1,285	Lodz	2.2
235.5	1,274	Kristianssand	0.5
236.3	1,269.4	Bordeaux-Sud-Ouest	2.0
237.2	1,265	Nimes	0.6
238.0	1,256	Nürnberg	2.0
239	1,255	Binche	0.3
240.6	1,247	Stavanger	0.5
241.3	1,243	Liege (Exp.)	0.2
242	1,238	Belfast	1.0
244.1	1,229	Basle	0.5
245.9	1,220	Berne	0.5
245.9	1,220	Cassel	0.25
245.9	1,220	Linz	0.5
247.7	1,211	Trieste	10.0
249	1,205	Prague (Strasnice)	5.0
249.7	1,201.1	Juan-les-Pins	1.0
250	1,200	Radio Schaerbeek	0.3
252.9	1,186	Barcelona (EAJ15)	6.0
253.4	1,184	Gleiwitz	5.0
255	1,175	Toulouse (PTT)	1.0
256.7	1,168	Hörby	10.0
259.3	1,157	Frankfurt-a-M.	17.0
261.0	1,147	London National	50.0
263.8	1,137	Moravska-Ostrava	11.0
265.8	1,128.5	Lille (PTT)	1.3
266.8	1,124.5	Valencia	8.0
267.9	1,119.8	Bremen	0.3
269.4	1,112	Bari	20.0
270.9	1,107.6	Rennes	1.3
271.9	1,103	Cointe-Liege	0.3
273.7	1,096	Turin (Torino)	7.0
276.5	1,085	Heilsberg	60.0
279.5	1,073	Bratislava	14.0
281	1,067	Copenhagen	0.75
282.2	1,063	Lisbon (CTIAA)	2.0
283	1,058	Innsbruck	0.5
283.0	1,058	Berlin (E)	0.5
283.0	1,058	Magdeburg	0.5
283.0	1,058	Stettin	0.5
286	1,049	Montpellier	C.8
287.0	1,043	Radio Lyons	10.0
288.5	1,040	Bournemouth	1.0
288.5	1,040	Plymouth	0.12
288.5	1,040	Scottish National	50.0
288.5	1,040	Swansea	0.12
291	1,031	Tampere	1.0
291	1,031	Viipuri	13.0
293	1,022	Kosice	2.5
293.7	1,021.5	Limoges (PTT)	1.0
296.1	1,013	Hilversum	20.0
299.1	1,003	Tallinn	11.0
301.5	995	North National	50.0
304.9	984	Bordeaux (PTT)	13.0
306.8	978	Zagreb (Agram)	0.75
307.1	976.6	Falun	0.5
309.9	968	Cardiff	1.0
311.1	964.3	Vitus-Paris	1.0
212.8	959	Cracow	1.5
313.9	955.6	Genoa (Genova)	10.0
315	952.5	Marseilles	1.6
318.8	941	Naples (Napoli)	1.5
318.8	941	Sofia (Rodno Radio)	1.0
319.7	936	Dresden	0.25
321.9	932	Göteborg	10.0
325	923	Breslau	60.0
328.2	914	Poste Parisien	60.0
331.4	906	Milan	50.0
335	896	Poznan	1.9
337.8	888	Brussels (No. 2)	15.0
342.1	877	Brunn (Brno)	35.0
345.2	869	Strasbourg (PTT)	11.5
348 8	860	Barcelona (EAJ1)	8.0
351	855.5	Leningrad (RV70)	20.0
352.1	852	Graz	7.0
355.8	843	London Regional	50.0
360.5	832	Mühlacker	60.0
363.4	825.5	Algiers (PTT)	16.0
365.3	821.1	Fredriksstad	0.7
365.5	820.7	Bergen	1.0
366.2	819.4	Seville (EAJ5)	1.5
368.1	815	Bolzano	1.0
368.5	814	Helsinki	13.2
370.4	810	Radio LL (Paris)	1.0
372.2	806	Hamburg	1.5
376.4	797	Scottish Regional	50.0
380.7	788	Lvov	16.0
385	779	Radio Toulouse	60.0
385	779	Stalino (RV26)	10.0
388.5	772	Archangel	10.0
389.6	770	Leipzig	75.0
394	761	Bucharest	12.0
398.9	752	Midland Regional	25.0
403	743	Söttens	25.0
408	734	Katowice	12.0
413.8	725	Athlone (tests)	60.0
413.8	725	Dublin	1.2
416.4	720.5	Radio Maroc (Rabat)	6.0
419	716	Berlin	1.5
423.4	707	Madrid (Espana)	2.0
424.3	707	Madrid (EAJ7)	2.0
429.8	698	Belgrade	2.8
431	696	Parede (tests)	1.5
435.4	689	Stockholm	55.0
441.2	680	Rome (Roma)	60.0
447.1	671	Paris (PTT)	7.0
453.2	662	Danzig	0.5
453.2	662	Klagenfurt	0.5
455	659	Radio Agen	0.5
459.4	653	Beromuenster	60.0
460.6	557	San Sebastian (EAJ8)	0.6
465.8	644	Lyons (PTT)	1.6
469.8	640	Tartu	0.5
472.4	635	Langenberg	60.0
480	625	North Regional	50.0
488.6	614	Prague	120.0
495.9	604.8	Trondheim	1.2
500.8	599	Florence (Firenze)	20.0
508.5	590	Astrakhan (RV35)	10.0
509.3	589	Brussels (No. 1)	15.0
518.5	578.6	Vienna (also testing on 1,258 m. from 7 p.m. (Mon., Wed., Sat.).	15.0
525.4	571	Riga	15.0
532.9	563	Munich (tests)	60.0
538.6	556.9	Palermo	3.0
541.5	554	Sundsvall	10.0
550	545	Budapest (1)	18.5
559.7	536	Kaiserslautern	1.5
559.7	536	Augsburg	0.3
564.4	531.5	Wilnot	16.0
564.9	531	Hanover	0.3
571.2	525.1	Grenoble (PTT)	2.0
574.7	522	Ljubljana	5.2
575.2	521.4	Freiburg	0.25
675	444	Oufa (RV22)	10.0
678.7	442	Lausanne	0.6
719.4	417	Moscow (RV2)	20.0
748	401	Ostersund	0.6
759.5	395	Geneva	1.25
840	357.1	Budapest (2)	3.0
848.7	353.4	Leningrad	200.0
882	340	Saratov	20.0
937.5	320	Kharkov (RV4)	20.0
967.7	310	Alma Ata	10.0
1,000	300	Moscow (Trades Unions)	100.0
1,034.5	290	Kiev	100.0
1,048.2	286.1	Tiflis (RV7)	100.0
1,071.4	280	Scheveningen-Haven	10.0
1,083	277	Oslo	60.0
1,107	271	Minsk (RV10)	35.0
1,117.4	268.5	Moscow (Popoff)	40.0
1,153.8	260	Kalundborg	7.5
1,170	256	Taschkent	25.0
1,200	250	Istanbul	5.0
1,200	250	Reykjavik	21.0
1,229.5	244	Boden	0.6
1,258	238.5	Vienna Exp.	8.0
1,260	238	Bakou	35.0
1,275	235.3	Luxemburg (tests)	100.0
1,304	230	Moscow (Old Kom)	165.0
1,348	222.5	Motala	30.0
1,380	217.4	Novosibirsk (RV6)	100.0
1,411.8	212,5	Warsaw	120.0
1,445.7	207.5	Eiffel Tower	13.5
1,481.5	202.5	Moscow RV1	500.0
1,538	195	Ankara	7.0
1,554.4	193	Daventry (Nat.)	30.0
1,600	187.5	Irkutsk (RV14)	10.0
1,620	185	Norddeich KVA	10.0
1,634.9	183.5	Zeesen	60.0
1,725	174	Radio Paris	75.0
1,796	167	Lahti	54.0
1,875	160	Huizen	8.5
1,935	155	Kaunas	7.0
2,625	119	Königswuster-Hausen (press)	20.0
2,650	113	Eiffel Tower	15.0
2,900	103.5	Königswuster-Hausen (press)	15.0
4,000	75	Königswuster-Hausen (press)	15.0

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New Regional Three (D, RC, Trans) AW349
World-Ranger Short-wave Three (D, RC, Trans) AW355
Wizard (SG, D, Trans) AW360
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Five-advantage Three (D, RC, Trans) WM257
Everybody's A.C. Radiogram (SG, D, Trans) .. WM258
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Everybody's A.C. Radiogram (with automatic G.B.) WM262
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Ideal A.C. Home Super (Super-het) WM290
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"A.W." Trickle Charger AW352
Add-on Band-pass Unit AW359

Copies of the "Wireless Magazine" and of "Amateur Wireless" containing descriptions of most of these sets can be obtained at 1s. 3d. and 4d. respectively, post free. Index letters "A.W." refer to "Amateur Wireless" sets and "W.M." to "Wireless Magazine."

Address letters:

Amateur Wireless Blueprints Dept., 58-61 Fetter Lane, London, E.C.4

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WIRELESS MADE EASY

JUST HOW THE JOB OF WIRING SHOULD BE DONE

LAST week we explained how the full-size print simplifies the home-constructor's job by telling him all the measurements for the baseboard and panel components. Further, this lay-out gives the full wiring details. It indicates the sequence of wiring, for each wire length is numbered.

Now we must explain more fully how to do the actual job of wiring. Use the print as a guide and you cannot go wrong. Not all the wires in the set will be the same length as the wires indicated in the print.

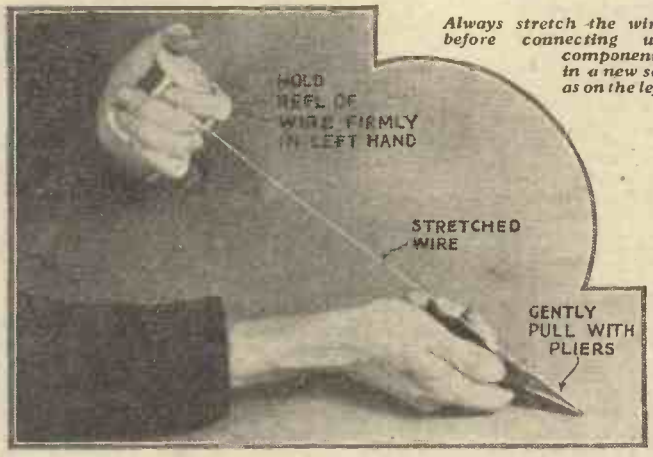
The reason for this discrepancy is that, for the sake of making the print clear, we often put in right-angle bends in the pictured wires that do not exist in the actual set.

Where wires join terminals of components of about the same height and close to one another, the print wire is usually the same length as the actual set wire.

Example—in the blackprint of the "New Century Super" you will see that No. 30 wire, joining the grid of a screen-grid valve to an I.F. coil, is a short straight length, as it is in the set.

The best idea is to find out from the print which two terminals are next on the list to be joined up, and then to seek out these terminals in the set. Having found them, by referring to the print, measure off the length of insulated sleeving needed.

You can then cut off a length of wire half an inch longer than the sleeving at each end. The extra wire lengths are, of course, for the loops.

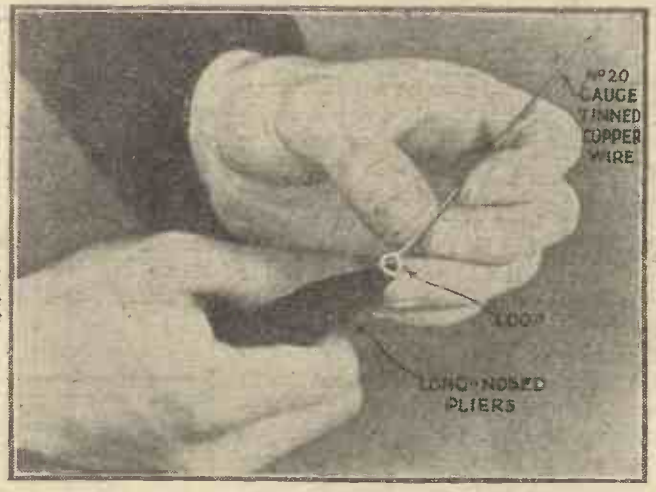


Always stretch the wire before connecting up components in a new set as on the left

As mentioned last week, we use No. 20 gauge round tinned-copper wire for the connections, covered with 1 to 1½ mm. insulating sleeving.

An important process in the wiring of any set is the stretching of the wire on the reel. Grip the reel in one hand and, uncoiling a foot or so of the wire, take the free end in the other hand. Exert a gentle though steady pull and you will find that the wire will "give" slightly, thereby taking out all the kinks and making the wire quite stiff.

Another very important process, and one that will afterwards make or mar the reliability of the set, is the looping of the wire ends. Use a pair of long-nosed pliers for this job.



To make a good pressure contact you must first loop the end of the tinned-copper wire with a pair of long-nosed pliers

Grip the wire half an inch from the end with the left hand and bend over the end of the wire with the pliers. If a good loop does not result, you can nip it into shape with the pliers.

The object of making these loops is to ensure a sound connection under the terminals to which the wires are connected. You must take care to put the loop on the shank of the terminal in such a way that when the terminal nut is screwed down the loop will tend to be closed and not opened.

All terminals should be tightened up during the wiring process. Use the pliers, and do not rely on the pressure of the fingers.

Most of our sets have battery flexes for the connection of the batteries to the set. These consist of rubber-covered flexible wires going from the actual components to spade tags or wander plugs.

You can remove the end of the rubber covering by nipping it gently with the pliers. The rubber will then tear off quite cleanly, leaving the stranded wire for the connection. If you attempt to cut off the end of the covering you will most likely cut some of the strands.

Loop these flexes as with the stiff wires, and see that before screwing them down under terminals they have all their strands well twisted together.

It is important to make sound connections.

HOW TO READ THE CIRCUIT DIAGRAM
page seven

PERCY W. HARRIS'S "BUILD AS YOU LEARN"
pages two and three

SHORT-WAVE RECEPTION IS EASY!
page eight

ELEMENTARY WIRELESS COURSE
pages four and five

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

The set as fitted with dual-range coil

YOU will recall that I showed you last week how to introduce the 10,000 ohms spaghetti resistance and the 1-microfarad condenser into the plate circuit of the first low-frequency valve, so that neither the detector nor the first low-frequency valve are appreciably affected by the fairly big current changes in the battery as set up by the last valve.

GOOD QUALITY

The set should now be not only completely stable but should give you excellent quality even though we are using in it modern valves with very high magnification. Indeed I am sure you will have been surprised not only by the quality but by the range obtainable in this set. It will probably be greater than many of the designs incorporating a screen-grid valve and only one low-frequency stage.

This week I want to talk about simple wave-change coils. A few simple diagrams will help, and I will therefore refer you to them. Note first our present coil, designed to cover, as you know, only the medium wave-band. The trouble with this coil is that with the condenser set at maximum it will only reach about 600 metres at the most, whereas we want to be able to tune as far as 2,000 metres, although between 600 and 1,000 metres there is not much we want. It will be sufficient if we can increase our tuning range so as to cover in addition the band between 1,000 and 2,000 metres.

There are two ways in which this can be done. We can either increase the total capacity or else increase the total inductance. We could, of course, increase both if desired. Why not, then, simply put a large condenser in parallel with our present tuning condenser so as to increase its capacity? There are two reasons against this.

The first is the more important. We must remember that we are aiming to get voltage across the ends of the coil, and the ideal tuning circuit has the largest amount of inductance with the smallest amount of capacity for a given tuning.

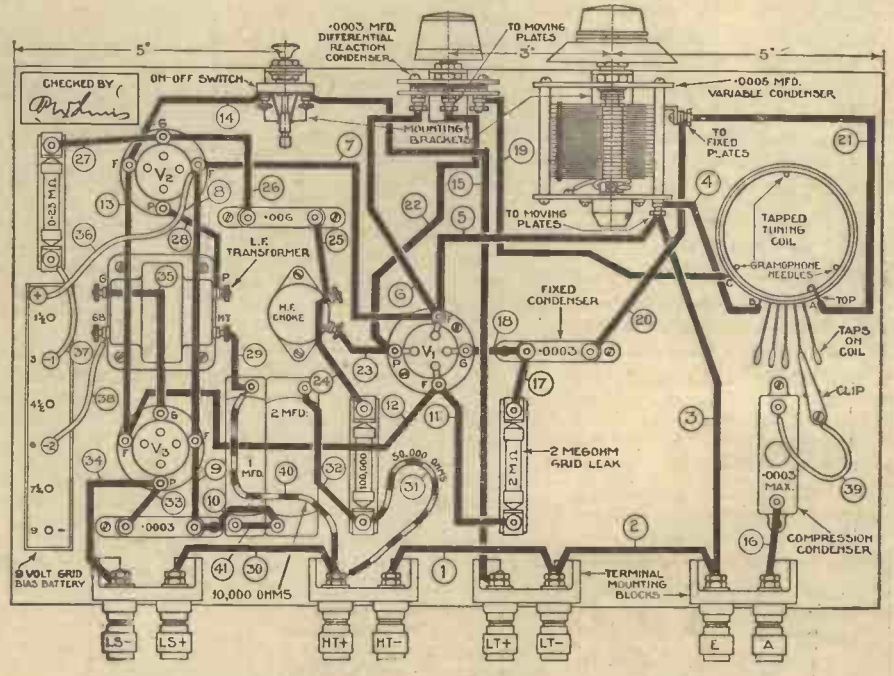
With .0005 microfarad, the "full-in" capacity of our condenser is quite enough to place across the coil, and if we increase the amount we shall increase the tuning range but the efficiency will drop.

The second point is that a single fixed condenser alone would not be sufficient. If we set our variable condenser at minimum and then place a large enough fixed capacity across the coil to bring the minimum wavelength up to 1,000 metres, the addition of .0005-microfarad variable to this large fixed capacity would not increase our tuning range sufficiently. If we make the whole condensers variable so as to go down to say 200 metres and up to 2,000 metres not only would it be extremely expensive, but it would be very difficult to design.

INCREASING THE INDUCTANCE

The fact is that the only practicable way is to increase the inductance or the number of turns of wire, Fortunately, if we add to our present tuning coil a fixed inductance, so as to bring the wavelength at the minimum setting of the variable condenser up to 1,000 metres, the .0005-microfarad capacity covers the range of 1,000 to 2,000 metres.

The simplest way is to cut the coil at the bottom and insert the additional inductance there.



Layout of the set with full decoupling but without the dual-range coil made this week

MAKING A COIL FOR MEDIUM AND LONG WAVES

In the diagram you will notice a small switch for short-circuiting this coil. It is an on-off switch such as is used for turning the set on. The connections are very simple.

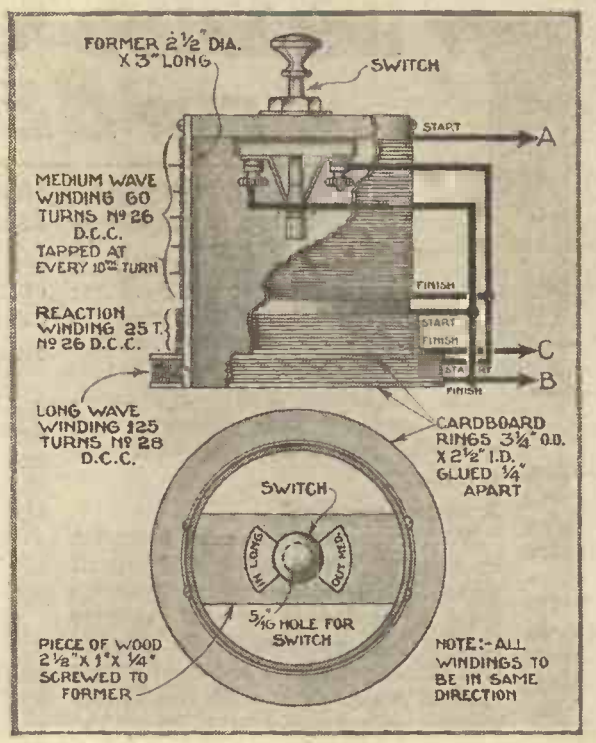
When the switch is open the two coils are in series and the variable condenser is placed across both of them. If the correct values are chosen then when the switch is closed we can tune from 200 to 550 or 600 metres, and with it open from 1,000 to 2,000 metres.

You will remember that on the medium waveband we had a number of aerial tappings to adjust the selectivity. We placed the aerial across only a portion of this total coil and, as you will remember from our experiments, we found this gave sharp tuning.

With the loading coil in series, however, the proportion of inductance in the small coil is not high and our aerial is now tapped across nearly the whole of the total inductance so we must not expect quite so much sharpness of tuning on the long band as we have obtained on the medium.

Another trouble is that our reaction coil is still acting only on the medium band and will not give sufficient or indeed any reaction worth while on the long band. We can of course have a separate reaction coil for long wave-band but this will complicate the switching.

The simplest solution to the problem is to wind the coils as shown by the diagrams. If we proportion the windings correctly, by placing a reaction coil between the two tuning winders and "concentrate" the windings of the loading coil, the one reaction coil will prove suitable for both bands.



Full details for making the dual-range coil are given above. Note the mounting of the wave-change switch on the top of the coil former

If you want to make your own wave-change coil for the present receiver, just place two cardboard "cheeks" below the present reaction winding as shown by the coil drawing. These cheeks are simply rings of cardboard cut so as to fit round the tube and you can glue them into place in any convenient way. Add 9 turns to the reaction winding, making 25 in all.

Space the cheeks about ¼ in. and wind in the space between them; 125 turns of number 28 double cotton-covered wire in the same direction as the two coils you have already wound. Join up the ends as shown, and take the two ends of the long-wave coil out to a simple on-off switch, which you can mount in any convenient position nearby.

I would advise you to fasten it to a small piece of wood running across the top of the coil, as it will then be in a very convenient position.

This coil will now be used exactly as we have used our coil before and you will find that when the switch is shorting the long-wave coil you will be able to tune in stations in the same position as previously. When the switch is "open" you will be able to cover the range from 1,000 to 2,000 metres quite comfortably.

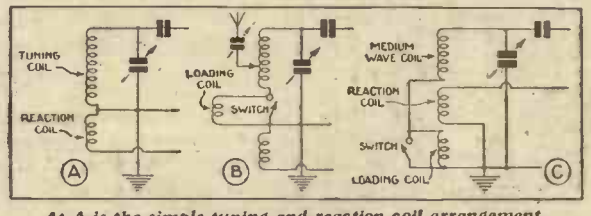
By now we have reached the stage where we understand the functions of the various parts and you will be able to fit into this receiver any of the standard wave-change coils, screened or unscreened, which are now marketed. Many of these coils are more selective than you can conveniently make them yourself, without adopting a rather elaborate switching system, and, as you know the connections necessary, you will be able to join them up very simply.

Next week I will show you how to put this set into a cabinet with a panel.

A NOTE TO NEW READERS

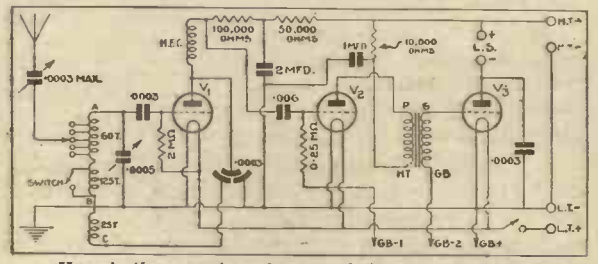
This is the ninth instalment of Mr. Percy W. Harris's special series of articles for beginners. In the preceding issues, all of which are still available through newsagents or direct from the publishers, price 4d. each post free, various refinements have been added week by week to the original two-valver. We now arrive at the final refinement of the set—which is now a three-valver—by adding a dual-range coil. Next week Mr. Harris will show you how the experimental baseboard set can be made into a fine three-valver, complete with panel and cabinet.

YOU MUST NOT MISS THE NEXT INSTALMENT

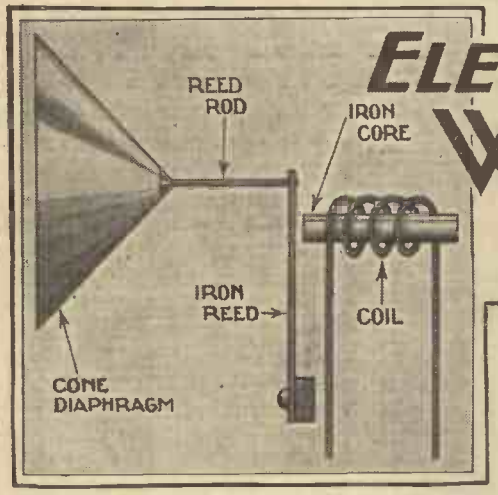


At A is the simple tuning and reaction coil arrangement used in the existing set. At B is a method of adding a loading coil to increase the wavelength range for long-wave reception. At C is the improved method adopted by Mr. Harris. Here you will see that the reaction coil is placed between the medium-wave coil and the loading coil

"BUILD AS YOU LEARN"



Here is the complete theoretical diagram of the latest version of the "Build As You Learn" set. Note the full decoupling and the dual-range coil connections



The simplest form of loud-speaker, as shown above, is really an enlarged telephone

ELEMENTARY WIRELESS COURSE FOR BEGINNERS

This week J. H. Reyner and the "A.W." Staff explain how the valve can amplify before and after detection

Why has my set several valves?

To increase the total amplification. We need not limit ourselves to one valve. We can use several, one after the other, increasing the strength of the signal at each stage.

Let me just remind you of the "mechanism" of radio telephony. In our tuning circuit we have currents oscillating backwards and forwards several hundred thousand times per second. We usually term these the high-frequency or "H.F." oscillations. The strength of these H.F. oscillations is caused to vary at a very much slower rate by the modulation, which occurs a few hundred or thousand times a second only.

The average value of these currents is nothing, because each current is immediately followed by another current in the opposite direction. Hence we cut off all the current in one direction with a rectifier or detector. The remaining currents are now all in the same direction, and although our telephones will not respond to the individual oscillations, the *average* value of the currents produces a noticeable effect.

Does this average value depend on the strength of the oscillations?

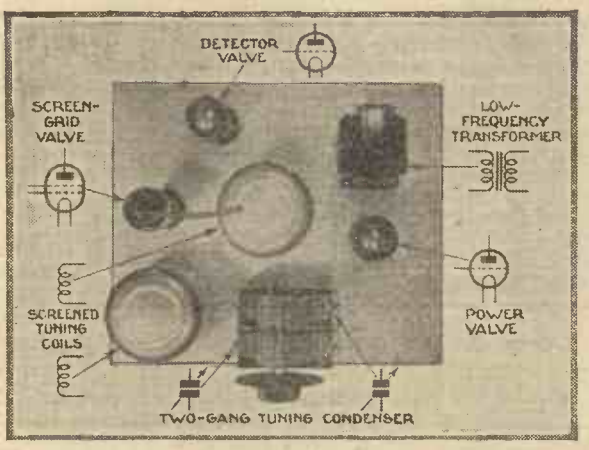
Certainly, and since the strength is varying, the average value alters, giving a varying current through the telephones which reproduces for us the speech or music we require. These variations of current after the detector, being much slower than the original H.F. oscillations, are termed low-frequency or L.F. oscillations, and every set is capable of being broken up into these two distinct sections—the H.F. portion dealing with the original oscillations before they are rectified, and the L.F. portion dealing with the speech currents after the detector.

Is that always true?

Yes. Some sets pay more attention to certain portions, but the general principle is true, and we shall obtain quite a good idea of the processes involved if we consider a typical three-valve set. This has three valves each of which deals with one of the three specific functions making up the whole chain.

You only mentioned two sections just now

That is true, but these are linked together by the detector. In the present set we use a valve in place of the crystal detector we have used hitherto.



A typical three-valve chassis (set framework) on which are mounted coils, tuning condenser, valves and transformer. Note the symbols for each component—they will help you to understand theoretical diagrams

Why do we do that?

For two reasons. Firstly, a crystal detector requires adjustment to find the best point of contact between the crystals. This is not necessary with a valve. Secondly, if we use a valve as a detector, we can also avail ourselves of its amplifying properties and so obtain stronger signals.

Then how can you make a valve detect?

By arranging it to pass current in one direction only. For instance, suppose we apply a negative voltage to the grid and adjust this so that the anode current of the valve is reduced practically to nothing. If we now apply a signal across the grid and filament of the valve this will either increase or decrease the steady grid voltage.

If the signal increases the grid voltage it will produce no result, because the anode current is already reduced to nothing, and making the grid more negative has no effect whatever. If the signal is in the opposite direction, however, it reduces the total negative voltage, and therefore the electrons in the filament are released and some anode current will flow.

Where will you get your voltage from?

The steady "bias" voltage we obtain from a small battery while the signal voltage is simply that across the tuning condenser. Any condenser which is charged has a voltage or e.m.f. across its plates trying to force the electrons back into their normal place, so that as the condenser in our tuning circuit charges up first in one direction and then in the other, we have voltages across the condenser alternatively positive and negative.

I see. Then these are the voltages which add or subtract from the voltage of the battery?

Exactly. The arrangement is shown in pictorial and symbolic diagrams. If you compare the two you will have no difficulty in understanding the circuit diagram.

I want to know why this arrangement is better than a crystal

Because of the amplification of the valve. A voltage of 3 or 4 volts on the grid of the valve would be enough to stop the anode current completely, whereas we have 60 to 80 volts on the anode trying to draw the electrons out

IN NEXT WEEK'S WIRELESS COURSE ARTICLE—

HOW VALVES AMPLIFY

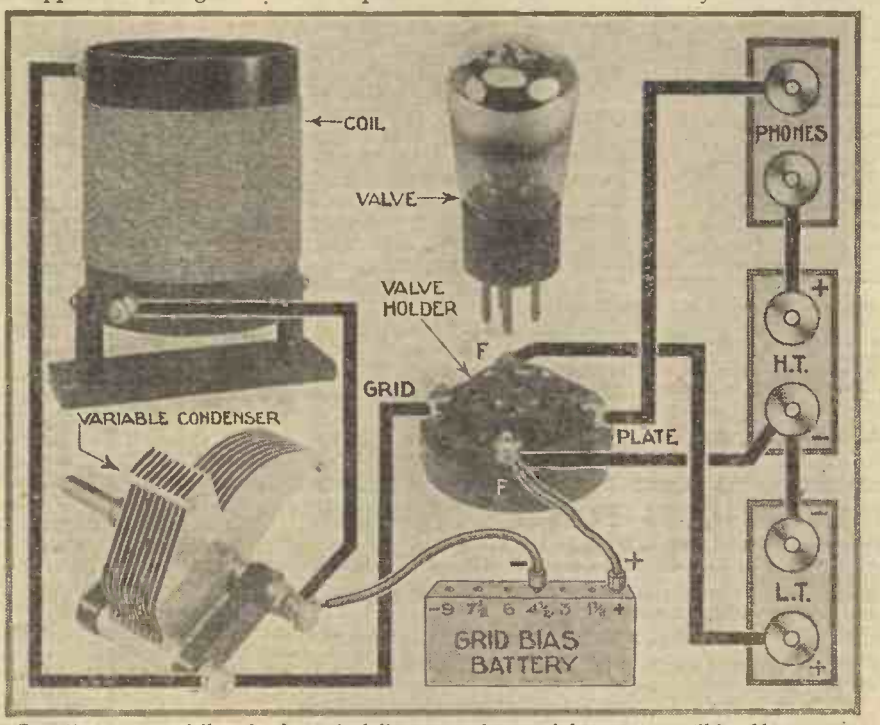
of the filament. So you see that 4 volts on the grid has as much effect as an anode voltage fifteen to twenty times as great.

Then does my set use a valve like this?

It is more likely to use a slightly different method. The system we have just discussed depends for its action on the fact that the anode current is reduced practically to zero, and it is known, in consequence, as *anode rectification*.

The average anode current increases when H.F. voltages are applied to the grid, and if the strength of the H.F. oscillations is varying, the average anode current will vary in a similar manner, giving us the L.F. variations we require.

There is another method, known as *grid rectification*, in which the anode current is kept at its normal value but is caused to *decrease* when H.F. voltages are applied to the grid. I will explain just how this is done another time, but you will see that if the average anode current changes at all, due to the application of H.F. voltages to the grid, we obtain the necessary rectification, and when the H.F. oscillations vary in strength due to the modulation, the average anode current varies in the same manner and produces for us the L.F. oscillations we need to work the telephones or loud-speaker.



Even if you cannot follow the theoretical diagram at the top of the page you will be able to trace out the connections of this pictorial diagram, which shows anode rectification

Will a detector valve work a loud-speaker?

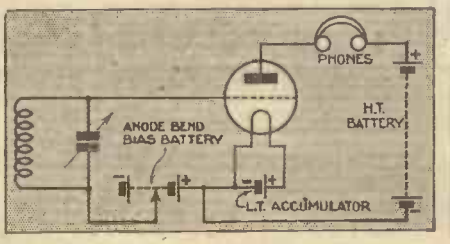
No. The L.F. currents produced by a valve detector are considerably stronger than with a crystal but it is still necessary to amplify them many times before they are strong enough for that purpose. That is what this *output valve* is for.

We pass the L.F. currents through a resistance or other suitable device which produces voltages, as I explained last week. These voltages are, in themselves, much stronger than those across the original tuning circuit, so that the currents in the anode circuit of the output valve have been doubly magnified and are now strong enough to operate a loud-speaker.

How does a loud-speaker work?

It is simply an enlarged form of telephone. Instead of a diaphragm we have a small soft iron *armature* which is caused to vibrate by the currents through the coil. Attached to this armature by a short metal rod is a large cone of specially prepared paper or similar material. The currents in the coil, therefore, cause this cone to vibrate and set up air vibrations of much larger intensity than would be possible with the diaphragm of a telephone receiver.

There are several variations of this principle which I shall discuss later on,



A simple theoretical diagram showing the connections for the anode detection system. Compare this with the pictorial diagram of the same circuit given below

but the essentials remain the same, namely that the L.F. currents in the anode circuit of the output valve are caused to vibrate a stiff paper cone which reproduces the air vibrations required.

Then what is the third valve for?

That is an H.F. valve, used for amplifying the high-frequency voltages developed across the tuning circuit *before* they are applied to the detector.

Why do you do that?

For two reasons. Firstly, the detector is insensitive to very weak signals. If the H.F. voltages are too small, it is not possible to cut off one half of the current effectively, and we only obtain partial rectification. Hence we are amplifying these voltages before applying them to the detector.

Now the method we adopt involves the use of a second tuned circuit so that the selectivity of the receiver is improved.

What do you mean by selectivity?

In theory a simple tuned circuit will only produce an appreciable voltage across the condenser if the circuit is tuned to the oscillations being received. In practice, however, a powerful transmitter comparatively close at hand may produce quite a strong voltage in the aerial even though the circuit is tuned to some other frequency.

If we have two tuned circuits we have to adjust them *both* to the correct frequency before we can hear the signal properly, so that the risk of interference from other stations is greatly reduced. You should now have a fair idea of the purpose of every part visible on the top of this chassis. Is that correct?

I think so, except that you have not told me what this little brown box is for

Ah, yes. That is a transformer. It is used in place of the resistance to couple the detector valve to the output valve, and enables us to obtain still more amplification. It involves a principle which we use a great deal in wireless. We will discuss it next week.

HOW VOLUME IS CONTROLLED

IN the modern set the question of controlling the volume is very much more important than the beginner might at first imagine. The reason is not difficult to see. We have to contend with stations of very different strengths.

The local station will not need nearly so much amplification as foreign stations. One foreign station may easily be twice as strong when it gets to the aerial as another foreigner.

At the output of the set, which is the loud-speaker, we usually want all these differing strength signals to be produced, in turn, at a level volume.

Then there is the different strength requirement of speech as against music. Even if we are confined to the reception of only one station the strength of that station may vary so much from speech to music that a volume control is essential.

Bearing these points in mind there is obviously a great deal in the question of the volume control. No really powerful set to-day can do without some means of cutting down the volume when stations are too strong, or of increasing the strength when stations are too weak.

In deciding where to install the volume control, the set designer has to remember that, at all volume levels, the quality must be equally good. In other words, the volume control adjustment must not interfere with the frequency response.

Another point is that the volume at one part of the set must not overload the valve before the final output stage is reached. As a rule this is ensured by arranging that the power valve distorts just before the detector.

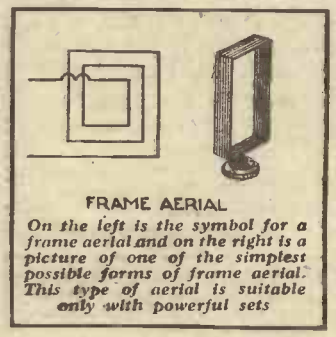
That is to say, we have a reserve of signal-handling capabilities in the detector. Otherwise we should have the undesirable state of affairs where the power valve was unable to deliver its maximum output owing to overloading in the earlier stages.

The usual place for a volume control in the modern set is *before* the detector valve. With the latest variable-mu type of screen-grid valves it is a very easy matter to vary the volume by varying the amplification of the high-frequency valves before the detector.

For strong signals, such as the local stations, the amplification of the variable-mu's is greatly reduced. Fortunately this does not interfere with the quality. For weak signals the bias is reduced, and the valves then amplify to their maximum extent.

Volume controls are not fitted to the low-frequency side of the set because this would often lead to distortion due to overloading of the preceding valves, such as the detector and high-frequency stages.

At the detector stage a volume control is usually fitted when the set is designed to work as a low-frequency amplifier. The control then enables the voltage from the pick-up to be adjusted to suit the output requirement.

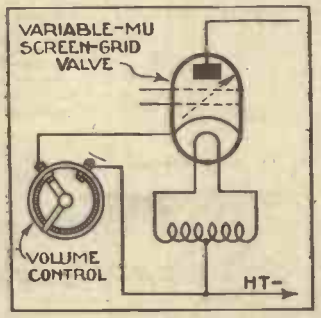


FRAME AERIAL

On the left is the symbol for a frame aerial and on the right is a picture of one of the simplest possible forms of frame aerial. This type of aerial is suitable only with powerful sets

WHY THE VARIABLE-MU VALVE GIVES BETTER QUALITY

BEFORE the beginner can understand why the variable-mu gives better quality, it is as well to point out that the variable-mu is a new form of the well-known screen-grid valve used for high-frequency amplification.



When the set is driven from A.C. mains the control of volume by means of varying the bias of the variable-mu valve is very simple—just a variable resistance between the cathode and the heater

The ordinary screen-grid valve consists of the usual filament, grid and anode with an additional grid, called the screening grid, inserted between the filament and the anode.

We cannot go into all the reasons why this screen-grid valve was developed. It will be enough to say that the addition of the screening grid in the existing three-electrode valve revolutionised high-frequency amplification.

The screen-grid valve made possible really stable high-frequency amplification, and for a time listeners were so impressed with this fact that they overlooked one of its drawbacks.

The drawback? Well, when the amplification of the valve was reduced by cutting down the voltage applied to the screening grid (part of the high-tension supply), the valve tended to "rectify" the signal instead of doing its real job of amplifying.

The result of this partial attempt to rectify was distortion, due to suppression of part of the signal.

In addition to this rather obvious weakness of the screen-grid valve it was later discovered that the valve was the cause of a form of unselective tuning that could not be cured by altering the tuning circuits.

So, after a year or so of the ordinary screen-grid valve, a new type was produced. Here the control grid, as distinct from the screen-grid, is tapered. The result of this modified construction is very striking.

For one thing, it is now possible to use two or more variable-mu screen-grid valves without introducing unselective tuning. Moreover, the quality of the reproduction is not spoilt when the volume is cut down by reducing the sensitivity or amplification of the valve.

In the old type screen-grid valve the amplification of the valve was controlled by varying the voltage of the screening grid. In the variable-mu valve the screen-grid voltage is kept constant, and the variation in the amplification (or "mu" as it is sometimes called) is obtained by varying the grid bias of the normal (*i.e.*, control) grid. See sketch above.

SPECIAL ARTICLES FOR NEXT WEEK

THE BATTERY TAPPINGS: What they are and how to use them.
HOW MANY VALVES? Explaining the uses of sets with one, two, three, and more valve stages.
THE WIRELESS MAN'S JARGON: Simple explanation of the terms commonly used by wireless amateurs.

WHAT EXACTLY *IS* A WIRELESS SET?

THE very first thing to understand about a wireless receiver is that it is only a part of a complete sequence that really starts with a microphone in the broadcast studio.

A wireless receiver is a piece of apparatus that enables you to reproduce speech and music, in the form of air waves in your home, at the very instant similar air waves are being set up by human speakers or musical instruments located in the distant broadcasting studio.

The intervening medium is the ether and not the air. The receiver is simply converting back to sound waves what the transmitter has converted into ether waves.

You cannot visualise a wireless receiver as just one piece of apparatus that does one well-defined job of work. Not like a motor-car that, when filled with petrol, enables the wheels to go round.

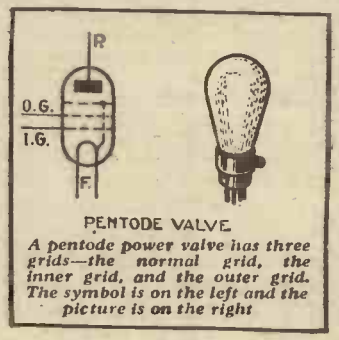
HOW IT WORKS

The "wheels" of the wireless set can be said to be the loud-speaker, and the "petrol" or driving power is the power released by the wireless waves from your batteries or mains.

In the ether—the medium through which wireless waves are transmitted—you have vibrations that cannot normally be heard. In your set you have a loud-speaker, with a moving diaphragm that will, under a certain stimulation, set up sound waves and so produce sounds.

The stimulation required is a variation in the current through the loud-speaker. This current is supplied by the power supply of the set. It is varied by the wireless waves.

Not directly, because the waves are of very high frequency and the loud-speaker mechanism is too sluggish to respond to them. So we slow down the waves, so to speak, so that their variations can be felt by the loud-speaker and so be turned into sound.



PENTODE VALVE

A pentode power valve has three grids—the normal grid, the inner grid, and the outer grid. The symbol is on the left and the picture is on the right

HOW TO READ THE CIRCUIT DIAGRAM -THE KEY TO THE LAYOUT PLAN-

ALTHOUGH most constructors follow the full-size layout plan when building up an AMATEUR WIRELESS set, it is very useful to be able to grasp the theoretical diagram, which is a sort of shorthand way of drawing the connections between the components.

The connections indicated by the theoretical diagram are just the same as those in the practical layout, the only difference being that the diagram can be read at a glance, whereas the layout has to be somewhat laboriously traced out.

INSTANT PICTURE

We might say that the theoretical or symbolic diagram gives an instant mind picture of the complete arrangement of the connections.

It gives you an "easy-to-read" idea of the electrical paths of the various wires, though it does not indicate the route taken by these wires in going from one point to another.

Many amateurs fight shy of the theoretical diagram because they think it is too "technical" to understand. Really the diagram is very much easier to read—at a glance—than the simplest of layouts.

The more you know about these theoretical diagrams the more you appreciate that they are the key to the layouts.

As an example, we have taken a one-valve set that was described in AMATEUR WIRELESS some time ago. This "Easy-to-Build" one-valver has a theoretical diagram at the top of the page and a layout plan below.

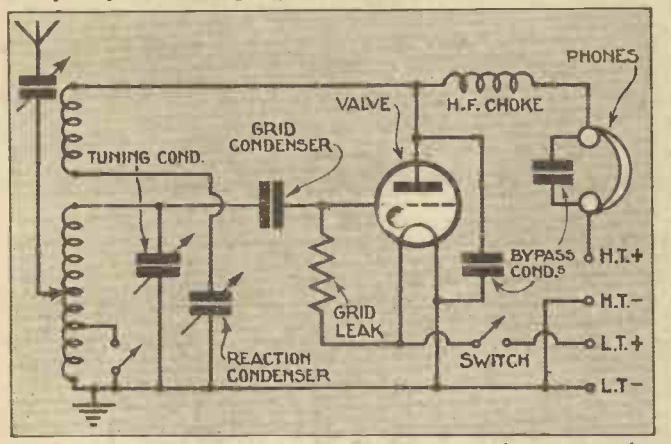
From the diagram we see what sort of circuit is used. From the layout we see how this circuit is put into practice.

By now those of you who have been following all these "Wireless Made Easy" supplements will know most of the individual symbols, such as the valve symbol forming the central point of the theoretical diagram above.

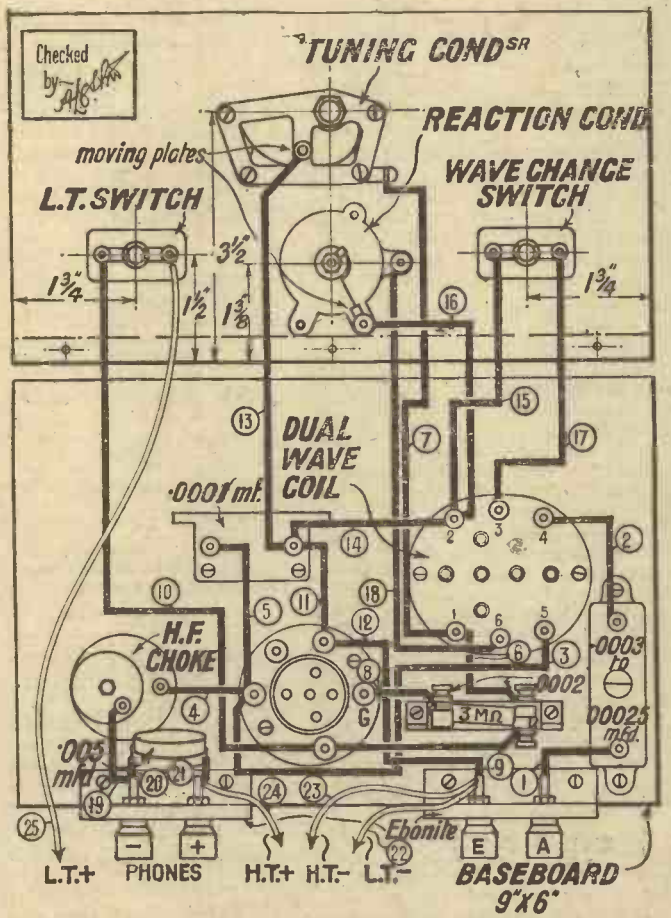
You will see that the valve is indicated by a circle with three separate electrodes, the anode a thick black line at the top, the grid a dotted line just below, and the filament a looped line at the bottom.

If you now look at the corresponding layout you will see, not a valve, but a valve-holder to take the valve. On this holder there are four terminals, two for the filament, one for the anode or plate, and the other for the grid. The grid socket, note, is nearer to the two filament sockets than is the anode socket.

Around the valve holder in the layout you will see grouped many connections. At a glance it is not very easy to see what they are all for, is it? Yet in the theoretical diagram how simple it is to follow the various connections from the filament, anode and grid.



Here is the theoretical circuit diagram of a one-valve set recently described in the pages of "Amateur Wireless." If you carefully study this diagram you will see its relation to the layout plan below



Here is the layout plan corresponding to the theoretical diagram above. Note that instead of a valve symbol this diagram indicates a valve holder, but the connections are just the same as above

Take the filament first. One side, you see, goes to low-tension negative, marked as a small circle in the diagram and as a flexible wire in the layout. The other side of the filament goes to low-tension positive but not directly.

TWO-WAY SWITCH

Inserted in this lead is a two-way switch, so that the filament battery supply can be broken at will, thus putting the set out of action when it is not wanted.

The anode of the valve, again referring to the diagram, has several leads going from it. Consider first the battery lead. If you trace the connection through, you will see that the anode is really connected to high-tension positive, through firstly the high-frequency choke and secondly through the 'phones winding.

This we call the direct-current path. There are two other anode paths. One is through the .0001 by-pass condenser to the negative side of the filament. The other is through the reaction coil and reaction condenser to the negative side of the filament.

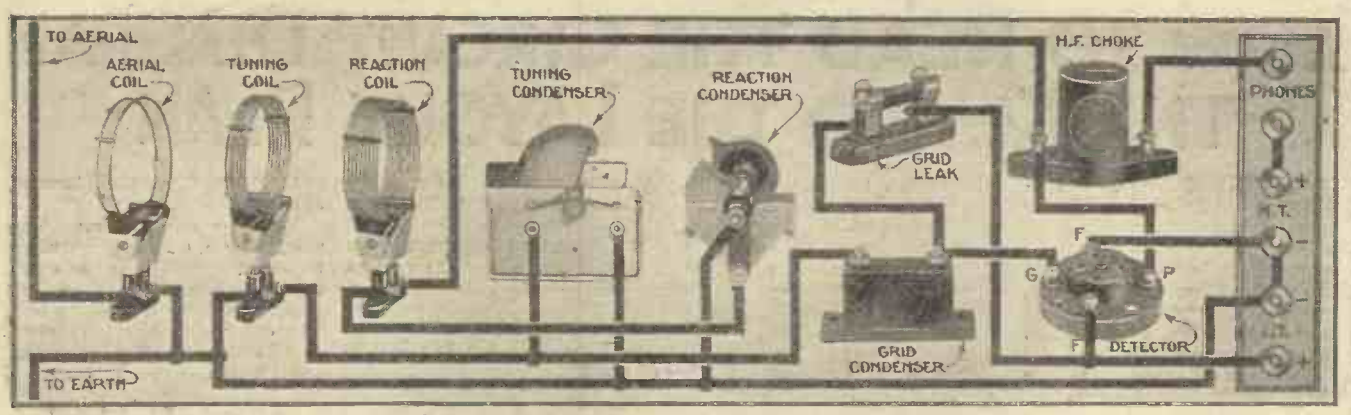
In a similar way you can trace out the grid circuit. There are two connections to the grid, one to the grid condenser and the other to the grid leak.

AERIAL TUNING

Having analysed the valve circuit you can look into the aerial-tuning circuit. Here you can quickly see from the theoretical diagram that the aerial is connected to a tapping on the tuning coil, though a variable condenser. The tapping is marked No. 4, and you can compare this with the actual terminal on the coil-holder shown by the layout.

Across the lower end of the coil in the diagram you will see a two-point switch of the same type as that used for the filament battery, but here the switch is used to short-circuit the lower portion of the complete coil when medium-wave reception is wanted.

In the layout this switch is shown mounted on the panel. So is the variable tuning condenser, which in the diagram you see is connected across the tuning coil. *Note how much longer these connecting wires have to be in practice than in theory.*



SHORT-WAVE RECEPTION IS EASY!

Above you see the connections for a complete one-valve short-wave set. As the article below explains, it is quite easy to adapt ordinary sets for use with a modification of this circuit, so that they can tune in many of the powerful short-wave broadcasting stations

THERE are two simple ways you can adapt a broadcast set for short-wave reception. In a broadcast set the tuning circuits are designed to respond to signals of wavelengths between 200 and 550 metres, and between 1,000 and 2,000 metres.

The object of adaptation for short waves is to make the tuning arrangements suitable for wavelengths between, say, 20 and 100 metres.

It depends on the type of set you are using which of the two methods of adaptation you adopt.

THE ADAPTOR

If your set is a simple design with a detector and low-frequency amplifier you must use the form of adaptor that cuts the present tuning circuit right out of circuit.

If your set has a stage or more of high-frequency amplification, you need not interfere with the tuning arrangements, as the other form of adaptor will make use of them in a system of super-het conversion to be explained later.

With simple detector sets a one-valve plug-in unit will convert the tuning to short waves. The idea is to use a complete short-wave one-valve circuit, complete with short-wave tuning and reaction, and to make this replace the tuning circuit and detector arrangement of the existing set.

In the output of a one-valver we find the high-tension positive and the two low-tension battery leads. Now suppose we connect these battery leads to a valve base, such as you find on the end of any battery valve.

Suppose we connect the high-tension lead to the anode pin of this valve base and the filament leads to the filament pins.

Then if we remove the detector valve from the valve holder of the set and insert this specially-connected base *we shall automatically bring into the set the short-wave tuning and reaction.*

Moreover, since we shall have left the grid pin of the valve base "blank," it follows that the grid connections of the valve holder in the set, namely the normal tuning circuit, will be cut out of action.

All this, then, can be done very simply with the aid of an adaptor valve base connected in place of the phones in a one-valve set. This is the basis of the plug-in short-wave adaptor type of unit.

With it, any broadcast set with only a detector and low-frequency amplification can be modified so that short-wave tuning and the low-frequency amplifying portion of the set are combined.

When short-wave reception is wanted, you simply remove the detector valve from the set, plug it into the valve holder of the unit, and then plug in the adaptor valve base into the detector valve holder of the set.

The aerial and the earth of the set will be transferred to the appropriate terminals of the adaptor, and then you can carry on with short-wave reception.

For sets with high-frequency amplification it is much better to use what is known as a short-wave super-het adaptor. This is a one-valve short-wave detector circuit, but it is an *addition* to the set and not a *replacement* for the existing detector.

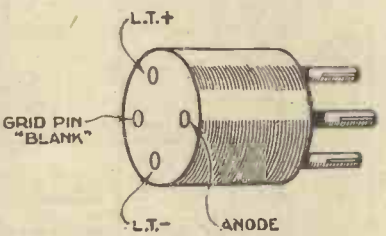
USING YOUR SET

The main idea is to make use of the whole of the existing set as an intermediate wavelength amplifier. All incoming short wavelength signals have their wavelengths changed to this fixed medium wave by the super-het process.

In practice there is nothing difficult about this system. You disconnect the aerial and earth from the set and connect them to aerial and earth terminals on the unit. You then take a single lead from the anode output through a fixed condenser to the aerial terminal of the set.

Battery connections have to be made from the unit either to the battery terminals of the set or to the batteries themselves.

The theory is quite as easy to understand as the connections are easy to make. We have a very high-frequency signal coming in at the unit detector stage. If the detector is allowed gently to oscillate and the tuning is slightly de-tuned from the incoming frequency or wavelength a new or heterodyne frequency will be produced.



This is the adaptor plug needed to convert a detector and low-frequency amplifier type of set for short-wave working. The anode connection of the short-wave valve that would normally go to the 'phones is taken to the anode pin of the adaptor plug

This corresponds to a medium wavelength of, say, 1,500 metres, the exact frequency depending on the difference in frequency between the incoming signal and the frequency of the local oscillations set up by the detector.

If the set is tuned to this wavelength we shall be able to amplify all the short-wave signals at the long wavelength of the set's high-frequency tuning circuits. This—without altering the set in any way.

Subsequent operation will then be very simple. Having found which long wavelength is best, simply by varying the set's wavelength until a short-wave signal is heard at its loudest, we have only to turn the tuning knob of the short-wave unit and the oscillating detector will do the rest.

Connect up the unit to the set, tune the set to a long wavelength, bring the unit valve into a gentle state of oscillation, and turn the unit tuning condenser slowly from minimum to maximum.

STATIONS TO HEAR

W8XK Pittsburg, is the most reliable station at the present time. After 10.15 p.m. the signal strength increases from fair 'phone strength to really good speaker strength five nights out of seven.

Having found this station, about 6 degrees higher (on a 180-degree dial) W3XAL is usually receivable on the loud-speaker; but if before midnight the signal strength is insufficient, tune to 24.59 metres, where the station is usually stronger at this hour.

W2XAF, on 31.48 metres, is normally quite a reliable signal after about 11 p.m., but before this, in many cases, Zeesen, on 31.38 metres, is strong enough to cause interference.

Between 6 and 7 p.m., W8XK and W2XAD, both on the 19-metre band, come over at good 'phone strength. On such low wavelengths it is essential that a small aerial be used and if maximum signal strength is required a total length of 20 to 25 ft. should be used.

To those who are able to listen during the afternoon, W3XAL on 16.87 metres, should be searched for.