

The Wireless Constructor

Vol. XIV.

OCTOBER, 1932.

No. 72.



JOHN SCOTT-TAGGART

A.M.I.E.E., F.INST.P.

CONTRIBUTES MORE
EXCLUSIVE ARTICLES
INCLUDING

“RADIO
OF
TODAY”

THIS
MONTH'S SET

The
“DOUBLE-
TUNE”
THREE





PRECISION-
Just one of the factors
that make

Lewcos
REGD.

RADIO COMPONENTS
The World's Finest

At every stage in the production of Lewcos Radio Components perfect precision is secured under test condition : precision in design, precision in selection of finest quality materials, precision in each technical process of manufacture.

The result is absolute assurance of the finest reception and reproduction.
Try "Lewcos" and hear for yourself !

The Lewcos components illustrated are:

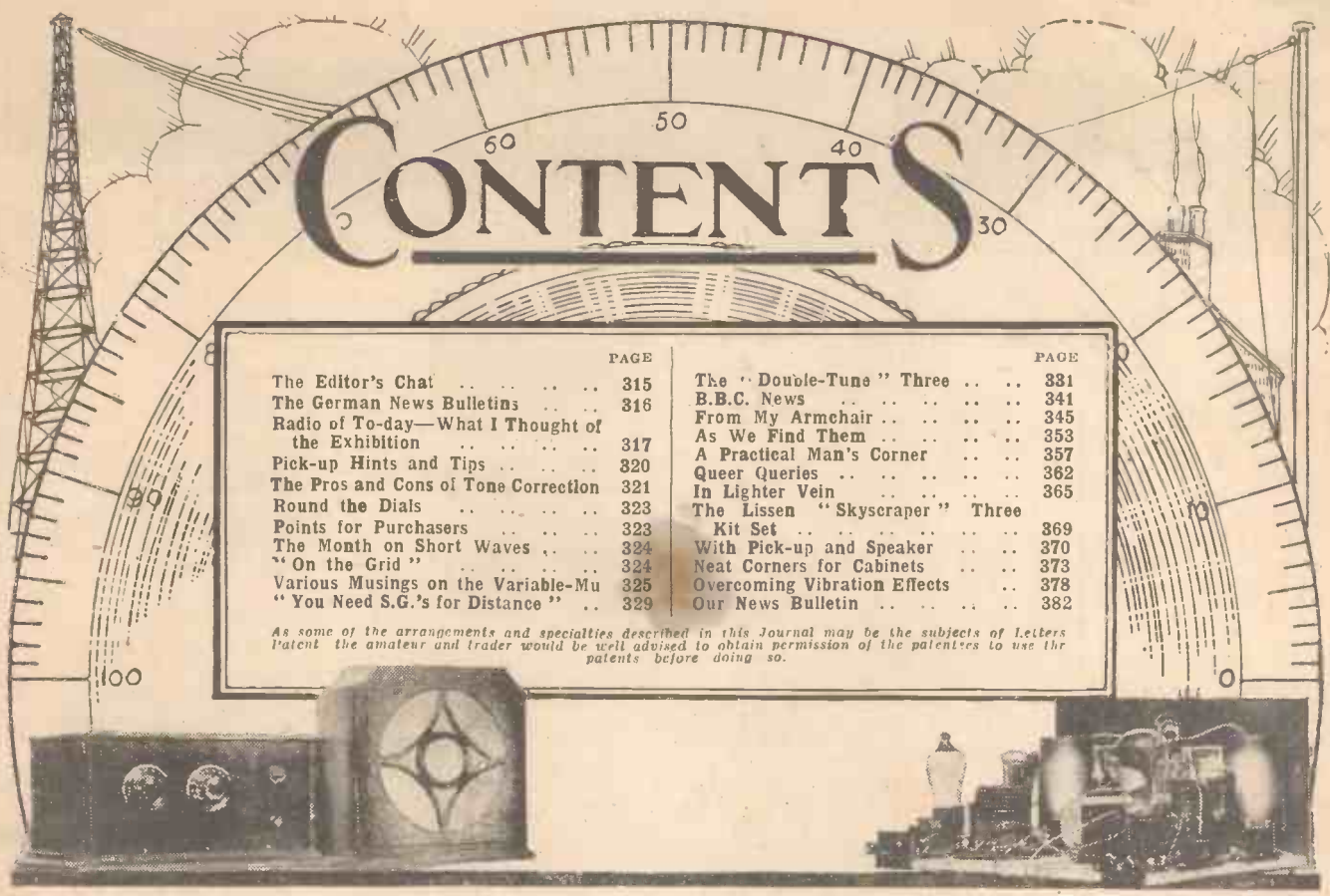
1. *The Lewcos L.F. Choke. Price 12/6d. Write for Leaflet Ref. R.78.*
2. *The Lewcos Super H.F. Choke. Price only 6/-. Write for Leaflet Ref. R.78.*
3. *The Band Pass Filter (Ref. BPF/R). Price 12/-. Write for Leaflet Ref. R.73A.*

Try them. Better performance will result!



LEWCOS RADIO PRODUCTS FOR BETTER RECEPTION

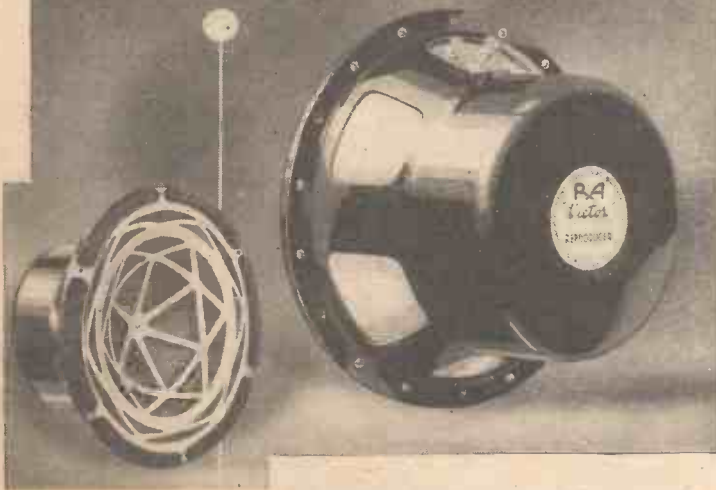
THE LONDON ELECTRIC WIRE COMPANY AND SMITHS LIMITED, CHURCH ROAD, LEYTON, LONDON. E.10



	PAGE		PAGE
The Editor's Chat	315	The "Double-Tune" Three	331
The German News Bulletins	316	B.B.C. News	341
Radio of To-day—What I Thought of the Exhibition	317	From My Armchair	345
Pick-up Hints and Tips	320	As We Find Them	353
The Pros and Cons of Tone Correction	321	A Practical Man's Corner	357
Round the Dials	323	Queer Queries	362
Points for Purchasers	323	In Lighter Vein	365
The Month on Short Waves	324	The Lissen "Skyscraper" Three	
"On the Grid"	324	Kit Set	369
Various Musings on the Variable-Mu	325	With Pick-up and Speaker	370
"You Need S.G.'s for Distance"	329	Neat Corners for Cabinets	373
		Overcoming Vibration Effects	378
		Our News Bulletin	382

As some of the arrangements and specialties described in this Journal may be the subjects of Letters Patent the amateur and trader would be well advised to obtain permission of the patentees to use the patents before doing so.

FAITHFUL REPRODUCTION



If you insist on the best—insist on "R&A"
—there is a model to suit your particular needs

"BANTAM" PERMANENT MAGNET MOVING COIL REPRODUCER.
The "Bantam" is the finest value ever offered in P.M. Moving Coil Reproducers. It is essentially a "quality" reproducer, and is ideal for small receivers, as well as for multi-valve sets. The Chassis is cadmium plated and lacquered. Speech Coil Impedance 5.5 ohms. Dimensions 7 1/2 in. dia. x 3 1/2 in. deep.



27'6
INCLUDING 3-RATIO TRANSFORMER.

The "VICTOR" Permanent Magnet Moving Coil Reproducer-de-luxe. An instrument for the connoisseur, representing the highest achievement possible in the present stage of P.M. M.C. design and performance. The forged cobalt steel magnet has a flux density of 8,000 lines per square centimetre, thus ensuring amazing sensitivity. The cadmium plated grille is a distinctive feature, and the 6-ratio transformer, permitting extremely accurate matching, is completely enclosed, as also are the magnet and speech coil. Chassis finished black enamelled. Dimensions 10 1/2 in. dia. x 5 1/2 in. deep. Speech Coil impedance 5.5 ohms.

Write for copy of New Leaflet. Sent Post Free.

70/- INCLUDING 6-RATIO TRANSFORMER.

P.A. gives faithful Reproduction

SOME NEW PRECISION INSTRUMENTS



J. B. UNITUNE GANG

Rigid one-piece chassis as NUGANG. Trimmer of front section is operated from receiver panel by a knob concentric with main tuning knob. Capacity .0005. Complete as illustrated, 2 Gang 18/6, 3 Gang 27/-.

J. B. NUGANG

Rigid one-piece chassis—very robust construction. Capacity .0005, .2, 3 or 4 Gang. Prices semi-screened, as illustrated, 14/-, 21/-, 28/- Fully Screened, 16/-, 23/6 and 31/-
NUGANG, Type "A," complete with Disc Drive. Semi-Screened, 16/6, 24/6, 31/6. Fully Screened 18/6, 27/- and 34/6.

J. B. SUPERHET GANG

Similar to the "Nugang" but modified for superhets. Capacity .0005. Fully screened, 3 Gang 25/6, 4 Gang 33/- Semi-screened 23/- and 30/-.



J. B. SHORT WAVE CONDENSER

With many novel features, very low minimum capacity. Special screened pig-tail to rotor. Capacities .00005, .0001, .00015, .0002, .00025, all 5/9 each.



J. B. ILLUMINATED DISC DRIVE

For use with the new J.B. Gangs. Extremely powerful. Ratio 12/1. Sloping Scale and Hairline Visor. Complete with full-length escutcheon in oxy-silver or bronze finish, 4/9.

CONDENSERS & DIALS
WRITE FOR NEW CATALOGUE

TO YOU

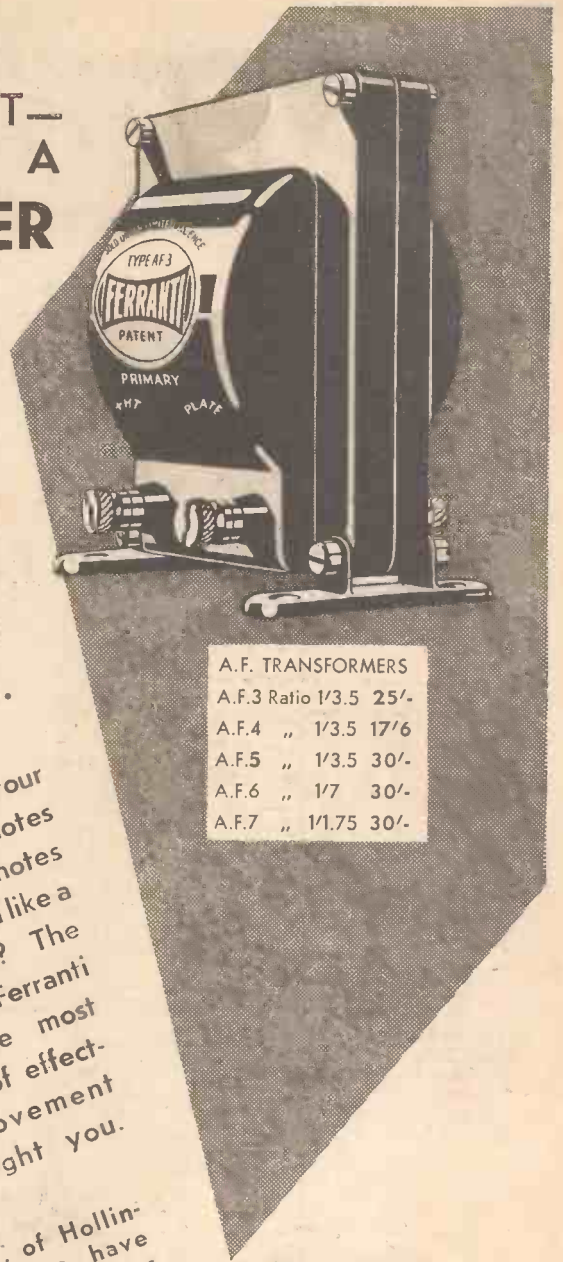
THE COST OF A BETTER SET—
MAY ONLY BE THE PRICE OF A
FERRANTI TRANSFORMER

It is easy to spend many pounds on a set giving poorer quality of reproduction than you would get from your own by simply installing a Ferranti Transformer.

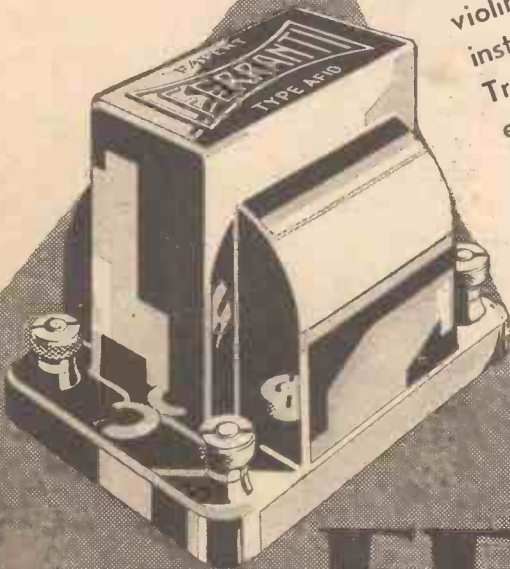
Listen IN — critically to your present set. Are the bass notes really there? Do the high notes of the violin really sound like a violin or like a flute? The installation of a Ferranti Transformer is the most economical way of effecting an improvement that will delight you.

Ferranti Ltd., of Hollinwood, Lancashire, have been making transformers since 1882 and every engineer knows that no better transformers are obtainable the world over.

Every Ferranti Transformer is guaranteed to give a performance within 5% of the published curve, AND within 5% of every other Ferranti Transformer of the same type. Ferranti are the only transformers so guaranteed.



A. F. TRANSFORMERS	
A.F.3 Ratio 1/3.5	25/-
A.F.4 " 1/3.5	17/6
A.F.5 " 1/3.5	30/-
A.F.6 " 1/7	30/-
A.F.7 " 1/1.75	30/-



A. F. TRANSFORMERS	
A.F.8 Ratio 1/3.5	11/6
A.F.10 " 1/3	6/6

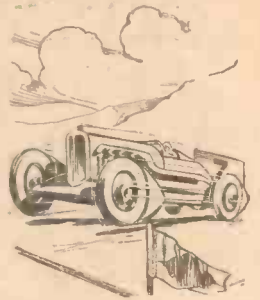
FERRANTI TRANSFORMERS

FERRANTI LTD., Head Office & Works, Hollinwood, LANCASHIRE
LONDON: Bush House, Aldwych, W.C.2.

Wonderful Books for BOYS!

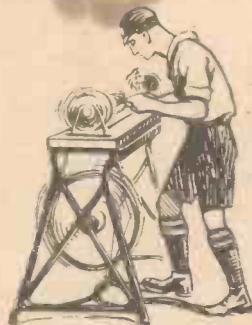


The first appearance of this magnificent book! It contains all the romance of man's mastery of speed on land and water, and the most famous mechanical achievements thrillingly pictured and described. There are four splendid coloured plates.



The Modern Boy's Book of MOTORS, SHIPS and ENGINES 7/6

NET.



The finest book on the market for the boy with a hobby or who wants a hobby, the 1933 HOBBY ANNUAL is packed with fascinating articles about how to make things and how things work. Illustrated with hundreds of photographs and sketches, and two large folding photogravure plates.

HOBBY Annual 6/-

NET.

Of tremendous interest to every up-to-date boy. Aeroplanes and flying, railways, motor-cars and motor-cycles, speed, the films—all the things a boy likes to read about are here. There are also three complete adventure stories by popular authors, hundreds of illustrations, and two coloured plates.



MODERN BOY'S Annual 6/-

NET.



Never were the wonders of the world's animals made so interesting as in the 1933 NEW ZOO ANNUAL, written by expert naturalists. With two splendid coloured plates and hundreds of photographs, it will fascinate boys and girls of ALL ages—and grown-ups, too.

NEW ZOO Annual - 6/-

NET.

Now on Sale at all Newsagents, etc.

FOR EVERY SET — there's a PILOT AUTHOR KIT

CASH — C.O.D. — or H.P.

S.T.300 RADIOGRAM

EXACT to
Mr. John Scott-Taggart's
Published Specification.

KIT "A"

Author's Kit, with Ready Drilled Panel, less Valves, Cabinet, Pick-up, Speaker and Motor

Cash or C.O.D.

95/-

Or 12 monthly payments of **8/8**

KIT "B"

Author's Kit, as above, with Valves, but less Cabinet, Pick-up, Speaker and Motor.

Cash or C.O.D. **£6:7:3**
Or 12 monthly payments of **11/8**

KIT "C"

Author's Kit, as above, complete with Valves, Cabinet, Pick-up, Speaker, and Motor.

Cash or C.O.D. **£13:13:9**
Or 12 monthly payments of **25/-**

KIT-BITS

Selected C.O.D. Lines. Post Charges paid on all orders over 1/-.

	£	s.	d.
1 Peto-Scott Radio-Gramophone Cabinet in Oak	2	19	6
1 B.T.-H. Minor Pick-up and Tonearm	1	7	6
1 Blue Spot 100U Loudspeaker and Chassis	1	19	6
3 Valves: P.M.12A, P.M.2D.X., L.P.2.	1	12	3
1 Sheet Copper Foil 10 in. x 7 in.	1	0	0
1 Garrard No. 20 Motor with long handle	1	0	0
2 Ormond .0005 mfd. slow-motion condensers with mahogany finished dials	15	0	0
2 Colvern special "S.T.300" Coils	12	0	0
1 Lissen Hypernik Transformer	12	6	0

THESE ARE THE PARTS THE AUTHOR USED.

1 mahogany finish ebonite panel, ready drilled, 18 in. x 8 in.	s. d.
1 strip of ebonite for Terminal strips, 16 in. x 1 1/2 in.	9 0
1 foil covered baseboard, 16 in. x 10 in. x 3/8 in.	1 3
2 Ormond .0005 slow-motion type variable condensers new type R.493	2 3
1 J.B. Midget .0004-mfd. condenser	15 0
1 Ready Radio .00015-mfd. differential reaction condenser	4 0
1 Telsen .0001-mfd. differential condenser	2 6
2 Colvern special "S.T.300" coils	2 6
1 W.B. horizontal valveholder	12 0
2 Lotus 4-pin valve holders type V.H.K.	1 0
1 Telsen Binocular S.G. H.F. Choke	5 0
1 Lewcos Reaction-type H.F. Choke	2 6
1 Wearite Switch type 123	4 0
1 Wearite 50,000-ohm volume control type Q.V.C.	4 6
1 Ready-Radio 3-point switch	1 6
1 Lissen Hypernik L.F. Transformer	12 6
1 Dubilier .0001-mfd. fixed condenser, type 670	1 0
1 Graham Farish "Ohmite" 1-meg. Grid leak with terminals	1 6
2 Telsen 1-mfd. Condensers	4 6
1 Lewcos 20,000-ohm Resistance	1 6
10 Bulgin Indicating Terminals	2 6
1 "S.T.300" Radio-gram Screen	1 9
Insulated Wire, screws, etc.	1 6
3 Belling & Lee G.B. Wander plugs.	6
4 Belling & Lee H.T. Wander plugs.	8

Kit "A" Cash or C.O.D. **£ 4 15 0**

Any parts supplied separately. Orders over 10/- sent post or C.O.D. charges paid.

PETO-SCOTT VOXKIT RADIO-GRAM CABINET

(Registered Design)

—Chosen and Specified by Mr. John Scott-Taggart for his S.T.300 RADIO-GRAM.

Soundly constructed of best materials by expert craftsmen. With silk covered fret, highly polished oak, standing 3 ft. 4 ins. high. With hinged lid. Complete with speaker baffle and motor board.



59/6

Or 8 monthly payments of 8/-

ORIGINAL S.T.300

As described in Wireless Constructor, February.

KIT "A"

Author's Kit, with Ready Drilled Panel, less Valves and Cabinet

Cash or C.O.D.

72/6

EASYWAY

12 monthly payments of 6/8

Valves as Specified, £1-12-3. Peto-Scott Cabinet, 15/-

KIT "B"

Author's Kit, as above, with valves but less cabinet.

CASH or C.O.D. **£5:4:9**
EASYWAY
12 monthly payments of 9/7

KIT "C"

Author's Kit, as above, complete with valves and cabinet.

CASH or C.O.D. **£5:19:9**
EASYWAY
12 monthly payments of 10/11

DOUBLE-TUNE THREE

(As described in this month's issue)

KIT "A"

Author's Kit less Valves & Cabinet.

Cash or C.O.D. **£4:6:3**

or 12 monthly payments of **7/11**

Set of Specified Valves **£1:2:9**

Peto-Scott Cabinet to Specification **15/-**

LISSEN "SKYSCRAPER 3." Chassis model with (Lissen) S.G., Detector and Pentode valves.

Cash Price, £4/9/6. Balance in 11 monthly payments of 8/3.

COSSOR MELODY MAKER. Model 335. Complete with valves, speaker, and cabinet. Cash Price, £7/17/6. Balance in 11 monthly payments of 14/6

Send **8/3** only

Send **14/6** only

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

IMPORTANT

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

PETO-SCOTT CO. LTD., 77, CITY RD., LONDON, E.C.1.

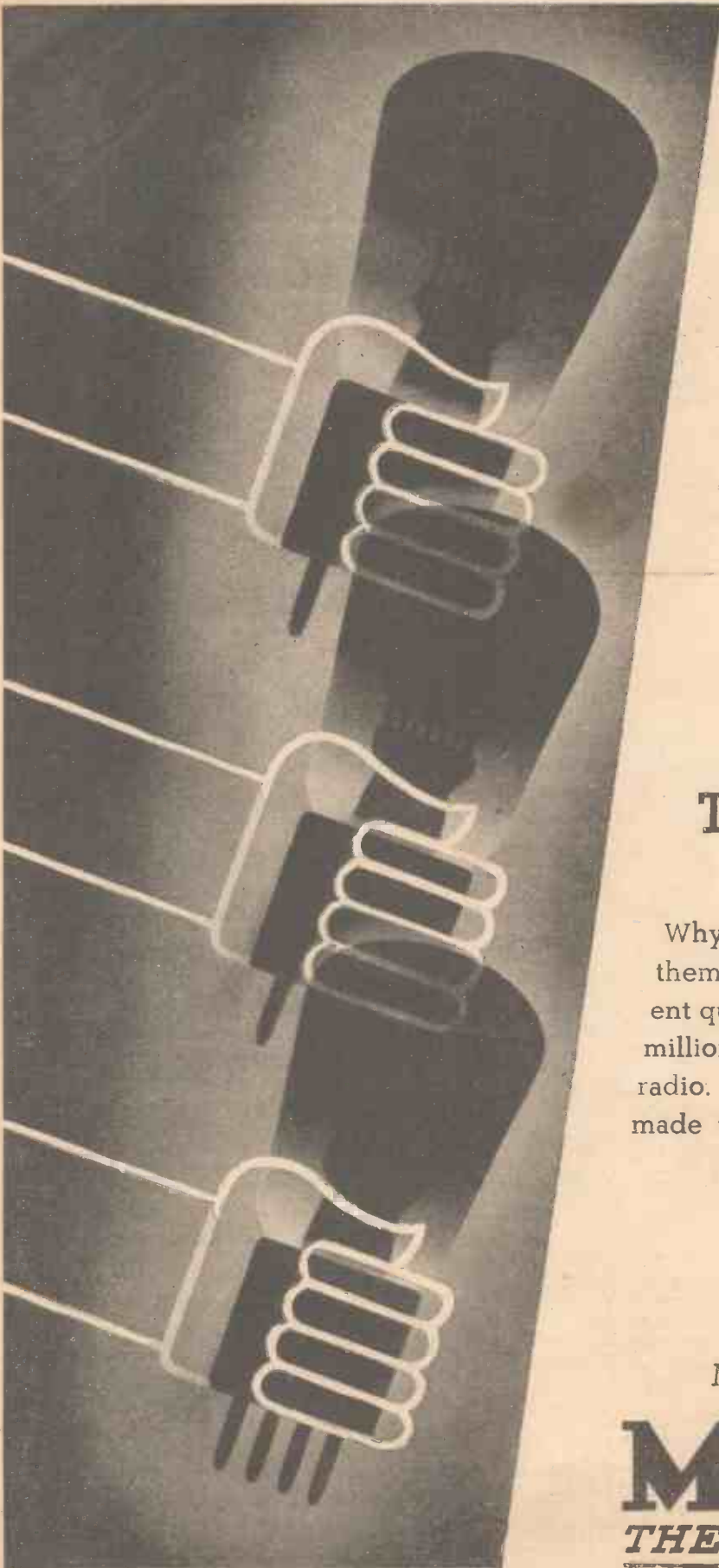
West-End Showroom: 62, High Holborn, London, W.C.1

Please send me (C.O.D., CASH or H.P.)

S.T.300 RADIOGRAM. KIT A/B/C. Peto-Scott VOXKIT Radiogram Cabinet. ORIGINAL S.T.300. KIT A/B/C. DOUBLE TUNE THREE. KIT A/B/C. for which I enclose £ s. d. CASH/H.P. Deposit.

Name.....
Address..... W.C. 10/32.

Buy by Post — it's Quicker



THEY ALL SAY MULLARD

Why? Because experience has taught them that Mullard never fails: consistent quality and performance has shown millions of listeners the way to better radio. Now a new construction has made them non-microphonic.

The valves specified by John Scott-Taggart for the S.T. 300 Radiogram are:

P.M.12A

P.M.2DX

P.M.2A

MADE IN ENGLAND.

Mullard

THE · MASTER · VALVE

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

The WIRELESS CONSTRUCTOR

Published by the Amalgamated Press, Ltd., Fleetway House, Farringdon Street, London, E.C.4.



THE EDITORS CHAT



MR. JOHN SCOTT-TAGGART'S LATEST SET—TESTS WHILE ON TOUR—VICTOR KING'S "DOUBLE-TUNE" THREE

THE principal item of news in this month's issue of THE WIRELESS CONSTRUCTOR is that the second special "S.T." set—one using four valves—is to be released in our December issue, on sale Nov. 15th. A new design by Mr. John Scott-Taggart is great news for set-builders. It is no exaggeration to say that the announcement of this new "S.T." receiver—the "S.T.400"—of which further details appear next month—will be echoed throughout the ranks of all home constructors, not only in this country, but in many countries abroad.

The "S.T.400"

Mr. Scott-Taggart's new set is already being discussed in buses, trains, offices—in fact, wherever keen amateurs happen to meet—and it is obvious that details will be eagerly awaited until they are offered in our issue to be published on November 15th. To tell the truth, we ourselves are pretty well as much in the dark as regards the circuit as many readers, and we are equally keen to know how Mr. Scott-Taggart gets the superb results, which he certainly *does* get, with this new "S.T.400" set.

There are certainly no secrets about the results he gets, for many readers in all parts of Great Britain have had the receiver—or experimental models—in their own homes and on their own tables, and thus have had opportunities of judging for themselves the remarkable capabilities of "S.T.'s" new set.

Thoroughly Tried

No receiver in the history of receiver design has been demonstrated and tried out in such a manner or on such a scale. Scores of readers—often in groups of four or five—have met and discussed this set with Mr. John Scott-Taggart—not just

in the South of England only, but in all the big centres.

A Remarkable Achievement

The "S.T.400" will be the combined result of Mr. Scott-Taggart's own inventive genius and the practical suggestions of readers of all types, working under the most varied and often the most difficult conditions. The labour and strain imposed on Mr. Scott-Taggart by entering new homes day after day, and meeting entirely different and unknown conditions to which to submit his set, can well be imagined.

He tells us, however, that he feels very well repaid, for he is more than satisfied with the "S.T.400" on test. We ourselves know that the unique confidence of constructors enjoyed by Mr. Scott-Taggart—confidence which has grown snowball fashion over ten years—will again be triumphantly proved.

MADE LIKE A "MIKE"



A novel type of handbag. It is made to resemble a condenser "mike," similar to the one shown hanging above.

Tens of thousands are going to build this new "S.T.400," the brilliant result of the most thorough preparation any set ever put before the home-constructing public has ever received. The prejudice against employing more than three valves has been dying for months; the "S.T.400" will kill it in one day, and that day is November 15th, 1932.

Victor King's Latest

In this month's issue our old friend Victor King describes a set entitled the "Double-Tune" Three, which has been designed and tested in our laboratories at the express wish of many of our correspondents.

It appears that a circuit employing that ever-popular arrangement of three valves, detector and 2 L.F., but in the most modern and up-to-date manner possible, still has many allurements for WIRELESS CONSTRUCTOR readers.

Mr. Scott-Taggart, going from strength to strength, contributes as well as his popular feature "From My Armchair," a fascinating article on "What I Thought of the Exhibition." It would be interesting to know how many WIRELESS CONSTRUCTOR readers spotted Mr. Scott-Taggart at the Exhibition. Certainly he spent hours and hours devoted to a careful analysis of all that was to be seen at the many stands at Olympia.

Mr. Scott-Taggart at Olympia

How many miles Mr. Scott-Taggart must have traversed in exploring the Exhibition, and how many millions of words he must have spoken in exchanging greetings and technical criticisms with his many friends at Olympia, would make an interesting calculation. But, anyway, the result is a first-class article which you will thoroughly enjoy when you turn to another page and read it.



GERMAN broadcasting has an independent company that supplies entire news bulletins, ready edited for immediate broadcasting. The Drahtloser Dienst A.G., or Dradag, as it is termed for short, has its offices in the centre of Berlin.

The Managing Editor, Dr. J. Rauscher, is the sole responsible person for the whole concern. He has a staff of twenty-two, including the charwomen, as he told me.

A Great Personality

Dr. Rauscher is not merely a news editor; he is a personality. He does parliamentary reports himself. He also did the reporting for the opening of the Limitation of Armaments conference at Geneva.

He has his own staff of men who do any very important events in Berlin. Otherwise the news is supplied by the Wolff Bureau, by the Telegraphen Union, by the official press office of the Reich and by Ullsteins. These offices supply the news direct to the Dradag, either by telephone or by hand.

The news is selected, checked and completely re-written to suit the listener. This is one of Dr. Rauscher's special hobbies. He has taken great pains to develop a new style of presentation which will suit the listener in contrast to the reader.

Making It All Clear

Then, of course, all the news is edited so that the very least intelligent listener will be able to grasp the meaning.

For instance, he never uses the name of a foreign paper; he says instead of "The Daily Herald"—

An intimate study of the man who is responsible for all Germany's broadcast news, and some notes on the methods he employs, are given here by

A. A. GULLILAND.

"The organ of the British Labour Party." He contends that there are very many listeners who do not read newspapers, and many that do read them who mispronounce the foreign words, and therefore he "translates" these names into comprehensible terms.

If the Wolff Bureau says, let us suppose, "Mr. Mollison has flown from the Cape to Cairo," he translates this into: "The British long-distance flyer, Mr. Mollison, broke the record in long-distance flying from one end of the African continent, Cairo, in Egypt, to the other, Cape Town. This distance is equivalent to seventeen or eighteen times," or whatever it is, "the distance from Berlin to Munich."

An Aural Check

After the news has been checked and re-written in this manner, the more important items are spoken into a dictaphone by one sub-editor, and a colleague, if at all possible, or in the worst case the same man, listens in to his bulletin and then re-writes the final version after having been able to actually hear what he wrote. Thus it is very seldom that a news item goes out without those responsible being sure that it will be understood by listeners.

Dr. Rauscher's main aim is always to be ahead of the newspapers and to be strictly impartial. In fact, if he

isn't his control board of forty members comes down on him.

But in spite of it all, I must say that Dr. Rauscher manages to put out a thoroughly interesting bulletin, where all understandable terms or names are either translated, as I have already mentioned, or are amplified in such a way as even the listener way back in Silesia will know what the man means by Timbuctoo.

His main instruction to his staff is: "Language is a means of conveying a meaning, and not a puzzle. The listener can't see, he is tired, and only has his ears. Whoever sticks to the words of the original despatch is a postman and not an editor."

His main instruction to his staff is: "Language is a means of conveying a meaning, and not a puzzle. The listener can't see, he is tired, and only has his ears. Whoever sticks to the words of the original despatch is a postman and not an editor."

EDITOR OF THE ETHER



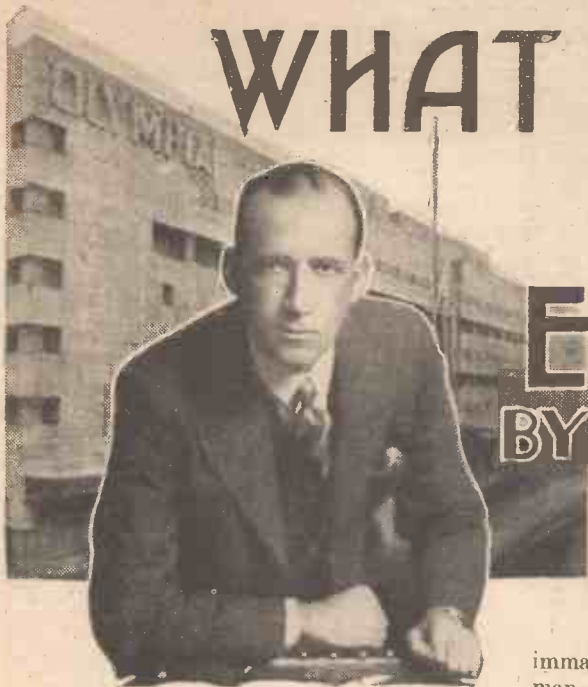
Dr. Rauscher, managing editor of Germany's broadcasting news service, speaking into a dictaphone so that he can hear how the bulletins will actually sound before he finally passes them.

RADIO OF TO-DAY—

WHAT I THOUGHT OF THE EXHIBITION

BY **JOHN SCOTT-TAGGART**

A.M.I.E.E. INST.P.



A first-class, first-hand impression of the 1932-3 Radio Show which catches the true atmosphere of the Exhibition in a most remarkable manner. Mr. Scott-Taggart gives his opinions of the sets and apparatus collected together under the roof of Olympia.

THE opening day of the Radio Exhibition found me in Olympia—anxious to pass a cool judgment on the new apparatus. Instead, it turned out to be the hottest day for twenty-one years.

The papers said ninety-nine. That was in the shade. What the temperature was under the arched roofs of Radiolympia only the crowds who tottered from stand to stand really know. I am writing the beginning of this article in the café of the Rialto cinema at Rochdale, and the weather is deliciously cool, so I can write calmly and easily.*

Polite—But Suspicious

The general public was too hot to ask questions at the 280 stands, and the assistants would have been too busy wiping their brows to answer any. I made a point, however, of asking a few myself—thus coming under suspicion in many cases. "Have you got a trade card?" was a common reply to an uncommon but reasonable technical query. "No," would be my reply. At least fifty per cent of questioned assistants inquired: "Might I ask who you're from?"—quite politely, but quite suspiciously. When I told them I wasn't "from" anyone, higher authorities were called in—the rough-tweeded, pipe-puffing gentleman from the far corner, or the sleek-haired,

immaculately dressed young man who had been draped over a lavishly upholstered armchair.

Not to be "from" anyone is the unforgivable crime at the Radio Show. You are like a person without a country or without a birth certificate. Just to be an individual unconnected with any firm, and yet to show an intelligently critical interest in a firm's products is to invite ignominious exposure. You

can almost hear the assistant whisper to the superior person: "He says he isn't from anybody, but he wants to know whether this is really mica inside this variable condenser." You see the pitying shrug of the shoulders, the curl of the lips, and you feel mean, despised and stripped of all respectability.

Sent Their Best Men

There are, however, some very notable exceptions; firms who year

THE FOCUS OF CONSTRUCTIONAL INTEREST



The first visitors to our stand, who were lucky in arriving early, for very soon after it was almost impossible to see the counter! Throughout the Show enthusiasts flocked to the stand to pay "The Wireless Constructor" a friendly visit and to discuss radio matters of all kinds.

* Readers may wonder what I am doing writing wireless articles in cinema cafés. The reason is that I am in the thick of my "aerial" tour. This is nine miles from Moorside Edge, and this evening I visit another unknown reader with the "S.T.400."

What I Thought of the Exhibition—continued

after year have sent either their best or their second best technical men. These firms are usually the most successful; but even some of these look disappointed when a visitor hails from nowhere in particular.

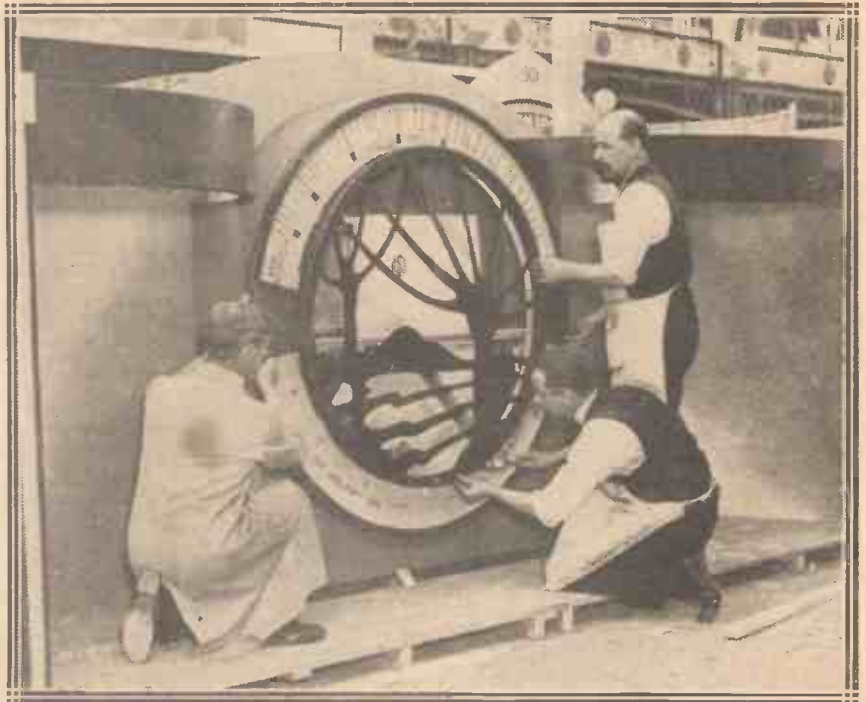
Mind you, some amateurs are a great trial and will buttonhole the chief engineer of a big firm for an hour on the strength of having once bought a sixpenny valve-holder.

But I am all in favour of chief engineers and technical men meeting amateurs face to face. There were many cases where the average sensible amateur could have put a firm on the right lines about some component.

And why—oh, why—did not someone—anyone—tell a certain set-maker that his otherwise beautiful receiver was made hideous by knobs which looked like grotesque false teeth?

Watching the Cat

The organisers of the exhibition deserve special credit for the general arrangements. The idea of an exhibition in August was to enable manufacturers to get into production before Christmas. Previously the set-makers wouldn't turn out supplies until they knew which way the cat would jump. By the time the cat had jumped it was too late to get the sets manufactured and delivered. Personally, I think cat-watching is a



WOULD YOU LIKE A DIAL LIKE THAT?

An "outsized" of the station-indicator dial fitted to Ekeo receivers. The names of stations are printed on the dials, with separate positions for long and medium waves.

sad business. Much better to give the feline creature a good kick in the direction you want it to go.* In

* Cat-lovers, the Feline Protection Society, and the R.S.P.C.A., must not imagine that I go about kicking cats.

other words, it is better to get into production on a good article in good time—even at some risk.

The exhibition had all the usual side-shows. Our radio appetites were whetted days in advance by headlines such as: "Floodlights to Fit Weather," "Giant Fountain," "Radio Robot Miracle," etc.

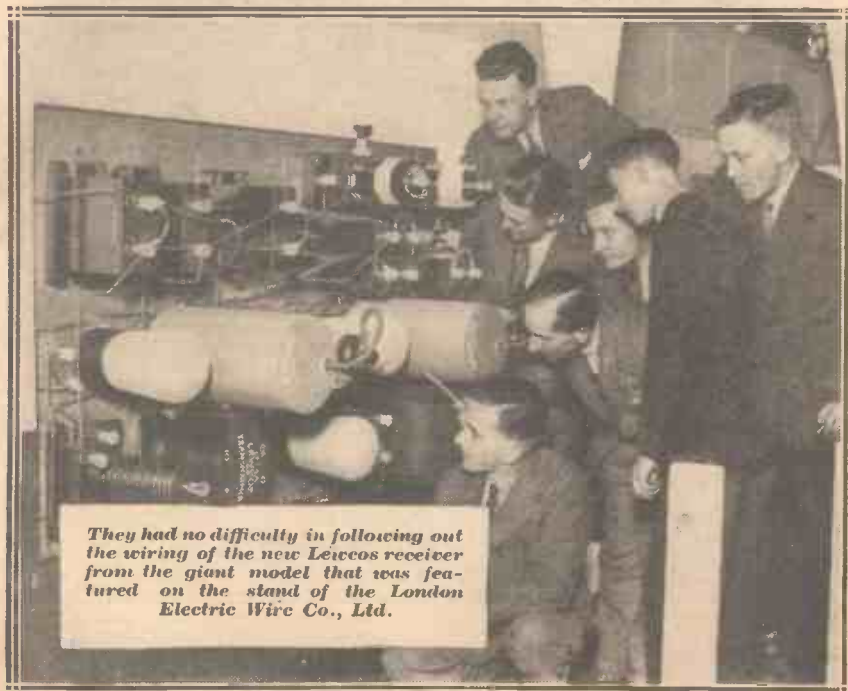
You know the sort of stuff: "Should the weather be characteristic of a real English summer, the colour scheme given by the floodlights will be royal blue and silver, for a cooling effect."

Over the Marble Arch!

"On the other hand, if modern wintry-summer conditions prevail the scheme can, by just turning a switch, be changed to crimson and gold to produce an atmosphere of warmth and cheeriness."

Ninety-nine. The crimson and gold proved unnecessary, and I found an iced orangeade more cooling than any amount of royal blue and silver. As for the fountain—well, the soda fountain proved more attractive to most visitors. The advertised kind, however, "is the highest that has ever 'played' in this country; in fact, it will throw its sprays twice the

ANOTHER MODEL THAT ALL COULD SEE



They had no difficulty in following out the wiring of the new Leiccoss receiver from the giant model that was featured on the stand of the London Electric Wire Co., Ltd.

What I Thought of the Exhibition—continued

height of the Marble Arch!" That is certainly more intriguing than getting Mühlacker clear of London Regional, Prague clear of Northern Regional, or Hamburg free of Falkirk.

A Race of Robots

And what shall I say of the Radio Robot that reads the newspaper, answers any question (especially what valves to use), and is "almost human"? Perhaps the last is true. We are all becoming a race of robots. The exhibition itself was opened by the voice of the Right Honourable J. H. Thomas, M.P., P.C., coming from mid-Atlantic. Nobody listened to it, of course. It is an old exhibition custom to ignore the opening speech. I feel that if you stopped to listen, a commissioner would move you on. To be caught listening to the opening speech would be hard to live down. Neighbours would point you out in the street and say: "That's the fellow who listened to the opening of Radiolympia."

Striking Similarity

The "fifty free theatres," the great ballroom (you simply *must* enjoy the *thé dansants*), the Gothic Arches (and don't forget to walk up the Grand Staircase), were all objects of interest. And, of course, there was quite a lot of wireless apparatus at the exhibition.

How a member of the public ever chooses a set at Olympia is a mystery to me. I suspect that few people really go Hammersmith-wards with the idea: "To-day I shall choose a set." Personal recommendations, retailers' advice, the reputation of the firm, and the opinion of the vast army of experienced amateurs are probably the deciding factors.

The sets were extraordinarily alike as usual. The cabinet-work was attractive, but, on the average, less so than what one finds in America for a set of similar price. Super-hets. with one-knob control were very much in evidence—another example of us following in transatlantic footsteps and doing so exceedingly well.

"Press the Button" Tuning

Ferranti, G.E.C., Ekco, H.M.V., R.I., Pye, McMichael, Lotus, Telsen, and other leading firms, had ranges of excellent sets. The Zetavox was calculated to appeal to many who want to receive a station by "pressing a button." Nine stations (changeable at will) can be tuned in by pulling

down a lever. Automatic sets have possessed many disadvantages in the past, but this one gives automatic tuning by the movement of the main tuning control, which, however, can also be used in the ordinary way. This super-het. is worth investigation by those to whom automatic tuning appeals.

Hypnotised by Moving Coils

As regards loudspeakers, probably the most interesting technically was the Primus electrostatic speaker. I have been testing one of these, and feel that we shall hear more of this type in the future. Its high-note response may need curbing if the average user is to be satisfied. Which reminds me that some sets were provided with two speakers working

"Moving-coil" sounds magical, but the speaker itself may only provide a reedy dribble of sound. *Caveat emptor*—which is Latin for "Don't buy a loudspeaker just because it is cheap and operates on a fashionable principle."

As regards cute gadgets, I am inclined to award the palm to Wearite's. Ordinarily this firm keeps to more serious—and very excellent—components, but their "selectivity control plus lead-in" is an amusing and ingenious novelty.

A Window Cleaning Problem

It consists of two metal plates made to stick by means of rubber "suckers" to each side of the window-pane. One plate goes to aerial and the other to the set. You can move the inside plate

THE VIEW FROM THE MAIN ENTRANCE



This is what greeted one immediately on passing in through the main entrance to the Exhibition. Gothic arches are to be seen at the far end of the hall, and to the left of the picture is the vivid-coloured pylon and fountain in the centre of the stands.

together to give extra quality of reproduction.

Moving-coil speakers were all the rage. Unfortunately, many people are hypnotised by the description "moving-coil" owing to the good reputation of the better makes. The result is that trashy speakers at highly competitive prices are trading on their big brother's good name. Personally, I never buy a speaker without hearing it, and I ignore all labels.

and so vary the capacity of this aerial condenser—thus varying selectivity. Many receivers will give better selectivity with this scheme, but, as readers know, I believe in controlling it on the set. And what happens when the window-cleaner comes? Nevertheless, I took off my hat to Wearite's. I also wanted to take off my jacket and waistcoat. It was still ninety-nine in the shade.

(Please turn to page 388.)



PICK-UP HINTS AND TIPS

Some interesting notes on various practical aspects of radio-gram. reproduction.

By A. BOSWELL.

NOT the least of the advantages of electrical reproduction over acoustic is the fact that with the former one is able to cut down the top if desired, and so get a tone that just suits one's aural "palate." The usual way that this is accomplished is by means of a fixed capacity used as a by-pass for the higher frequencies.

Down the "Soft" End

But it is very often surprising what a large capacity is needed before any appreciable effect is made on the reproduction. Quite often a .001 or less is taken no more notice of than if it were a .00001 neutralising condenser!

Particularly is this the case when a volume control is used and the capacity is connected across its output. The place to connect the capacity is across the pick-up itself.

The reason for this is that when the volume control is in use well down the "soft" end, the capacity is across a small amount of resistance and its by-passing is naturally less than it would be were it connected across a greater one.

Another undesirable effect of connecting across the output from the pick-up is that the by-passing of higher notes becomes greater with the reduction of volume. Quite often the necessary capacity is in the neighbourhood of .01 to .05 microfarad.

No Provision for Records

The question was raised the other day by a friend of mine who wanted temporarily to fit a pick-up on to a set that had no provision for record work: "What is the absolute simplest and most inexpensive way of making pick-up connections?" As the method we used is applicable to any set with grid-leak detector I will tell you what we did.

First of all, the grid leak was sprung out of its clip at the grid end, and a wire then laid in the clip so that when the grid leak was re-inserted the wire was held firm. Nothing else had to be done to the wiring of the receiver.

The end of the wire thus fixed went to one pick-up input lead, the other going to $1\frac{1}{2}$ volts negative in the G.B. battery. The pick-up could then be

YOU SHOULD HEAR THESE

SELECTED RECORDS		
Liebestraum.		
Squire Celeste Octet	.....	Columbia
Hills of Devon.		
Peter Dawson	.....	H.M.V.
When Work is Through.		
Sam Browne	.....	Zonophone
An Old Violin.		
Victor Olof	.....	Broadcast
Why Be So Unkind to Me?		
Mellow and Rich	.....	Broadcast
Gipsy Moon.		
Albert Sandler	.....	Columbia
Lullaby of the Leaves.		
Henry Hall and Orchestra	.....	Columbia
Soft Lights and Sweet Music.		
Ambrose and His Orchestra	.....	H.M.V.
The Way I Feel To-day.		
The "Cotton Pickers"	.....	H.M.V.
The Flies Crawled Up the Window.		
The Blue Lyres	.....	Zonophone
Sing, Brothers.		
International Accordion Band	.....	Zonophone
When the Band Goes Marching By.		
The Rhythm Rascals	.....	Broadcast

used. We did not find that radio broke through at all, because the impedance of the part of the volume control across the pick-up was small enough more or less to short-circuit the grid leak and so prevent rectification.

Remove the Aerial

However, should anyone trying the scheme find radio still coming through on records, detuning will very often cure the trouble. In the case of a set with an H.F. stage, the H.F. valve can be removed if break-through still persists, or the aerial lead can be removed.

Reverting for a moment to my remarks about the large sizes often found necessary for by-pass condensers, often a more effective place for the by-pass condenser is across the detector output rather than across the pick-up input. This assumes, of course, that you can get at the wiring conveniently to make the necessary alteration.

One side of the condenser should go direct to the anode of the detector valve and the other to L.T. negative. Naturally this condenser must be removed for radio, because it would otherwise prevent any reaction effects being obtainable.

"Hurdy-Gurdy" Effect

In spite of all I wrote last month about the importance of the correct speed for the turntable, there is just one case in which I would advise running a little above normal revs. But, even so, it is only a makeshift idea to avoid an even worse effect.

Occasionally when a very old or extra-cheap clockwork motor is in use there is a distinct tendency for the motor to keep on slowing up whenever the music is a little loud, giving a proper "hurdy-gurdy" effect to the reproduction. Slightly increasing the speed will often overcome this by giving the turntable more force to help it over the loud parts.

Of course, it will increase the pitch and time of the reproduction, but a small error in this way is far better than the other business of slurring passages.

With recording at the pitch of perfection (as it is at the present), I don't quite know whether there is a technical reason for the following effect or whether it is just my imagination. Perhaps anyone else who has noticed it, if there is anyone, will have some ideas on the matter.

A Pick-up Puzzle

The thing that has been puzzling me is why one particular make of pick-up often seems to suit one particular make of record. It is not a matter of my liking one special make of record, because I work with all sorts of pick-ups and have hundreds through my hands, and sometimes it's one make and sometimes another that seems best.

I hardly dare suggest—for fear of the record makers—that it is due to the peaks in the pick-up's characteristic curve being balanced out by the troughs in the recording curve of the records. Still, it may be the case!

The PROS and CONS OF TONE CORRECTION



By
VICTOR KING

IT is very heartening to discover that people nowadays are becoming much more critical of the results given by their radio sets in regard to quality.

Uncommonly Wide Interest

Indeed, judging from my recent correspondence, it would appear that WIRELESS CONSTRUCTOR readers, at least, are developing very keen appreciations of loudspeaker outputs.

And in my article which appeared in the August issue I seem to have struck a theme of uncommonly wide interest, for it has produced some hundreds of letters, practically all of which I found excellent reading. The exceptions include a mathematical argument, indited by an Edinburgh gentleman, which took me about two hours to unravel (it was badly written in a soft, smudgy pencilling), and an unsigned postcard bearing the single word "Bosh!"

Faithful Reproduction

Among the readable communications there is this letter from Mr. R. D. Trigg, of Brockley:

"With reference to your article re tone-correcting circuits, I gather that you are in favour of this principle. You ask: 'What is the real thing?' and 'Do listeners want it?' I believe what we try to achieve is a faithful reproduction of the original. As

regards acoustic-control at the studio preventing a faithful output when received, I do not think I am wrong in stating that an even frequency response is maintained at the transmitter. One drawback to tone correction is that though it maintains a certain balance between bass and treble, the human voice loses its characteristic quality, inasmuch as it is unrecognisable with the response at the loudspeaker. If you have tried this system you will possibly have noticed this.

"I maintain that quality should be given priority, especially as, say,

In a recent article Mr. King raised the question: "Do listeners want the real thing in loudspeaker reproduction?" He came to the conclusion that, quite apart from the impossibility of achieving concert-hall conditions in a drawing-room and the necessary control by B.B.C. engineers, listeners actually prefer "free-and-easy listening." This statement has aroused a lively discussion, which Mr. King deals with here.

90 per cent of the average listening done by the public is to the local transmitter. Foreign stations, you must admit, have a secondary importance. You may say: 'What about heterodyne, mush, etc?' I would reply to the effect that too much is attributed to this. Very little heterodyne whistle, etc., is present in the average speaker, when the associated receiver is tuned to local transmissions, and is only noticeable when foreign reception is required, which, as I have previously stated, constitutes about 10 per cent of the listener's quota of entertainment.

"In my own case, I have a receiver that gives a satisfactory account of itself as regards quality (being designed to that end), and I maintain that at any time you wish within reason you can hear this receiver in operation free from heterodyne, mush, etc.

Innocent of Tuning Condensers

"The means of contriving this is as follows. The receiver is good for four wavelengths only—261, 356, 399, and 1,724 metres—is entirely innocent of tuning condensers, as they become unnecessary, but boasts two multiple switches independently controlling two wavelengths each. Low inter-electrode capacity valves have been incorporated (to maintain the cycles above 5,000) in a parallel-feed system.

"In closing, I should like to ask you one question. As I dispense with all foreign stations except one (since they do not justify reception, in my opinion), I can design a really high-quality receiver that enables my ear to differentiate quite easily between a violin and a 'cello, etc. Could you do as much with your tone corrector?"

Beating His Wife!

Mr. Trigg's question reminds me of the witness who, after being bullied in cross-examination, asked the counsel: "Can you give a plain 'yes' or 'no' to any question?" "Certainly I can; or I should

The Pros and Cons of Tone Correction—continued

not insist that you should do so," said the legal luminary.

"Then answer this with either 'yes' or 'no': have you stopped beating your wife?" (Some of you may not have heard that one!)

Mr. Trigg asks me, as he says, one question: "Could you differentiate quite easily between a violin and a cello, etc., with your tone corrector?"

Now the above-mentioned counsel may or may not have been guilty of wife-beating—history doesn't tell us—but I am able to place on record that I do not apply what would legitimately be termed "Victor King corrector" to my radio receiver.

No Need to Quibble

And I do not remember saying anything which could lead readers to imagine that I did. However, there is no need to quibble about interpretations. I certainly dealt at length with the subject of realistic reception, and mentioned that there are two things which render it impossible to obtain, in the home, "a faithful reproduction of the original" (Mr. Trigg's words).

One concerns the limitations of the average house. An ordinary room has neither the size nor the acoustic

qualities to enable it to function as a replica of a concert hall, studio, or wherever it is that the "original" comes from. And surely a "faithful reproduction" means—well, what it says.

The other obstacle is that there are throttles at work at every turn, from the control panel at the B.B.C., right to the very loudspeaker of the receiving set in the listener's house.

Prove It At the Seaside

And this is the point to remember—you cannot alter the volume without affecting the tone. A faithful duplication of the original speech or music is impossible unless you have a faithful volume equivalent.

The reason is that the human ear is not equally sensitive to different frequencies. You can prove for yourself when you are at the seaside. Stand close to a band on the pier or promenade and note the "loudness" of the bass, middle and high notes.

Then walk slowly away until you can hear the band only faintly. You will find that the lowest bass notes will disappear first, until at length all you hear is a faint sound of the higher notes.

Applying the principle to radio, if

the B.B.C. control-panel engineer reduces the volume of the input from the studio every now and then, and the listener cuts down the volume on his set, there will inevitably be distortion, because the "loudness" of notes of certain frequencies will be diminished more than that of others.

This fact indisputably justifies tone correction; indeed, without it the listener is unable to obtain more than a mere pretence to an approach to "realism." Whether or not the average listener desires to do this is another matter altogether.

But what about that tone correction? You get a goodly proportion of that in the "peaky" tuning of most sets, and it is just that which so many experts cavil against!

A Complete Re-Shuffle

Now let us be "purist" for a moment. Supposing it were possible, which it isn't, to fashion receiving equipment able to deal equally with all frequencies from 25 to 20,000 cycles.

And let us suppose the B.B.C. could transmit on a similar "straight-line" basis. (In practice they never could do this unless there were a complete re-shuffle of wavelengths and over half the European stations closed down. As it happens they don't even transmit a "straight line" over their restricted frequency band.)

Anyway, let us imagine we have all these ideal conditions. But, I forgot, we must also install the set in a hall or chamber of identical dimensions and construction to that of the broadcast.

Faking the Volume

Now we are ready for our "faithful reproduction." But the moment the B.B.C. starts to fake about with the volume in order to squeeze the variation into its 10 to 1, or whatever it is, compass, *there will be distortion even though the transmission maintains its "straight line."*

And the moment you, the listener, reduce volume to "room strength," as against concert-hall volume, there will be further distortion, *even though the receiver maintains its so-called "straight line."*

But I can hear quite a number of you murmuring "We should worry" as you turn to your well-cooked but pleasant (to your ear) sounding sets. And I'll add: "Hear, Hear!"

HOW YOUR PROGRAMMES ARE CONTROLLED



The magnificent new control room, under the eaves of Broadcasting House, provides for the balancing of every programme—whether from studio or from outside—before it is forwarded to the transmitter.



Practical notes on what stations to look for and how to get the foreigners that are coming over well.

FARMERS and village maidens who have looked forward eagerly and not in vain to a successful harvest will understand how the radio man feels as he takes a run round the dials these early autumnal evenings. A rich crop is in prospect. Plenty for everybody!

The long-wavers, after a period of summer lassitude, have all shown a tendency to shake off dull sloth and get down to the serious business of flooding Europe with easily-picked-up programmes. At the lower end of the long-wave dial, Oslo, after falling sadly from grace, staged a spectacular come-back to my aerial, while his fellow Scandinavians, Motala and Kalundborg, seem to get louder every week.

Leningrad, on 1,000 metres, un-

expectedly poked part of a programme past all the interference usually to be encountered on that wavelength, which is a certain sign that conditions are improving fast!

Warsaw and Eiffel Tower have provided a somewhat striking contrast, the former emerging from his shell night after night with increasing vigour, while "Tour I-fell," on the neighbouring wavelength, has apparently not varied a hairbreadth. It is pleasant to welcome Warsaw to the come-in-easily class, his programmes being always well worth listening to, especially if the Philharmonic Orchestra is featured, as it usually is on Saturday-evenings.

On the medium waves the approach of winter is acting like a well-chosen

tonic. All the announcers seem full of vim, and the players of orchestral instruments hit their drums and blow their saxophones with immense gusto compared with the effect, say, only three weeks ago. (So much so that a careless adjustment to the "London National" recently proved to be bringing in Heilsberg, and his strength was such that the announcement was a complete surprise!)

Readers who have been sea-siding or otherwise inattentive to radio developments for some time should try for Poste Parisien, on 328.2 metres, which is just above the setting for Goteborg, and several degrees below Brussels No. 2. The musical stuff recently dished up by this new station (which has been on the air only for a few months) is often of the satisfying quality which talkie fans refer to as "Oak."

Radio-Suisse-Romande, Florence, Rome, Trieste, Toulouse, Hilversum and Brussels No. 1 all seem to be specially in form at the moment of writing, and many of the less well-known stations are making a bold bid for publicity.

A somewhat surprising catch of this kind was Moravska-Ostrava—only a couple of metres above the London National, and coming in like a two-year-old.

Lower "Lotus" Prices

LOTUS RADIO, of Mill Lane, Liverpool, announce that their P.C.2—a two-gang condenser which is provided with a dust-proof cover and suitable for practically all modern circuits—is now priced at 19s. 6d., and not at 20s., as first announced. Not a big reduction, perhaps, but, considering how prices have to be pared nowadays, a very welcome one.

Similarly, the big brother, type P.C.3, is reduced from thirty shillings to 29s. 6d.

Gramophones to Cost Less

Since the Gramophone Co. have equipped their Hayes factories with new conveyors, etc., for radio, they have found it advantageous to use similar methods and machinery for the construction of gramophones. And for the first time in the thirty years' history of the gramophone industry a cabinet instrument can be purchased at a lower cost than that for a portable type of the same manufacture.

In the early days of wireless it was said that the new industry would be

POINTS FOR PURCHASERS
 * Interesting details from manufacturers about recent trade activities. *

harmful to the gramophone industry. Few, if any, foresaw the huge increased demands for records that would result, the possibilities of the acoustic gramophone, and the successful and mutually beneficial wedding of these two immense entertainment industries.

G.E.C. Progress

The additions which have been made this season to the General Electric Co.'s range of receivers have clearly been planned after a very close analysis of the market. For the A.C. mains man there are three all-electric receivers, in addition to an all-electric radio-gram called "The Carnival."

For the many still linked to D.C. there is the "Nomad," with its two S.G. H.F. stages, S.G. detector, and power-pentode output. While for constructors the G.E.C. has intro-

duced another kit set in the form of the already-popular Osram Thirty-Three Music Magnet.

Many new and distinctive features are incorporated to provide a complete table model receiver with built-in loudspeaker and the batteries housed inside the cabinet. Employing two metallised S.G. valves and the latest type Osram power output valve, in conjunction with an S.G. detector, the receiver is embodied in a handsome one-piece cabinet of moulded bakelite, which will certainly act like a powerful magnet to many would-be constructors.

"Atlas" Mains Receivers

Would-be purchasers of mains receivers—either A.C. or D.C.—will be interested to know that H. A. Clarke & Co. (Manchester), Ltd., of "Atlas" fame, have now entered this field with great success.

The specification of the "Atlas Two" includes moving-coil speaker, one-knob tuning, provision for pick-up and extra speaker, mains aerial, and Westinghouse rectifier in the A.C. model. Cash price, ten guineas.

THE MONTH ON SHORT-WAVES



All the latest news about this interesting band.

A FRIEND of mine called me in the other day to investigate an atrocious case of hand-capacity in his short-wave receiver which, until a few days before I was approached, had been as mild as a lamb to handle.

Naturally, the first thing that I did when I got round there was to examine his earth, because I've been had before with so-called hand-capacity troubles!

Was It the Earth?

But no. His earth connection had every appearance of being perfect. The joint was good, there was hardly any corrosion to speak of, and it was located in a part of the garden that was almost perpetually damp as soon as the surface dirt was removed.

So I had to content myself with an examination of the set itself in the

hope of finding one of the more elusive faults. But do you think I succeeded? Did I rats! In fact, I got so fed up with trying to approach the outfit that I gave it up and took the set along to my own aerial and earth, and when I got it there (would you believe it!) there wasn't so much as a trace of hand-capacity!

A few days later found me back again at the original address, confirmed in my belief that it *must* be the earth that was at fault somewhere. So, as the earth cable itself was insulated, I got out a pair of 'phones and a dry cell and I tested the wire for continuity.

Completely Broken

I was right! There was a complete break in it, and we then fell to figuring out how the inside could possibly have become broken without there

being any trace of it on the outside.

Then it suddenly dawned on us!

You see, the earth cable, which was rubber-covered stuff, was not passed in the correct manner through a hole from the inside to the outside of the house, but it was trapped in position between the window and the window frame, and during the recent spell of hot weather the family had been unable to refrain from opening and shutting the window.

The results were that the rubber covering gave every time the window was closed, and the wire inside gave in a different sort of way!

I'm passing this on because we all know the effects of hand-capacity, and, who knows, you may be bitten yourself if this hot weather continues! Moral: See that your earth lead is taken from the inside to the outside of the house in the correct manner!

Radio and the Eclipse

I wonder how many of you were listening to short waves on August 31st? If you remember, that was the date of the Eclipse, and I am most anxious to hear from readers all over the country as to what happened during the hours immediately before and after the "black-out."

If any of you did have any interesting experiences, I should be very glad to hear about them. G.T.K.

LISTEN, all you seekers after quality with dry battery sets, to a suggestion of mine, and then maybe you will listen to better quality as well. Experiments which I have just been conducting indicate that back-coupling, due to the H.T. battery, is often the main cause of our troubles, even when decoupling components are in use!

Not So Difficult

As I write I am listening to a small power valve handling more power with more quality than I have ever heard before, and all the alterations consist of a separate battery for the detector valve.

Yes, you have certainly got to buy another battery, but everything desirable in this world has to be paid for; and, anyhow, if you are really striving for quality, you may easily spend more than the price of a battery on extra components and gadgets.

"If you hear nothing, turn the plug round" is quite usual advice where a D.C. mains set is concerned; but "if you get hum, try turning

 * "ON THE GRID" *
 * Using separate batteries—Try reversing the mains plug—Another fine Show—Reviving the super-het. *

the plug round" is unusual advice where A.C. mains are being dealt with, and yet it is just as good advice.

Oh, no, I'm not going into possible reasons as to why hum should be less with the plug one way round than with it the other. Someone might prove me wrong!

But they can't prove that it couldn't possibly be the case, for I had it most markedly the other day on a portable set to which I fitted a mains unit—AND with an earth in use!

Actually, no doubt it has something to do with which side of the mains is earthed, and the construction of the particular unit in use.

The Radio Show

Did you go to the Show? No need to say which Show; just THE Show. I did, almost every day, and I

often wished that I was with readers who were away beside the briny. No doubt readers beside the briny were wishing—also sometimes—that they were at the Exhibition.

Those who had the say as to when the Show should take place also said that the fact August was holiday month would not matter. Many sceptics avowed the result would be a washout, but they were wrong; the Show was certainly as much a success as in past years when it was held later in the year.

Reviving the "Super"

Super-hets. are steadily staging what I reckon is going to prove a permanent come-back. The Show showed (hit him, someone) that they have a firm grip now in commercial sets, and no doubt constructors will find them invading their realm more and more as this season wears on.

All the super-het. wants now is for someone to improve it so that the whistles and hisses to which it is so often subject are entirely overcome, and then watch it move!

A. S. C.



SITTING in a restaurant some months ago I was rudely disturbed by a non-technical friend who, planting himself by my side, opened conversation by asking: "I suppose you've seen all about this revolutionary wireless invention?"

He ignored my mildly-pained expression and went on: "It's going to alter everything. What are you people (he meant those who hadn't invented the revolutionary invention) going to do about it?"

The "variable-mu" valve has been hailed as "a revolutionary invention" and "a wireless miracle."

You probably took these high-sounding phrases with a grain of salt. At the same time you thought there might be "something in it."

In order that you may judge for yourself, here are all the advantages and disadvantages clearly and logically presented

by

But it is good for trade and good for us to hear emphatically about wireless developments. Just as we never know how hot we are till we read the temperature in our newspapers, so we wireless folk never know what we want till we are told.

The variable-mu valve is a case in point. This valve is—first and foremost—an H.F. volume control. It varies the degree to which the radio-frequency currents are amplified by the valve.

John Scott-Taggart, F.Inst.P., A.M.I.E.E.

Great new valve it was, apparently—but he had only read the newspaper headlines. Had he read more he would have understood less.

What Could It Be?

I wondered if it was the Abbé X at it again. (In some remote French monastery he had invented a wireless set for wearing inside your hat, and several years ago had abolished all telephone communications.)

My next thought, of course, was of the televisionaries. Perhaps they had received in a kite a television of Gracie Fields standing on her head on the top of St. Paul's.

But I felt they must have done that already. With an epoch-making achievement every week one soon runs through ideas.

However, my attitude to life is not really a cynical one. How can one be

sceptical of anything when Westminster politicians of thirty-year convictions are splitting hairs, and Cambridge scientists are splitting atoms?

So I let my friend talk. All I really gathered was (a) that wireless had been revolutionised; (b) that I should be out of work, and (c) that my friend seemed glad that it should be so.

This was my introduction to the variable-mu valve.

Knew All About It

This was, at any rate, my introduction to its importance. I knew all about the existence and production of variable-mu valves both in this country and—at a considerably earlier date—in America. But I had not expected a song and dance about it—far less a Cochran revue to celebrate it.

Of course, there are other methods of volume control with which we have been satisfied; for example, the simple and straightforward one of varying the H.F. input to the H.F. valve.

A Different Method

But it is possible to vary the H.F. input and cause a deterioration in selectivity, or even alter tuning. A variable resistance in parallel with a tuned grid circuit would do this.

But even if we choose a different method of cutting down the input, the H.F. valve (an S.G. valve in these days) will retain its full amplifying power even though that power is not used. The result is that "valve noises" (due to irregularities in filament emission, etc.) remain, and are more noticeable because the desired signal shelve been toned down.

“Our Daily Fight for Better Radio”

The valve noises can be cut down by reducing the amplification, and many sets provide a means for reducing both H.F. inputs and amplification.

It may well be asked: “Why not just reduce the amplification?” The retort to that is: “Because if you do, the strong signals—being applied to a valve specially adjusted to operate inefficiently—will become distorted and, moreover, cross-modulation will result.”

ARE THEY TWINS?



Here you see an ordinary S.G. valve and its “variable-mu” brother together. There’s not much difference in their outward appearance, is there? The difference lies in their grid-volts—*anode-current* curves.

This answer requires further explanation, but the question was an extremely sensible one—so sensible, in fact, that someone decided that reducing amplification was the only logical and seemly way to go about the job, but that a special valve would be needed. That valve was the variable-mu. With this valve one is able to vary its *mutual conductance*. (The mutual conductance, of course, is the change in anode current in milliamperes, produced by one volt change on the grid).

Nothing New Here

At this stage you may well say: “Well, that is nothing new. I can cut down the amplifying powers of my ordinary S.G. valve by reducing the screen voltage.”

Old hands at set-building will remember that it was the regular thing to “turn down the filament” of

the H.F. three-electrode valve to cut down volume. You can do the same thing with an S.G. valve, by including a variable resistance in its filament circuit.

With Cool Detachment

Having decided—and quite correctly—that the variable-mu is not a revolutionary invention, we can examine with cool detachment its merits as a highly useful weapon in our daily fight for better radio.

As understood at present, the variable-mu is a screened-grid valve of a slightly different type from that normally used. The difference lies in its grid-volts—*anode-current* characteristic curve. When dealing in this series of talks with S.G. valves, I explained that an S.G. valve had a grid-volts—*anode-current* curve no different from that of an ordinary 3-electrode valve.

At a certain negative potential on the control grid the anode current is zero; as we make the grid less negative the anode current rises slowly at first, and then—at what we call the “bottom bend”—rises rapidly.

The S.G. curve in the diagram is a sample S.G. valve curve showing what happens to the anode current as we vary the grid potential. (We are not concerned as to what happens when the grid is given high positive potentials, because this never happens in practice.) The normal “operating point” is probably R ($-1\frac{1}{2}$ volts), although the value varies with different S.G. valves.

Steep and Straight

At this point the curve is steep and straight and the maximum amplification is obtained. But if we gave the control grid of our S.G. valve a “bias” of -4 volts we should be working near the point Q. We should suffer three main disadvantages by operating at this bend.

(1) The H.F. amplification given by the valve would be decreased as the “slope” is flatter. For every volt on the grid there would be less change of anode current, and therefore lower output volts to be passed on to the detector.

(2) The H.F. would undergo rectification, and this would result to some extent in distortion. For example, large positive grid swings caused by incoming broadcast signals would get on to a steeper part of the

curve and would be amplified more than the small E.M.F.’s occurring at other parts of the stream of modulated oscillations.

(3) Cross-modulation would occur, impairing selectivity. This will be explained later.

The first of these “disadvantages” can actually be turned to advantage, since it is convenient to vary amplification, and therefore output volume.

By connecting a potentiometer across a grid-bias battery we can give the grid of our S.G. valve any potential we like, and therefore work the valve at R, Q, P, or any other point. Since the curve of an ordinary S.G. valve varies in steepness, it might seem perfectly feasible to vary its grid potential, and so get our volume control.

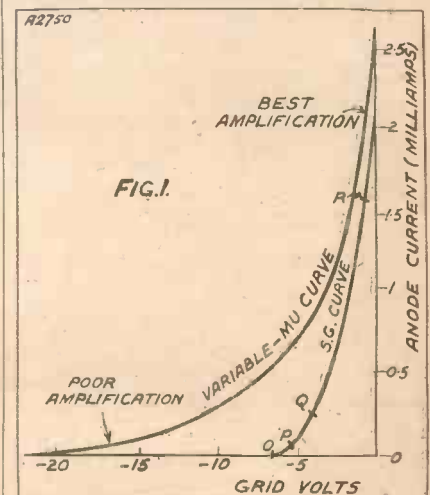
Very Small Input

The objections to the ordinary S.G. valve are, however, numerous.

For one thing, the change in amplification would not be gradual. It will also only handle very small input voltages. If these are exceeded you run into grid current on the positive side and into the bottom bend on the other. You are between the devil and the deep sea!

With a strong station coming in you are bound to get rectification, with resultant percentage-modulation change, and interference due to cross-modulation. The ordinary S.G.

HERE LIES THE DIFFERENCE



A long curve whose slope only gradually changes and which can accommodate very large grid swings is necessary for volume-control purposes. Compare the curves of the two valves in the diagram and notice how this gradual slope is achieved by the “variable-mu.”

"Variable-Mu" Will Minimise Cross-Modulation

valve—at the time of writing—has a totally inadequate permissible grid-swing. You have, at the best of times, only a volt or two which you could vary, and that is not helpful if the incoming signal itself produces swings of three or four volts, as it may readily do when the "locals" are received.

What We Want

What obviously is necessary for volume-control purposes is a long curve whose slope only gradually changes, and which can accommodate very large grid swings. Such a curve is given by the variable-mu valve, and a sample is given in the diagram on the opposite page:

By using, say, -1.5 volts on the grid of this valve it will give high amplification, and the valve is operating in the same way as an ordinary S.G. valve.

If the signals—perhaps quite weak at this stage of the set—give too much noise at the speaker, you simply increase the negative potential on the grid until the desired speaker strength is obtained. By putting a greater negative potential on the grid you are working the valve on a flatter portion of its curve and thus H.F. amplification is reduced.

The case of strong local signals can also be handled. You now work normally with a large negative potential on the grid and so get good loud-speaker strength without overloading and distortion in the H.F. stage. If you want to weaken the local station, you simply put *still* more negative bias on the grid of the variable-mu.

And this control does not prevent your bringing up the valve to maximum amplification power (for weak signals) by a simple turn of the potentiometer knob:

Harmonics Don't Matter

There must, of course, be some rectification where there is a bend. But a little rectification does not bother us. Harmonics of high frequency are produced, but these do not affect the output oscillatory circuit of the valve which is tuned to the desired signal.

The concave slope of the variable-mu valve is not nearly as pronounced as that of the ordinary S.G. valve and part of the curve is substantially straight.

It may be mentioned here that

the curves, although static, do not differ greatly from the dynamic ones for normal anode loads.

The gradual decline of anode current with increasing negative potential on the grid is called a "tailing characteristic" because the current tails off. The special curve of the variable-mu is, in practice, obtainable by leaving two or three gaps in the grid, so that some electrons from the filament pass on to the screen-grid and anode without coming properly under the control influence of the grid.

A Valuable Property

At high negative potentials on the grid the resultant electric field is, however, capable of "covering" the gaps and preventing electrons from leaving the neighbourhood of the filament.

modulation due to A (e.g. during an interval) you may hear quite clearly the music of a neighbouring foreign station B. Moving your tuning condenser each way a little shows that you are getting the foreigner on A's wavelength. If A stops working you cease to hear B at all, and to get B you have to tune in specially to B.

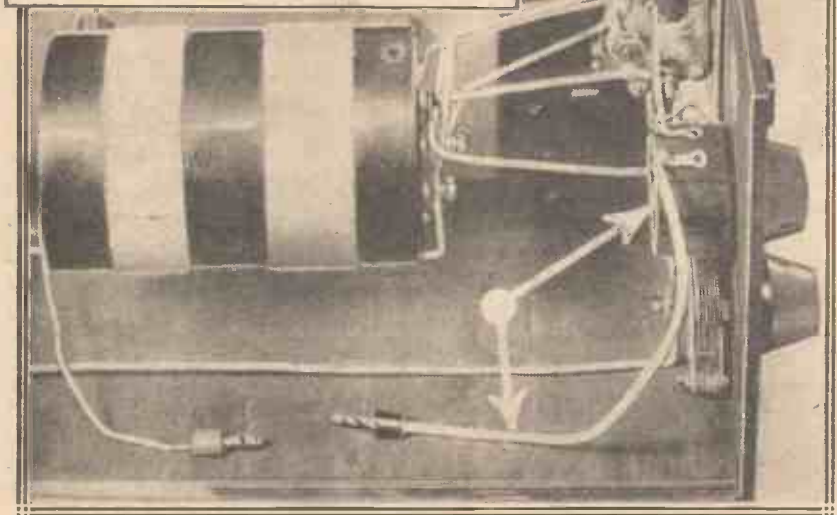
Modulating the Carrier

How did B get on to A's wavelength? The answer is that magic word "cross-modulation."

The signals from B—although too weak to be heard when you are tuned to A—are strong enough to cause small variations of the grid potential of the S.G. valve. If rectification is occurring in this valve owing to grid current, operating near the bend, or excessive input, then the signals from B will modulate A's carrier,

AN UNUSUAL ARRANGEMENT

The upper arrow in this photograph shows the potentiometer volume control situated at the H.F. end of the set. Below it another arrow indicates one of the leads to the G.B. battery, which will also be found near the aerial terminal in sets where the "variable-mu" is used.



The effect of the variable-mu valve in preventing cross-modulation, or, at least, minimising it, is so valuable that it calls for special notice.

Cross-modulation means the modulating of one signal by the other and vice-versa. The result is that, whichever signal is tuned in, the other will also be heard. A simple case is as follows.

You are tuned to the carrier-wave of a station A. Although there is no

somewhat in the same way as a microphone modulates or varies the carrier-wave of a transmitter.

Riding On Its Back

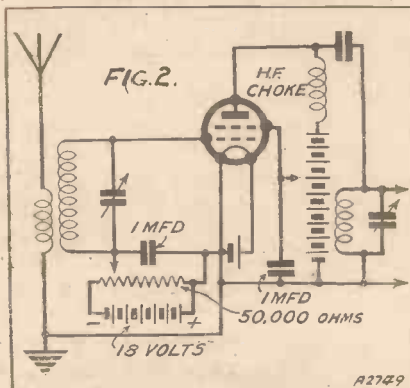
And the modulated oscillations will be on A's wavelength and will be amplified by the S.G. valve, and by a second S.G. valve if one is used. They will then be rectified by a detector and you will be hearing station B.

"Automatic Volume Control Is Easily Arranged"

You cannot tune out the interference because it is riding on the back of the carrier to which you are tuned. No amount of selectivity afterwards helps.

The action is reciprocal when you have two stations sending out their respective programmes; you will hear A on B's wavelength and B on A's.

HOW IT IS USED



Here is the theoretical diagram which illustrates how a "variable-mu" valve is used as an H.F. amplifier.

The difference between cross-modulation interference and ordinary interference is seen at once if one station closes down; if there is enough selectivity to prevent normal interference, and you are tuned to A's wavelength, you will no longer hear B when A closes down. This is evidence of cross-modulation which can take place when there is no chance of heterodyne interference.

Similar Trouble

"Hum modulation" experienced on sets worked from the mains, or where A.C. hum is picked up by the aerial of a battery set, is a similar phenomenon. You only hear the hum when the set is tuned in to a station and when rectification in the S.G. valve is occurring.

The stray A.C. on the grid modulates the station's carrier-wave and these modulated signals are amplified and detected together with the wanted ones. You thus get an unpleasant hum in the speaker; if you detune, this kind of hum disappears, because no signal is being received.

To avoid cross-modulation, two methods of attack should be employed.

One is to decrease as much as possible the voltage applied to the grid by interfering signals; in other

words, we should increase the selectivity as much as possible *before* the S.G. valve.

The second is to avoid rectification at all costs in the S.G. valve.

Unfortunately, the ordinary S.G. valve is very prone to rectification. It does so on the slightest pretext, and if we start controlling its amplifying powers (e.g. by varying the grid or screen potentials) we are asking for trouble. Hence the development of the variable-mu valve.

There are one or two points that may be mentioned before summarising the merits of the valve. One is that by increasing the negative potential on the grid, the screen-grid current will be reduced.

Screened-Grid Changes

Since we do not "use" this current in an outside circuit this does not matter. When the screened-grid is connected directly to a point on a high-tension battery a change in screen-grid current will not affect the screen-grid voltage.

But if the screened-grid derives its potential from a potentiometer, or otherwise through a resistance, the change in screened-grid current (due to varying the grid bias) will alter the screened-grid voltage.

ADVANTAGES OF THE VARIABLE-MU VALVE.

1. It provides a very simple form of volume control.
2. Cross-modulation is reduced.
3. Distortion due to rectification is avoided.
4. Wide variations in input may be handled without grid current or "bottom bend" rectification.
5. Absence of grid current ensures constant selectivity of input circuit.
6. Volume control does not affect tuning.
7. Hence volume control does not upset ganging in ganged circuits.
8. Absence of rectification largely prevents hum and "motor-boating" caused by modulation of incoming signal.
9. Background noises in general are reduced.
10. Valve noises are reduced as signal volume is cut down.
11. Remote volume control is a simple matter.
12. The valve lends itself to automatic volume control.
13. Two or more H.F. valves may be controlled at the same time.
14. As most listening is probably done on the more powerful stations, high negative bias will normally be used; thus saving H.T. current.

To keep the latter steady, in the case of indirectly-heated valves, the screened-grid is connected to a fixed point on a potentiometer across the H.T. supply, while the cathode is connected to a slider working near the negative end of the potentiometer. Moving the slider so that the grid becomes more negative tends simultaneously to reduce the screened-grid voltage, while the fall in screened-grid current tends to increase the screened-grid voltage.

Ganged Potentiometers

These effects are made to balance so that a constant screened-grid voltage is maintained. Another scheme would be to use ganged potentiometers.

An advantage of the variable-mu valve is that it is possible to have the volume-control potentiometer (for varying the negative grid bias) any distance from the set. Remote control of volume from an armchair is thus very simply carried out.

Automatic volume control, which is popular in America and which brings in all stations at substantially the same strength, is easily arranged with the variable-mu valve.

We arrange that any tendency to very loud signals automatically "pushes back" the voltage on the grid of the variable-mu, thereby cutting down signal strength.

The amount of negative bias required to control the amplification of a variable-mu valve will depend upon the type of valve. As much as forty or fifty volts may be necessary in the case of an A.C. valve, but an 18-volt grid-bias battery is used in conjunction with, say, a 50,000-ohm potentiometer when battery valves are used.

Long Life For Your G.B.

This 50,000-ohm potentiometer will drain about one-third of a milliamp., so the grid-bias battery will last as long as your H.T., but the potentiometer must be switched off at the same time as the set.

The description I have given above does not, of course, cover the whole ground, but it should serve as an introduction.

The advantages claimed for the variable-mu valve are tabulated separately. They are largely interdependent, and how far they are justifiable is a matter for decision

(Please turn to page 387.)



"YOU NEED S.G.'S

for
"DISTANCE"
says
HERBERT
K.
SIMPSON



LAST month I reminded readers that giraffes had long necks so that they could reach up to eat the succulent leaves of palms.

This bit of zoological information—at first sight incongruous in a wireless journal—was to draw an analogy between a giraffe's neck and the "H.F." stage of a wireless receiver. High-frequency amplification, you see, is necessary for a set to reach out and nibble succulent foreign stations.

Romping Home on a Poker

Of course, Radio-Paris and stations like that will romp home on a receiver consisting of a poker, a piece of coal and a wire mattress. But if you want Vienna, Budapest, Copenhagen, Moscow—not to mention the small but tasty little fry, such as Trömsö, Notodden, Rjukan, Pietarsaari, Petrozavodsk and Freiburg-im-Breisgau—you will need "H.F." or else signals will be just too bad.

Naturally, I am speaking in general terms, and it is possible that someone with a "det. and 2 L.F." at Frogley-cum-Chinthorpe will write and say he has received Tiraspol, Tashkent and Nijni Novgorod—all over the

house. (Personally, I should hate to hear Nijni Novgorod all over the house; Tashkent wouldn't be so bad.)

Once swayed by my eloquence to believe in the need for H.F. amplification, the next step the student

This month Mr. Simpson explains, in easy-to-understand terms, the need for H.F. amplification in meeting modern reception conditions. His style is such that this contribution makes really enjoyable as well as informative reading.

should take is an examination of some simple methods of amplifying the oscillating currents in the aerial circuit.

This means ferreting in moth-eaten text-books (do moths eat text-books?) for obsolete circuits which were the cat's pyjamas in 1919, but which to-day are simply "not worn."

Exhibit "A" is duly paraded in Fig. 1. It is a three-electrode valve operating as a single stage of H.F. amplification. You will notice that

the H.F. aerial oscillations are applied across grid and filament of the valve, while an inductance coil shunted by a variable condenser is connected in the anode circuit. The only other piece of apparatus in the anode circuit is the high-tension battery.

Very Strong Meat

Two arrowheads marked "To detector" mean that any kind of detector, e.g. crystal or valve, may be connected across the second inductance (the one in the anode circuit). The second inductance with its variable condenser is known as a "tuned anode circuit," a phrase still regularly used but in connection with screened-grid valves.

Exhibit "A"—although small beer these days (in fact, it could hardly be called ginger ale)—was once very strong meat and was used by all the best people. A valve detector was usually tacked on and then a stage of L.F., but in the "S.T.100" (the first of the popular sets) a crystal detector was used.

Special complications were added, giving great amplification; this made the set inclined, if faultily adjusted, to make a grunting noise; but most

“You Need S.G.’s for Distance”—continued

of the grunts came from constructors and were grunts of satisfaction.

There are two things we must note about the simple “tuned anode” H.F. amplification stage. The first is that the valve acts as an amplifier in exactly the same way as it does when

OLD-TIME H.F.

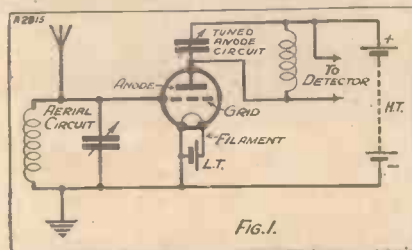


Fig. 1.

Referring to the above circuit, Mr. Simpson says: “Although small beer these days (in fact, it could hardly be called ginger ale), it was once very strong meat and was used by all the best people.”

working as an L.F. amplifier. The miracle is that a valve will magnify currents of the lowest frequencies (e.g., 50 cycles per second on L.F. work) and also currents of a frequency running into millions.

In both cases the output is identical with the input, only bigger. In the case of this method of H.F. amplifi-

TRANSFORMER COUPLING

A three-electrode H.F. valve using a transformer for coupling to the detector. This type of circuit is often used nowadays in conjunction with S.G. valves.

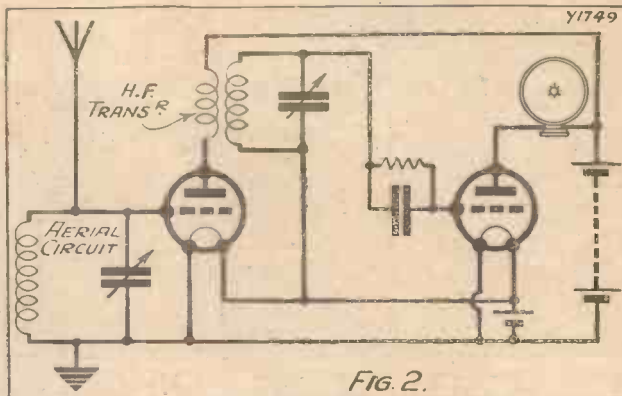


Fig. 2.

cation, however, we tune the anode circuit to the frequency of the incoming signals. If the anode circuit is “off tune” signals will be weakened or will disappear, just as if the aerial were mistuned.

Single Knob Tuning

That is why it is very important to tune both circuits accurately. If either of them is “off tune” there will be a loss of signal strength. Sometimes, to simplify tuning, both aerial and anode variable condensers are tuned by turning a single knob, the moving vanes of the condensers

being mechanically connected, i.e. “ganged.”

Both aerial and anode inductances are usually made identical and small variations of capacity in aerial and anode circuits are compensated for by “trimmers”—little pre-set condensers attached to and electrically connected across their “mother” variable condensers.

I do not know whether kangaroos regard their diminutive offspring—which they carry, as you know, in a pouch in the front of their bodies, when proceeding on long hops—as a nuisance, but wireless constructors are apt to fight shy of the little trimmers which the big “variables” carry. It is certainly simpler, in many ways, to get the most out of a single stage of H.F. amplification when “ganged” condensers are not used.

Untuned Primary

My second exhibit (Fig. 2) shows a two-valve receiver employing a transformer—this time an H.F. transformer between the H.F. amplifying valve (the left-hand one) and the detector valve. A single accumulator is used for heating the filaments and a single H.T. battery feeds both anode circuits. The amplified H.F. currents in the primary (untuned) winding are induced into the secondary which is tuned.

This “tuned transformer” system of coupling is still frequently used with screen-grid valves, although usually only when two or more stages of H.F. amplification are employed.

In my next article I am going to discuss reaction. Meanwhile we mustn't sneer at the two simple circuits I have explained. They form the basis of even modern technique and only require a little pressing and cleaning to become quite fashionable.

MUSICAL MOMENTS AT MADRID



A busy band of musicians broadcasting from one of the Madrid studios. It is when receiving far-off stations such as this that an S.G. stage is most appreciated, and if good quality and full volume are desired, such a refinement must be considered essential.

The "DOUBLE-TUNE" THREE

by
VICTOR KING



I WAS very struck with Mr. Herbert K. Simpson's remarks last month on det. and L.F. sets in his article "L.F. Amplification. Are We Starving Our Sets of It?" He remarked, among other things: "I want to add my protest against the welter of 'Det. and 2 L.F.' sets that have been offered to—and, in some cases, foisted upon—a public ignorant of wireless principles. I have in mind more especially those sets with one tuning circuit, and which will give loud signals on local and some of the more powerful foreign stations, but which are inadequate when it comes to selective and distant reception.

Right Up to Date

This is more or less exactly how I feel about the matter, and is the reason behind my designing the "Double-Tune" Three, which is a

really modern detector and two low-frequency stage receiver.

Three valves has undoubtedly been the most popular arrangement in the past, and still is at the present. And the det. and 2 L.F. has certainly been the most widely-used version of the three valves, because of its

An absolutely up-to-date version of the ever-popular "Detector-and-Two-Low-Frequency" arrangement. It retains all the inherent advantages of this type of set—enormous volume and simplicity in construction and use—with adequate band-pass selectivity for modern conditions.

simplicity, its efficiency in bringing in foreigners at fine strength, as well as the local, and its inexpensiveness.

The thing which confronts one in designing a modern det. and 2 L.F. is to retain these advantages and yet make the set suitable for present-day conditions. Good selectivity simply

must be included among the features of the receiver. And thus the decision that band-pass tuning must be employed. Whatever critics may write about this form of tuning, there is no doubt that it gives us a degree of selectivity that can cope with modern conditions.

Plenty of Power

Even if it does involve a loss in volume—as we are so often told—the powerful L.F. part of the set is well able to make up for that. It has two transformer-coupled stages which give great magnification, and there is often a big surplus of volume in hand.

In simplicity of control we lose nothing by the presence of two resonant circuits. They are tuned by a double-gang condenser, so that there is still just the one tuning knob to be tuned when searching for stations.

Also in the "Double-Tune" Three I have arranged one wave-change switch for both circuits, and the number of controls is still further reduced by combining two of the components, the volume control and on-off switch, into one.

Simplicity of construction is also

PICK AND CHOOSE THE MAKES TO USE

- 1 Panel, 10 in × 7 in. (Peto-Scott, Wearite, Goltone, Becol, Permcob).
- 1 Cabinet to fit, with baseboard 10 in. deep (Peto-Scott, Osborn, Pickett, Lock, Gilbert, Ready Radio).
- 1 .0005 double-gang solid-dielectric variable condenser with trimmer (Utility).
- 2 Screened coils (Goltone G.G.O.).
- 1 L.F. transformer (Ferranti A.F.8).
- 1 L.F. transformer of medium ratio (Lissen Torex, R.I. Hypermite or Dux, Lotus, Ferranti A.F.8, Varley Niclet).
- 1 H.F. choke (Ready Radio Standard, Lissen, Telsen, Tunewell, Peto-Scott, Graham Farish, Goltone, R.I., Wearite, Lewcos).
- 2 2-mfd. condensers (Telsen, Lissen,

- T.C.C., Dubilier, Ferranti, Sovereign).
- 3 4-pin valve-holders (Bulgin, Lissen, Telsen, Graham Farish, Ready Radio, Benjamin, W.B., Wearite, Clix, Igranite).
- 1 .0003-.00035-mfd. diff. reaction condenser (Telsen, Lotus, Lissen, Igranite, Polar, J.B., Peto-Scott, Ready Radio, Graham Farish, Magnum).
- 1 50,000-ohm combined volume control and switch (Wearite, Bulgin, Radiophone, Clarostat, Magnum).
- 1 .02 fixed condenser (Dubilier type 9200, T.C.C., Telsen, Lissen, Ferranti, Graham Farish, etc.).
- 1 .0003-mfd. condenser (T.C.C., etc.).
- 1 2-meg. and 1 ½-meg. grid leak with

- tags or terminals (Lissen, Dubilier, Igranite, Graham Farish Ohmite).
- 1 1,000-ohm resistance (with holder if necessary) (Graham Farish Ohmite, Colvern, Telsen, Lissen, Ferranti, Wearite, Sovereign, Bulgin).
- 1 20,000-ohm resistance with terminals and tags (Graham Farish Ohmite, Dubilier, Lissen, Igranite).
- 1 70,000-ohm resistance with terminals and tags (Graham Farish Ohmite, Dubilier, Lissen, Igranite).
- 1 Rotary control switch, without terminals (Wearite I.33).
- 8 Indicating terminals (Igranite, Goltone, Belling-Lee, Clix, Eelex, Bulgin).
- 1 Terminal strip 10 in. × 1½ in.

maintained in the "Double-Tune" Three, and it is a set which even those who have not built a receiver before may tackle with confidence. There are no screens or copper foil or any complicated pieces of constructional work to be done.

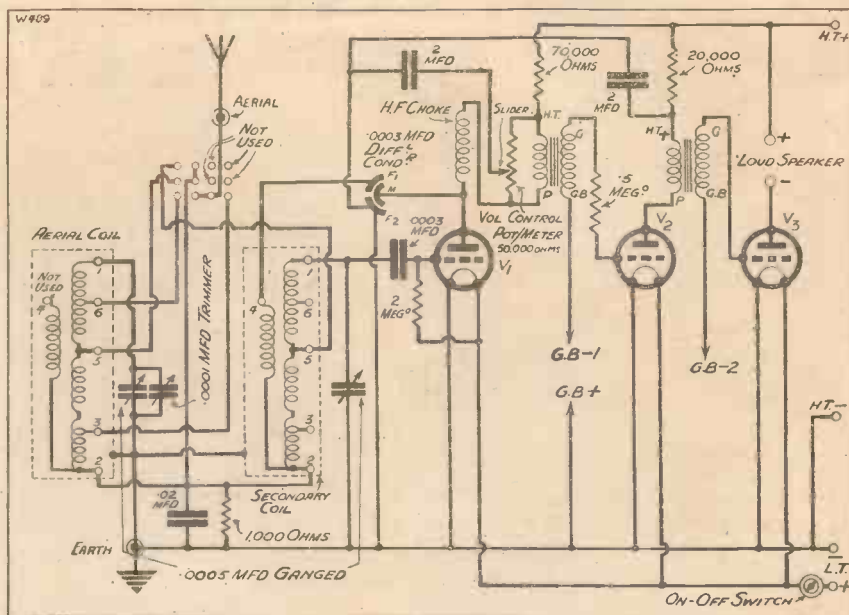
The receiver is particularly compact considering that it contains a full band-pass scheme with its double coils and condenser and with its coupling components. Another point which I must emphasise is that quality is extremely good, thanks to careful decoupling of the detector and first L.F. stage.

One Switch Only

Quite apart from the general considerations with which I have dealt, there are a number of other interesting points in the design, most of which are concerned with the circuit arrangement. First of all there is the wave-change switch.

The band-pass circuits are controlled by a compact type of variable condenser which tunes them both simultaneously.

BAND-PASS FOR BOTH BANDS—



SIMPLICITY AND COMPACTNESS

The decoupling arrangements, though quite inexpensive, are unusually elaborate and effective in ensuring perfect stability.



As already mentioned, although there are two tuned circuits, only one wave-change switch is employed,

making the change from one band to the other easy and convenient. Unlike the type of wave-change switch

usually employed these days, it is of the change-over type.

The reason for this is to be found in the two separate taps on the first tuned coil, one for medium and one for long waves. By providing this change-over of taps, ample selectivity is ensured on the long-wave band as well as on the medium.

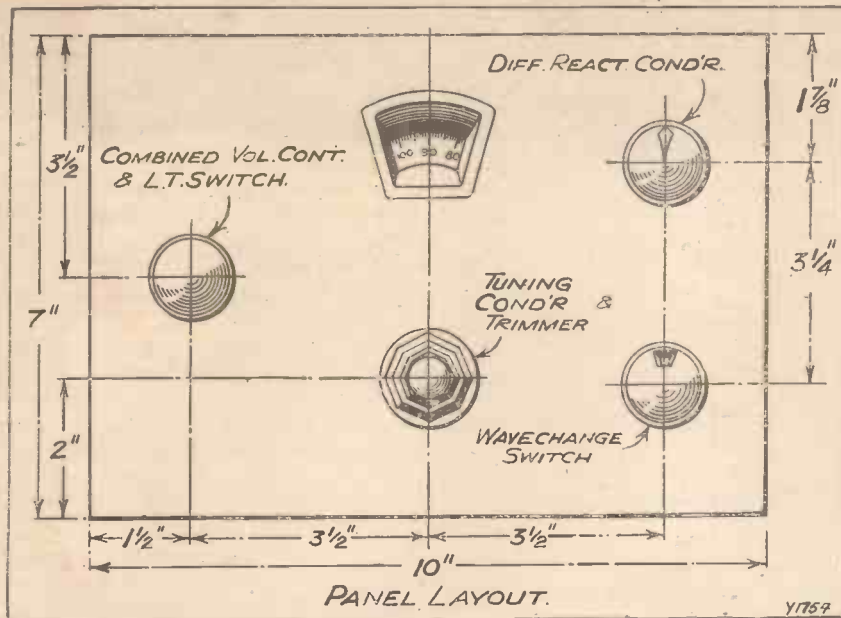
Capacity Coupling

The tapplings on the second coil are not utilised, the coupling to this circuit from the first being entirely via the .02 fixed condenser (that is common to both tuned coils) and the 1,000-ohm resistance joined across it. The purpose served by this resistance is largely that of preventing peaks in the coupling.

I must not pass from the tuning scheme without pointing out the reason why the trimming condenser, which is controlled from the front of the panel, is wired across the first, or aerial, tuning circuit. Tuning is first carried out with the main knob which controls the double-gang condenser, and the station is finally brought up to maximum volume with the small knob in the centre of the main tuning knob.

This knob controls the trimmer, whose duty it is to make sure that both circuits are exactly in tune, without which very big losses might take place in the band-pass arrangement; and it must be remembered

—BUT NO NEED FOR BOTH HANDS



There is only one tuning control, with a trimmer for the distant programmes.

EASY TO TUNE AND MAKE

The shielded coils render vertical and baseboard screening unnecessary and aid quick construction.

there is no high-frequency amplification to make up for it.

Except on the local station, when accurate tuning is not necessary to ensure ample volume, the second tuned circuit will have the sharper resonance curve, and will therefore be the one which the main tuning knob will bring exactly into tune.

Obviously, then, there is no reason for having a trimmer on the tuning condenser of this section, because the main knob will bring it exactly into tune right away. That is why we put the trimming condenser across the first section, which might easily be out of tune a bit before adjustment of the small knob. Incidentally, the reason why the second circuit will tune sharper than the first on all but the local is because reaction is applied to it; and, as you know, application of reaction to a tuned circuit considerably sharpens up its tuning.

Primary Potentiometer

Now we come to volume controlling. Here you will see I have used a scheme widely differing from those you will normally find in simple sets.

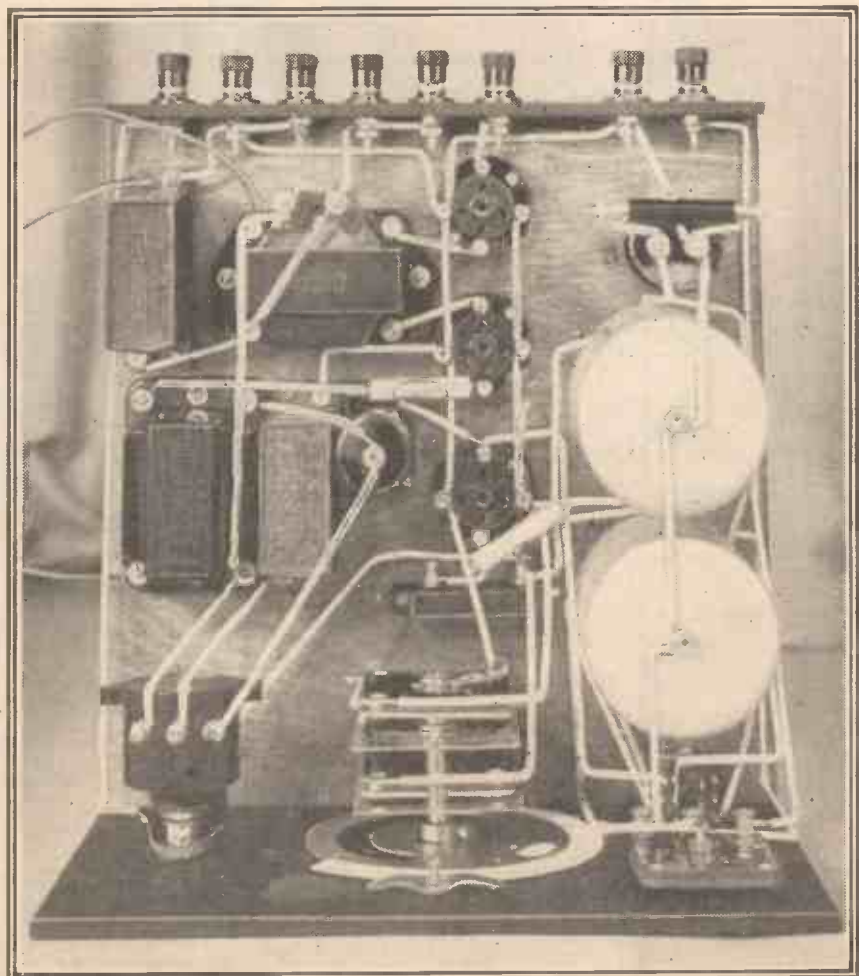
Certainly a potentiometer type of resistance is used, but it is connected across the primary of the first L.F. transformer, instead of the secondary, as is the more usual. The slider, instead of feeding on the voltage variations, hands them to a large by-

The nearer the slider is to the H.F. choke end of the resistance, the more the 2-mfd. condenser by-passes, and the softer reproduction becomes. This condenser also serves at the same time as the by-pass condenser for the 70,000-ohm decoupling resistance.

Thoroughly Decoupled

When the slider is at the 70,000-ohm end of the resistance, things are just about the same as an ordinary decoupled stage, apart, of course, from the resistance across the transformer's primary.

Finally, the decoupling of the set is completed by the 20,000-ohm resistance in the first L.F. anode circuit, and the associated 2-mfd. fixed condenser. The detector's 70,000-ohm decoupling resistance also cuts down the voltage for this valve. Only one H.T. positive terminal is



pass condenser which enables them to go directly back to the filament circuits without serving any useful purpose.

used, and if full volts went to the detector, reaction would be much too sudden.

The "Double-Tune" Three—continued

This is an important point, because the build-up in signal strength when reaction is used on a band-pass set is of necessity somewhat rapid. However, with a powerful low-frequency "side" there is no need to push reaction right up to the very point of oscillation, so that no drawback exists in this quick increase in volume.

And that completes the exploration of the circuit. Now what about the practical design?

Here, again, there are many features, chief among which is compactness, and this accomplishment is greatly assisted by the solid-dielectric double-gang condenser, which takes

I had better mention at this stage that you should take care to get the connections to this component just as shown in the wiring diagram, or you will find it "working backwards," and will have to turn to maximum volume before you can switch off. This might have disastrous results if you are in the habit of sitting up listening to the dance music when everyone else is in bed.

Wide Choice of Parts

Although there are one or two components for which no alternatives are given in the list of parts needed, in most cases you have quite a good number of makes from which to

this will enable you to mark out both the position and shape of the hole for the escutcheon plate. A fretsaw is about the best thing for cutting out the piece of unwanted ebonite.

Fixing the Condenser

After the panel has been fixed to the baseboard, screws should be put through the feet of the condenser and screwed into the baseboard. The presence of these feet make it necessary to get the hole for the spindle of the condenser just right, so that the feet will rest on the baseboard.

The two-megohm and quarter-megohm grid leaks used in my set are of the type with lengths of wire fixed to each end, but those with terminals like the 1,000-ohm resistance may be used.

There is not room for grid-leak holders unless the layout is somewhat modified, a procedure which I certainly do not advise.

The cans over the coils are earthed by the connection which runs from the F_2 vanes of the differential reaction condenser to one side of the .02 band-pass coupling condenser. To make the removal of these cans easy, I advise you to use an entirely separate piece of wire between the two earthing terminals.

When putting these cans over the coils, do so gently, and watch that they do not rub hard against the insulation on the wire to the coils. Otherwise you run the risk of short-circuits which may produce all sorts of troubles.

Note that the .0001-mfd. trimming condenser is wired in parallel with the back section of the double-gang condenser. This is done by joining the fixed vanes' soldering lug of the back section to the fixed vanes' lug of the trimmer.

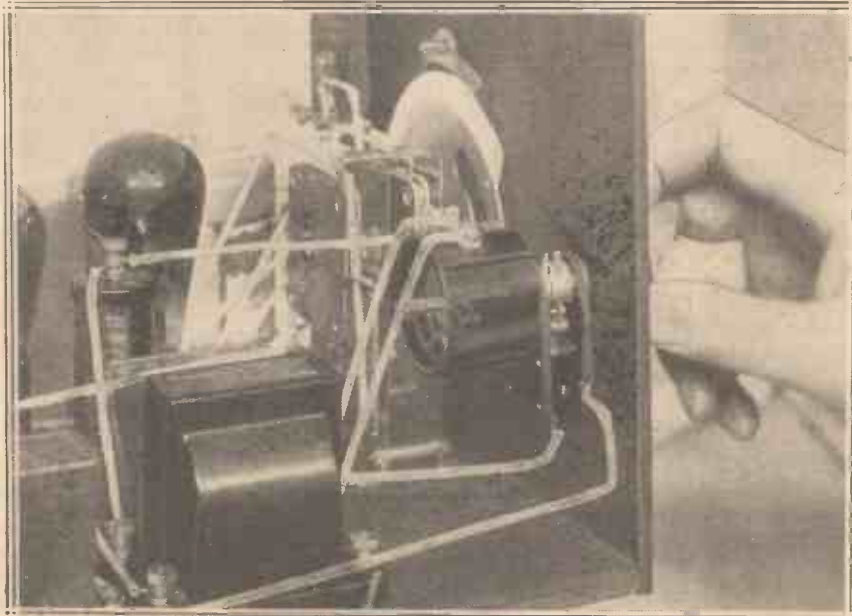
The Trimmer

No connection is necessary for the trimmer's moving vanes as these are common with the main sets of moving vanes.

Accommodation for the grid-bias battery is found on the inside of the back of the cabinet, where it is held in place with metal clips or the cardboard flap that is provided on some G.B. batteries.

And that, I think, tells you all you need to know, except, of course, for valve, battery and other accessory details, which you will find, together

FROM MAXIMUM THROUGH MINIMUM TO "OFF"



The volume-control knob also switches the set on and off. When it is turned in an anti-clockwise direction, after reducing sound to a minimum, it turns the set off. Movement in the opposite direction turns the set on, and then increases volume.

up less room than many ordinary single .0005-mfd. variable condensers.

Another particularly interesting scheme is to be found in the combined volume control and on-off switch. This component is controlled by one plain knob.

A Combined Control

When this knob is turned as far as it will go in an anti-clockwise direction, after reducing volume to a minimum, it switches the set off. Turned the opposite way, after switching the set on, it acts just like any ordinary volume control; results getting louder as it is turned more and more in a clockwise direction.

choose. With regard to the transformers, the makes mentioned work very nicely in "double harness," and it is possible that others would do just as well, but unless you have them on hand my advice is very definitely to stick to the makes given in the list.

There is only one point in the drilling of the panel that will need a little care—but it is by no means a difficult one. The positions for all the holes except the dial-viewing escutcheon of the gang condenser are shown in the panel diagram.

But a template is supplied with the condenser, and once you have fixed the position of the hole for the spindle

METEOR S.G.3



The first and only Kit Set to give you all the wonderful features which made the "S.T.300" famous, plus a number of additional advantages not obtainable with any other set.

"METEOR S.G.3" KIT

Complete Kit, with set of three Mullard Valves

£5.7.6

or 10 monthly payments of 12/6

CABINET MODEL

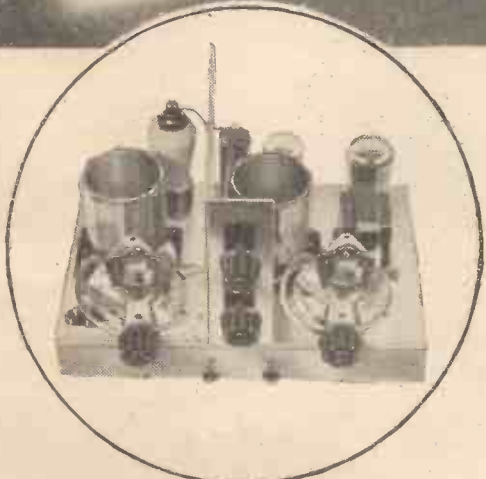
Complete Kit and Valves, with beautiful walnut cabinet fitted with moving-coil speaker

£8.17.6

or 12 monthly payments of 17/-

Your Safeguard—Every owner a Registered user.

The set that needs no service.



COVERS ALL WAVELENGTHS
LONG - MEDIUM - ULTRA-SHORT

SUPER-SHARP SELECTIVITY

30 STATIONS GUARANTEED
MEDIUM & LONG WAVES

MOVING-COIL SPEAKER

TESTED IN ALL DISTRICTS

Free

A beautifully illustrated 20-page Book, giving complete instructions for building and operating this wonderful receiver (as well as the new "303"), will be sent you free on receipt of coupon.

To **READY RADIO LTD.** (Book Department), Eastnor House, Blackheath, London, S.E.3.
Please send me, FREE, the "Meteor S.G.3" and "303" Book. I enclose a 1/2d. stamp for postage.

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

Please put a cross against the set in which you are interested. "Meteor S.G.3".....
"303"..... W.C.2.

Manufactured throughout by **READY RADIO, LTD.**, at Eastnor House, Blackheath, London, S.E.3.

READY RADIO



RECTATONE

1. Has a rising response curve from 1,000 to 4,500 cycles.
2. Balances any form of sound reproduction.
3. Restores a weakened treble to its correct value.
4. Gives a variable compensation and therefore complete control of tone correction.
5. Gives the required tone-correction without an extra L.F. stage.
6. Becomes at will and instantly a normal straight-line transformer.
7. The ideal L.F. coupling for selective sets.
8. Particularly useful where the same L.F. amplifier is used for radio and gramophone reproduction.

Step-up ratio 1:7. Can be used in all the usual methods, either direct coupled or choke or resistance fed, with or without the tone correction feature in each case.

List No. D.P.33 - 15/-

Varley

Proprs.: Oliver Pell Control Ltd.

FREE COUPON

To Messrs. Varley, Kingsway House, 103, Kingsway, London, W.C.2.

Use this coupon

Please send me, free and post free, the "BOOK of the RECTATONE"

Date.....

Name.....

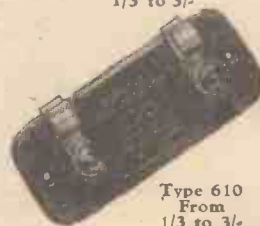
Address.....

W.C.1.

From 6^d
to 37/6



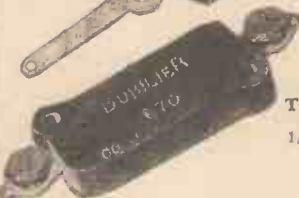
Type 620
From
1/3 to 3/-



Type 610
From
1/3 to 3/-



Type 665
6d. and 9d.



Type 670
From
1/- to 2/-



Type B.775
From
3/- to 37/6

THERE IS A
TYPE AND SIZE
TO SUIT EVERY
REQUIREMENT



For those who want condensers occupying only a fraction of the space of the ordinary type, yet containing the finest materials and workmanship, there are the Dubilier Types 610, 620, 665 and 670 Mica Condensers for receivers, while for power amplifiers and transmitters there are the Types B770/1/2 and B775/6/7.

No matter whether a Dubilier Condenser is large or small, it is the most up-to-date in design and contains the finest materials it is possible to obtain. On every Dubilier Condenser rests the Dubilier reputation for Dependability. You may be sure that Dubilier will never let you down.

Have you seen the new Dubilier Components Booklet, "Choosing your Condensers and Resistances." Ask your dealer for a copy or write direct to us.

DUBILIER

MICA

CONDENSERS

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

The "Double-Tune" Three—continued

with brief information regarding the use of the controls, in the special operating chart.

This chart forms a concise instruction leaflet for the receiver, and, therefore, is well worth cutting out and fixing to the set, where it will

found, assuming reaction has been pushed almost to its limit, it may cause the set to go into oscillation, and a slackening off of the reaction may become necessary. But I must point out that this seldom happens, because it is only very occasionally that it is

To be able to carry this out you want to watch just where it is set for loud stations. For instance, on medium waves you may find that for the top end of the dial it wants to be about half-way in, while lower down it requires to be still farther round towards the maximum capacity end.

The position will, of course, vary from case to case, so I cannot say anything very definite about it. However, if you bear these few points in mind you will have no difficulty in bringing in very many stations.

The Operating Panel

In the operating panel, after the details of the wave-change positions, a warning is given to avoid the centre position. The reason is that in this half-way position neither coils are connected up properly, and it would be possible to spend quite a long time trying for stations that simply could not come in.

If you want to use a largish power valve on H.T. batteries it will be necessary for you to use those of super-capacity type—unless you do not mind buying new ones very often. Otherwise you can run the set off the ordinary size ones. But in any case it is best to use as much grid bias as you

"THE WIRELESS CONSTRUCTOR" "DOUBLE-TUNE" THREE

Circuit: Band-pass Tuning Detector and Two-Transformer L.F.

VALVE TYPES

1st (nearest panel): H.F., H.L. or special detector.
2nd: L.F. or L.
3rd (nearest terminals): Small power, or super-power if mains unit is used for H.T.

VOLTAGES

L.T.: 2 volts.
H.T.: 120 to 150.
G.B.: 1½ to 3 volts negative on G.B.—1 and voltage to suit power valve and H.T. voltage used on G.B.—2. (See valve-makers' recommendations in this connection.)

CONTROLS

Centre knob: This is a double control, the larger knob providing the main tuning and the smaller one being a trimmer for fine tuning once a station is coming in.
Left-hand knob: Controls volume and turns set on and off. Turn as far as possible in anti-clockwise direction to switch set off. Turn to right to switch on and also to increase volume.
Top right knob: This is reaction condenser. Turn clockwise to increase amount of reaction in use.
Bottom right knob: Turn clockwise for medium waves, anti-clockwise for long. (Avoid half-way position.)

always be handy for reference purposes in the future.

The tuning is the same as for any simple receiver, and there are only two controls which have to be operated in the ordinary way to bring in the distant stations, the variable condenser control and the reaction knob.

The latter should be used with care, because, as already explained, the build-up in volume just before the receiver goes into oscillation is very rapid. Naturally, it is desirable to work on the build-up part of the adjustment, but one doesn't want to go beyond it.

Handling the Set

As the capacity of the tuning condenser is increased more reaction will be required to keep the set at its sensitive point, and therefore more reaction capacity will be wanted. Increases in capacity of both these controls are obtained by turning them in a clockwise direction.

Similarly, when the tuning capacity is reduced the reaction capacity must also be reduced, so both controls are turned in an anti-clockwise direction. If you take the trouble to remember that both these controls have to be moved in the same direction when an alteration in wavelength is desired you will have little difficulty in handling them.

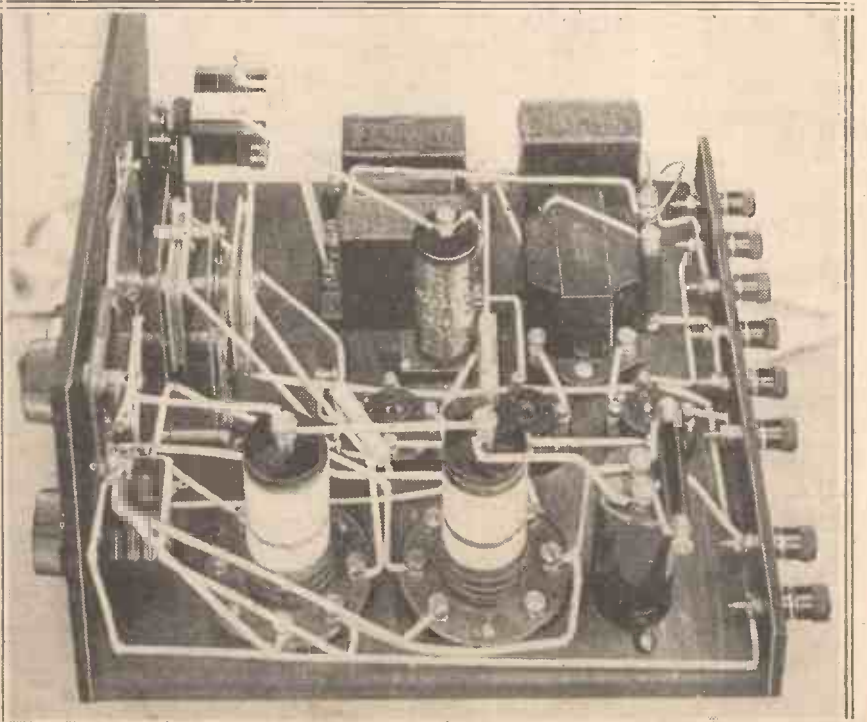
There is just one other point where reaction is concerned, and it is in connection with the trimmer on the tuning condenser. When this is finally adjusted after a station has been

necessary to push reaction to this extent to bring in a station.

Trimmer Advantages

To facilitate searching for weak stations it is desirable to have the trimmer set as near as possible to its correct value for the particular part of the dial on which reception is taking place, and for the particular waveband on which the set is being worked.

NO NEED TO MOUNT THE RESISTANCES



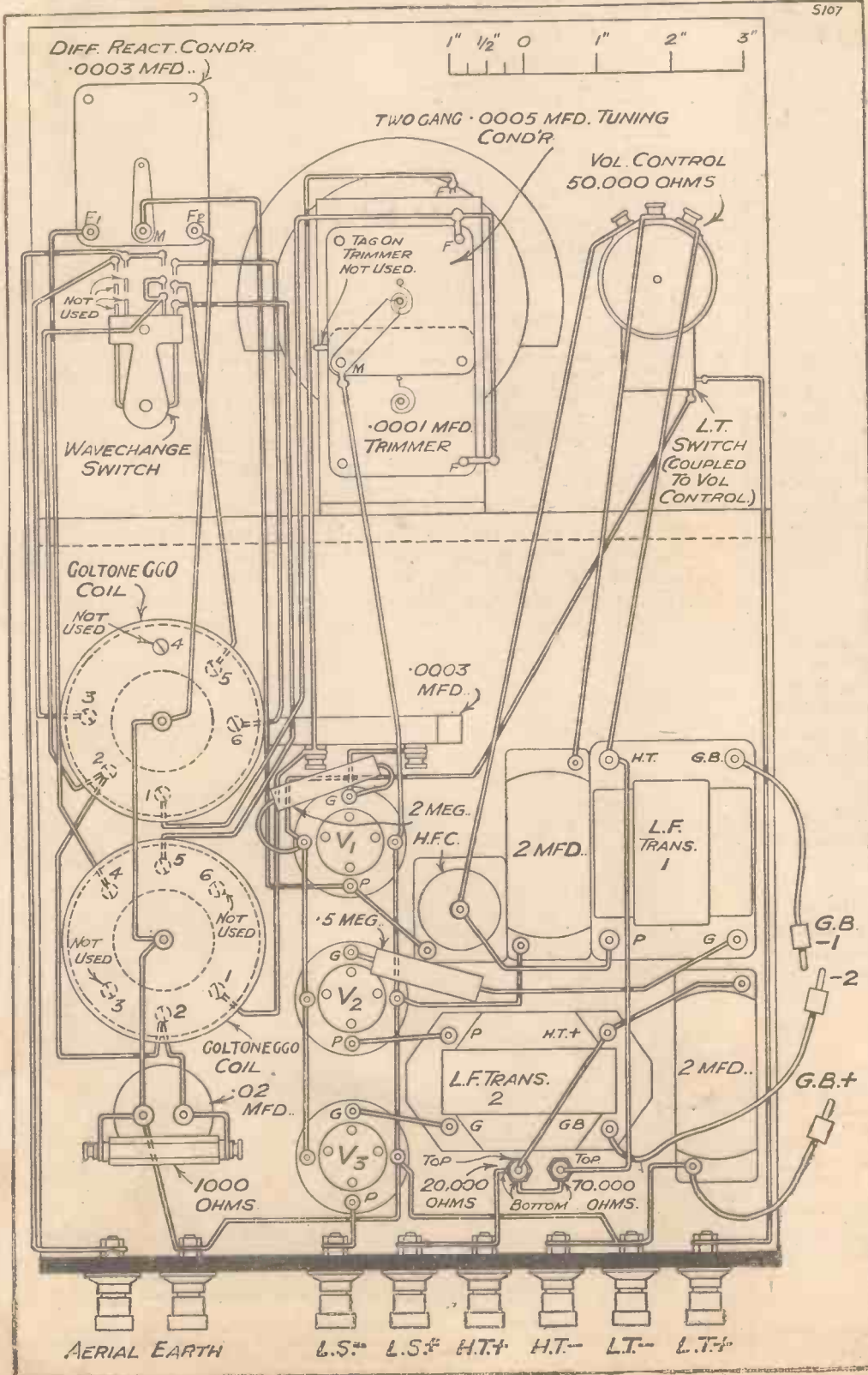
Victor King supported five of the resistances by their own wiring, and thus another advantage in simplicity was achieved.

The "Double-Tune" Three—continued

can, short of enough to affect results sufficiently for the difference to be noticeable to the ear.

In conclusion, let me say that the "Double-Tune" Three represents the most modern version of a det. and

2 L.F. circuit arrangement which, by its very popularity, seems to have won for itself—immortality!



RECOMMENDED "EXTRAS" TO COMPLETE YOUR OUTFIT

Loudspeakers.—W.B., Epoch, Celestion, H.M.V., Marconiphone, B.T.H., Blue Spot, Ferranti, Cossor, Ormond, Atlas.

Valves.—Det.: Mazda H.L.2, or equivalent in Mullard, Cossor, Marconi, Six-Sixty, Eta, Lissen, Tungram, or Osram ranges.

1st L.F. valve: Osram H.L.2, or equivalent in Mullard, Marconi, Six-Sixty, Cossor, Mazda, Lissen, Tungram, or Eta ranges.

Power: Mullard P.M.2, or equivalent in Marconi, Mazda, Cossor, Lissen, Tungram, Osram, Eta, or Six-Sixty ranges. **NOTE:** If the set is to be worked from an H.T. eliminator, a Mullard P.M.252, or equivalent in other makes, can be used in the output position.

Batteries.—The larger the better is a standard rule. (120 volts is desirable.) Lissen, Ediswan, Drydex, Pertrix, Ever Ready, Siemens, Magnet, Marconiphone, Cossor.

Grid-Bias Battery.—Voltage depending upon valve in output stage. (See above makes.)

Mains Units.—Atlas, Tunewell, Heayberd, R.I., Lotus, Tannoy, Regentone, Formo.

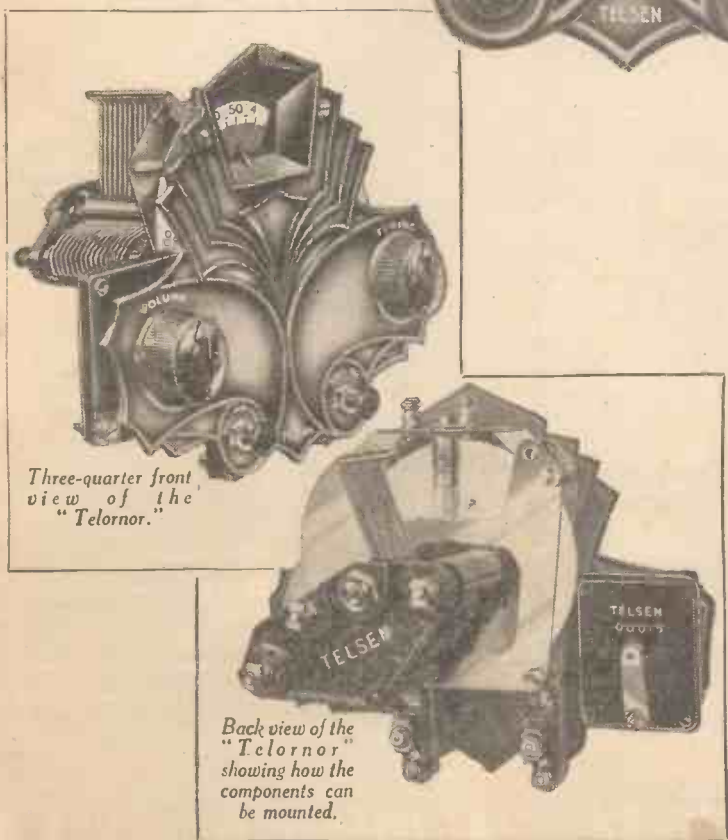
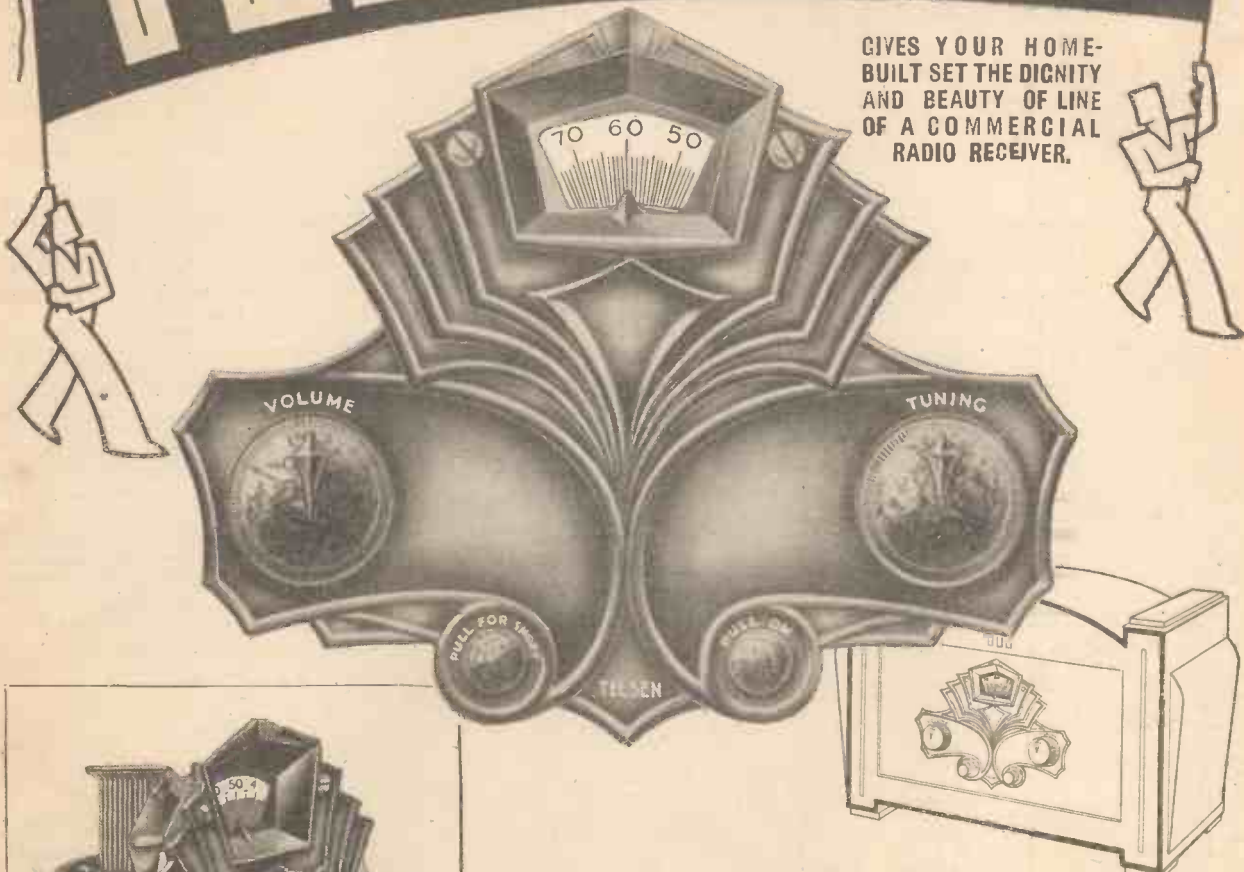
Aerial & Earth Equipment.—Electron "Superial," Graham Farish "Filt" earthing device.

The double lines indicate how the various points are connected and, moreover, the shading where the "leads" cross over one another clearly shows which wire is behind the other. This unique WIRELESS CONSTRUCTOR diagram system enables you to place every lead with great accuracy, thus avoiding the use of unnecessarily long wires and ensuring efficiency, as well as ease in wiring.

TELSEN

TELORNOR

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



Three-quarter front view of the "Telornor."

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

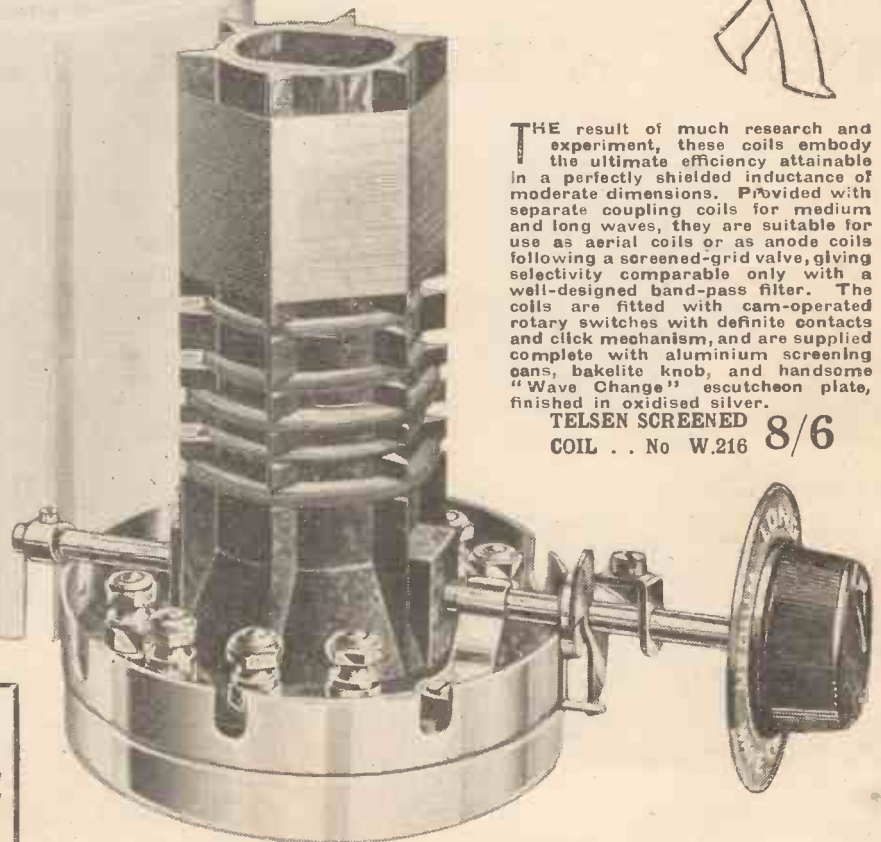
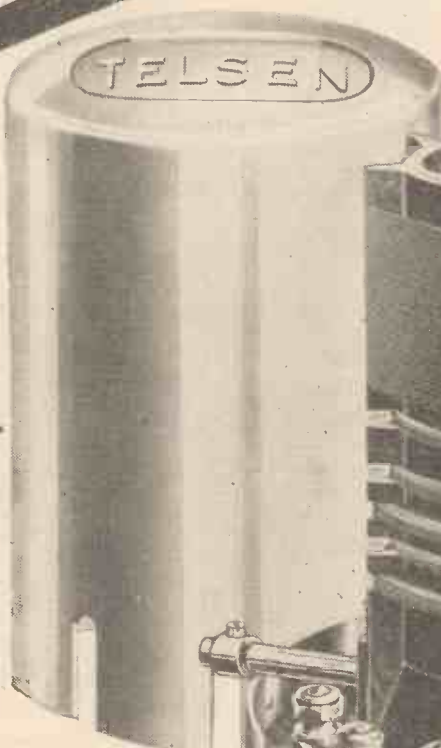
GIVE your home-built set the dignity of an expensive commercial radio receiver with the new Telsen TELORNOR. It makes better sets easy to build! The handsome silver oxidised escutcheon plate, embodying an illuminated variable ratio slow-motion Disc Drive, adds immensely to the "good looks" of your set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

No. W.206.
7'6

TELSEN
RADIO COMPONENTS

Get your copy of the new **TELSEN RADIOMAG, Issue N°3**

TELSEN SCREENED TUNING COILS



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

TELSEN SCREENED 8/6
COIL . . No W.216

TELSEN COIL SWITCH KNOB ASSEMBLY

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

No. W.218. 1/-



W.288
Triple
Matched
Screened
Coils
25/6

W.287
Twin
Matched
Screened
Coils
17/-

TELSEN COIL SWITCH COUPLING ASSEMBLY

When it is desired to mount two or more of the Telsen Screened Coils in a line parallel to the panel, and to control the wave-change switching by a single knob on the panel, this switch coupling assembly will be found indispensable. The link arms of the coupler are fitted over the switch rods of the coils, and adjusting slots are provided in the link bar to allow for the spacing of the coils varying from 3 in. to 6 1/2 in. The whole assembly has a neat nickel-plated finish, is perfectly smooth and positive in action and free from backlash.

No. W.217 6d.

TELSEN

RADIO COMPONENTS

Get your copy of the new **TELSEN RADIOMAG, Issue N° 3**

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



B.B.C. NEWS

Topical notes regarding British Broadcasting Stations and Programmes.

By Our
Special Correspondent

Continental Affairs

MR. VERNON BARTLETT'S resignation from the staff of the League of Nations in order to devote all his time to broadcasting has caused quite a stir, particularly on the Continent, where broadcasting is not regarded as being even a potential rival to the Geneva body as an employer.

As a matter of fact, however, Mr. Bartlett is now returning to his original sphere. Before he went to the League of Nations he was well known in several European capitals as a special correspondent of the London newspapers. As a travelling representative of the B.B.C. he will give eye-witness accounts of events and affairs on the Continent.

Being relieved of his League of Nations' responsibilities his work should be much more interesting and challenging than it could be in the past. I hear that he has been engaged for a minimum period of two years.

Proms. and Weather

I understand that this season, for the first time since the B.B.C. took over the Proms., some anxiety has been caused as a result of the effect of the weather. Extreme heat appears to have frightened people away.

Of course, the falling off has not been serious and a great effort will be made to catch up before the end of the season. There are those, however, who profess to see in this a sign that the Prom. tradition may be in danger.

Is it that the new generation will not be bothered to stand up for a whole concert? This is an interesting speculation.

The Musicians' Union and the B.B.C.

The path of Empire broadcasting is by no means easy. First of all there was the trouble about news, some Dominion journals taking alarm lest the news bulletins in the Empire service would damage their interests. This difficulty was settled by the B.B.C. agreeing to limit news bulletins to very mild proportions, so much so, indeed, as to cause misgiving as to their utility.

And then came the Musicians' Union with a whole series of new demands.

First of all, the Union said that it would not agree to any B.B.C. orchestras being used for recording purposes in the Empire programmes.

This prohibition was to extend both to ordinary gramophone discs and to the Blattnerphone tapes.

Secondly, all recording was to be paid for at the normal commercial rates. The first demand was based on the argument that the B.B.C. orchestras were already fully employed and well enough paid, and that if any more work were to be made available it should go to the less fortunate musicians outside the B.B.C.

The probable solution of this difficulty will be in the form of a compromise, the B.B.C. agreeing to pay the normal recording charges and to include as many outside musicians as possible, but retaining the right to employ its own orchestras and other combinations according to programme requirements.

HOW THEY DO IT IN THE U.S.A.



Three popular radio artistes caught by the camera while broadcasting in America. The two on the right are the famous pair of comedians, Amos and Andy, while to the left is Rudy Vallee.

B.B.C. News—continued

Executant Music

Certain elements in the music industry attempting to organise a "boom" chose to attack the B.B.C. as part of the campaign. Broadcasting House, however, skilfully ignored the attack and by actively espousing the cause of executant music has challenged the leadership in the campaign.

Apparently those who inspired the attack on the B.B.C. had forgotten that Dr. Adrian Boult is as sincere and consistent a friend of executant music as there is in the country.

an industrial series, and talks for mothers.

There will be a specially intriguing series under the general title: "About the House." This will be divided into two parts, the first being: "The Man About the House," in which Mr. G. Bumphrey will disclose on six successive Saturday mornings, beginning on October 1st, how to deal with such ordinary catastrophes as "Burst Pipes" and "Damp in the House."

He will wind up his series by a lively discourse on "Furniture and Packing Cases."

being hampered by political party inhibitions.

Wavelength Plans

Mr. Noel Ashbridge, the Chief Engineer of the B.B.C., has not waited until after the Madrid Conference to frame his plans for future wavelength distribution. I understand he has spent a great deal of time in devising alternative schemes, any one of which can be supplied without delay.

The conclusion of Madrid will give Mr. Ashbridge the first clear run he has had, and it will be his purpose to secure a stabilised distribution as soon as possible.

Deficient Alternatives

The economy measures which the B.B.C. had to introduce to find the extra money for the Treasury at the time of the "crisis" last summer have affected programmes a good deal more seriously than is generally imagined.

The chief contraction has been in the provision of suitable contrasts and alternative programmes. The pooling of Regional resources, one of the economy measures, has very considerably curtailed the listeners' range of choice.

Moreover; there is not now nearly the same meticulous care to make sure that at all the main programme times there is easily available at least one appropriate alternative. This, of course, may be inevitable because of the financial strain, but I for one hope that the authorities at Broadcasting House will do all they can to remedy the deficiency.

I think it could be argued that this matter of good alternatives is of greater importance than the maintenance of large-scale orchestral efforts at lavish cost.

The Mid-Week Service

When Canon Elliott suggested from the pulpit the possibility of the discontinuance of the broadcast of the mid-week religious service from St. Michael's, Chester Square, there were 12,500 letters in support of the autumn resumption of the broadcast. Apparently the mid-week service has an enormous following.

HOURLY WEATHER REPORTS FROM HESTON AIRPORT



The radio-telephone transmitter at Heston is used for broadcasting accurate weather reports, every hour, for the benefit of the pilots of radio-equipped 'planes. It has a range of about 200 miles and operates on 833 metres.

The Autumn Talks

The plan of broadcast talks for the autumn and early winter is easily the best that so far has been produced by the B.B.C. Emphasis is to be placed on talks by physicians on all kinds of common ailments and health problems.

Farmers, too, are to receive special attention. There is also to be a development of gardening talks, and technical talks on wireless reception,

And then, when Mr. Bumphrey has dealt with the man about the house, Miss Florence Simpson will follow on covering woman's activities in the house. Beginning on November 12th with the "Floors," Miss Simpson will work her way through the carpets and rugs, the furniture, the beds, and the kitchen.

There is a hope also that the B.B.C. will take its courage in its hands and put on some really interesting political discussion without

BROADCASTING

Has just completed its tenth year in this country, and it has profoundly affected the life of the nation. Keep in close touch with its developments and tendencies by reading

"The Wireless Constructor"

TELSEN

LOGARITHMIC CONDENSERS and DRUM-DRIVE



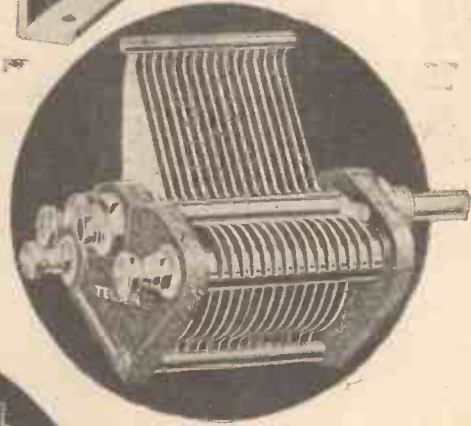
THE Telsen Drum-Drive and Condenser Assembly comprises a complete ganged condenser tuning unit incorporating several distinctive features. Two Telsen '0005 logarithmic variable condensers with right and left-handed movements, and fitted with compensators, are mounted and ganged together through a rigidly constructed drum-drive control. Mounted on the same spindle axis as the main tuning drive is a trimmer, giving a swinging movement of about 20° to the stator vanes of the right-hand variable condenser, thereby enabling perfect matching of the condensers to be maintained throughout the Tuning Range. Two scales are supplied with the unit, one marked in wave-lengths and one in graduations from 0-100. The Scale is illuminated and has the additional advantage of being easily removable when it is desired to fit one of special calibration. The escutcheon is handsomely finished in oxidised silver and knobs of the push-on type are fitted. Provision is made for panel and base-board mounting, and a double-ended spanner is supplied free with the unit for fitting the variable condensers. Full instructions for mounting are included with every unit.

No. W.262. Price **17/6**

TELSEN LOGARITHMIC CONDENSERS

The Frame is braced by three solid pillars, and the effective damping of the vanes, each held at three points, makes distortion impossible. The rotor is also built into a rigid unit, the vanes being held at both ends. Generous bearings: obsolete backlash or end-plate. Models No. 260 and 261 (left hand and right hand movements respectively) incorporate a compensator (max. cap. 60 micro-microhenries) for balancing out stray capacities, thus greatly facilitating ganging.

No. 130.....	Cap. '00025....	4/6
No. 131.....	Cap. '00035....	4/6
No. 132.....	Cap. '0005....	4/6
No. 260 (Left hand movement with trimmer) Cap.	'0005....	5/-
No. 261 (Right hand movement with trimmer) Cap.	'0005....	5/-



TELSEN DRUM DRIVE

Follows standard practice generally, but embodies several detail refinements, among which may be instanced the cord drive, arranged to reduce wear to a minimum and to prevent over-run, and the rocking stator trimmer, which gives a variation of 20°, and visual indication of setting. For use with Telsen screened coils, an extra scale, marked in wavelengths, is supplied free of charge. Illustration shows escutcheon, handsomely finished in oxidised silver.

No. W.255. Price **8/6**

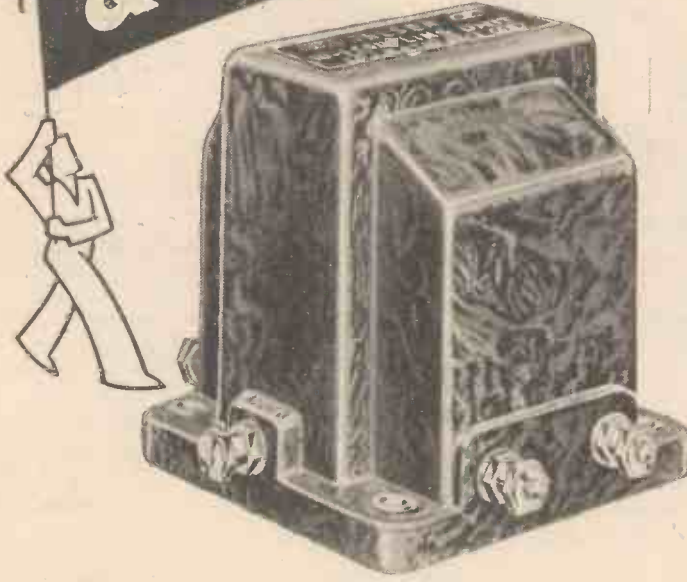
TELSEN

RADIO COMPONENTS

Get your copy of the new **TELSEN RADIOMAG, Issue N°3**

TELSEN

10-1 COUPLING UNIT & 1-1 COUPLING UNIT



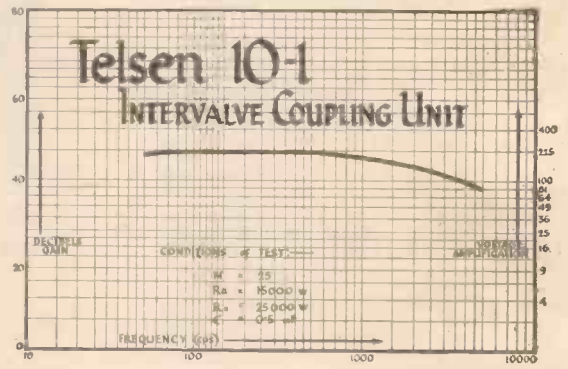
TELSEN 10-1 INTERVALVE COUPLING UNIT

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



12¹/₆

No. W215.

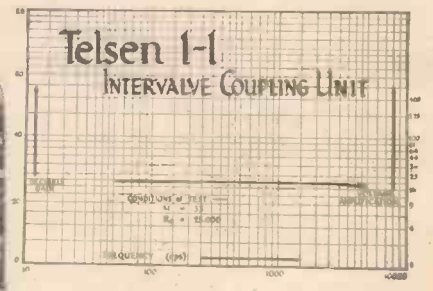
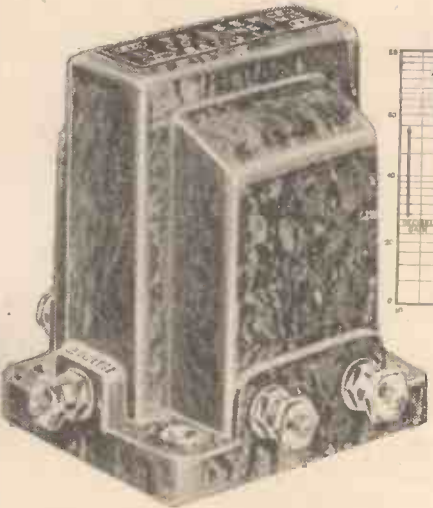


TELSEN 1-1 INTERVALVE COUPLING UNIT

This is a modern development of the one time deservedly popular R.C. units. It incorporates a low pass filter feed in its anode circuit, thus effectively preventing "motor-boating," "threshold howl," and other forms of instability arising out of common couplings in eliminator and battery circuits. Used with an H.L. type valve it will give an amplification of about 20 and a perfect frequency response, at the same time consuming negligible H.T. current.

7¹/₆

No. W214.



TELSEN

RADIO COMPONENTS

Get your copy of the new **TELSEN RADIOMAG, Issue N°3**

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



THAT picture you see above—of me comfortably ensconced in an armchair—ought really to be altered this month.

“Get out of that armchair,” one correspondent bluntly ordered, “and give us another set.” That was months ago. I wrote back and told him what I told all readers of this magazine when I first undertook to design exclusively for THE WIRELESS CONSTRUCTOR, to wit: (a) that my sets would not be flashes in the pan, and (b) that I would not produce a new receiver unless I felt it represented a definite step forward in design.

Successful Policy

This policy has proved a great success. The steady, maintained interest in and popularity of the “S.T.300” has shown that CONSTRUCTOR readers prefer a concentrated effort on a “big” set rather than that my efforts should be frittered away on a multitude of sets of little distinction.

I speak only for myself. I have no wish to influence the general policy of this journal. I believe there is always a need for sets which suit the requirements of particular groups of readers, and no other paper, in my belief, has better designers to supply that need.

“My Job”

On the eve of the launching of my second set, I hope you will not mind my re-explaining what can be tersely termed “my job.” And I want to be forgiven if I appear at all

egotistical. My “job,” then, is to develop one or two sets each year for construction on a really national scale.

It was agreed between the Editor and myself that I should concentrate on these “national” sets, so that British wireless constructors would look on a new “S.T.” set as an outstanding event. To achieve that success, and to achieve it a second time—as, knowing many readers’ opinions of my new set, I am certain I shall—means hard work.

Such skill as I may possess, as

The idea of these monthly “Armchair Notes” came from Mr. John Scott-Taggart himself.

“I want somewhere in this magazine,” he told each CONSTRUCTOR reader, “where I can just talk—not of some special subject, but on any topic that may interest both of us.”

So these articles are really just informal chats, intimate and informative, between “S.T.” in his armchair and you in yours.

inventor and designer, has gone into this new receiver. But, over and beyond that, *it will be a readers’ set*, for I have consulted constructors in every part of the country, tried experimental models on their own aerials, and been “got by myself” in their own homes. You—or, rather, your representatives—have already passed a verdict on the set.

It is a good set. It is very definitely a better set than the “S.T.300.” It is a rather more ambitious set, but it is a set for the million—a set every one of you could build, and a set every other one of you *will* build.

I am not easily fanned into a blaze of excitement, but as regards this new receiver I am an ardent enthusiast. I believe there will be more talk about the circuit than about any of the last few years, and while thousands are talking I am confident that tens of thousands will be building.

Surprises in Store

November 15th. On that day will be disclosed the full details. A reader who attended an advance demonstration of the “S.T.300” told me that he and ten of his friends had sketched out their individual ideas of what the “S.T.300” circuit would be. A money prize was to be the reward. If they run a similar competition on my next circuit I’m afraid the result will be the same. No one will win the prize.

You who are reading this have either built my “S.T.300” or have read the scores of published letters from all over the country. I need, and hope I possess, your confidence. With that backing this new set is certain of success.

In Readers’ Chairs

And now to turn to more armchairish topics, although I have seen very little of my own nestling ground recently. Most of the armchairs I have sat in lately have been readers’, and then only when tests have been completed.

What, I wonder, is the longest watch ever kept by a wireless enthusiast? How many hours of the

“Could Lloyd George Do It?”

twenty-four has he heard music, speech—or advertising?

The Germans, of course, can keep up pretty late when waiting for the result of a Max Schmelling boxing contest in America. Every snippet of a station—and probably all Czechoslovakia, Poland and Austria—will join in the fun. And what sport they have! I don't know a terrific amount of German—although at the age of five I listened to my first lecture on wireless in that language—but they can make things hum.

One of the most rollicking songs at the Schmelling night-out had as its refrain: “What will it matter in fifty years time?” You can imagine the scope for inventive talent in com-

Capri they used to capture migrating larks and put out their eyes with red-hot needles—because the poor creatures were then found to sing better as pets!

Easy-Living Spaniards

Italy, generally, is a dull place for entertainment. Except perhaps for opera, there is no night-life worth speaking of. We cannot look to Italy for late programmes.

How different is that other Latin but easier-living country—Spain! The country of “mañana”—where they do not believe in doing to-day what they can put off to-morrow!

About those larks. Having mentioned them, I cannot get them out of

Whether one would care to hear the same feminine voice across the hearth-rug is another matter. But from the loudspeaker it is as cool and refreshing as iced lager—or nearly.

But to return to Spain. Of course, they go in for siestas—afternoon naps, in common or garden English. No wonder they stop up late.

They go in for a lot of café life at night. No women, of course. The nice ones are kept behind bars, with duennas and people looking after them.

Quaking Tables

But the men sally forth to the cafés to talk politics. Arguments are hurled across marble-topped tables, and—as the arguments get fiercer—other things are hurled as well. They switch on the discussion about eleven, and signals get stronger and stronger till about three a.m., when atmospheric are at their best. At four the café habitués of, say, the Puerta del Sol decide to call it a day and adjourn.

So when you listen to Madrid, or Barcelona, or Valencia, do not think of onions, nuts in general or almonds in particular, but of fists pounding on quaking tables—or merely pounding.

Political topics of shattering interest are being literally hammered out. And, curiously enough, it's all done on a lemonade—or something equally sedative.

Why can't we liven up Lockhart's and lash-out at Lyons'?

Not Too Modest

German stations are very patriotic. We don't often hear our own National Anthem on the radio, but our late enemies, despite Versailles, broadcast nightly to themselves and the world in general “Germany Above All.” Rather provocative, I think. What does France think about it?

Still, our own anthem is hardly worded in a modest strain. There is a good deal about “confounding their knavish tricks” and things like that, but we in this country regard our national hymn simply as a loyal and affectionate tribute to the King.

The Germans, on the other hand, treat theirs as a proud rallying cry to help the Vaterland. However, I do not wish anything I say to upset negotiations at Lausanne or wherever they happen to be going on! But I

DEUTSCHLAND'S LITTLE PATRIOTS!



“German stations are very patriotic. They broadcast nightly to themselves and the world in general—‘Germany Above All.’” Our photograph was taken on a recent occasion in the Berlin studio when two dozen German school children concluded a programme of folk songs by lustily singing their national anthem.

posing the verses. It reminded me of the post-war song with its verses ending: “Could Lloyd George do it?”

Night-Birds of Europe

The Spaniards, of course, are the night-birds of Europe—if you exclude some Russian programmes. Spain likes its amusements late, so does Rome. The theatrical performances would never dream of starting at 8.15 in the city of the Cæsars. They've hardly finished their tea-dances!

Curiously enough, Roman radio programmes usually finish early. Mussolini probably wants his Fascist followers to be up with the lark—if they have larks. (In the island of

my mind. The horror of it all. A Swiss physician—Dr. Munthe—had to buy the top of the mountain where the birds rested on their way north, so that the cruel practice should cease.

But do not think harshly of Italians. They are, as a whole, a lovable race—and we ourselves were burning witches in this country about—well, a mighty short time ago.

The voice of the lady at Rome (“Radio Roma eh Narpoli”) is exquisite, in my opinion. It softens the effect of even Mussolini's scowl. The liquid tones are clearer and sweeter than the “canned” notes of the nightingale which are used as an interval signal by Italian stations.

The TELSEN TELELEXOR



THE Telexor represents a new development in radio set construction, and renders unnecessary all existing wave change methods by switching or changing coils. In conjunction with the Telsen Dual Range Tuning Coil, the whole of the medium and long wave broadcast band may be covered by one turn of the dial, without any operation being necessary to change wave lengths. Briefly, it incorporates a special design of tuning condenser, covering the full circle and giving "log law" tuning in both directions, together with an

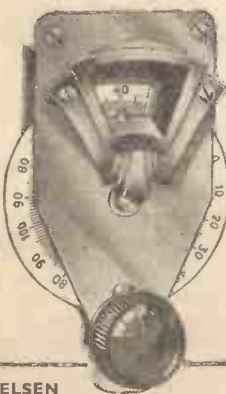
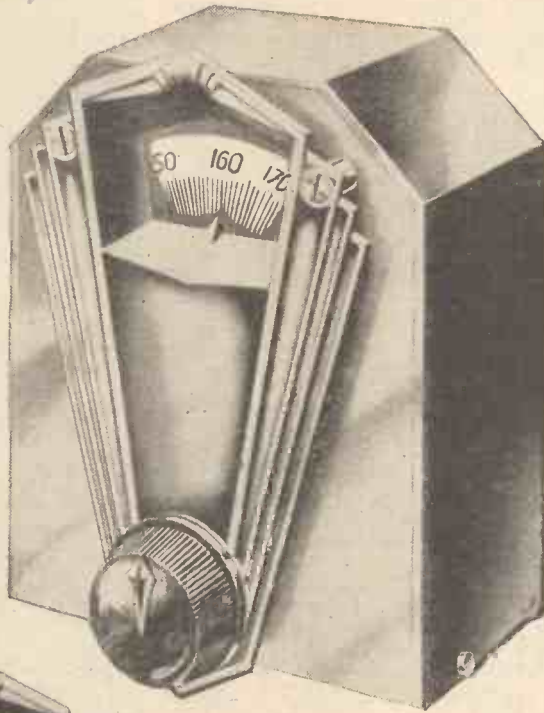
automatic wave change switch and illuminated disc drive.

No. W. 180.

MOUNTING INSTRUCTIONS

Full instructions are included with every Telexor for baseboard or panel mounting, together with the necessary screws. The approx. overall dimensions, excluding the escutcheon plate, are 5 1/4" high, 4 1/2" wide and 2 1/4" deep.

10 1/6

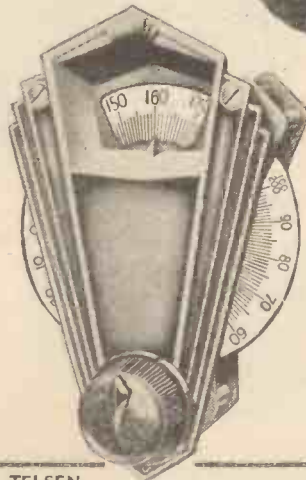


TELSEN SMALL FRICTION DISC DRIVE.

A low-priced disc drive for auxiliary controls. It is extremely robust and may be used for main tuning condensers when such a course is advisable owing to considerations of space.

No. W. 257

2 1/6



TELSEN ILLUMINATED DISC DRIVE.

Fitted with a handsome oxidised silver escutcheon of modern design, this drive incorporates an improved movement. The gear ratio of approx. 5-1, and the bold and well proportioned figures, make for delightfully easy tuning. The dial may be illuminated by means of an ordinary flash lamp bulb. A double ended spanner, to fit all Telsen one-hole fixing nuts, is supplied free.

No. W. 184

3 1/6

TELSEN SLOW MOTION DIAL.
An exceptionally smooth-acting dial, with an approx. ratio of 8-1. There is no toothed gearing, so that it is impossible to strip the dial. The figures are clear and arranged to provide for right and left hand condensers.
No. W. 141 (black)
No. W. 141a (brown)
2/-
EACH



TELSEN

RADIO COMPONENTS

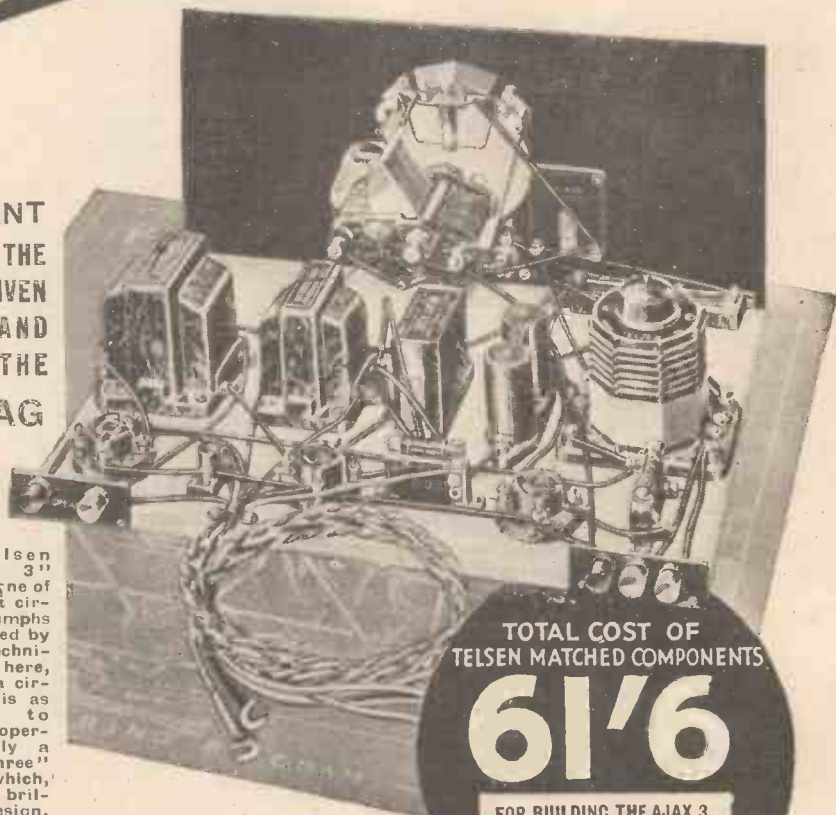
Get your copy of the new **TELSEN RADIOMAG, Issue No 3**

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

The TELSEN

AJAX 3

**BUILD THIS BRILLIANT
CIRCUIT WITH THE AID OF THE
FULL-SIZE 1/- BLUEPRINT GIVEN
FREE WITH THE NEW AND
ENLARGED EDITION OF THE
TELSEN RADIOMAG**



THE Telsen "Ajax 3" represents one of the greatest circuit triumphs ever achieved by Telsen technicians. For here, at last, is a circuit which is as inexpensive to build and operate as only a "straight three" can be, yet which, owing to its brilliance of design, gives an all-round performance of hitherto unattainable excellence, with

a degree of range, power and selectivity which definitely sets a new standard for receivers of its type. Full constructional details of this and several other brilliant circuits, together with free full-size 1/- Blueprints, are contained in the new, bigger and better issue of the Telsen Radiomag—price 6d. You'll agree that it's the finest radio sixpennyworth ever offered, for not only does it tell you how to build the latest types of receiver—not only is it crammed with valuable information from cover to cover—but it also contains full details of the improved and now all-embracing range of Telsen Radio Components at the revised prices only made possible by Telsen's enormous sale—the largest in the world! Get your copy of the Telsen Radiomag NOW—from your radio dealer or newsagent.

TOTAL COST OF
TELSEN MATCHED COMPONENTS

61'6

FOR BUILDING THE AJAX 3
including panel, base-
board, terminals,
battery cords and all
accessories.



"TELORNOR" CONSTRUCTORS' OUTFIT

Contains all the sundry requirements for the construction of any type of receiver circuits using the "Telornor." Of these the Telsen "Triple" 3, the "Ajax" 3, and the "Nimrod" 2, are excellent examples. All are supplied neatly packed in a carton, together with instructions.

Cat. No. 220

3'6

Included in the Outfit are the following components :

Specially cut and drilled crystalline-finish Panel. 14" x 10" Baseboard. 8-way Battery Cord. Complete set of Wander Plugs, suitably engraved, and Spade Terminals, Terminals for Aerial, Earth and Loud Speaker.

Engraved Terminal Strips. An ample supply of 22 S.W.G. Tinned Copper Wire and necessary Sleeving for wiring up the set. A double-ended Spanner for mounting the single-hole fixing components.

A 4-way Spanner, for tightening up all Terminal Nuts. All the Wood Screws and sundry other small accessories contributing to the complete assembly of the finished Receiver.

TELSEN

RADIO COMPONENTS

Get your copy of the new **TELSEN RADIOMAG, Issue No. 3**

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

“Variable-Mew”—and the Dog Biscuits!

remember once punching a German boy on the nose for thinking Deutschland was all-important. Unfortunately, I got two black eyes in return.

Putting Out the Cat

Of course, some of the dignity of the whole business of Germany's “signing off” is sometimes spoilt by the reminder to “earth your aerial.” Vienna goes one better, and also tells you to turn off the gas. Czechoslovakian stations may be expected to add a reminder about putting out the cat.

Talking about cats suggests the mention of a peculiarly attractive kitten which has heard all the Central London tests on my new set. At first scared, it was almost immediately won over by my separating

THE “INKSTRAIN”—

As promised, here is an actual photograph of the much-talked-of “Silver Inkstrain” sent as a “present” by a Portuguese admirer.

Mühlacker from London Regional! It purrs at Poznan, but is terrified by Toulouse! Frankfurt attracts it. Can it scent them? Which reminds me that this kitten, which is not my property, is fed on—and enjoys—dog biscuits!

I know very little about cats, having preferred Airedales, but eating dog-biscuits for a kitten of six weeks seems good-going.

I wonder how readers' pets have reacted to the radio? Let me know. I ought to get some interesting replies. By the way, I have called this kitten—without the owner's consent—“Variable-Mew.”

Followers of these notes will remember all about the mysterious “inkstrain” (*alias* reliquium) which my Portuguese admirer sent me (with a request for a wireless shopful of stuff as a return gift). Well, here you have a photograph of me holding the silver inkstrain. This “front of panel” view is probably not recognisable as me; but, then—as so many have pointed out—I never look the same twice in my pictures.

To friends who irritatingly com-

he simply meant “reappearance.”

If, however, my appearance is of too chameleon-like a character I shall have to standardise it by growing a beard. (Incidentally, I did so eighteen months ago in Switzerland while writing some very candid and even vitriolic articles on television; there was no connection between the two pursuits, and although I enjoyed face-comfort in the intense cold where I was, I had to return to “normal” before being allowed into Italy because I did not tally with my passport photograph.)

But to get back to the inkstrain. What do you make of it? It is calculated to appeal to me: it has plenty of controls. At first I thought it was a cruet!

—ALIAS

“RELIQUIUM”

“It is calculated to appeal to me,” says S.T., “it has plenty of controls.”

You can have three guesses at the uses of the various “gadgets.”

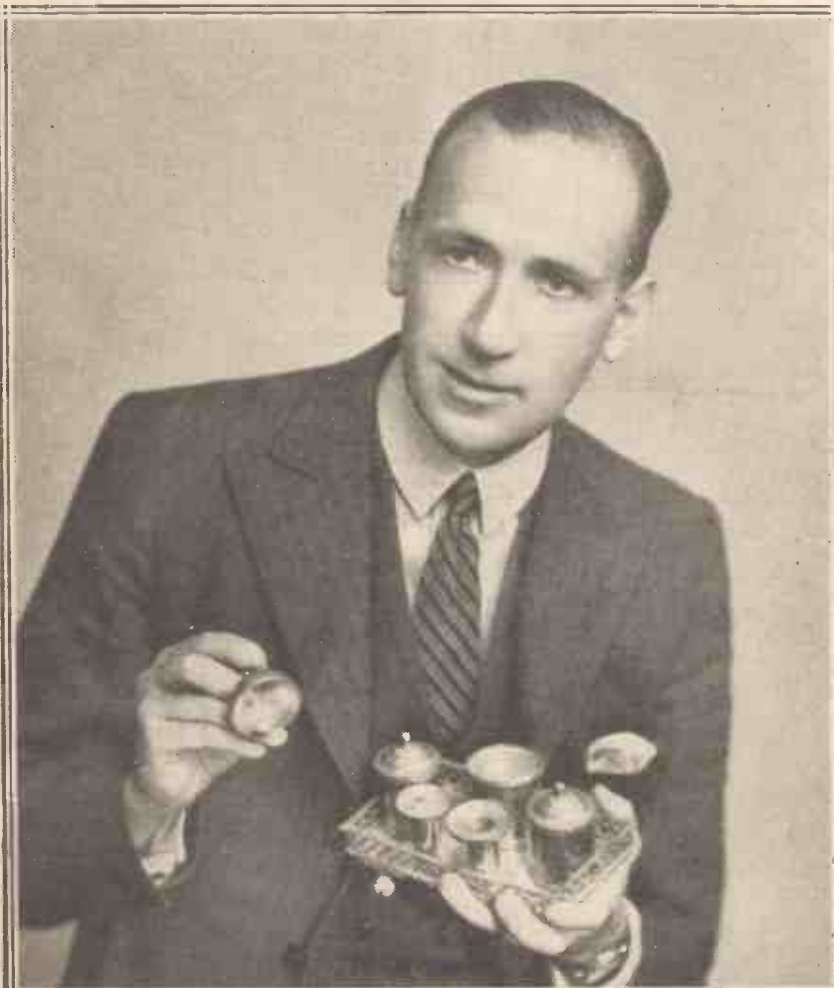
It seems to comprise (a) two inkwells—insulated; (b) a holder for quill pens; (c) a holder for a candle; (d) a silver jar with a domed lid containing a bell (to summon a servant?—the jar perhaps is for

sand, which they used before someone sensible invented blotting-paper).

The above are pure guesses. For all I know the thing may be a model of the first Portuguese locomotive. Have we no antique-dealers in our “club”?

Unfavourable Reply

The gadget is obviously very old. I may make a fortune out of it. But a dealer in old silver in Oxford Street sniffed at it (as a matter of fact, it has



plain “But this isn't like you,” I always retort: “This is a wireless paper. Readers want results. They don't care what you look like.”

“S.T.” as a Beaver

I am not certain I am altogether right about the matter. One letter from a correspondent opened with: “I was so pleased at your appearance in the CONSTRUCTOR that I built the ‘S.T.300’ at once.” But perhaps

"Tried to Sell Me a Tricycle"

rather an aroma of its own) and suggested half-a-crown.

What shall I do. Let me think. . . . I have a very old wireless set that Señor Carlos might prefer. It dates back to 1919. It has more knobs than his inkstraw. It must have great "antique value," and if he is "fearful supposing for a chagrin" he could always send the set "some helst."

"Wireless Inventor Killed"

The trouble about these vague jottings of mine is that I get led away so easily from my line of thought. I really want to talk about lightning. Germany's insistence on earthing aerials must result in a big business in earthing switches. Personally, I've never earthed an aerial. Criminal, I admit. I've looked at those advertisements of earthing-switches (you know, lightning flashes all over the place, house on fire, etc.), and whimpered with fright—but never done anything.

Some day you will see a headline: "Wireless Inventor Killed by Lightning," and then I hope you will go and do what you should have done years ago—buy an earthing switch.

The atmospheric season will soon be over, thank goodness. What with storms cavorting about, and the Heavyside layer not doing its stuff, the ice-cream season is a blight on wireless reception. But dark evenings will soon be upon us, and the Government will alter again the hour at which the sun is permitted to rise and set.

If you are a loyal citizen, 100 per cent British, and refuse to eat Danish bacon, it may comfort you to know that we grow our own atmospherics at this time of the year. Meteorologists—those men who dabble gloatingly in "depressions" and issue gloomy guesses about to-morrow's weather—tell me that on 110 days out of 183 in the six summer months of last year there were thunderstorms in these Isles.

Spies Everywhere

"How do they know?" you may ask. They have spies all over the country—amateur gloaters—meteorologists in the making—who rush about their district looking for storms. When one breaks they go and tell father ("father" being Chief Guesser at the Meteorological Office).

I suppose the figures are all right because they are official. But suppose you and I lost our self-respect sufficiently to enlist voluntarily as storm-counters. Just suppose that. You are given Manchester, and I have Wigan, and a thunderstorm occurs exactly half-way between. Whose storm is it?

The figures, however, are interesting because they mean that *somewhere* in this country some storm-ghoul has dug up some thunder to report on each of those 110 days. Even allowing a 10 per cent reduction for mistakes (coals being delivered next door, etc.) the figures are impressive.

Tariff on Atmospherics

As there is no thunder without lightning (somewhere), there must be a good output of atmospherics; although I have heard of lightning without a resultant crackle in the speaker.

—AND NEXT MONTH
THERE WILL BE MORE
OF THESE ENTERTAIN-
ING NOTES FROM THE
PEN OF

John Scott-Taggart

But this other surprising fact emerges from the work of this voluntary army of sky-scanners: In the winter six months there are about 94 thunderstorms—or one every other day!

All one can say is that, fortunately, our wireless sets are much quieter in winter than these figures suggest. Of course, atmospherics often come thousands of miles to visit these shores.

If only we could use the tariff!

"Bon Soir, Messieurs"

I've just been listening to two French stations closing down: Poste Parisien and Strasbourg. Having written about National Anthems, it was piquant to note that the Paris station closed with the *Marseillaise*, but Strasbourg simply said: "Good-night, ladies and gentlemen"—first in French and then in German.

Strasbourg, of course, was the German capital of Alsace-Lorraine, and many of its inhabitants speak German. You can tell this station

by the fact that all its announcements are laboriously duplicated in French and German. Even though France regained the province after the war by the Treaty of Versailles, one can understand their tact in not playing the *Marseillaise* from the Strasbourg station.

"Must I Give Way?"

The accidental propaganda power of broadcasting is becoming more and more realised. The South and East of England gets foreign stations louder than the English ones. We are used to hearing English from French stations, and Polish stations broadcast in languages other than their own. Mr. Winston Churchill has threatened to speak to us from abroad.

Where will it all end? Fécamp insists nightly (I hope the printer won't spell it as "rightly") that I shall use a certain beauty preparation: urges me to get rid of freckles, pimples, blackheads, and blotches generally. Must I give way? And now Toulouse to-night tried to sell me a tricycle!

* * *

Herbert K. Simpson, I see, has been caught napping. In his vigorous attack on the "complacency of inventors" he has aimed several barbed shafts with the idea of wakening everyone up to the need for finding a new method of detection instead of relying on the old "leaky grid"—a relic of 1904 and 1907.

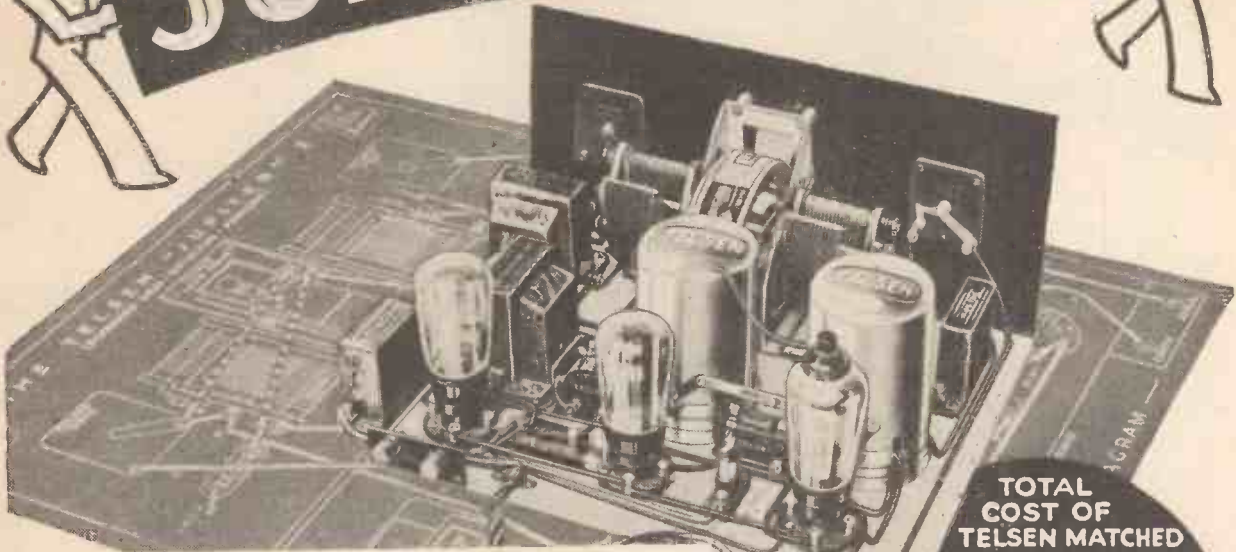
Nosing Out the Stations

But he is utterly wrong and completely misinformed if he imagines that no one is doing anything about it. Mr. F. C. Verk, of Jersey City (U.S.A.), has opened up an entirely new line of research. He finds that if he connects an aerial to his dog's tail, and a pair of headphones to a clip at the dog's neck, he can hear broadcasting perfectly. The dog, of course, is acting as a detector.

Here is a great opportunity for readers of these notes. Mr. Verk says he has tried other dogs, but they don't work. I doubt it. If I follow up Verk's pioneer researches I shall experiment on bloodhounds. Success may mean that my next year's set may be of the "H.F.-dog-and 2 L.F." type. It will seem strange at first having to feed your detector.

The **TELSEN**

JUPITER S.G.3



FULL SIZE 1/- BLUEPRINT OF THIS AMAZING CIRCUIT GIVEN FREE WITH THE NEW AND ENLARGED EDITION OF THE **TELSEN RADIOMAG**



Build the Telsen Jupiter S.G.3—the Telsen Radiomag tells you how! Devised by Britain's leading radio technicians, and utilising the latest Telsen Matched Components, this outstandingly brilliant Telsen circuit is one which every keen home-constructor will want to build. For it gives a performance immeasurably ahead of anything previously achieved—not only in its extreme selectivity, its exceptionally wide range, and its tremendous amplification, but also in its really superb quality of reproduction. Complete constructional details, together with a full-size 1/- Blueprint, are contained in the new Telsen Radiomag, Issue No. 3. Packed with valuable information, this biggest and best issue also tells you all about the improved and now all-embracing range of Telsen

Radio Components, at the revised prices only made possible by Telsen's enormous sale—the largest in the world! Get your copy now, price 6d., from your radio dealer or newsagent.

TELSEN

RADIO COMPONENTS

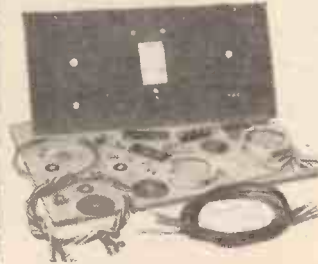
TOTAL COST OF TELSEN MATCHED COMPONENTS

77/-

FOR BUILDING THE JUPITER S.G.3

including panel, base board, terminals, battery cords and all accessories.

DRUM DRIVE CONSTRUCTOR'S OUTFIT



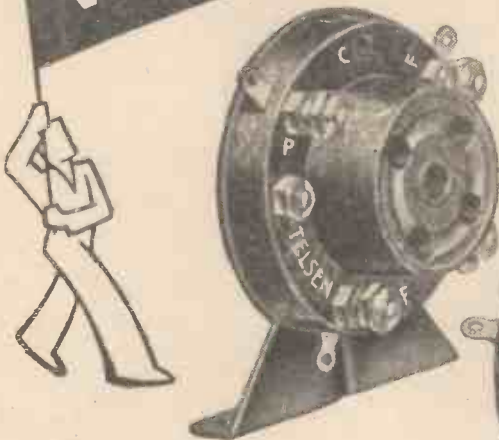
Contains all the necessary requirements for the construction of the TELSEN "JUPITER S.G.3," but the constructor will find the outfit of great value in the building up of any receiver circuit employing the drum drive condenser assembly. No.219 **3/6**

The Outfit Contains the Following :

- | | | |
|--|---|---|
| 1 Metal Panel with attractive crystalline finish, specially cut and drilled for mounting the Telsen Drum Drive, and other panel-mounted components normally required in a ganged condenser receiver. | 7 Wander Plugs mounted in holder. | 1 Volume Escutcheon |
| 1 Baseboard 14 by 10 in. | 2 Spade Tags. | 1 "On-Off" Escutcheon. |
| 1 Aerial and Earth Terminal Strip. | 1 8-way Battery Cord | 2 Height Plinths for the matched screened Coils. |
| 1 Loudspeaker Terminal Strip. | 1 Cord Clip. | 1/2 in. of 3 mm Sleeving (black). |
| 2 Red Terminals complete and mounted in holder. | 2 Large Insulating Washers. | 1 1/2 in. of 3 mm Sleeving (red). |
| 2 Black Terminals complete and mounted in holder. | 1 Small Thick Insulating Bush. | 20 feet of 1 1/2 mm Sleeving (green). |
| | 1 Small Thin Insulating Bush. | 21 feet of 22 S.W.G. tinned Copper Wire. |
| | 2 Spacing Nuts for the reaction and aerial series condensers. | 1 Double-ended Spanner for lock-nuts. |
| | 2 Spacing Nuts for the "On-Off" Switch. | 1 Fourway Spanner |
| | 1 Wave-Change Escutcheon with two screws and nuts. | Assortment of 1/2-in., 3/8-in., 1/4-in., 3/16-in., and 1/8-in. Wood Screws. |
| | 1 Separator Escutcheon. | |

Get your copy of the new **TELSEN RADIOMAG, Issue N° 3**

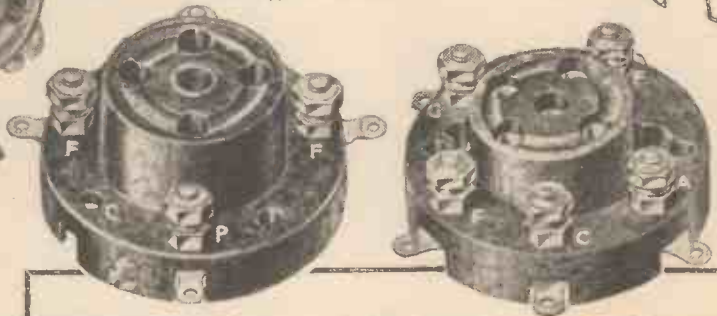
TELSEN VALVE HOLDERS SWITCHES AND GRID LEAKS



TELSEN VALVE HOLDERS

A new range of valve holders has been introduced in both solid and anti-microphonic types. These embody special contact sockets of one-piece design with neat soldering tag ends and terminals. They have an extremely low self-capacity and are easily mounted.

SOLID TYPE NO.	PRICE	ANTI-MICROPHONIC NO.	PRICE
4 Pin. W.224	- 9d.	4 Pin. W.222	- 1/-
5 Pin. W.225	- 1/-	5 Pin. W.223	- 1/3
W.198. Universal Type Valve Holder	-	-	- 1/-



TELSEN GRID LEAKS

These are absolutely silent and practically unbreakable, and do not vary in resistance with application of different voltages. They are non-inductive and produce no capacity effects.

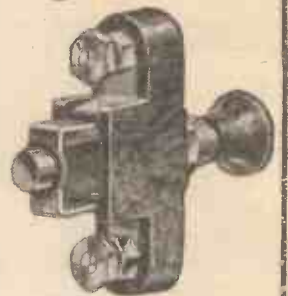
CAP. MEGOHMS. NO.	CAP. MEGOHMS. NO.
5 W.254	1 W.250
4 W.253	1/2 W.249
3 W.252	1/4 W.248
2 W.251	

TELSEN PUSH-PULL SWITCHES

employ the "knife" type of self-cleaning contact, and a positive snap action. The nickel-silver bridge-piece is driven between the springy "fixed" contacts, and the wedge-shaped plunger squeezes the inner contacts outwards, closing the jaws in a firm grip. The series gap reduces self-capacity to a minimum, and the spindle is insulated from all contacts. For use as battery switch, or as wave-change switch with the dual-range short-wave coil unit.

Two-point. No. W.107

1/4

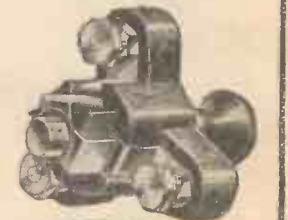


TELSEN WAVE-CHANGE SWITCH

The wave-change switch for Dual Range Aerial Coil, or for breaking L.T. and H.T. circuits simultaneously.

Three-point No. W.108

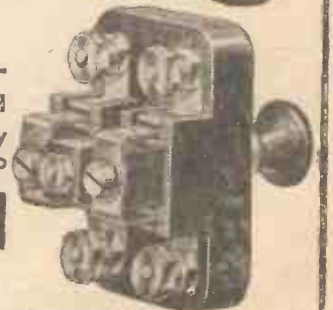
1/3



TELSEN FOUR-POINT "TWO-POLE" PUSH-PULL SWITCH

This model is a two-pole switch highly suitable for use in wave-changing on two coils or an H.F. Transformer, or for switching pick-up leads or an additional loudspeaker.

1/6



TELSEN

RADIO COMPONENTS

Get your copy of the new **TELSEN RADIOMAG, Issue N°3**

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

**AS WE
FIND
THEM**



**NEW
APPARATUS
TESTED**

A Super Choke

THE latest "Goltone" H.F. choke has been specially designed for use in parallel-feed S.G. circuits, or for the second detector position in super-heterodynes. In both of these cases it is absolutely essential that the choke should have a high inductance value, combined with a very low distributed self-capacity.

In the case of the "Goltone" Super H.F. choke the inductance is as high as 350,000 ohms, and the self-capacity is around 5 micro-mfds.

Readers may wonder why it is necessary that a special choke should be employed in circuits such as super-hets. or parallel-feed H.F. stages. In the case of the S.G. stage, where the choke is directly in series with the anode of the S.G. valve, the winding has to offer as nearly as possible an infinite impedance to the H.F. currents, since any H.F. which passes through the choke is wasted.

Thoroughly Sound

In super-hets. the choke must have a high enough inductance to resist the passage of the H.F. currents in the anode circuit of the second detector, which, of course, has to deal not with broadcast frequencies, but with an intermediate frequency, which may be anything from 110 to 130 kc.

The "Goltone" choke has a small iron core, and this has enabled a high inductance value to be obtained with a low D.C. resistance, this resistance being only 225 ohms.

This H.F. choke is a thoroughly sound job, and one that we can recommend. Its price is 4s. 6d., and the makers are Messrs. Ward & Goldstone, Ltd., of Pendleton, Manchester.

"Goltone" Aerial Wire

Which reminds us that, some years ago, the "Goltone" people produced a super aerial wire called "Negrolac." This wire comprises a number of

Under this heading we publish reviews of apparatus submitted by radio manufacturers and traders for examination and test in "The Wireless Constructor" laboratories.

strands of enamelled copper wire having a weather-resisting outer covering. An aerial composed of "Negrolac" possesses extremely low losses, and the fact that the wire is covered gives it an immunity from atmospheric corrosion.

Obviously such a wire as "Negrolac" has to pass through numerous processes in manufacture, and in consequence its price is comparatively high, although it is undoubtedly efficient.

Realising the advantages of a weather-resisting covering on an aerial wire selling at a popular figure, Messrs. Ward & Goldstone have now produced a wire called "Lektrite." It makes an effective aerial and in virtue of its weather-proof properties should last for a very long period unaffected by the

results of acids in the atmosphere. Its price is 3s. per 100 ft.

The "Multitone" Transformer

We have recently had on test one of the new "Multitone" tone-control transformers marketed by The Multitone Electric Co., Ltd., 95/98, from White Lion Street, London, N.1.

The transformer is designed to be used with a potentiometer, preferably the "Multitone" graded potentiometer, and when connected up in accordance with the maker's scheme of connections, full correction for either high- or low-note deficiency is possible merely by adjusting the potentiometer knob.

If you wish you can get straight-line amplification corresponding with that given by the ordinary high-class transformer, and then, by moving the potentiometer knob, the bass or top notes can be exaggerated at will so compensate for any falling off in the tone balance elsewhere in the amplifying chain.

The "Multitone" can be used in any straightforward L.F. circuit and our

HIGH OR LOW NOTES AT WILL



The "Multitone" transformer and graded potentiometer. With this "high" and "low" transformer it is possible to accentuate top or bass notes at will and so compensate for any deficiencies elsewhere in the amplifying chain.

As We Find Them—continued

laboratory tests proved the device to be highly effective. We commend this transformer to the attention of all those who are desirous of achieving a fully corrected quality output. The price of the instrument is 17s. 6d., or one guinea complete with potentiometer.

R. & A. "Challenger"

R. & A. loudspeakers are made by Reproducers and Amplifiers, Ltd., of Frederick Street, Wolverhampton.

GOOD WORKMANSHIP



The R. & A. "Challenger" is a permanent-magnet moving-coil speaker handling up to about 2 watts. A three-ratio output transformer is incorporated and can be seen in the photograph attached to the chassis.

The latest product of this firm is a permanent-magnet moving-coil called the "Challenger," selling at 35s.

On examining the "Challenger" one is immediately struck by the high-grade workmanship and finish. The diaphragm itself is in one piece—that is to say, the usual rubber or stockinette surround has been dispensed with, and there is thus no chance of sag due to stretching of the surround, and it is evident that every effort has been made to achieve accurate centring of the coil and mechanical strength without unduly restricting the cone movement.

The speaker incorporates a three-ratio output transformer mounted integral with the chassis, the windings being proportioned so that the speaker can be connected directly in the output circuit of a power, super-power or

pentode valve, and it will handle up to about two watts of A.C. energy.

On test we found that the sensitivity was such that a fully-loaded power valve capable of giving 350 milliwatts of undistorted output would give adequate volume for ordinary domestic purposes.

The response over the musical frequency range is good, the reproduction being bright and speech crisp and clear. The "Challenger" is a value-for-money product.

"Utility" Condensers

There is no need to introduce such well-known components as those bearing the trade mark "Utility." "Utility" condensers have achieved a well-merited popularity by reason of their sound construction and electrical efficiency.

We have recently received samples of the 1932-1933 range, comprising "gang" units of various types, both screened and unscreened, solid and ordinary air-dielectric condensers.

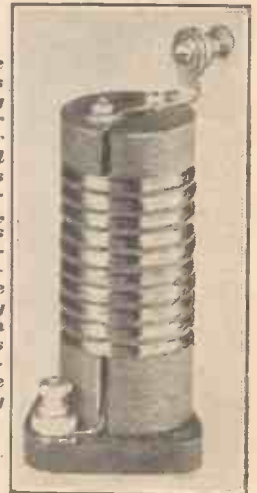
One of the models we have had on test is a miniature twin-gang made up of two .0005 solid-dielectric sections, and having a separate .0001 trimmer controlled by a small concentric knob on the main tuning control. This miniature gang is very suitable for use in sets where space is limited, although the dielectric losses render the efficiency slightly less than that of the normal air-dielectric type. In our tests, however, we could not detect any real difference between the results obtained with one of these condensers

as compared with a very much larger air-dielectric unit, although we prefer the firm's standard gangs in those cases where extreme compactness is not essential.

Turning to the conventional air-dielectric models, these are exceptionally fine pieces of work, the solid mechanical construction giving an absolute freedom from backlash, end-or side-play.

FOR SUPER-HETS.

This Goltone H.F. choke has been specially designed for super-hets., or for parallel-feed S.G. circuits where the winding has to offer, as nearly as possible, an infinite impedance to the high-frequency currents. In spite of this the D.C. resistance of the choke is only 225 ohms.



A feature of the "Utility" condenser is the very smooth movement provided by the slow-motion friction drive, and hairbreadth tuning can be carried out with ease.

This new range is fully in keeping with the enviable reputation of the makers, who are Messrs. Wilkins & Wright, Ltd., of Holyhead Road, Birmingham.

COMPACTNESS IN CONDENSER DESIGN



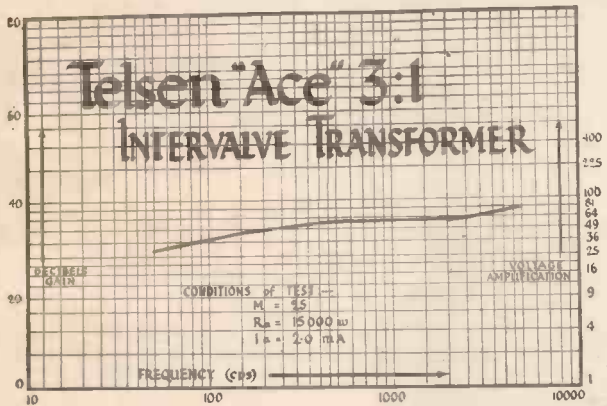
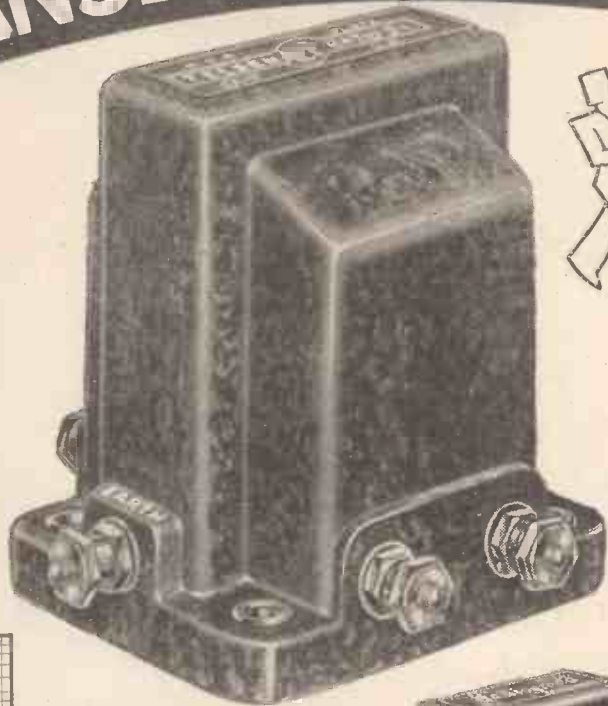
A group of "Utility" condensers. The compact unit in the centre is a twin-gang comprising two solid-dielectric condensers each having a capacity of .0005 mfd. Compare the size of this with the air-dielectric standard model on the left.

TELSEN L.F. TRANSFORMERS

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

RATIO 3-1 No. W.66
RATIO 5-1 No. W.65

5/6



TELSEN "RADIOGRAND" L.F. TRANSFORMERS.

Telsen "Radiogrand" Transformers have signified to expert designers and enthusiastic constructors all that is finest in British Radio craftsmanship. The design is based on the results of recent research coupled with the soundest engineering principles, tested rigorously for immaculate performance and enduring efficiency.

RATIO 3-1. No. W.59.
RATIO 5-1. No. W.58.

7/6



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

This Transformer is designed to give extra high amplification on receivers employing only one stage of L.F. amplification. It is not recommended for use in receivers employing two L.F. stages, as overloading is likely to occur.

No. W.60

10/6



TELSEN "RADIOGRAND" INTERVALVE TRANSFORMER. Ratio 1.75-1.

For use in receivers employing two stages of L.F. amplification, where exceptionally good quality is desired. When used following an L.F. stage employing choke or resistance coupling it will be found to give ample volume with remarkable reproduction. No. W.61.

10/6

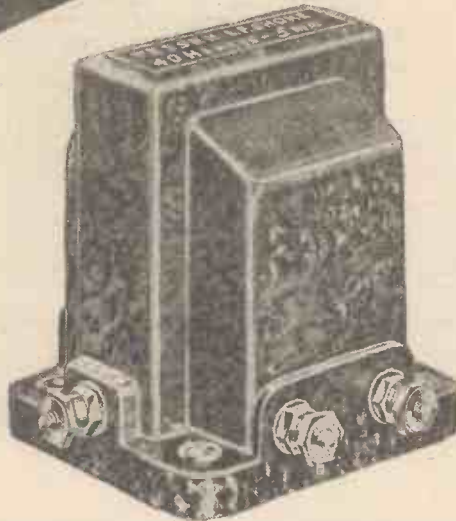
TELSEN
RADIO COMPONENTS

Get your copy of the new **TELSEN RADIOMAG, Issue N°3**

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

TELSEN CHOKES

COUPLING, OUTPUT,
AND SMOOTHING



TELSEN INTERVAL L.F. COUPLING CHOKES

These popular L.F. Chokes are primarily intended for use as coupling chokes, but may be used in any circuit not carrying more than the stipulated maximum current. The 100 H. type is for H. or H.L. type valves, the 40 H. type for L. type valves.

RATING	NORMAL CURRENT	MAX. CURRENT	NO.
40.H. at	5.M.A.	10.M.A.	W.68
100.H. at	3.M.A.	8.M.A.	W.69

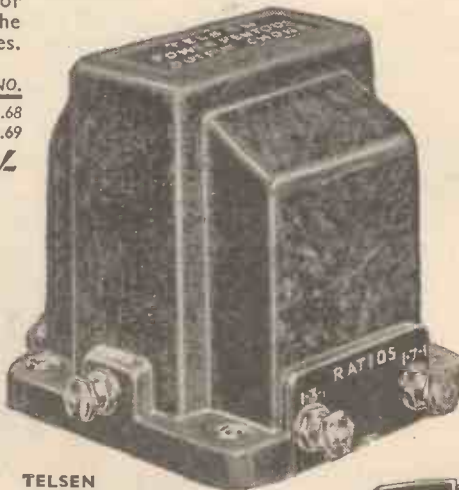
5/-



TELSEN TAPPED PENTODE OUTPUT CHOKE

This choke is designed primarily for pentodes taking an anode current of not more than 20.M/A which includes the ordinary battery operated types. The single tapping provided gives (by reversing) ratios of, 1-1, 1.6-1, 2.5-1, which provide for matching under widely varying conditions. The choke is equally suitable for matching a low impedance speaker with an ordinary power valve. A coupling condenser of 1.Mfd. is recommended.

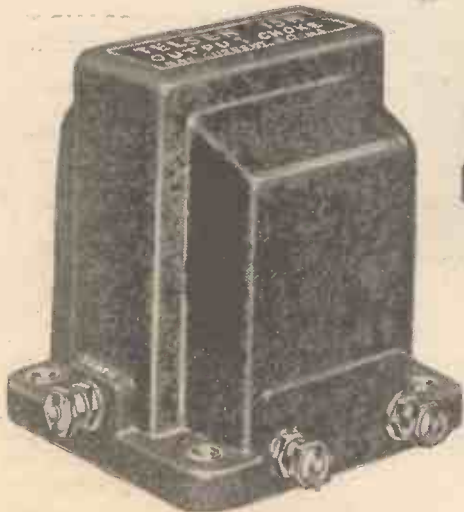
No. W.72 **7/6**



TELSEN POWER PENTODE OUTPUT CHOKE

The purpose of this power pentode output choke is to prevent direct current passing through the Loudspeaker, and also to match the speaker to the pentode valve. By using this choke in conjunction with a condenser of 1.Mfd. the quality obtained from a pentode becomes quite equal to that expected from a normal super power valve, and the volume is much increased. This model is suitable for mains power pentodes carrying currents up to 40 M/A and for correct matching gives the choice of three ratios, viz:—
1-1, 1.3-1, and 1.7-1.

No. W.172 **10/6**



TELSEN OUTPUT CHOKE

Designed for use as Output Filter in conjunction with a condenser not less than 1.Mfd., following any power or super power valve taking up to 40 M/A anode current. Gives an ideal response curve under all conditions.

No. W.71 **7/-**

TELSEN
RADIO COMPONENTS

Get your copy of the new **TELSEN RADIOMAG, Issue No. 3**

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



A PRACTICAL MAN'S CORNER

By R. W. HALLOWS, M.A.

Into these pages, month by month, our contributor packs a wealth of practical information and advice on constructional work. The regular reader of this "Corner" cannot help picking up a more or less complete training in radio workshop practice, while every month there are wrinkles to read, gadgets to make, and hints to help you.

SEVERAL readers have suggested that I should give a design for a radio-gram cabinet, a general stipulation being that it should be neither difficult nor expensive to construct. I have, therefore, worked out a cabinet which, though its cost runs to only a few shillings and though it can be made by anyone who has a little skill in the use of woodworking tools, has a very pleasing appearance when finished.

A Strong Chassis

Fig. 1 illustrates a wooden chassis which I used recently for making a four-valve radio-gram for myself. The gramophone motor is mounted below the motor-board and towards the left-hand side. The valves, condensers, transformers and other components of the radio-gram circuits are mounted both upon the underside of the motor-board and on the inner vertical surfaces of the end-pieces.

When the instrument is finished, the turntable, the pick-up, the controls and the switch appear on the upper side of the motor-board, everything else being hidden away beneath.

The exact dimensions of the chassis will depend upon individual requirements, and the design is easily adaptable.

A convenient size for the motor-board is 19½ in. from end to end, and 16 in. from front to rear. The total height of the chassis is 7 in., which means, as the motor-board is ¾ in. thick, that the end-pieces of 1-in. deal measure 6½ in. by 16 in.

The end-pieces are screwed to the underside of the motor-board. Small angle-brackets form a reinforcement, and the whole is made as strong as a

house by the 1 in. by 1 in. deal battens which are 17½ in. long.

Further Details

If desired, the underside of the motor-board may have a liner of thin sheet aluminium, and the end-pieces may be treated in the same way. For the motor-board I recommend ¾-in. seven-ply with either a mahogany or oak veneer.

When the motor and all other components are in position, the chassis may be provided with a bottom of plain three-ply which serves effectively as a dust excluder. A further refinement is to glue green baize to the underside of this piece of three-ply so as to protect the surface of any piece of furniture on which the instrument stands.

The cabinet itself is of the "slip-on" type, and I am indebted to two kind correspondents for valuable suggestions concerning its design. One of these, who has been in touch with me since THE WIRELESS CONSTRUCTOR'S first birthday, sends an excellent idea for an easily-made soundproof lid; the other has sent a very pretty solution of the problem of plywood corners to which I recently referred in these notes.

The Cabinet

The material for the cabinet is seven-ply with the same veneer as that chosen for the motor-board. The way in which the slip-on shell is made is illustrated in Fig. 2. The inside dimensions as regards length from end to end and depth from

LINED UNDERNEATH WITH ALUMINIUM

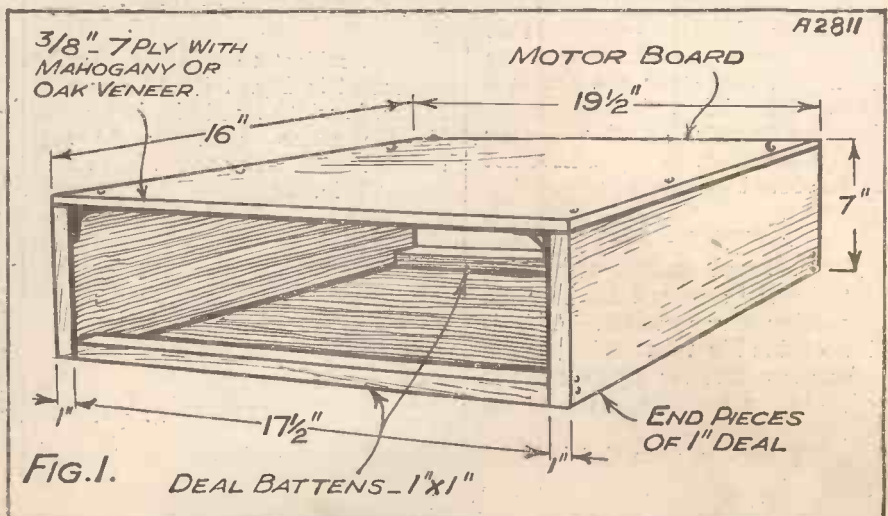
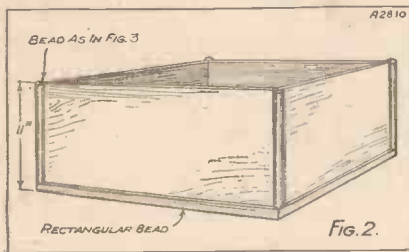


FIG. 1. A useful wooden chassis is the basis of the radio-gram cabinet described on this page. The underside of the motor-board and the end-pieces have a lining of thin sheet aluminium. Incidentally, when the instrument is finished, only the turntable, the pick-up and the controls appear on the upper side of the motor-board.

A Practical Man's Corner—continued

STEPS TO SUCCESS



Make this slip-on "shell" of seven-ply and see that the veneer is the same as that chosen for the motor-board.

front to rear are just $\frac{1}{16}$ in. greater each way than those of the motor-board in order to allow an easy but neat fit.

The height of the shell overall is 11 in., which gives plenty of clearance between the top of any make of pick-up and the inside of the lid.

The detail of the corners is illustrated in Fig. 3, which shows the junction of the front with one of the side-pieces. The front is fixed to the side-piece by means of countersunk screws, and the rather unsightly seven-ply end of the front-piece is covered up by means of the bead illustrated.

This is three-quarter circular in section and it is glued to the plywood. It is, I believe, a stock beading. At any rate, I had no difficulty in obtaining it, but if you cannot purchase it from stock any joiner or cabinet maker will make what you require at small cost. The beads look very well since they form pillars at the corners of the cabinet.

All round the bottom of the cabinet is a rectangular bead—or if you do not care about this somewhat severe rectangular shape you can choose a "fancy" moulding. The corners of this must be mitred, a job which the joiner will do for you if you have not a mitre board.

Corners Again

For a second method of making neat plywood corners I am indebted to another correspondent. This is illustrated in Fig. 4, but unfortunately it cannot be used for slip-on cabinets owing to the presence of the corner battens.

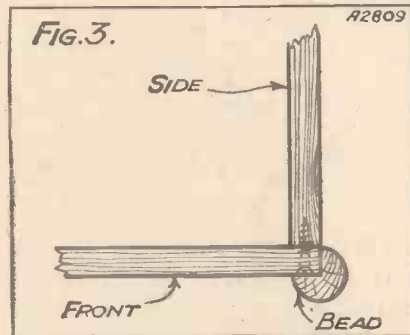
As will be seen from the drawing, the front and the side-pieces are fixed together by means of a $\frac{3}{4}$ in. by $\frac{3}{4}$ in. whitewood batten. The same method is, of course, used for attaching the back to the side-pieces. The triangular

gap left is filled by a quarter circular bead glued into place.

The Soundproof Lid

It is recommended that both the lid and the front-piece illustrated in Figs. 5 and 6 should be made of solid pieces of wood of the same kind as the veneer of the plywood of which the rest of the cabinet is made.

I would suggest making both of wood $\frac{3}{4}$ in. thick, since it is most im-



NOVEL CORNERING

A three-quarter circular bead gives a neat finish to the junction of the front and side pieces of the cabinet.

portant to have a soundproof lid in order to avoid interference with reception by pick-up chatter.

The fixed piece is attached to the front of the cabinet, as shown in the plan view in Fig. 6, by means of screws driven into the side and front pieces. It should have an overhang of $\frac{3}{4}$ in. both in front and at the sides, and it may conveniently measure $2\frac{3}{4}$ in. in width by $21\frac{3}{4}$ in. in length. The lid proper fits flush with the back, but overhangs at the sides.

For a cabinet to suit the chassis illustrated in Fig. 1 it will measure $14\frac{3}{4}$ in. in width by $21\frac{3}{4}$ in. in length. To the underside of the lid are screwed two battens of whitewood, each $1\frac{1}{2}$ in. in width by $\frac{1}{2}$ in. in thickness. These protrude $\frac{5}{8}$ in. from the front edge of the lid, but fit inside the back-piece of the cabinet. Their length is, therefore, 15 in. The rear end of each batten is rounded off as shown in Fig. 5.

Spring Clips

To place the lid in position, insert the protruding ends of the battens under the fixed piece at the front and press the lid down.

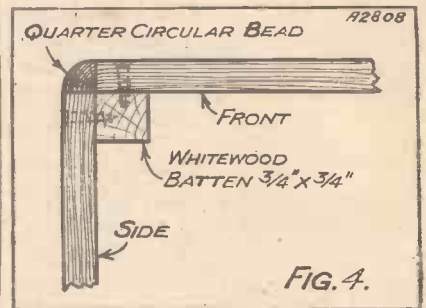
It is kept in place by means of two easily-made spring clips, details of which are shown in Fig. 7. The

clips are made from pieces of springy sheet brass $\frac{1}{2}$ in. in width by $1\frac{1}{2}$ in. in length. Holes are drilled as shown in Fig. 7A, and the clips are bent to the shape seen at B in the same figure. Each clip is secured to the back of the cabinet by means of a couple of round-headed screws.

A pin driven into the rear edge of the lid fits into the hole drilled for the purpose in this slip. Pins may conveniently be made by cutting the heads off small brass nails.

How It Works

A moment's consideration will show that to remove the lid it is only necessary to press back the brass clips with the thumbs and to lift it off with the fingers curled under the overhang at the sides. To replace the lid, just push the ends of the battens under the fixed piece in front and press down. The lid then snaps into place and is tightly held by the



AN ALTERNATIVE METHOD

You may think this corner finish more attractive—but, remember, it cannot be used for a slip-on cabinet.

engagement of the pins with the spring clips.

This system has a great many advantages. In the first place, if you wish to make any adjustment of the automatic stop or the turntable itself, the lid can be removed completely and is therefore quite out of your way.

Secondly, it is a good deal easier by this method to obtain a tight fit than is the case if hinges are used. Lastly, if the wood is carefully cut and fitted, joints that are for all practical purposes soundproof can be made without difficulty.

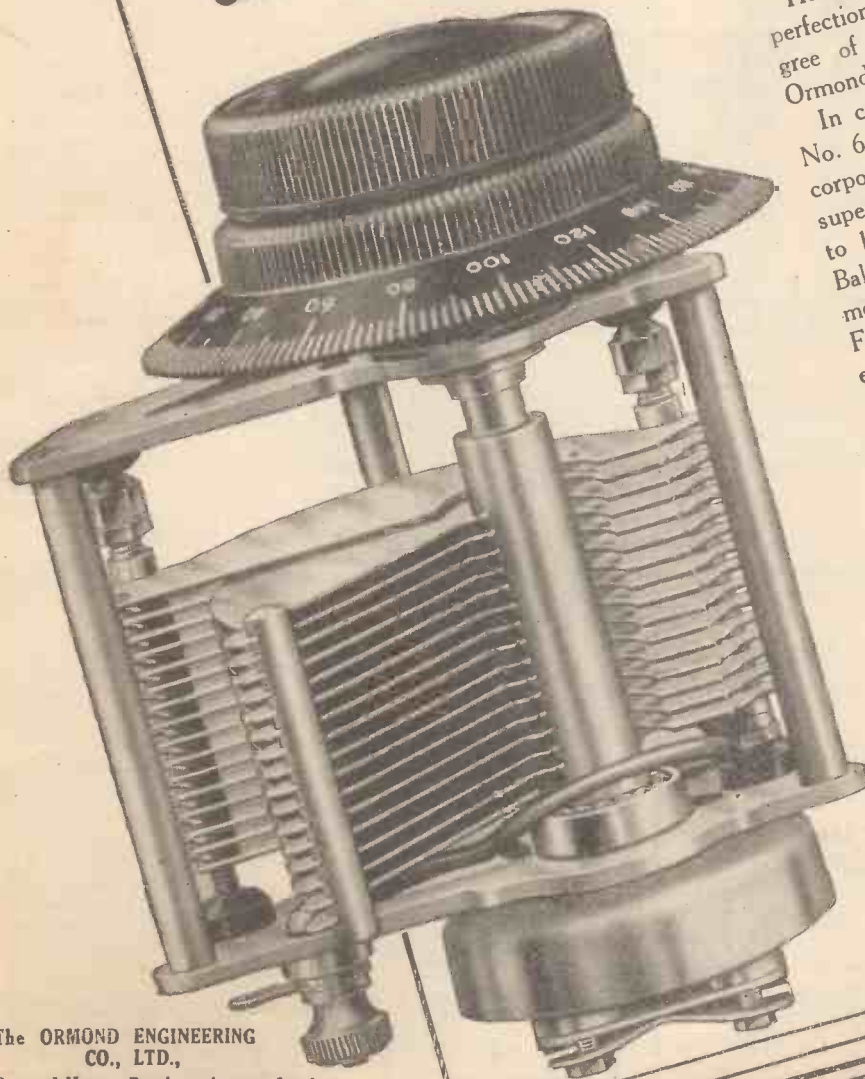
Cabinet and Set

When the radio-gram has been built up on the chassis and thoroughly tested out, the cabinet is slipped over it and fixed in place by means of three round-headed screws driven

Make sure of Success

USE THE *New* ORMOND N°6 FRICTION CONDENSER

as specified for the S.T. 300
Exhibition Radiogram



Here is a component which "fills the bill" to perfection when precision work of the highest degree of accuracy is required. Naturally so, Ormond makes it with that one end in view.

In construction it is similar to our range of No. 6 Condensers. A slow-motion device is incorporated at the rear end of condenser, giving a superb slow-motion movement with ratio of 55 to 1. Direct drive is obtained by means of Bakelite dial, engraved 0 to 180 degrees. Slow motion is controlled by the upper small knob. Fast enough for easy searching, it is yet slow enough for finest tuning.

This condenser is strongly recommended for general use, and particularly on short-wave sets, Super-Heterodynes, etc.

Easy to mount. One-hole fixing. Terminals and Soldering Tags for connections.

Complete with 2½-inch dial and slow-motion knob.

Cat. No.	Capacity	Price
R/491	.. .00025	.. 7/6
R/492	.. .00035	.. 7/6
R/493	.. .0005	.. 7/6



The ORMOND ENGINEERING CO., LTD.,
Ormond House, Rosebery Avenue, London, E.C.1.

Telephones: Clerkenwell 5334-5-6 and 9344-5-6.
Telegrams: "Ormondengi, Isling."

RIGID AND ACCURATE



SMOOTH your M.C. Speaker

PUT a 2,000 mfd. T.C.C. Electrolytic Condenser in parallel with the field winding of your moving-coil loud speaker, and, once and for all, banish that annoying mains ripple.

Look at the oscillograms reproduced above—the top curve records the voltage applied before the connection of a T.C.C. Electrolytic Condenser, and below it is shown the voltage after—the ripple is negligible.

Only with a ripple-free background can you enjoy to the full the advantages of a moving coil.

Get a T.C.C. 2,000 mfd. Electrolytic Condenser from your dealer to-day price 15/-

NOTE. This condenser is suitable for working up to 12 V.D.C. only. It is therefore only applicable to speakers energised by low voltages up to about 9V.

T.C.C.

ALL-BRITISH
CONDENSERS

The Telegraph Condenser Co., Ltd., Wales Farm Rd., N. Aston, W.3

♥ 1069

TERMINAL- Programme 1932-33

TYPE "B"
Non-removable, bakelite insulated head, non-rotating name. 36 indications.
6d.

TYPE "M"
As "B" but not insulated, and smaller.
4½d.

TYPE "R"
REDUCED TO
2½d.
Non-removable, insulated head, 36 indications. 4 B.A. stem.

TYPE "Q"
Rotating, removable head. Brown, red or black.
2d.

TYPE "H"
A giant model of Type "B" for 100 amperes and 10,000 volts.
NOW
1/6

SPADE TERMINAL
Spring prongs, firm grip. Lettered on head.
2d.

TERMINAL MOUNT
Mounts two terminals of any make anywhere—vertically or horizontally. Particularly suitable for Belling-Lee "B" type terminals.
8d.



Adot. of BELLING & LEE, Ltd., Cambridge Arterial Road, Enfield, Middlesex.

A Practical Man's Corner—continued

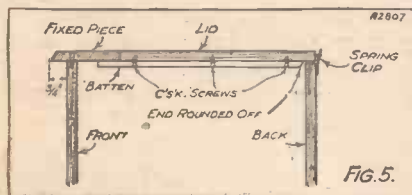
through into the end-pieces of the chassis. Stout 1-in. screws are suitable for the purpose.

Be careful when securing the cabinet to the chassis to see that they both stand on a perfectly level surface and that the cabinet is pressed well down. If it is ever necessary to remove the cabinet in order to make adjustments to the set, all that is required is to take out the six screws and to lift it off.

Some Possibilities

I do not care myself about having the loudspeaker built into the radiogram, because, rightly or wrongly, I never mount a moving-coil unit in a cabinet, but prefer to have it standing behind a plain baffle-board. If, though, it is desired to have the loudspeaker as part of the instrument, the design is easily adapted for these conditions.

The chassis will probably have to be made a little larger all round, and a third batten will be required to provide a suitable anchorage for the heavy chassis. The loudspeaker unit should be so mounted that the front of the cone is just flush with the forward edge of the motor-board. A circular aperture of the same size as the cone should be cut in the proper place in the front of the cabinet



THE OVERHANGING LID

The neat arrangement for the lid does away with the use of hinges and makes your cabinet quite soundproof.

shell, the edges of the hole being bevelled off.

A piece of silk or net may be glued over the aperture from the back so as to hide the cone of the loudspeaker.

Choice of Veneer

The veneer selected for the plywood must depend upon the taste of the builder of the cabinet. Seven-ply is obtainable in a large variety of ornamental veneers, such as oak (light or dark), mahogany, rosewood, walnut and maple.

Whichever you choose do not forget to rub down the surface of each part with the finest grade of glass-paper before putting the shell together. My

own choice for cabinets is usually oak, a wood to which it is easy to give a very pleasing finish.

Having rubbed it well down and polished with a dry, soft cloth, stain the veneer to a warm brown shade with a solution of permanganate of potash. When this has thoroughly dried in, the wood is treated with furniture polish—and plenty of elbow grease.

If a dull finish is preferred, apply linseed oil. Or, if you like a very shiny surface, make use of one of the "amateur" french polishes such as that supplied by Messrs. Hobbies.

A Tip About Plywood

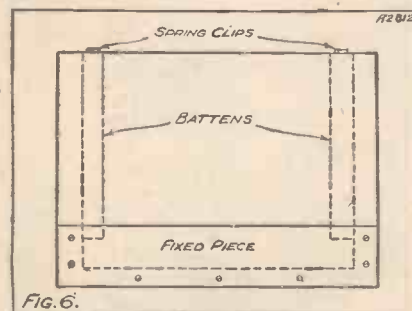
One of the few drawbacks that plywood has is that you are rather liable when drilling screw-holes near the end of a length to split off small pieces of the veneer thickness.

If a piece comes right away, or if you see that it has become loosened and will do so on the slightest provocation, finish drilling the hole and then deal with the matter at once.

Apply a little Seccotine to the under surface of the piece and press it firmly down into its place.

Don't be tempted to go on with the drilling of other holes, saying to yourself that you will attend to the split-off piece in due course.

Believe me, one of two things will inevitably happen. Either you will forget all about it or you will discover when the time comes that the little piece has lost itself so successfully that no efforts of yours can find it again.



HOW IT IS MADE

Study this diagram and you will have no difficulty in making the lid one of the most efficient parts of the whole job.

I have gone very thoroughly into all the construction details because so many readers have found the need for just such a cabinet.

By following the diagrams you will not, I think, come up against any

snags, and certainly you will find much to please you in a cabinet which provides ample room for all your requirements and yet takes up so little space.

CUTTING TINFOIL
TO SIZE

 An Easy and Practical Method

TINFOIL — "silver-paper" — is flimsy stuff to work with at the best, and often the constructor experiences difficulty on this account when cutting up small sheets and strips of the foil for use in fixed condensers.

Cutting by scissors certainly gives a clean edge to the foil, but it is not always easy to keep the edge straight by the scissors' method of cutting.

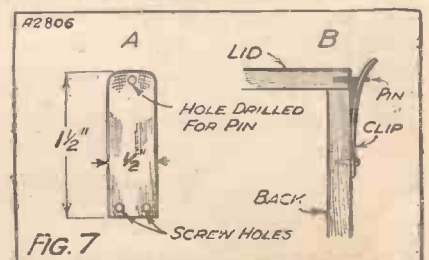
Here is a more efficient method. The tinfoil is sandwiched between two thick sheets of glass, a large lower one and a smaller upper one. Underneath the lower glass sheet is a mark indicating the size of the tinfoil strip required.

No Jagged Edge

The area of tinfoil sandwiched between the glass sheets is made to coincide exactly with this mark on the lower sheet of paper, and then, keeping the upper glass firmly in contact with the lower one by means of the thumb and fingers of one hand, the superfluous tinfoil is torn away with the thumb and finger of the other hand. A jagged edge will not result, provided that the upper sheet of glass is kept firmly pressed down.

The advantage of this method of tinfoil cutting is that the tinfoil sheets and strips need not be touched by hand. They are kept free from kinks and creases, and it is very easy to keep them all the same size.

THE FINAL STAGE



The spring clip and pin holding the lid will put the final touches to a serviceable and attractive cabinet.



Some details about an unusual radio fault, and some suggestions that may help you to better radio reception.

By P. R. BIRD.

A Surprise for the Window-Cleaner

MANY a time I've paid three-and-six to see a variety show, and came away without having half the laugh that my aerial has given me," says D. G. G.

It appears that he was sitting on the lawn at the back of his house one afternoon when, slightly to his annoyance, the window-cleaner and his boy—a very talkative boy—called to clean the windows.

D. G. G. lay back in his deck-chair and drowsily watched them finishing the outside, wishing all the time that they would go away and let him doze.

Suddenly this peaceful scene was swept by a hurricane—at least, that's what it seemed like!

The boss window-cleaner—a tall, thin chap he was—had leapt into mid-air from the middle of the short ladder, shrieked like a Mohawk Chief making whoopee, and landed with both feet on the edge of a bucket.

Such a Stir!

Overturning this, and the loquacious boy, who upset another bucket, caused such a stir that D. G. G.'s little girl gathered the impression that she was being murdered! And her agonised "Mummie!" brought that good lady out of the kitchen and over the rockery at one gymnastic bound.

And neither D. G. G. himself, nor the neighbour who looked over the wall, nor anybody else, could see anything at all to account for this cataclysmic breach of the peace! Until the tall window-cleaner spoke.

"It was that aerial," he said. "Gave me the shock of my life!"

And that explanation was the clue for the audience to laugh! D. G. G. himself admits that he "nearly died"; but the window-cleaner's boy, who a moment before had been tenderly fingering a bruised shin, went almost into hysterics as he remembered how the boss had shot upwards and outwards, like a wasp-stung contortionist, before kicking the bucket!

When at last peace, perfect peace stole over the garden again, it dawned on the owner that such shocking propensities on the part of the aerial might lead to real trouble one day, so he ought to take steps to prevent the wire from tingling when touched. It had always done that when the set was switched on, but being well insulated and out of the way this was

HOW NOT TO DO IT!



Coils should not be mounted like this when a metal-covered baseboard is used, as the presence of the conductive surface reduces the effective inductance of the winding. In such cases it is better to fix the coil in a horizontal position, well away from the baseboard.

regarded more as a little peculiarity than as a definite fault.

Such a state of affairs is not uncommon, so it may be as well to point out that a "tingling" aerial has dangerous possibilities, and the sooner its tingle is stopped the better. The trouble usually occurs when the set is run from a D.C. mains unit, and at houses where the positive main is earthed.

HOW IS YOUR SET BEHAVING NOW?

If you are troubled by a radio problem, remember that "The Wireless Constructor" Technical Queries Department is fully equipped to help you.

Full details of the service, including scale of charges, can be obtained on application to the Technical Queries Department, "The Wireless Constructor," The Fleetway House, Farringdon Street, London, E.C.4.

SEND A POSTCARD, on receipt of which the necessary application form will be sent by return.

LONDON READERS, PLEASE NOTE. Application should not be made by telephone, or in person at The Fleetway House, or Tallis House.

In such instances all the set's high-tension wiring—H.T. plus leads, etc.—is at earth potential, but all the set's negative wiring, including L.T., earth, grid bias, etc., is a hundred volts or more below normal potential. In such a condition it is quite as capable of giving a shock as any other part of an electrical installation.

The tendency can be cured quite inexpensively by inserting condensers where necessary, but as sets differ in their requirements the alterations should be made by an electrician, or by someone who knows exactly what he is doing, to prevent the possibility of trouble arising.

Against Regulations

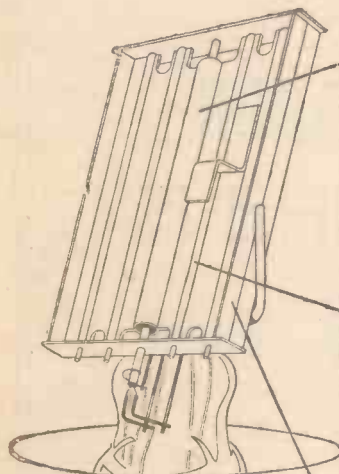
In cases of doubt the Technical Queries Department can be applied to (see announcement on this page), and emphasis is laid on the fact that the necessary alterations are not a bit complicated or expensive. But failure to tackle an aerial with this constant tendency to tingle may have serious results, is against the electric light company's regulations, and contravenes the fire policy conditions.

Moreover, with damp weather in front of us, all "tingling" aerials become wasters of electricity; the damp insulators being capable of passing a lot of current to earth.

DEVELOPMENTS OF GREAT IMPORTANCE TO EVERY SET-CONSTRUCTOR

Standard Micromesh VALVES

Trade Mark



Extremely close spacing of the electrodes, assuring high slope.

Large surface radiation fins eliminate distortion through grid emission and furnish extra cooling for anode.

Assembly, constructed as separate unit, gives unusual accuracy and rigidity.

The outstanding feature of the Micromesh valve is the extremely close spacing of the electrodes. Owing to the new methods of construction that are employed, this spacing is reduced to dimensions never previously attained, yet with absolute reliability and accuracy. Distortion through grid emission is avoided by mounting the grid and the tubular anode on cooling fins.

	List Price.
Type H.L.A.1. Detector	13/6
Type P.A.1. Power Output	17/6
Type R.1. { Indirectly-heated }	12/6
Type R.2. { full-wave Rectifiers }	15/-

Write for leaflet which tells you all about "Micromesh," the Modern Valve.

All STANDARD Radio Products are British in design and manufacture.

Standard SPEAKERS



Standard Speakers are of robust construction and very efficient in performance, giving remarkably clear reproduction of both speech and music.

PERMANENT MAGNET SPEAKER CHASSIS.
Type S.S.P. (as illustrated). List Price
(including transformer) ... 41/6d.

Energised Types also available from 30/9.

Write for leaflet "Standard Loudspeaker Chassis."

All STANDARD Radio Products are British in design and manufacture.

Standard Telephones and Cables Limited

(Radio Merchandise Dept.), St. Chad's Place, 364, Gray's

Inn Road, London, W.C.1. Telephone: Terminus 6255.



Banish H.T. troubles with the Milnes Unit

The Perfect H.T. Supply

Why spend time and worry on other methods of high-tension supply when the Milnes Unit will give twenty years of unflinching H.T. current? The Milnes H.T. Unit supplies 40 milliamps at a constant voltage and is automatically recharged by the low-tension accumulator, with only a very slight increase in current consumption. None of the usual troubles is experienced—there is no sulphation or mains hum—and presents a dead silent background, and it cannot be damaged by over-charging or under-charging. Write for full details.

SMOOTH H.T. CURRENT AND CONSTANT VOLTAGE FROM YOUR L.T. ACCUMULATOR

Read these tests by the *Technical Press*

"The unit tested had a voltage of 120, and when tried out on a four-valve set taking about 18 milliampères, gave a perfectly even and noiseless discharge. It is impossible for the cells to be ruined by sulphation."

AMATEUR WIRELESS.

"The unit has been giving excellent service and there are no signs of depreciation. It comprises a bank of nickel-iron type secondary cells which can be charged from an L.T. accumulator when this is not working the set."

MODERN WIRELESS.

Write for Full Particulars To-day.

MILNES H.T. SUPPLY UNIT

PRICES IN U.K.

£ s. d.

90-volt 2. 18. 0

120-volt 3. 16. 0

150-volt 4. 14. 0

MILNES RADIO CO.

TANFIELD WORKS,

BINGLEY, YORKS.

Telephone: Bingley 500.



ROBERT HICHENS'

New long complete novel appears in the OCTOBER STORY-TELLER. It is at once a brilliant story and a penetrating study of a woman's mind. You will be enthralled by "The Gardenia," which is supported by the work of many other brilliant authors, including:—

B. L. JACOT

JOHN HUNTER

ELIZABETH MARC

BRUNO LESSING

DAGVAR

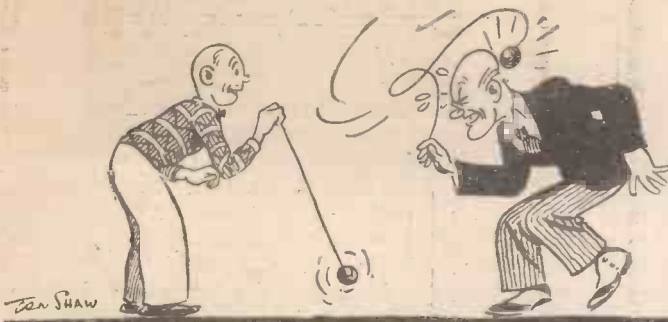
ETC.

No where will you find a more varied and entertaining selection of contemporary fiction. Place a regular order for

The
STORY-TELLER

1/-

OCTOBER Issue - - - Now on Sale



IN LIGHTER VEIN
By Wireless Wayfarer

ONE of the Professor's greatest inspirations, I think, was that of the electrified door handle for the portal of his study at the "Microfarads."

Mrs. Goop, you see, can never realise that men of science must not be disturbed when they are at work. Notices such as "ENGAGED," or "GO AWAY. THIS MEANS YOU," had no effect whatever. Despite them she would burst in at times when we most wanted complete quiet.

I have known her, when we were concentrating so hard that our eyes

THE YO-YO GAME



"... crack went the string, and crash went the wooden bun through the window."

were closed as we lay back in our chairs, actually take us by the shoulders and shake us.

The Professor smiled grimly as he put the finishing touches to his invention.

"That, I think, should settle her," he remarked. "And now, my dear fellow, let us resume our investigations."

Important Experiments

We were engaged at the time on some particularly absorbing work in practical mechanics. Our task was to discover just how many times an oblate wooden spheroid could be made to ascend a string by a sine-wave oscillatory movement of the hand.

The Professor contended, and wished to prove by experiment, that if y was the length of the string and o the amplitude of the oscillatory movement the answer might be expressed by the ordered couple (yo, yo).

Our practical work went forward with great intensity.

"Hooray," cried the Professor suddenly. "I've got a new one."

He let the little wooden bun thing slide down its string, made a small upward movement with his hand, and then proceeded to swing.

"Just watch this!" he cried.

I watched. After a complicated

Our popular pair of adventurers, Professor Goop and Wayfarer, try their hand at Yo-Yo, London's latest craze, and as a result invent a new type of tuning coil. As usual they have many amusing experiences in the course of their experiments.

series of whirling movements the wooden bun hit him a whack on the head that knocked him speechless for several minutes.

"Magnificent," I remarked, when he had recovered a little, "but I think your wrist action was just a little too violent when you made that last downward movement. Now let me show you."

Disastrous Results

I got the thing going magnificently, weaving giddy patterns round my head. Then suddenly crack went the string, and crash went the wooden bun through the window.

"The best place for it," sighed the Professor. "Here goes mine, too!"

Bang went another pane, and we settled down for a few moments of rest.

I had barely closed my eyes when the Professor let loose a cry of triumph.

"The greatest idea of the century," he roared. "My new coil will make long-distance listening the most fascinating pastime in existence."

"New coil?"

"Yes, the Goop Variable—"

"The Goop-Wayfarer," I protested once more, reaching for the poker.

The Great Idea

"Well, have it your own way. The Goop-Wayfarer Variable Tuning Bun."

"Tell me all about the big idea

that we have evolved together," I begged.

The Professor sighed.

"You know, of course," he inquired, "how distant stations are tuned in?"

"Naturally. You twiddle knobs until you hear something. If it's music you declare it's Rome and then pass on hastily to something else before there's time for the announcer to begin talking English,

Splendid Fun!

"Generally you can't get anything because you have forgotten to connect up the aerial, so you explain that atmospheric are so bad that it is positively dangerous to listen. But if the set is working the best tip I know is to keep on coming back to Brookmans Park, telling your admiring friends that London is being relayed by Barcelona and Constantinople and Athens and New York and Yokohama, and asking them whether they can tell the difference between the original transmission and the relays.

"Most of them will swear that they can detect a very distinct difference in the reproduction of the higher frequencies, or some bilge of that kind. It's splendid fun."

"I mean," said the Professor, "do you know precisely what happens when you turn the knobs of your set?"

"Mine generally come off in my hand. I never can remember to

NOT RECORDING!



"... a most refreshing little nap."

tighten up those binding screw things."

The Professor commenced an interminable explanation, but I am afraid that I cannot record it, for I was engaged at the time in taking a most refreshing little nap. As I recovered

In Lighter Vein—continued

consciousness I heard him saying:

"... in that way we tune the circuit to resonance by means of the variable condenser."

"Perfectly," I commented.

"Now you know," said the Professor, "that parallel capacity has a damping effect."

"I do, indeed!" I replied. "You should just have seen what happened when that electrolyte condenser of mine sprung a leak."

"For heaven's sake switch off. Now if only we could have a variable inductance without any parallel capacity more efficiency would result, and that is the whole idea of my tuning bun."

I will not weary the reader with Professor Goop's own explanation of the way in which this epoch-making invention works.

Put into human language here is the *modus operandi* (French for book of the words).

Really Novel

The coil former, which can be bought at any toyshop, consists of one of the previously mentioned wooden buns. In place of string this is wound with three hundred or four hundred turns of fine flex wire. Double flex must be used in order to make the external connections of the coil.

Owing to the length of the wire, it

PRONOUNCED HUM!



"... slightly on the fruity side."

is necessary to stand either at the top of a staircase, well, or at a fourth or fifth floor window in order to cover the whole of the broadcast waveband. Where hand-pass tuning is employed two coils are used, one manipulated by each hand.

To tune in, say, Turin, the operator leans from his window or over the banister and allows the bobbin to slide down the flex. As it does so station after station is heard as the wavelength of the tuned circuit or circuits runs down the scale.

As soon as Turin has been found, gentle movements of the hands keep

the bobbins spinning at precisely the right level, and the programme continues to come in until the operator grows sick of it or gets cramp.

Calibration is delightfully easy, since the flex wire is marked off directly into wavelengths just like the log-line used in a ship. In fact, tuning-in stations strongly resembles heaving the lead; though, considering the actual process, perhaps swinging it would be a rather more exact term.

Winding the Coils

The Professor and I at once set ourselves the task of winding a number of suitable experimental coils. One snag that may occur immediately to the would-be constructor is that it is difficult to find flex fine enough.

Fortunately, though, this difficulty is very easily surmounted. All that you have to do is to use No. 40 double-cotton-covered wire, though, of course, this requires a little preliminary treatment.

You see, the cotton covering, if the wire were used just as it comes from the makers, would very soon fray; the insulation must suffer and short-circuits would be almost bound to occur.

Easily Done!

All that you have to do is to give the wire a rubber coating, and this is, so to speak, simplicity itself. The Professor has a gas ring in his den, and there is always a saucepan handy. It occurred to us that the obvious method was to melt down some rubber and steep the wire in it.

Both the Professor's and Mrs. Goop's goloshes were fortunately in the room, and we quickly had them warming up in the saucepan. The smell of boiling rubber is generally an acquired taste, but in the sacred cause of science one learns to put up with much.

Mrs. Goop's Goloshes

When the last of Mrs. Goop's second golosh had slid gently down into the now liquid contents of the saucepan, the atmosphere in the Professor's den, which at the best of times is never exactly what one might call seasideish, was slightly on the fruity side.

He lifted the pan from the ring, bidding me drop the wire into it. His

foot must have caught in something, for next moment he had poured the melted rubber all over my boots, and I found myself firmly glued to the hearthrug.

Meantime the fumes had become almost more than even ardent scientists like the noble Professor and myself could bear.

"Quick," I yelled, "open the door, or I am certain we will both be asphyxiated!"

The Fatal Leap

The Professor made a flying leap for the door, placed his hand on the knob, and—

THOROUGHLY ELECTRIFIED!



"Yes, but I'm stuck, too."

A horrible kind of twitching seized his whole frame, whilst an agonised expression came over his usually peaceful countenance.

"Open the door, you ass!"

"I can't! I'd forgotten about the electrified handle."

"Well, go away from the door and open the window."

"I c-c-c-c-can't open my hands. For heaven's sake switch off the current."

"You know perfectly well," I said, "that the switch is on the other side of the door."

"Then ring the bell."

"But I'm stuck, too."

Marked Out in a Moment

By this time I could hardly see the Professor owing to the rolling clouds of smoke.

With great presence of mind I pulled out my pocket knife and ran its point over the hearthrug, using the soles of my boots as a template.

It was the work of a moment to dash across the room on my carpet soles and cut the wire to the door knob.

And then Mrs. Goop came in to ask what was causing the appalling smell that filled the whole house.

I went out by the window.

INTRODUCING

**THE NEW
"GOLTONE"**

**SCREENED
DUAL-RANGE
COILS**

**EXCLUSIVELY EMPLOYED
IN THE
"DOUBLE-TUNE 3"**
as described in this issue.

Matched to a high degree of accuracy and fixed inductance standards.

For mounting on metal chassis or wood baseboard.

Terminal connections to inside of screen or underside of base.

Medium wave range 190-572 Metres.

Long wave range 890-2000 Metres.

TYPES available:

- "GGR" Tuned Grid with Reaction
- "GGC" Aerial Coil *without* Reaction
- "GGO" Tuned Grid with Reaction and 2 Aerial Tappings
- "GBA" Band-Pass Aerial Coil
- "GBS" Band-Pass Secondary Coil or Tuned Grid

All Types Price 5/9 each.

Pamphlet with full particulars on request.



ILLUSTRATION
TYPE R10/C.C.O.
with cover removed.

GOLTONE COMPONENTS
FOR THE
"WIRELESS CONSTRUCTOR"
"S.T. 300" RADIO-GRAM

GOLTONE S.T. 300 COILS	Price 10/- per pair
GOLTONE SUPER H.F. CHOKE	R 3/46 Price 4/6
GOLTONE R 3/36 BINOCULAR H.F. CHOKE	Price 2/6
GOLTONE L.F. TRANSFORMER GRAND (3 to 1)	R 17/98 Price 8/6
WANDER PLUGS (ENGRAVED)	R 31/97 Price 1½d. each
GOLTONE "LACOLINE" CONNECTING WIRE (Coloured) per 10ft. assorted colours	R 42/240 Price 4d. per packet

For details of Panels, Terminal Strips, etc., see Catalogue FREE on request.





The
“DOUBLE-TUNE 3”

TUNED BY *Utility*

Again “Wireless Constructor” experts have chosen Utility components, this time for the “Double-Tune 3.”

This fine set is tuned with a Utility 2-Gang solid dielectric condenser, and it is this special condenser which ensures the results obtained by the designers. When buying your components insist therefore on obtaining the Utility condenser indicated.

***0005 2-Gang solid dielectric Complete with dial and trimmer. 12/-**

If your dealer cannot supply, write to us and we will supply post free.

Our new catalogue shows the finest range of condensers available for the home constructor.

Write for a free copy.

WILKINS & WRIGHT, LIMITED,
 Utility Works, Holyhead Road, Birmingham.

AGENTS—London: E. R. Morton, Ltd., 22, Bartlett's Buildings, Holborn Circus, E.C.4; Scottish: E. B. Hammond, 113, Vincent Street, Glasgow; Lancashire and Cheshire: J. R. Lister, 93, Old Road, Blackley, Manchester; Westmorland, Cumberland, Durham, Northumberland, Yorkshire and Derbyshire: H. C. Rawson, Ltd., 100, London Road, Sheffield; South Western: Lawrence Fraser, Chelsea House, Lansdown Road, Bath.



Belmont



has gone

TWO better!

Formo experts have surpassed themselves—and everyone else. They have brought you something really new in the Multicoupler. High amplification—super performance—real efficiency—and greater simplicity in set design, these things now have a real meaning, thanks to the exclusive double screen of the Multicoupler. The electrostatic screen cuts out all H.F. interference, whilst an electromagnetic screen positively eliminates mains distortion and hum, no matter where the Multicoupler is placed in the set.



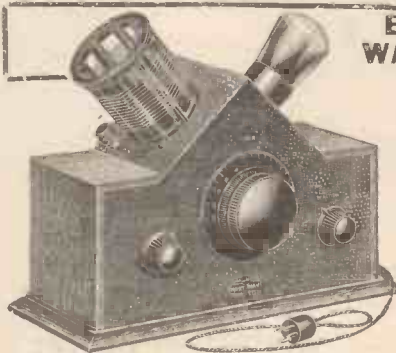
ONLY FORMO CAN OFFER THIS DUAL ADVANTAGE

Get the new Formo Catalogue-Handbook of better quality, better value components. If unobtainable locally, send us the name and address of your usual dealer.

The FORMO Co.
 Crown Works, Regents Park, Southampton.
 London: 23, Golden Sq., Piccadilly, W.1

The MULTICOUPLER is combined with two feed resistances and a coupling condenser. It gives high-quality amplification and its eight terminals can be used to give ratios of 2.5-1, 3.5-1 or 4.5-1.

10/6



ENJOY SHORT-WAVE RECEPTION

The latest Magnum Short-Wave Adaptor is suitable for both A.C. Mains and Battery Sets.

Model T. For sets using British Valves.

Model T.A. For sets using American Valves.

Price, of either model, including coil 40/80 metres. **39/6**

Cord and Plug **3/6**

Extra Coil if required, 18/40 metres **3/-**

Send at once for full particulars with a list of short-wave stations and free trial offer.

All “Wireless Constructor” sets are available ready wired and tested, particulars free on request

BURNE-JONES & Co., Ltd.

“Magnum” House, 296, Borough High St., London, S.E.1.

Telephone: HOP 6257 and 6258.

Scottish Agent: Mr. ROSS WALLACE, 54, Gordon St., Glasgow, C.1.

Special slotted Screen specified for the “S.T.300” **1/9**

WIRELESS CONSTRUCTOR

Advertisement Rates

Single Insertion - - - **£60 0 0**
 per page and pro rata to eighth page.

6 CONSECUTIVE Insertions 55 0 0
 per page and pro rata to eighth page.

12 CONSECUTIVE Insertions 50 0 0
 per page and pro rata to eighth page.

ONE INCH single col. (2 1/4" wide) 2 5 0

Minimum Space, half-an-inch 1 2 6

IMPORTANT. Copy and Blocks must be in hand by 25th of each month for issue placed on sale 15th day of the following month.

ALL communications respecting advertising must be made to:

JOHN H. LILE, Ltd., 4, Ludgate Circus, London, E.C.4

Phone: CITY 7261.



THE LISSEN "SKYSCRAPER" THREE KIT SET

It has long been established that a three-valve receiver comprising one H.F., a detector and one L.F. stage is the best combination of three valves for all-round work. The S.G. stage is there to give the required range and selectivity, and the L.F. stage to provide sufficient energy to operate a loudspeaker.

A Popular Circuit

The fact that Messrs. Lissen have used this combination in their new "Skyscraper" kit set is further evidence of the popularity of this particular arrangement of valves. The Lissen kit is a cleverly designed S.G., detector and pentode, using an all-metal chassis construction; that is to say, metal is used both for the panel and baseboard.

The circuit comprises two Lissen dual-range screened coils, one in the aerial circuit, and the other connected in the grid circuit of the detector valve, with shunt-feed coupling from the S.G. valve.

There are alternative aerial sockets on the chassis, giving a choice of two values of series condensers, thus enabling different degrees of selectivity to be obtained.

Straightforward Switching

A pleasing feature is that the wave changing is carried out with only one simple push-pull switch, on the lines of the "S.T.300" circuit; and this, of course, means that there is one knob less on the panel.

The H.F. valve is metallised and the lead to its anode is screened by an armoured casing. The detector is a conventional grid-leak rectifier, and there are two terminals on the chassis for the purpose of connecting a gramophone pick-up in the grid circuit of the detector valve to suit the needs of those who wish to use the receiver as a radio-gram. The detector is coupled

A new all-metal chassis three-valver employing a popular "time-tested" circuit arrangement. Simple construction, excellent range, and adequate selectivity are outstanding features of the design.

to the P.T.225 output valve by that very efficient little component, the Hypernik transformer.

That the makers have taken particular care with this part of the circuit is evinced by the fact that there is a .25-meg. resistance in series between the L.F. transformer secondary and the grid of the pentode, a feature which ensures perfect stability and freedom from H.F. currents in the output circuit.

ALL READY FOR USE



The "Consolette" model incorporates a loudspeaker having a winding specially matched up to the "Skyscraper's" pentode output valve. The set can be used either with a dry H.T. battery or an H.T. mains unit.

Another good point is the use of an on-off switch which simultaneously disconnects the H.T., G.B. and L.T. So much for the circuit itself.

With regard to the actual construction, this is a job that can be undertaken by the absolute beginner, and no special constructional ability or

knowledge of radio is required. The step-by-step instructions are extraordinarily clear, and well worked out, and the possibility of any mistake occurring in the wiring-up is extremely remote.

On the front of the cabinet there are but five controls. These are the two tuning knobs operating the aerial and tuned-grid circuits, the reaction control, and the wave-change and L.T. on-off switches.

Smooth Controls

We like the smooth movement of the slow-motion drives, and with them it is possible to tune in a distant station both with ease and precision. In our aerial tests at Tallis House we had no difficulty in separating the two London transmissions, using the aerial connection giving the lowest degree of selectivity.

The Midland Regional and Northern Regional transmissions came in at excellent strength in daylight, while on the long waves Radio-Paris was perfectly free from any interference from 5 X X, and was receivable at a volume adequate for all ordinary purposes.

Not Expensive

At night the set should bring in numerous British and Continental transmissions on the medium and long waves, and the "Skyscraper" is without doubt a design embodying a sensitive circuit arrangement, together with adequate selectivity for all practical purposes. It is perfectly stable both on the H.F. and L.F. sides, and the reaction control is smooth and progressive.

The price of the kit is 89s. 6d., the complete table model is 5 guineas, and the Consolette model £6 5s. Incidentally, the cabinet is specially designed for home assembly, being made up in sections.

WITH PICK-UP AND SPEAKER



by
A.
JOHNSON-
RANDALL

Long pick-up leads—High-pitched reproduction.

A FRIEND of mine has been trying to fit a pick-up to his four-valver with but little success. I have lent him several pick-ups, and given him loads of advice, but he still complains of distortion, and so I suppose I shall have to look at the set myself.

Going Over to Records

Now I can never understand why some perfectly good radio sets should commence to give trouble directly their owners attempt to convert them to radio-grams, provided the L.F. side is completely stable in the first place.

I find that the snag arises when there are two L.F. stages and the pick-up is switched into the circuit of the detector valve, which, of course, then becomes an additional L.F. amplifier. In these cases the pick-up is used without a volume control across it, and consequently overloads the first stage, the distortion being magnified by each succeeding stage, thus resulting in a horribly mangled reproduction.

Two Valves Sufficient

There is no need for this sort of thing, because the modern pick-up is generally sensitive enough to give good volume with only two L.F. valves. The use of the detector as an additional amplifier when the L.F. side incorporates a couple of stages does give a margin of safety from the volume standpoint, but it is essential to use a pick-up in conjunction with a volume-control potentiometer, and also to see that the first L.F. valve has grid bias applied to it.

My experience is that quite a lot of the instability which occurs when the pick-up is switched in is due to the length and disposition of the pick-up

leads. You have a long length of flex from the two terminals, either at the back of the set or the panel front, and this is taken to a playing desk comprising a turntable and motor elsewhere in the room. I am not speaking of complete radio-grams here, but of radio sets which have been converted and utilise a separate turntable.

The flexible lead is frequently allowed to trail across the cabinet, and consequently there is feed-back between one of the L.F. stages and the input from the pick-up.

Of course, the set either howls or distorts, giving the usual symptoms of L.F. instability. The remedy is very simple and merely entails keeping the

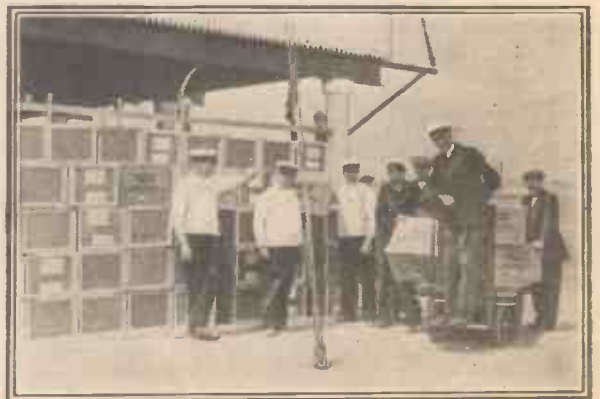
any attempt being made to bias the valve. The radio-gram switch should be arranged so that in changing over from radio to gramophone about 1½ volts negative bias is applied to the first valve on the gramo. side. This, in conjunction with a suitable volume control, will eliminate any distortion at this point, and there is no reason why the amplifier should give any further trouble.

Pentode Output

Pentodes seem to cause a certain amount of trouble at times, the main complaint being high-pitched or "hissy" reproduction. Actually, this is due to the fact that a pentode

EKCO SETS FOR THE NORTH

This batch of Ekco receivers—over 200 of them—was the first consignment of goods ever to leave Southend Pier. They are bound for Newcastle-on-Tyne.



pick-up leads right away from the L.F. side, or alternatively screening them by using metal-covered flex.

It is always advisable to earth the pick-up arm itself if this is metal.

Now how about the distortion which is caused by overloading of the first valve. It is not uncommon to find that the pick-up is simply joined between grid and negative filaments without

amplifies the high notes far more than the low ones, unless the output stage is carefully matched up and equipped with a "tone adjuster."

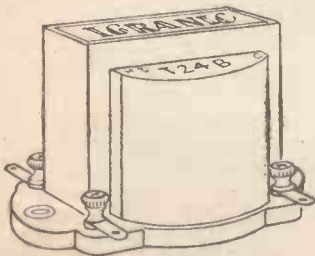
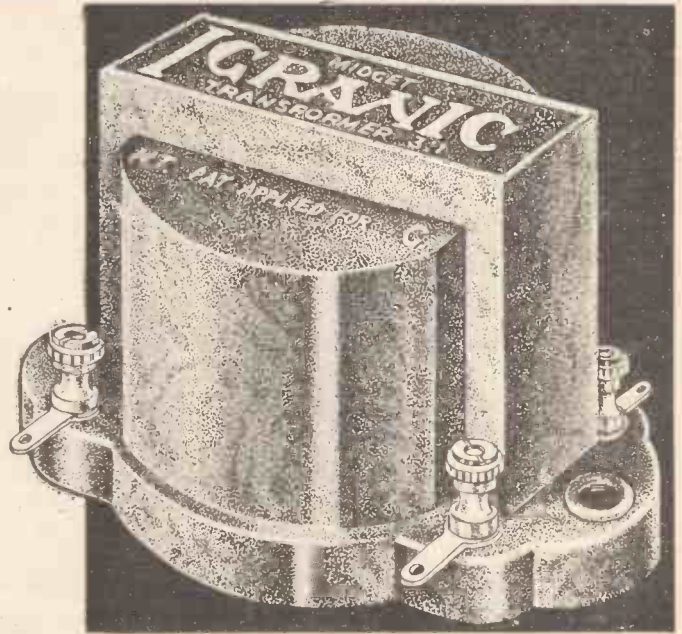
The "hissy" effect is simply over-accentuated scratch and can be easily cut out by joining the usual resistance-condenser tone corrector across the output choke, which incidentally should be centre-tapped.

RADIO
IGRANIC
 DEVICES

TRANSFORMERS

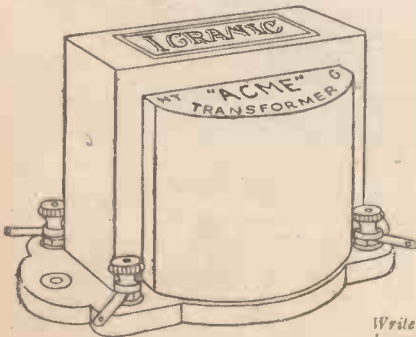
You cannot expect IGRANIC results unless you build on IGRANIC components, and if there is one component more than any other in which you must have unquestioning faith, it is the Transformer. In the designing, construction and finishing of IGRANIC Transformers nothing is left to chance—they are built to the highest standards, and only works' efficiency of the highest order enables them to be priced so economically.

IGRANIC "MIDGET" Transformer
 A masterpiece in miniature—it weighs only 6½ ounces, and its size is 2 7⁄8" x 1 7⁄8" x 1 3⁄4". Primary inductance over 60 Henries. Beautifully finished in brown bakelite. Ratios—3:1 and 5:1. PRICE **10'6**



IGRANIC T. 24 B TRANSFORMER

A good general-purposes transformer at a popular price. Neatly cased in brown bakelite, with terminals and soldering tags. Weight 10 oz. Size 2 7⁄8" x 2 1⁄8" x 2". Ratios: 3 : 1 and 5 : 1. Price **5'6**



IGRANIC 'ACME' TRANSFORMER

The Transformer 'par excellence'—employs the Igranice patented bi-metal core which permits of high current-carrying capacity without loss of inductance. Ratios: 3 : 1 and 6 : 1. Price **17'6**

Write for Catalogue J.1193 to Igranice Electric Co., Ltd., 149, Queen Victoria Street, E.C.4

IGRANIC

COMPONENTS WILL

BE THE MAKING

OF YOUR SET.

CONDENSERS WITH A PERSONALITY



Polar condensers do not "follow the crowd." In design and construction they are distinctive. They embody those original points which make them different and much more desirable to the man who realises the importance of the variable condenser in his "scheme of things."

The "No. 2"

Owing to its precise workmanship and amazingly low price, it has proved itself the outstanding condenser of its type. Its popular features include fast and slow motion, ball-bearing spindle, positive pigtail connection, one-hole fixing. It follows mid-line law, and is made in hard aluminium with brass pillars for rigidity.

•0005
•00035
•0003

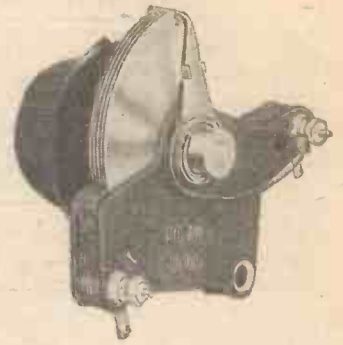
6/6

POLAR CONDENSERS

CATALOGUE OF FULL RANGE—FREE.

WINGROVE & ROGERS, LTD., 188-9, STRAND, LONDON, W.C.2. POLAR WORKS: LIVERPOOL.

Representative for France: W. A. Swift, 6, Rue Dequerry, Paris XI.

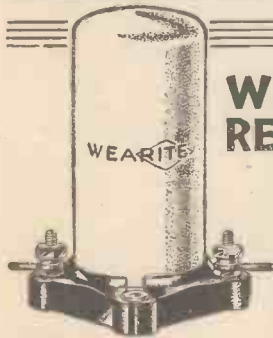


The "COMPAX"

A low-priced variable condenser suitable for tuning or reaction, where air dielectric is not essential.

Made with the very best materials and of the highest efficiency of its type. Solid dielectric. One-hole fixing. Supplied with knob.

•00075, 3/-; •0005, 2/9; •0003, •00015, •0001, •00005, 2/6.



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

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

WHATEVER THE RECEIVER

Whatever the type of set you are proposing to build, consult the Wearite range first. Wherever unquestioned reliability is demanded Wearite are always used. Here are two "star" receivers—get the most from them by using Wearite parts.

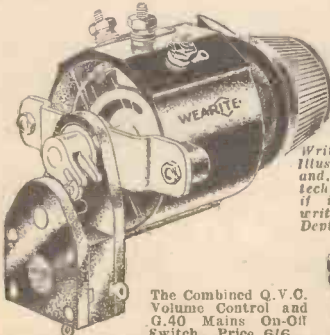
FOR YOUR "DOUBLE-TUNE 3"

- 1 Wearite Panel, 14" X 7". Price 6/.
- 1 H.F. Choke (H.F.P.), see illustration. Price 3/6.
- 1 Combined Volume Control and Switch (50,000 ohms). See illustration (Q.V.C. and G.40). Price 6/6.
- 1 Plug-in Resistance (D.R. and base). Price 1/3.
- 1 Rotary Switch, 3-way, I.33, without terminals. Price 3/9.

HERE ARE THE WEARITE PARTS FOR THE "S.T.300 EXHIBITION RADIOGRAM."

- Mahogany-finished panel, 18" X 8". Price 9/.
- 2 4-pin Valve-holders, Price 1/3 each.
- 1 Switch (I.25) (exclusively specified) 4/.
- 1 50000-ohms Volume Control (Q.V.C.) (specified) Price 4/6.
- 1 "S.T.300" Radiogram Screen, 10" X 6". 2/.
- 1 Reaction type H.F. Choke (H.F.P.). 3/6.
- 2 "S.T.300" Coils. Price 10/6 per pair.

Write for special Illustrated Booklet—and, if you have a technical problem, if it's components, write our "Technical Dept."



These Volume Controls are available in all values from 600 to 100,000 ohms.

WRIGHT & WEARE LTD. TOTTENHAM, N.17

WEARITE COMPONENTS

740, HIGH ROAD, TOTTENHAM, N.17. Tel.: Tottenham 3847/8/9 and 3015.



Build your eliminator with a metal rectifier

and ensure years of service without the annoyance of breakdown or falling off in output. Prices from 12/6. Full particulars, circuits and prices are given in the new and enlarged 1933 edition of "THE ALL-METAL WAY." Post the coupon now, with 3d. in stamps, and get a copy.



METAL RECTIFIERS

THE WESTINGHOUSE BRAKE AND SAXBY SIGNAL CO., LTD. 82 York Road, King's Cross, London, N.1

WESTINGHOUSE PUBLICITY, 82 YORK ROAD, KING'S CROSS, LONDON, N.1. Please send me a copy of your 44-page booklet, "THE ALL-METAL WAY, 1933," for which I enclose 3d. in stamps.

NAME.....
ADDRESS.....

W.C.10/32.



NEAT CORNERS FOR CABINETS

Radio cabinets can be made very attractive by the amateur woodworker, but in many cases their appearance is spoiled by unsightly jointing at the corners.

And neat joints are not really difficult if they are tackled in the right way, as explained in this easy-to-follow article.

By REGINALD TEECE

WHILE it is possible to construct cabinets without employing various recognised methods, in the long run it is far more satisfactory and really easier to make use of the correct methods. Often in trying to avoid the making of proper joints we are forced to go to extra trouble to ensure the desired result. Most things that are considered difficult are really easy if we go about the job in a systematic manner, and this applies to the making of joints.

Watch Your Wood

It is impossible to turn out good work unless the materials we are going to use are free from defect, and true. When you decide to make a new cabinet pay attention to the materials you intend buying.

At first sight the wood might appear to be in prime condition, but when you finally come to work on the stuff you may find that the texture, straightness and seasoning qualities leave much to be desired. In Figs. 1, 2, and 3, three of the most usual defects are shown. The presence of such defects, even to a slight degree, in the material used will affect the finished job to a considerable extent and render good joints impossible.

It is an easy matter to detect such irregularities by sighting along the edge of the timber. Certain firms make a speciality of catering for the small-woodworker's needs, and will send guaranteed parcels of wood. This is worth consideration, as the material is prepared ready for use.

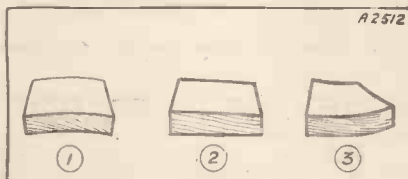
A Cause of Failure

To return to the practical side of wood preparation, we must not overlook the important part—that of the square and the correct manner of its use. Inattention to the correct use of a square is often the cause of failure and results in bad joints,

twisted framework, and even cabinets that only stand on three legs, or corners.

Suppose we wish to make an open mortice and tenon joint from the material shown in Fig. 4. Before any setting out can be done we must first prepare the *face-side* of the wood, so making the wood straight and

SPOTTING DEFECTS



Good timber should show no signs of warping, and irregularities like these must be avoided at all costs.

true. The face-side of the wood is that part which will be displayed to the view after the cabinet has been constructed.

The next step is the squaring of the *face-edge*. This is shown at (4), and both these edges are marked in the way shown so as the worker will know which is which at a glance.

These faces are always brought dead square with each other, and play an important part in the construction of all woodwork.

Temporary Fences

In Fig. 8 is shown the correct manner of holding the jack-plane while squaring the edge. Note the disposition of the fingers which keeps the plane at the correct angle and prevents it swaying while in use. Sometimes it is a good plan to make a temporary fence for use on this kind of work, as shown in Fig. 7. The fence is screwed to the plane as shown at "G." The wood is represented at "W," and the plane "P."

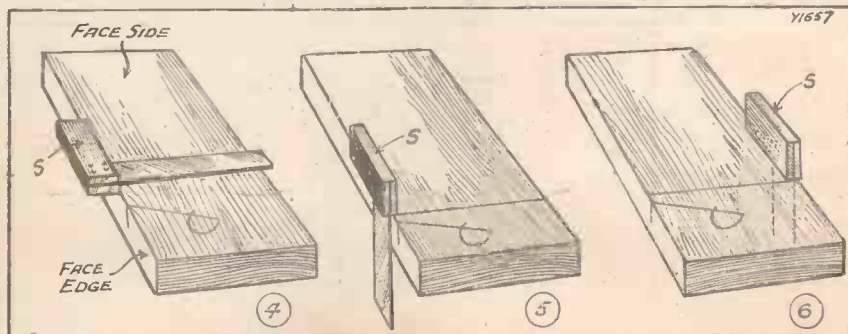
The wood having been prepared, the next step is setting out the joints. For a mortice and tenon of this type it is a good plan to make the tenon a little longer and the mortice slightly deeper than necessary.

In marking the joints we lay the square on the wood, as shown in Fig. 4, with the stock "S" against the edge-mark—this is important. The next position for the square is shown in Fig. 5. Note how, this time, the square is resting with the stock on the face-side of the wood.

Upside Down

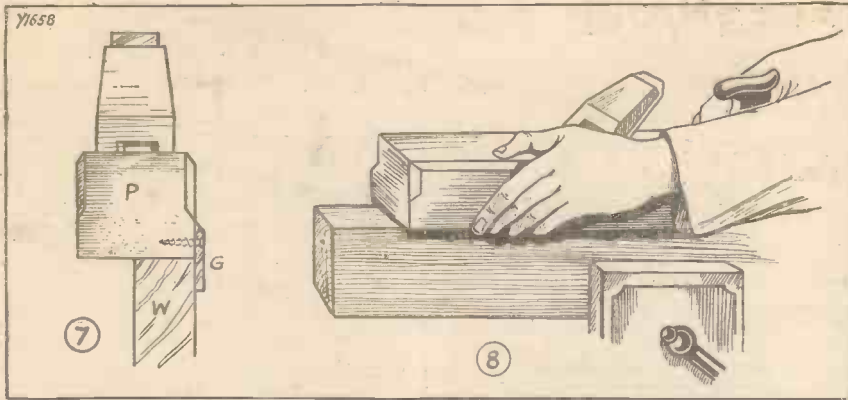
Fig. 6 shows the next position for the square, and to complete the marking operation we bring the stock of the square back to the face-edge and mark the underside of the timber, having turned it over on the bench.

THE RIGHT WAY TO USE A SQUARE



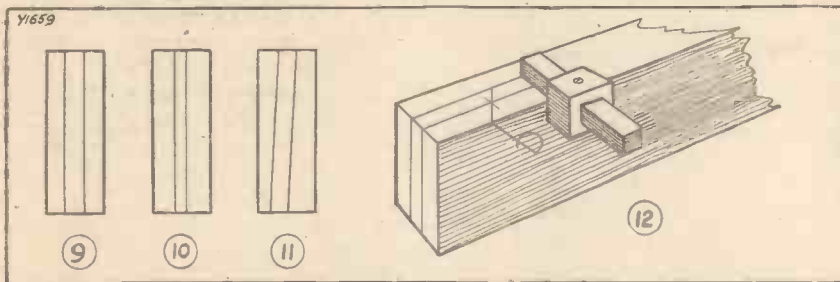
A square is a most useful tool, for given one true side, it takes a few minutes only to check up all the other edges. Diagrams 4, 5 and 6 show the correct method of using a square, as detailed by the author.

TRICKS OF THE TRADE TO REMEMBER



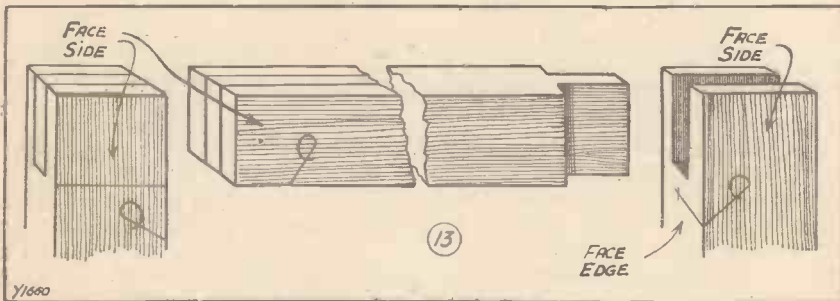
The proper way to hold a jack plane, and—in the small sketch—a handy dodge for keeping the plane on a straight path.

TAKE EVERY CARE WHEN MARKING OUT



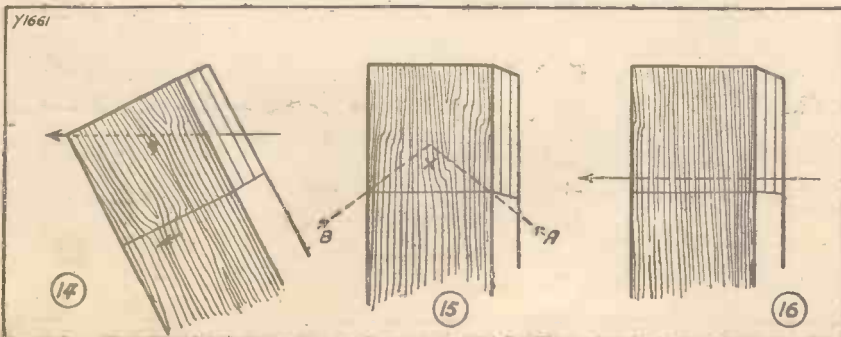
It is most important to mark out the wood with care, as any deviation from the straight will throw the whole work out of true. The marking gauge should be used as depicted in the sketch.

HOW THEY LOOK—BEFORE AND AFTER



Illustrating the work marked out ready for cutting, and how the two pieces to be joined appear prior to the final fitting.

ALL DONE WITH A TENON SAW



The wood should be cut inside the marks with a small tenon saw. It is done in three stages—14, 15 and 16—the cuts being made in the direction of the arrows in each case.

NEAT CORNERS FOR CABINETS

—continued

In marking the joints we must divide the wood into thirds as seen at Fig. 9. In Fig. 10 is shown a piece of wood set out in the wrong manner—the joint section is too thin.

Fig. 11 shows another defect, due to the wrong use of the marking gauge. The gauge should always be used as shown in Fig. 12. Note the stock position.

Keep to the Lines

Fig. 13 gives an idea as to how the parts look when set out and, later, cut with the saw. Note particularly the face and edge marks.

The wood is held in the vice on the slope when cutting the joint (see Fig. 14). The saw is started as shown by the arrow; the wood is then reversed and the next cut follows on the same lines as the first. This leaves a small portion uncut inside the joint, as shown at "X" (Fig. 15).

The last operation is seen in Fig. 16. While sawing the joint it is very important to keep in the lines of the marking gauge; the saw in the last operation is used straight and removes the small portion of wood mentioned previously. The cheeks of the tenon are sawn away last of all, as in Fig. 17. The mortise is treated in a similar way, and the waste portion of the joint is removed with a chisel.

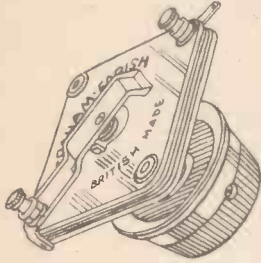
In Fig. 18 we see the parts fitted together. Note the overhang, which is removed with a fine saw after the joint has been fixed. By arranging for the excess we can ensure the joint being neatly finished off at the corners. Fig. 19 is another type of joint, and is shown apart in Fig. 20. Note the waste again at "X" and the method of cutting the tenon.

Another Useful Joint

Fig. 21 is another kind of useful joint. The tenon only partly enters the wood. The mortise for this joint is cut with a wood chisel, or, if you find it easier, you can remove most of the wood with a drill of suitable size, afterwards using the chisel.

If the joint is cut entirely with the chisel (see Fig. 23), you must start in the middle of the mortise and remove the wood a bit at a time towards the end of the joint in the direction of the arrow. Do not cut right up to the end, but leave a little

GRAHAM FARISH COMPONENTS FOR HIGH EFFICIENCY



'Litlos' Variable Condensers

In all capacities up to .0005, log line, straight line capacity and differential. Particularly low loss. Single hole fixing. All capacities and types, **2/6**

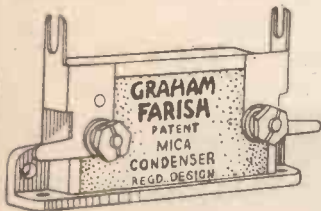
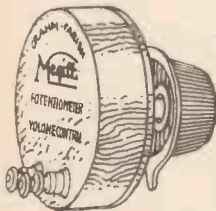


Ohmite Resistances

Better than wire-wound. All values from 300 ohms to 5 megohms, **1/6**

Megite Volume Control

A new design. Potentiometer type. Ideal for loudspeaker and pick-up. Nickel-chrome wire-wound. Slipper action making broken contacts impossible. Absolutely silent. 3 terminal type. Bakelite case. Single hole fixing. Resistance up to 25,000 ohms, **3/6**. Resistance over 25,000 ohms, **4/6**



Graham Farish FIXED CONDENSERS

In a complete range of capacities, upright or flat mounting. Registered design No. 723,271.

.0005 mfd. to .004 mfd., **1/6**. .005 mfd. to .01 mfd., **1/6**

The GARD Lightning Arrester



A permanent and absolute protection against lightning and static charges. No need to switch off during thunderstorms. Definitely does not interfere with reception, **1/6**

A Sensational Radio Discovery

PERMANENT-EFFICIENT EVER-DAMP EARTHING

TO EARTH TERMINAL OF SET

Rejuvenates the heart of your receiver

More radio troubles come through faulty earthing than from any other single defect of a receiver. Crackling in the loudspeaker, oscillation, mains hum, weak volume and poor tone are ALL caused by an inefficient earth. PREVENT these troubles and get the last ounce of power and purity of reception by fitting a **FILT**—the wonderful new percolative earth—a sensational invention that makes perfect earthing CERTAIN.



See how it works

Wonderful New Percolative Chemical makes even Dry Soil permanently conductive

FILT is based on a completely new principle of **CHEMICAL** earthing. It doesn't depend on the dampness of your soil or the depth at which you bury it. As soon as it is under ground, the wonderful **FILT** chemical begins to spread and percolate, attracting moisture and making a **PERMANENT** conductive area for several feet around and below its copper container. It works ANYWHERE, in ANY soil, in ANY climate!

How FILT works and what it does

Imagine dozens of chemical tentacles spreading outwards and downwards through the earth, every tentacle a high conductor of electricity, and every one leading to your earth and through the earth wire to your set. That is what **FILT** gives you. It means high efficiency earthing—always damp—always active—enabling you to get the very utmost out of your set from one year's end to the next. It is the most effective earthing system money can buy.



GRAHAM FARISH
(pat. applied for)

FILT

PERCOLATIVE CHEMICAL EARTH

Get a **FILT** to-day from the nearest radio dealer or order direct (post free) from the sole manufacturers:

GRAHAM FARISH LTD.,
189, Masons Hill, Bromley, Kent.

2/6 COMPLETE

NEAT CORNERS FOR CABINETS

—continued

of the mortice intact, as shown at "Y." This is removed last of all.

After you have cut towards the end of the mortice you can turn the wood round and repeat the operation in the other direction. When all the wood has been removed and the walls carefully trimmed, you can remove the part "Y" at each end of the joint, but not before.

The marking gauge is shown in Fig. 24. It consists of a sliding stock "S" and a brass gauge moving in a groove in the body of the tool, and shown at "G." The two pins marked "P" are for scribing the wood, and these are adjusted by the projection "A."

In actual practice the gauge is set with a chisel of a suitable size. The chisel is allowed to sink very slightly below the points of the pins in doing this, and then the sliding section and the stock of the tool tightened up.

HOW TO CLEAN YOUR SOLDERING IRON
 A very useful tip that will enable you to remove scales from your iron very quickly.

THE slightest lapse from vigilance on the part of the constructor and, often enough, the soldering iron acquires a characteristic "scaly" condition which is directly opposed to good and easy soldering!

Overheating the iron will often bring it into a scaly condition. So, also, at times will the use of the iron in bad weather out-of-doors, as, for instance, when carrying out "roof jobs" in aerial erection.

The trouble about a scaly iron is that it grows worse if you do not take the precaution of scotching the condition immediately it sets in.

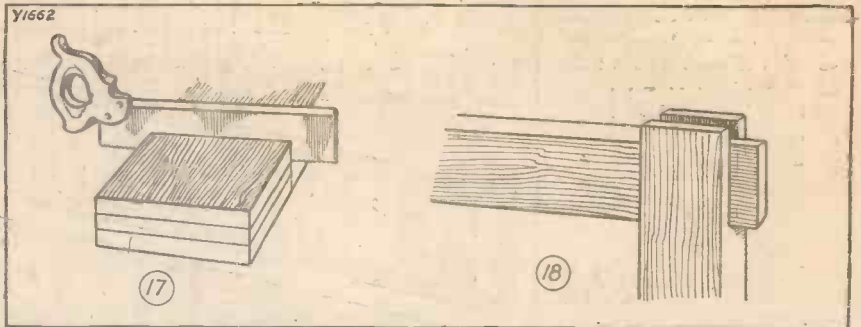
Nothing is Easier

Nothing, fortunately, is easier than to cure a scaly soldering iron. Heat it up to bright-red heat, and then plunge it into a basin or a bucket of cold water.

Give the iron a good brushing with a stiff brush, and then repeat the process twice. After this your iron will be in an entirely new condition, and ready for tinning afresh.

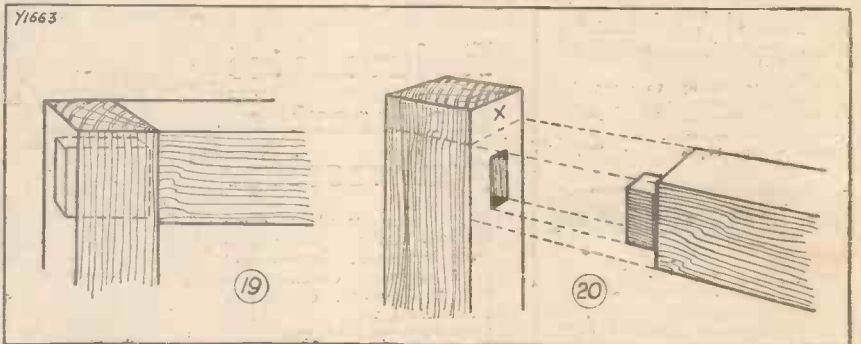
J. F. C.

CHOPPING OFF THE CHEEKS TO MAKE A PERFECT FIT



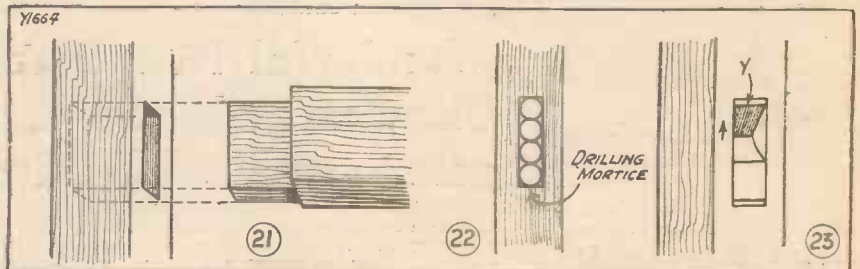
After the operations described in the previous sketches have been carried out, the surplus wood is cut away. The two pieces to be joined should now be a nice tight fit.

ANOTHER TYPE OF JOINT WORTH TRYING



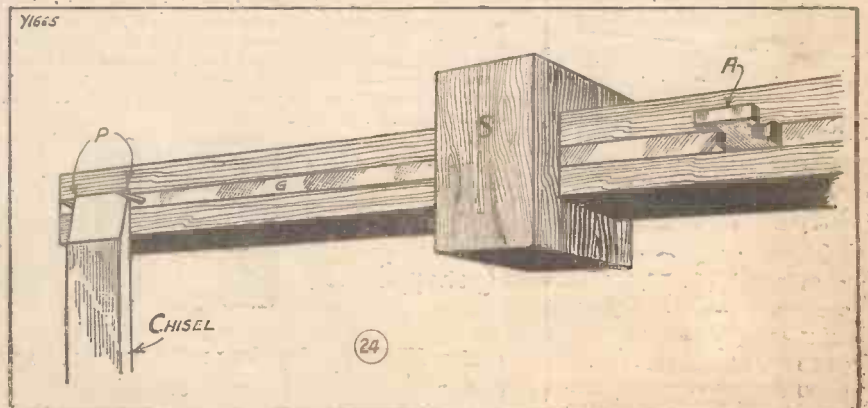
Another good way of making a joint. It is very neat, and on fairly big work is really strong.

METHODS OF MAKING A MORTICE



The advantage of this type of joint is that it is almost invisible, the tenon sinking only just over half way into the mortice.

IT HELPS WHEN MAKING MEASUREMENTS



A marking gauge usually has two sharp points for scribing the wood, the distance between them being set with a suitable size chisel.

The Greatest Constructional Chart ever published

FREE

HOW TO BUILD THE LISSEN

SKYSCRAPER 3 KIT



Lissen have published a 1/- Constructional Chart, giving the most detailed instructions ever printed for the building of a wireless set. Every part, every wire, every terminal is identified by photographs. Everybody without technical knowledge or skill of any kind can SAFELY and with COMPLETE CERTAINTY undertake to build this most modern of radio receivers from the instructions given and the parts Lissen have supplied.

This new LISSEN SKYSCRAPER KIT SET is the only one on the market that you can build yourself employing Metallised Screened Grid, High Mu Detector and Economy Power Pentode Valves. Around these three valves Lissen have designed and produced a home constructor's kit, the equal of which there has never been before. It is the only battery set delivering such power—yet the H.T. current consumption is far less than the average commercially designed 3-valve set.

KIT COMPLETE WITH

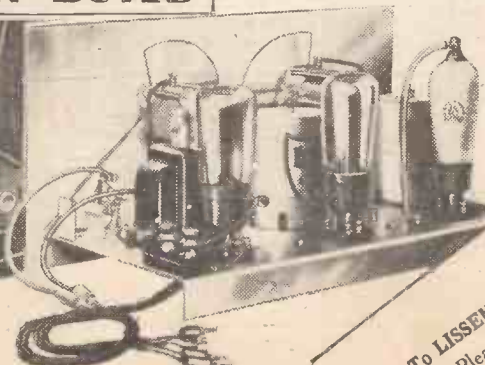
Metallised S.G. Valve – High Mu Detector & Economy Power Pentode

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 Console Skyscraper Cabinet and Loudspeaker combined as illustrated. It holds all batteries, and accumulator and loudspeaker as well. It makes everything self-contained. A special Lissen Pentode Matched Balanced Armature Loudspeaker of great power is supplied with the cabinet, and the price of the Skyscraper Kit complete with valves, and this cabinet and loudspeaker, is only £8 5s. For this you will possess a receiver which has no equal.

THERE IS A FREE COPY OF THE CHART FOR EVERY READER OF "WIRELESS CONSTRUCTOR"—ask your radio dealer for yours, or FILL IN COUPON BELOW.

WHAT YOU CAN BUILD



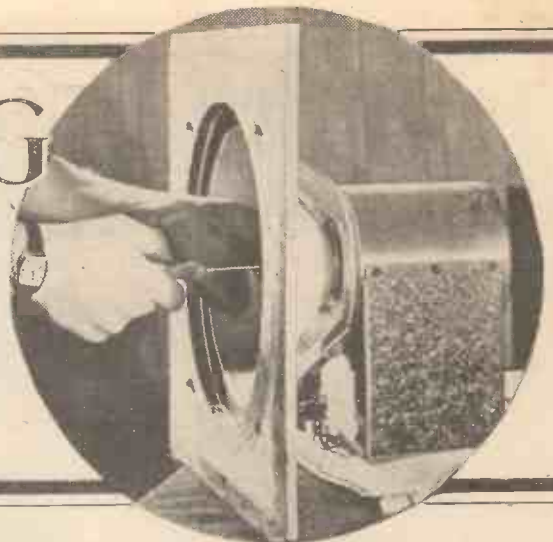
89'6

POST THIS COUPON

COUPON

To LISSEN, Ltd., Dept. C.1, Worples Road, Isleworth, Middlesex.
Please send me FREE copy of your 1/- Skyscraper Chart.
Name.....
Address.....

OVERCOMING VIBRATION EFFECTS

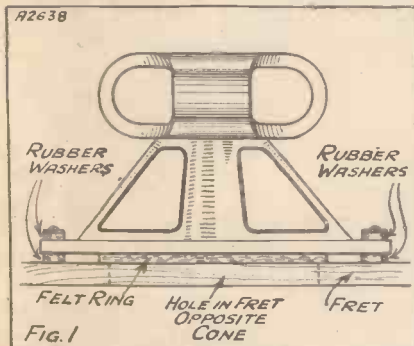


It is desirable when mounting a moving-coil loudspeaker that it should not be in direct contact with the loudspeaker fret, or else there is a tendency for the vibrations from the speaker to be communicated directly to the cabinet. This, of course, will often give rise to trouble with valves that are inclined to be microphonic, especially in a powerful receiver where the output from the speaker is great.

Fixed to the Fret

This kind of trouble is specially liable to occur in a set where the loud speaker is built into the same cabinet, and you can get all kinds of

IMPROVES YOUR SPEAKER



One very useful scheme for overcoming vibrator troubles is to fix thick rubber washers between the loudspeaker and baffle-board.

unpleasant results from it. In many cases the loud speaker is provided with a bracket so that it can be mounted on the baseboard, but even where this is provided the construction of the set may not make it possible to do so, and the only way of fixing the speaker is to fix it direct to the fret.

Our requirements as regards fixing the speaker are as follow: (1) The join between the speaker and the fret

The method of mounting loudspeakers and self-contained radio receivers is a matter of vital importance. This applies especially to large moving-coil instruments and powerful amplifiers, for mechanical vibration can introduce all kinds of queer resonances into the reproduction. Here is a practical article on this very important subject.

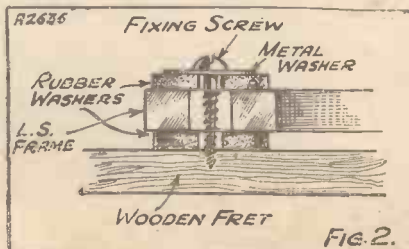
By P. C. BAKER.

should be airtight; and (2) the speaker should be so mounted that the minimum of vibration is handed on to the fret by direct contact. The first point is easily dealt with in the usual way by means of a felt ring placed between the speaker and the fret. This felt ring need not be very thick. Its actual thickness will depend on the exact details of our fixing arrangements.

Use Buffers

Now as to the second point, what we want to ensure is that there should be no direct contact between the fixing screws and the speaker as well as the fret. You should, therefore, interpose something between the fixing screws and the speaker. Now the best substance for this "something" is rubber, preferably

HOW IT IS DONE



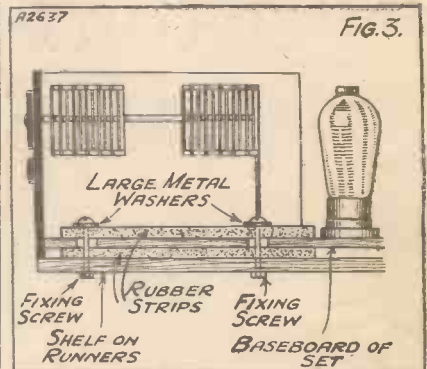
This is a close-up of one of the mounting points referred to in Fig. 1.

fairly springy rubber. Sorbo rubber is made in various grades of springiness, and the actual grade to use will depend to a certain extent on the weight of the speaker. A heavy speaker will need firmer rubber than a small, light one.

Try Tap Washers

You will need to cut out twice as many washers from the rubber as there are fixing screws. If there are four fixing screws you will need eight washers. You need a very sharp knife for cutting the rubber and the stuff is not at all nice to work. Personally I have found that a very good mounting can be obtained by

MOUNTED ON RUBBER



In the case of self-contained sets and amplifiers it often pays to mount the offending part of the receiver on rubber strips as shown above.

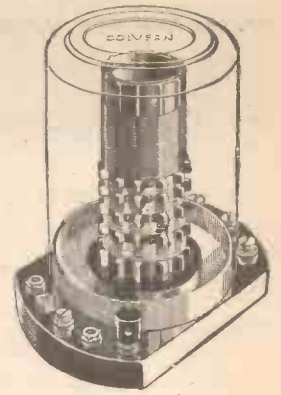
the use of ordinary tap washers; rubber ones, of course.

With a large heavy speaker such as the one I am using I found that these tap washers were very suitable.

The general method of mounting the speaker with rubber washers is shown in the drawing in Fig. 1, while details of one of the mountings are shown in Fig. 2. You will need the

COLVERN -T.D.COIL

AN UP-TO-DATE COIL WITH
UP-TO-DATE FEATURES



TYPE T.D., an entirely new COLVERN COIL, designed to give super selectivity on both long and broadcast wave-bands.

The coil is completely screened, giving a very neat appearance, and incorporates tapped aerial coupling and reaction, while the four alternative aerial tapings are arranged as sockets with a wander plug.

The first two tapings give aerial couplings similar to those normally employed but with greatly increased selectivity.

Nos. 4 and 5 give a high degree of selectivity with weak aerial coupling—suitable for use in a "swamp" area.

A most important feature of this coil is that there is no break through on the long wave-band from B.B.C. stations.

This coil is specified for the "DIODION," which is described in the Exhibition Number of MODERN WIRELESS.

TYPE T.D.

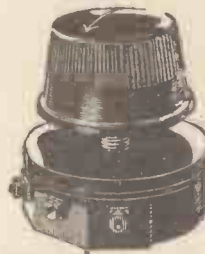
PRICE
8/6

VARIABLE COLVERSTATS

Wire-Wound.
For Voltage Regulation
and Volume Control



Type S.T.10. Rating 10 watts. Standard values 500 to 50,000 ohms. 5/6.



Type S.T.5C. Protected Windings. Rating 5 watts. Standard values 250 to 25,000 ohms. 5/3.



Type M.T. Rating 3 watts. Standard values 25 to 10,000 ohms. 4/6.

STRIP RESISTANCES



Wire-wound. For Mains Units and Decoupling. Rating 5 watts. Fitted with terminals and soldering tags. Price—values up to 25,000 ohms, 1/9
Price—values from 25,000 to 50,000 ohms - - - - - 2/3

Our 1933 Booklet Radio List No. 10 is now available and free on request.

COLVERN LIMITED
MAWNEYS RD., ROMFORD, ESSEX

Overcoming Vibration Effects—continued

following materials assuming that there are four fixing screws to your speaker: 4 fixing screws, 8 rubber washers, 4 large metal washers, 1 felt ring.

Screw Sizes

Now, as regards the screws, the exact method of fixing will depend on the thickness of your fret. With a thick fret, wood screws may be used with quite a heavy speaker, because you will get enough grip before the screws begin to appear through the other side. In this case you will have to choose the length of your screws carefully. For size I suggest No. 6 or 8.

washers should be about the same diameter as the rubber ones, or else a little less, but the hole through the centre should, of course, be the right size for the fixing screws you are using.

The felt ring should be about the same thickness as the bottom rubber washers. If the washers are made of very soft rubber the felt ring should not be quite so thick so as to allow the rubber to be compressed. Should tap washers, however, be used, in which case the felt may be softer than the rubber, the felt ring should be a little thicker than the washers.

When mounting the speaker, lay the fret flat on the bench or table

ring. These holes in the mounting ring should give quite $\frac{1}{16}$ th of an inch clearance for the fixing screws, so that they are not in direct contact with the speaker. This is very important, and it is equally important that the fixing screws are so placed as to be clear of the speaker frame.

The Final Assembly

Next place the other four rubber washers on top, after this the large metal washers, and, finally, place the fixing screws in position and tighten them down till the rubber is just under the correct amount of compression. This will depend on the weight of the speaker and probably on your own ideas.

The above scheme of mounting may also be applied to the receiver itself if desired. Some receivers seem to be extraordinarily microphonic. The slightest jar, or the slightest bit of extra kick from the loud speaker, may produce the most terrifying noises from the loud speaker.

An Unusual Case

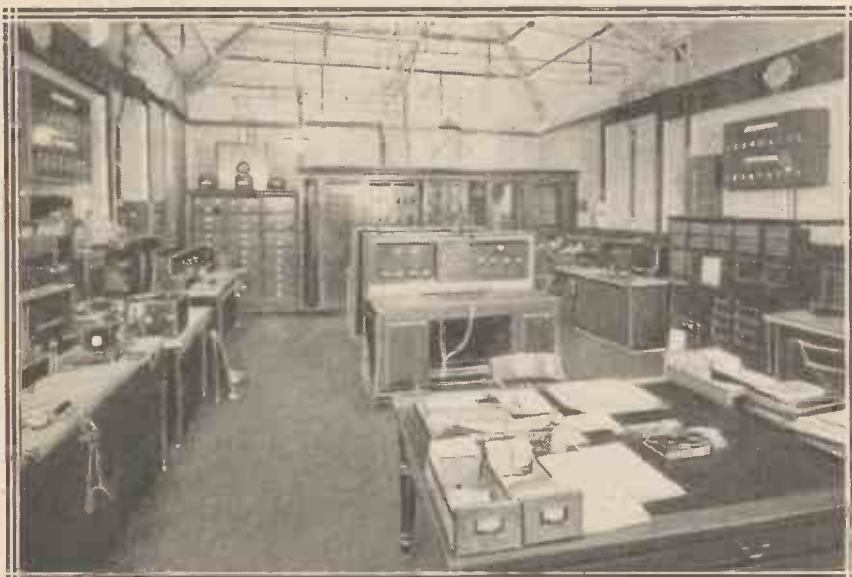
I had a set like that quite recently. It consisted of 2 H.F. stages using S.G. valves, detector and 2 L.F., the output stage consisting of two L.S.G.A. valves in parallel. You will therefore appreciate that this set had got some kick in it.

The receiver was found to be extremely difficult to handle. The slightest increase in volume set up awful rattling and howling which resisted all attempts to cure them. It was found, however, that just taking the H.F. unit out of the cabinet and working it away from the L.F. side and power pack resulted in stable operation, so it was decided to try the effect of insulating this part of the set from the cabinet by the use of springy rubber mounting

Remedied by Removal

This was accordingly done as shown in Fig. 3, which you will see is merely a variation of the Fig. 1 mounting, suitably adapted to the particular purpose for which it was employed. This cured the trouble at once, and it was now possible to tune in a transmission at really good volume without trouble occurring due to mechanical feed-back through the cabinet and thus to the chassis of the H.F. amplifiers, which carried the detector valve as well.

THE OLD CONTROL ROOM AT SAVOY HILL



This photograph gives a good impression of the old control room at Savoy Hill. It was a very makeshift affair when compared with the elaborate room at Broadcasting House, but, nevertheless, it has done good work and served its purpose extraordinarily well.

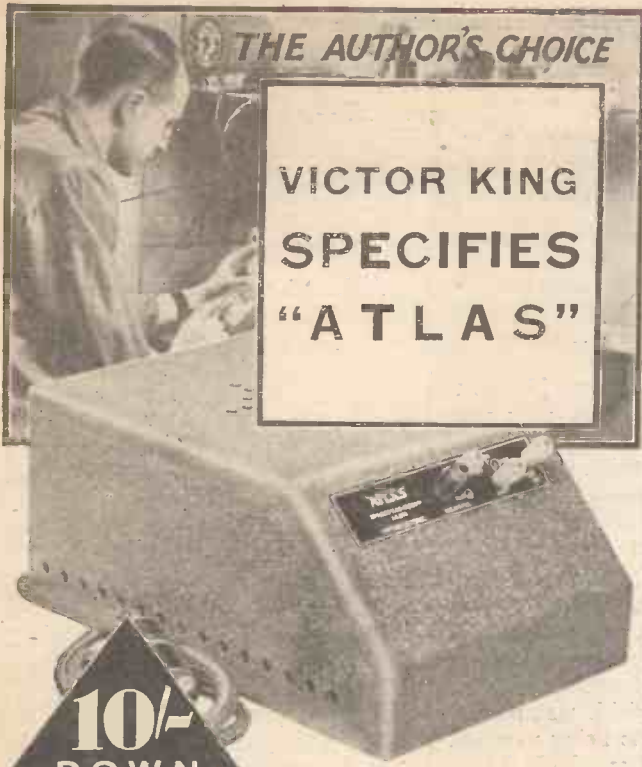
If the fret is not thick enough to let wood screws get a good grip, then you will have to use screws going right through the fret, with nuts on them, probably 2 B.A., or its equivalent in Whitworth, i.e. $\frac{3}{16}$ th of an inch, will be the best size to use. (Sometimes a countersunk head is best. This can be sunk below the surface of the fret, the hole filled with putty and painted over so that no signs of the fixing will show at all from the front.)

The rubber washers should have a diameter of about $\frac{3}{4}$ in. at least, and should be not less than $\frac{3}{16}$ th in. thick. If softish rubber is used they may need to be thicker. The metal

and fix the felt ring in position by means of a little Durofix or Seccotine. If the fixing screws for the speaker have to go right through the fret you will have to mark out their positions and drill clearance holes for them. Otherwise you will just start the wood screws with a suitable size bradawl.

No Direct Contact

Next place four rubber washers approximately where the fixing screws are to come and lay the speaker down on top. Now move the washers about till the holes in them come exactly in the centre of the fixing holes on the loudspeaker mounting



THE AUTHOR'S CHOICE

VICTOR KING
SPECIFIES
"ATLAS"

10/-
DOWN
AND BALANCE
IN EASY
MONTHLY
PAYMENTS

for the
"DOUBLE-TUNE"
THREE

- MODEL A.C.244.
59/6 Cash.
- 1 Tapping 60/80v.
(Max. & Min.)
- 1 Tapping 50/90v.
(Max., Med. & Min.)
- 1 Tapping 120/150v.
Output 20 m/A at 120v.
- MODEL A.K.260.
With L.T. Trickle Charger for 2-, 4- and 6-volt Accumulators.
90/- Cash.
- Westinghouse Rectifiers
Guaranteed 12 months.

Yet again "ATLAS" is the designer's choice and definitely specified to ensure the finest possible reception from the "Double-Tune" Three, described in this number.

Make sure of getting the best in value and performance by insisting on "ATLAS," winners of the Olympia Ballots in 1930 and 1931.

Ask your dealer for a demonstration and post the coupon to-day for your FREE Folder.

CLARKE'S
"ATLAS"
MAINS UNITS

H. CLARKE & CO. (M/CR.), LTD.
Patricroft, Manchester.

LONDON OFFICES: Bush House, London, W.C.2
Sole Scottish Distributors:
G.E.S. Co. Ltd., 38, Oswald St., GLASGOW.

POST THIS COUPON TO-DAY

H. CLARKE & CO. (M/CR.) LTD., George St., Patricroft, M/cr.
Please send FREE copy of Folder No. 68.

NAME.....
ADDRESS.....
W.C.2o.

**SOLDERED
CONTACTS
FOR
BETTER
RADIO**



Soldered contacts give the best results. Do your soldering the modern way by electricity. Electric soldering is

SPEEDY, switch on — ready in four minutes

CLEAN, no flame — hence no dirt

EFFICIENT, constant heat maintained in the bit

RELIABLE, no jobs spoiled through bit cooling off

ECONOMICAL, 15 hours' use for 1 unit

MADE FOR
STANDARD
VOLTAGES

Please state
voltage when
ordering

SOLON

**ELECTRIC
SOLDERING IRON**
(PATENT NO 243928)

7/6
EACH

OBTAINABLE FROM YOUR LOCAL DEALERS, OR DIRECT FROM THE MAKERS (CASH WITH ORDER)

Write for illustrated leaflet

COMPLETE
WITH FLEX
& ADAPTOR

W. T. HENLEY'S TELEGRAPH WORKS COMPANY LIMITED.
DEPT. Y 252 — HOLBORN VIADUCT — LONDON — E.C.1.



A First-Class Guide
THE B.B.C. has just published a very charming souvenir volume under the title "Broadcasting House."

This book is not only a souvenir, but it is a first-class guide to the B.B.C.'s magnificent new headquarters in Portland Place, and its 100 pages or so—profusely illustrated—give full and detailed accounts of the interior of the building, the decorations, studio arrangements, and all the rest of it.

Many of the photographs and diagrams are coloured, and I understand that souvenir copies of the book, stamped with the Royal Arms, were

graciously accepted by the King and Queen on their recent visit to Broadcasting House.

Listeners who would like a copy of this book may purchase one for 5s., on application to the B.B.C.'s Publication Department at Broadcasting House.

Menace from America

The "Sunday Referee" recently pointed out that, having built up a business in which £30,000,000 of British capital is invested, and which, with its ancillary trades, employs nearly 1,000,000 British workpeople, the radio industry is being menaced by illicit dumping from the U.S.A.

Misuse of Preference

It appears that American radio manufacturers, having over-produced, find themselves with hundreds of

thousands of surplus sets on their hands, and some firms are pulling these sets to pieces and having them reassembled at Canadian branches, from which they can then be imported into this country under the preferential tariff that exists in favour of Canadian productions.

Buy British

Although the radio industry has sent to Ottawa two representatives to present their views to the Empire Conference, and although great hopes were voiced with regard to the success of the Radio Exhibition at Olympia, listeners should bear in mind that the British radio manufacturers need championing.

Here is a case where, when readers are contemplating purchasing sets or parts, they should buy British with a vengeance, and every reader should do his little bit in preventing injury to the British radio industry.

"Will the Relatives—"

The B.B.C. reports that, during the first six months of this year, the number of S.O.S. messages broadcast shows a marked increase. In fact, the total number of distress signals sent out from all stations amounted

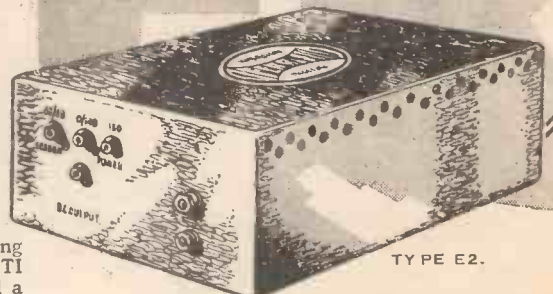
(Continued on page 384.)



The simplest and most effective way of operating your existing Battery Type Receiver from the A.C. Mains is to use FERRANTI UNITS—an H.T. Eliminator to replace your H.T. batteries, and a Ferranti Trickle Charger to keep your accumulators perpetually charged and in good condition.

The first smoothing or filter arrangements ever devised were the subjects of a patent taken out by Dr. Ferranti as long ago as 1888, and the first radio power units to use the metal rectifier were also produced by Ferranti.

A Ferranti Power Supply Unit is a combination of unparalleled experience, manufacturing facilities and skill. No better units are available at any price.



- TYPE E1. Maximum Output, 200 Volts, 115 Milliamps - Price **£11.11.0**
- TYPE E2. Maximum Output, 120 Volts, 15 Milliamps. Two Tappings - - - Price **£3.10.6**
- TYPE E3. Maximum Output, 150 Volts, 25 Milliamps. Three Tappings - - - Price **£4.16.6**
- TYPE E4. For H.T. and A.C. Low Tension. Maximum Output, 240 Volts, 70 Milliamps; 4 Volts, 5 Amps. and 4 Volts, 1 Amp. Five Tappings. Price **£8.11.6**

FERRANTI LTD., Head Office & Works: HOLLINWOOD, LANCASHIRE.

London: BUSH HOUSE, ALDWYCH, W.C.2.

Direct Radio

159, BOROUGH HIGH ST.

Still selling

OFFER

Double Tune Three

THE DIRECT RADIO "S.T.300" BATTERY KIT

	£	s.	d.
1 Polished oak cabinet, 16 in. x 7 in., with baseboard	18	6	
1 Ebonite panel, 16 in. x 7 in., drilled to specification	4	6	
2 Ormond .0005 slow-motion condensers, No. 6	13	0	
1 J.B. Midget .00004 condenser	4	0	
1 RadiRad .00015 differential condenser	2	6	
1 Teisen binocular choke	5	0	
1 Differential condenser, .0001	2	0	
2 Colvern "S.T.300" coils	12	0	
1 W.B. horizontal valve-holder	1	0	
2 Valve-holders	1	0	
1 Lewcos H.F. choke, type M.C.	2	6	
2 3-point switches	2	0	
1 Varley Niclet L.F. transformer, 3-5-1	7	6	
1 T.C.C. .0001 fixed condenser, type S	1	3	
1 1-meg. resistance		10	
2 T.C.C. 1-mfd. fixed condensers, type 50	5	8	
1 Lewcos 20,000-ohm spaghetti	1	6	
1 Terminal strip, 16 in. x 1½ in., drilled to specification	1	0	
1 Screen, 10 in. x 6 in. (with notches)	1	6	
1 Sheet copper foil, 10 in. x 7 in.	1	0	
2 Coils-Glazite	1	0	
3 Valves, as specified	1	12	3
2 Belling-Lee wander plugs		4	
10 Belling-Lee terminals, type R	2	1	
Flex, screws, etc.		4	

KIT No. 1 (less valves and cabinet) **£3.13.6**

Or by Easy Payments, 6/9 down and 11 monthly payments of **6/9**

KIT No. 2 (with valves, less cabinet) **£5.5.9**

Or by Easy Payments, 9/9 down, and 11 monthly payments of **9/9**

KIT No. 3 (with valves and cabinet) **£6.4.3**

Or by Easy Payments, 11/5 down and 11 monthly payments of **11/5**

Every Component Guaranteed

KITS for CASH

KITS for C.O.D.

Any components supplied separately

KITS on EASY PAYMENTS

Come early

Here is an announcement that will interest you! Clearance sale of last season's components and cabinets at "give-away" prices to callers only at 159, Borough High St.

A REALLY MODERN RECEIVER THAT SIMPLY MUST BE BUILT WITH A DIRECT RADIO TESTED AND GUARANTEED KIT.

	£	s.	d.
1 Permeol panel, 14 in. x 7 in., drilled to specification	3	9	
1 Cabinet with 10-in. baseboard	15	6	
1 Utility .0005-mfd. double-gang solid-dielectric variable condenser with trimmer	19	6	
2 Goltone coils	11	6	
1 Ferranti L.F. transformer, A.F.8	11	6	
1 Lissen Torex L.F. transformer	5	6	
1 Ready Radio Standard H.F. choke	4	6	
2 T.C.C. 2-mfd. condensers	7	8	
3 4-pin valve holders	1	6	
1 .0003-.00035-mfd. diff. reaction condenser	2	6	
1 Wearite 50,000-ohm combined volume control and switch	6	6	
1 Dubilier .02 fixed condenser, type 9200	2	0	
1 T.C.C. .0003-mfd. condenser	1	3	
1 Lissen 2-meg. and 1½-meg. grid leak with tags	2	0	
1 Graham Farish Ohmite, 1,000 ohms (with holder if necessary)	2	0	
1 Wearite I.33 rotary control switch, without terminals	3	9	
8 Belling-Lee indicating terminals, type R	1	8	
1 Terminal strip		8	
3 Mullard valves: P.M.1H.L., P.M.1L.F., P.M.2A.	1	2	9

KIT No. 1 (less valves and cabinet) **£4.7.9**

Or 12 equal monthly instalments of **8/-**

KIT No. 2 (with valves less cabinet) **£5.10.6**

Or 12 equal monthly instalments of **10/2**

KIT No. 3 (with valves and cabinet) **£6.6.0**

Or 12 equal monthly instalments of **11/7**

You can, of course, buy your favourite accessories direct from Direct Radio. Write us for lowest quotations and suggestions.

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

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

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

(a) I enclose
for which (b) I will pay on delivery {cross out line} £.....
(c) I enclose first deposit of {not applicable}

NAME.....

ADDRESS.....

Wireless Cons., Oct.

OUR NEWS BULLETIN

—continued from page 382

to 493 for the past half-year, as compared with 833 for the whole of 1931. In all cases, except those dealing with witnesses of accidents, the percentage of successes was rather higher than in 1931.

Even messages dealing with missing persons show a higher percentage of success, whereas previously only one message out of every five proved successful.

The percentage of appeals to relatives of sick persons is still over 50.

A Strange Mishap

The B.B.C. is always receiving strange and unusual requests in connection with S.O.S. broadcasts. A recent case was that of a message dealing with a girl who went to St. Thomas' Hospital to be X-rayed after swallowing a pin.

She ran away while the X-ray photographs were being developed, and the doctor, who had taken her name and not her address, and who realised that she was in grave danger, requested the B.B.C. to send out an S.O.S. message for her return. Luckily

for the girl, she was traced and returned to hospital.

Very Rigid Code

Of course, the B.B.C. receives hundreds and hundreds of requests for facilities for broadcasting S.O.S. messages, and the result has been that the officials have been compelled to lay down a rigid code of rules.

Listeners should bear in mind that messages permitted may be placed in three classes:

1. Application for the attendance of relatives of sick persons.
2. For missing persons.
3. For witnesses of accidents.

In the first case, application for people to go and see sick persons can only be broadcast when the patient is certified as dangerously ill and after all other means of getting in touch with relatives have failed. Requests for witnesses of accidents are broadcast only on behalf of the police.

Amateurs and the Navy

The Secretary of the Admiralty announced recently the institution of a Royal Naval Wireless Auxiliary Reserve, to be known as the R.N.W.A.R. in Great Britain and Northern Ireland.

Recruits will be obtained largely from wireless amateurs owning transmitting plants, and the idea is to provide a reserve of operators trained in naval procedure for naval service afloat or ashore in war or emergency.

A National Network

Organised training will be arranged, and, in the end, the scheme will aim at providing a network of R.N.W.A.R. stations linking up districts and, finally, areas themselves.

These W.T. stations will be exercised for handling W.T. traffic according to naval regulations, and the Reserve will generally be under the orders of the Admiralty through the Admiral Commanding Reserves.

Where to Apply

Listeners who are interested in this scheme are requested to apply for further particulars by post to the Admiral Commanding Reserves, Queen Anne's Chambers, Tothill Street, London, S.W.1.

Our Anonymous K.C.'s

A good deal of interest has been aroused by the B.B.C.'s statement that in the autumn a series of talks will be broadcast on legal topics.

(Continued on page 385.)

**TUNEWELL'S
2 BIG OLYMPIA HITS!**

Amazing interest was shown at Olympia in the new range of Tunewell Super-Radio Components, which have removed the price-bar to quality radio. Whatever set you intend to build, there are Tunewell Components to **improve reception—and save you money!** Get the "Guide to Super-Radio" which gives details, and includes **8 FREE BLUE PRINTS** (Kit Eliminator, All Mains Band Pass 3, etc.).

The new Tunewell A.C. All-Electric Radio-Gramophone also made a great hit. **This instrument has given Tunewell the lead in Radio-Gramophones.** Its greatest features are wonderful fidelity and purity of tone. Send Coupon now for the illustrated Brochure.

TUNEWELL

To Tunewell Radio Ltd., 54 Station Road, New Southgate, London, N.11.

Please send me

- * (a) "Guide to Super-Radio."
- * (b) Radio-Gramophone Brochure.

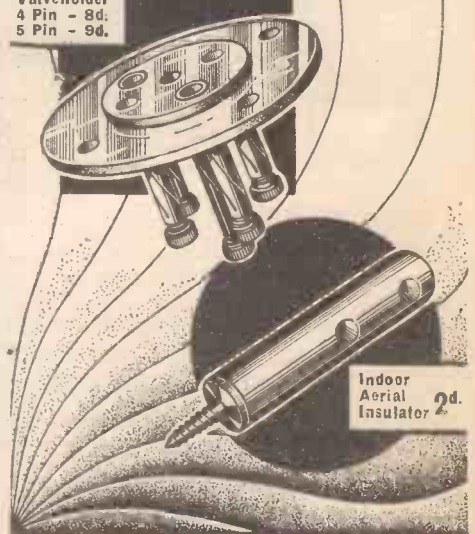
NAME.....

ADDRESS.....

* Cross out if not required. C.3

CLIX
FOR PERFECT CONTACT

Valveholder
4 Pin - 8d.
5 Pin - 9d.



Indoor Aerial Insulator 2d.

For every form of contact you require in radio there is a 'Clix' component designed to make a better job of it. Write us for folder 'C,' fully describing the wide 'Clix' range. Also ask your dealer for 'Clix.'

LECTRO LINX LTD., 254, Vauxhall Bridge Rd., S.W.1.

OUR NEWS BULLETIN

—continued from page 384

Practising barristers will give these talks.

For over three years difficulties have been put in the way of this scheme because of professional etiquette at the Bar, etc. Recently, the General Council of the Bar, after full discussion at a meeting, made this rule:

“A practising barrister may, on the invitation of the B.B.C., broadcast lectures on law, but must not allow the publication of his name or any photograph.”

“Consider Your Verdict”

Consequently, the lecturers broadcasting on law in future will be anonymous, but the talks on legal problems will have reference to such

You cannot afford to miss

JOHN SCOTT-TAGGART'S

Striking articles and remarkable set designs, so place a regular order for

The Wireless Constructor
and avoid disappointment

interesting matters as rent restrictions, hire purchase, and even annoyance caused by your next-door neighbour's loudspeaker.

In other words, the country will soon be going law-minded.

Also, under the heading of “Consider Your Verdict,” the B.B.C. will stage a number of mock trials, and, later on, I hear that Val Gielgud, that energetic B.B.C. Dramatic Producer, will arrange for broadcast reproductions of some of the great historical trials of the past.

The latter is an excellent idea, and the trial of Charles the First; or Anne Boleyn, or Queen Catherine of Arragon, should make excellent historical entertainment.



Why pay 5/- for 3/6 worth of H.T.?

you can save money with a Lively 'O' H.T. Accumulator BECAUSE:

IT ELIMINATES WASTE

When you discard a rundown H.T. Dry Battery you are throwing away power. Due to self-discharge the voltage of a Dry Battery continuously falls. Nothing can stop it. Finally it is too weak to work your Set *but there is still power left in it—power you cannot use—waste!* The Lively 'O' H.T. Accumulator is waste-proof. Its famous “air-spaced” construction prevents self-discharge. It is full of life right up to the time when it needs recharging.

IT COSTS LITTLE TO RECHARGE

For only a few shillings—much less than the cost of a new H.T. Dry Battery—the Lively 'O' Accumulator can be recharged—made like new again—full of life and energy, ready to run your Set for another three or four months.

IT LASTS FOR YEARS

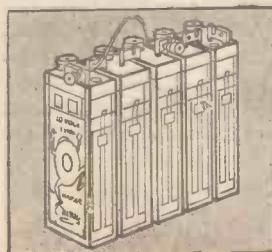
Provided it is charged every three or four months the Lively 'O' Accumulator will last for years. It is definitely the most economical H.T. supply you can use. Every Wireless Dealer sells it in convenient 10 volt units.

TWO TYPES:

Standard 10 volt unit capacity 2,750 milliamps. **5/6**

Extra large capacity 5,500 milliamps (10 volt unit). **6/9**

BRITISH MADE by Oldham & Son Ltd., Denton, Manchester. Est. 1865, and at London, Glasgow, Belfast and Dublin.



The **Lively 'O'**

H.T. ACCUMULATOR

PUT THE LIVELY 'O' INTO YOUR RADIO



HEAYBERD
MODEL AO.2
BATTERY
CHARGER

2, 4, or 6v.
at 1 amp.

35/-

CHARGE
YOUR
ACCUMULATORS

AT HOME—You can easily charge your accumulators by plugging one side of the Heayberd AO.2 Charger to the mains and connecting the other side to your accumulator. Write for 1933 catalogue explaining all about battery charging and mains power for your radio. Sent to you for 3d. stamps.

HEAYBERD
MONARCH OF THE MAINS.

10, FINSBURY STREET, LONDON, E.C.2
One minute from Moorgate Underground Station.

**HAVE YOU
HAD YOUR COPY
OF THE NEW**

CAMCO CABINET

CATALOGUE ?

Write immediately for a FREE copy
CARRINGTON MFG CO., LTD.,

Showrooms:
24, Hatton Garden, London,
E.C.1. 'Phone: Holborn 8202.
Works: S. Croydon.

TAYLEX WET H.T. BATTERIES.
Give long service, improved volume and
tone; very economical.
Replacements for Taylex or Standard batteries at low
prices; details post free; also Bargain List, Radio
Kits and parts at lowest prices.
C. TAYLOR, 57, Studley Rd., Stockwell, London.

ADVERTISEMENTS

As far as possible all advertisements appearing in "Wireless Constructor" are subject to careful scrutiny before publication, but should any reader experience delay or difficulty in getting orders fulfilled, or should the goods supplied not be as advertised, information should be sent to the Advertisement Manager, "Wireless Constructor," 4, Ludgate Circus, London, E.C.4.

SUBMARINE TELEVISION

Some news of the latest television developments.

By Dr. ALFRED GRADENWITZ.

THE latest development in television is a transmitter to aid deep-sea exploration and to assist in raising sunken ships. Dr. Hans Hartman, the well-known pioneer in the field of oceanography, who for about twenty years, by means of most efficient diving apparatus of his own invention, has been exploring the depths of the sea, is the inventor.

Details of Construction

This, as shown by the illustration, comprises a thick-walled steel ball 1, the lid 2 which carries a number of quartz lenses 3 in a circular arrangement, through which light from the lamps 4, and reflectors 5, is radiated into the water. In the centre of the lid there are two small lenses 6 and 7.

An image of the surroundings is thrown through lens 6, and the double prism 8, upon the rotating perforated disc 9, and thence upon the photo-electric cell 10, the electric fluctuations of which are led upwards through cable 19 to the ship, where they are re-converted into an optical image in the well-known manner by a televisor of the usual type.

The other lens 7 throws an image of the outside scene through a similar prism 11 into the electrically operated cinema camera 12. Inasmuch as the whole apparatus is lighter than the weight of the corresponding amount of water, it is drawn downwards by an electrically-operated propeller 14, but in the event of breakage of the cable it would, in virtue of its buoyancy, automatically rise to the surface.

Pressure Variations

The motor 13 is operated at a low voltage so as to avoid any short-circuit through the sea water. A cylinder 15 filled with compressed air is arranged on top of the steel ball, and, through a valve 16, augments the pressure in the interior of the latter, thus increasing its resistance to the pressure of the surrounding water.

This additional compressed air is allowed to escape through the safety valve 20 as the apparatus is rising towards the surface. The luminous tubes 18 are designed to add to the brilliancy of the illumination.

The explorers are seated in a

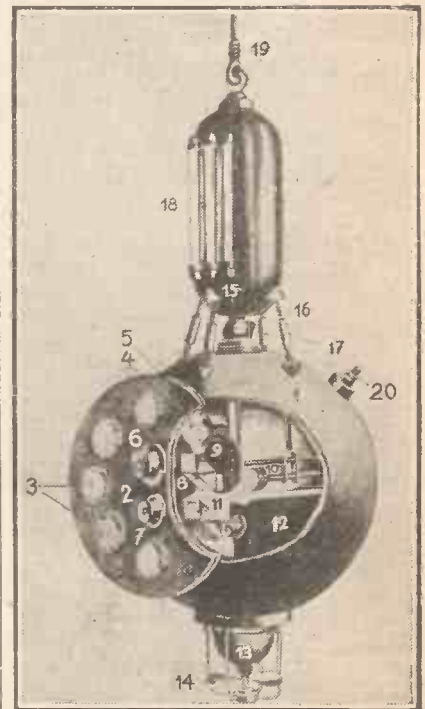
darkened cabin on board the ship from which the submarine television camera, attached to an electric cable, is lowered into the sea, and, on the screen of an ordinary televisor, watch the television image transmitted through the cable from the depth of the ocean.

As soon as anything of particular interest appears on the screen a pressure upon a contact button will bring the cinema camera into action, thus recording upon the film all that is passing in the depth of the sea.

A Submerged City

Aided by television, the human eye will be able to plunge into the farthest depths, otherwise inaccessible to man. Hartman's Television Camera is likely to show what creatures, never allowed to rise to the light of day, are the inhabitants of these infinite lightless spaces.

THE UNDER-SEA EYE



The complete television transmitter which is let down into the water for deep-sea exploration of sunken wrecks.

Dr. Hartman has already, with the aid of his special diving apparatus, been able to dive to far greater depths than any of his predecessors, and to discover in the Mediterranean extensive submarine ruins of some prehistoric city which he is inclined to connect with the mythical Atlantis, and which he expects further to explore with his television camera. Any improvement in television will, of course, readily be applied to the submarine television camera.

VARIOUS MUSINGS ON THE "VARIABLE-MU"

—continued from page 328

after seeing a particular valve's characteristics.

There is no definite point at which an S.G. valve becomes a "variable-mu," and so we must judge each make on its merits. Any S.G. valve can have its "mu" varied, but, for reasons already discussed, a specially designed one is to be preferred.

Unfashionable to Criticise

The casual purchaser who has read marvellous accounts of this new valve will probably be disappointed in results, especially if he uses only one stage of H.F. amplification. When receiving weak signals he may be using a larger anode current, although for local work he will probably use less than if he had an ordinary S.G. valve.

LOOK OUT for S.T.'s NEXT SET

Further Details Next Month

The variable-mu will, in all probability, give less H.F. magnification than the ordinary S.G. valve, but this matters less when two stages of H.F. amplification are used.

I know it is unfashionable to criticise new valves, but having solemnly and sincerely compiled a list of variable-mu merits I cannot help feeling somewhat of a humbug.

Most Acceptable Convenience

I know perfectly well that nine-tenths of the advantages could be obtained simply by a proper control of the input to an S.G. valve designed to handle more grid swing; and that a constant-mu valve of suitable type would be preferred by many.

We may have questioned the variable-mu's newspaper claim to be a cure for all our ills; we may have declined to let our eyes bulge at the miracle; but we can still welcome this valve as a most acceptable and wholesome convenience.



UNIFORM RESPONSE AT EVERY FREQUENCY

The famous Bulgin "Transcoupler" was one of the outstanding successes at Radiolympia.

It is the acknowledged leader in the "Better Quality by Uniform Amplification" movement. Fit it in any set; your set. Just connect it in place of your straight-connected transformer and add the earth connection; the other wires remain unaltered.

YOU WILL AT ONCE NOTICE THE MARVELLOUS IMPROVEMENT.

The alternative H.T. terminals allow of perfect matching. Full instructions and hints with every one.

Obtainable from all dealers.

NEW 80-PAGE CATALOGUE AND MANUAL Send 2d. postage for your copy.

F. F. BULGIN & CO., LTD., ABBEY ROAD, BARKING, ESSEX.

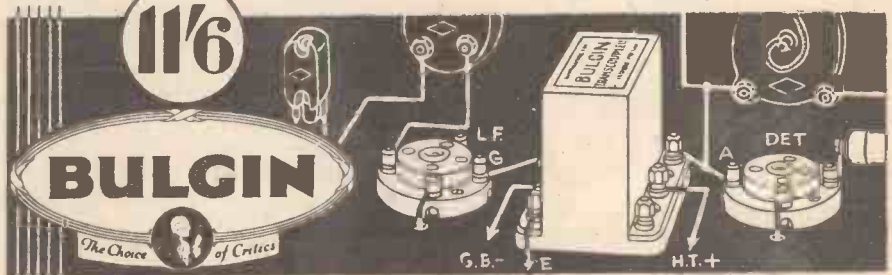
Phone: Grangewood 3266/7.

London Showrooms: 9, 10, 11, Cursitor St., E.C.4

Phone: Holborn 2072.

FIT IT IN ANY SET, UNIVERSAL FOR ALL VALVES.

TRANSCOUPLER TRADE MARK



Famous Makers Offer! **£5 Radio-Gram CABINET for 65/-**
7 DAYS' FREE TRIAL (or 10/- monthly.)
 Polished Oak 1 and Piano built 1 the acoustic Tono brings a fine thrill. Makers to (Radio Press, B.B.C. 3,000 clientele). Other Models 35/- to £15. Photographs and List FREE.
PICKETTS Piano-Tono Cabinets. (C.W.) Albion Rd., Bexleyheath.

RADIO SUPPLIES
 Send your list of Radio needs for our quotation—Kits, Parts, Sets, etc. Everything in Radio stocked; prompt delivery. 7 days' approval. Catalogue free. Taylex and standard Wet H.T. replacements stocked.
H TAYLOR, 57, Studley Rd., Stockwell, London.

Engineers' Guide
 containing the widest choice of engineering courses in the world
 Quality for a well-paid post in Engineering, by studying at home with The T.I.G.B. Become an A.M.I.C.E., A.M.I.Mech.E., A.M.I.E.E., A.F.R.Ae.S., etc. Training until Successful is Guaranteed for the one fee. WRITE NOW for "The Engineers' Guide to Success," stating the branch, post or qualification that interests you, to THE TECHNOLOGICAL INSTITUTE OF GT. BRIT., 21, Temple Bar House, London, E.C.4. Founded 1917. 18,000 Successes.
Free!
 140 PAGES

Make **The DAILY SKETCH** YOUR Picture Paper.

WIRELESS IS THE WORLD'S FINEST HOBBY.
MAKE IT A PROFITABLE ONE.
SAVE MONEY, MAKE MONEY, NO OUTLAY.
JOIN THE ELECTROSET CLUB
 Every Wireless Salesman, Experimenter, Constructor should write his name and address in the margin, and post in 1d. unsealed envelope for particulars, and FREE 1,000 illustration catalogue of all makes, components, kits and sets.
ELECTROSETS, SOLIHULL, BIRMINGHAM (W.C.)

The ACME of CRAFTSMANSHIP
 High Grade RADIO GRAMOPHONE CABINET
 of exclusive modern design, with record wells, hand-made and polished, on Queen Anne legs.
 Figured Oak £27 13 6
 Figured Walnut or Mahogany £9 9 0 (Carriage Paid.)
 Illustrated Catalogue Free. Cabinets made to order a speciality.
GILBERT Cabinet Maker, SWINDON
 Estimates Free. Estd. 1866.

WE invite readers to support our Advertisers—care being taken to accept only announcements of reputable firms!

WHAT I THOUGHT OF THE EXHIBITION

—continued from page 319

"Molison gets across!" shouted newspaper sellers. Splendid!

"Have you got your Filt?" eagerly cried an assistant.

"No," I replied soberly, feeling mean again because I use a water-pipe as earth (thereby corroding it, causing wear and tear on the lead and incensing the local water-board).

Here we are at the Multitone stand.

Potentiometer Tone-Control

"Who are you from, may I ask?" No one. The deficiency was overlooked, however. An interesting transformer idea, this. A potentiometer effects tone-control. It is claimed that you can produce the response curve you want. I have samples at my lab. awaiting test when I get back from this aerial tour. I shall be most interested in the results.

Telsen's have a new range of components. Their "Telonor" is an elaborate escutcheon plate to which various components may be affixed at the back. Screened tuning coils represent an incursion into more ambitious fields. A ganged drum-drive with scale calibrated in wavelengths will appeal to those who are one-knob-minded.

Reliable and Smooth

Ormond's deserve special mention for their new 55 to 1 slow-motion condensers.

I think they ought to draw special attention to the difference between

this new model at 7s. 6d. and the 6s. 6d. type. The latter was used on the "S.T.300," and, while good value, was inclined to "stick" now and again. The new model is of an entirely different type, and the movement is extraordinarily reliable and smooth.

Pruning Prices

Igranic's have reduced prices to a point which should bring them in a great additional volume of business. Other firms, on the whole, have made few reductions, although I firmly believe that the home-constructor market would be greatly expanded by a pruning of prices.

Users of D.C. mains will be pleased to hear of new types of valve. Variable-mu valves are proving popular commercially—especially in mains sets.

British Radiophone have produced what I always felt was needed—a unit consisting of coils and ganged condensers. For too long have coil makers blamed the condenser people and vice versa.

In Sorry Straits

The exhibition was 100 per cent British. From a purely technical point of view—since science recognises no frontiers—this is a pity. We

"Modern Wireless"

The Leading Shilling Radio Magazine

Have you read "World's Programmes"? A Special feature which tells you how, when and where to hear those Foreigners. Don't miss this fascinating feature—Full of valuable information about alternative programmes.

Polar and J.B. have come out with new ganged condensers guaranteed to be really ganged. Colvern's, the coil specialists, are apparently ready to meet any competition. The Lissen stand merited attention, and their Hypernik transformer is proving justly popular.

It is impossible to mention all the firms whose products evoked interest. Remember those two-hundred-and-eighty stands!

Garrard's should be noted in connection with a simple record-changer.

should be in sorry straits without the contributions which German, Dutch, French and American inventors have made to radio—not to mention the Italian founder of wireless.

But an examination of the stands showed that British set and component manufacturers have little to learn, and a good deal to teach their foreign competitors. It has become an industry to be proud of, and an industry to support.

INDEX TO ADVERTISERS

Amalgamated-Press Annuals	Page 312
Belling & Lee, Ltd.	360
British Blue Spot Co., Ltd.	Cover iii
Bulgin, A. F., & Co., Ltd.	387
Burne-Jones & Co., Ltd.	368
Carrington Manfg. Co., Ltd.	386
Clarke, H., & Co. (M/cr.), Ltd.	381
Colvern, Ltd.	379
Direct Radio	383
Dubiller Condenser Co. (1925), Ltd.	336
Edison Swan Electric Co., Ltd.	Cover iv
Electroets	387
Ferranti, Ltd.	311, 382
Formo Co.	368

Gilbert, J. C. (Cabinets)	Page 387
Graham Farish, Ltd.	375
Heyberd, F. C., & Co.	386
Henley's, W. T., Telegraph Works Co., Ltd.	881
Igranic Electric Co., Ltd.	371
Jackson Bros.	310
Lectro Linx, Ltd.	384
Lissen, Ltd.	377
London Electric Wire Co. & Smiths, Ltd.	Cover ii
Milnes Radio Co.	364
Mullard Wireless Service Co., Ltd.	314
Oldham & Son., Ltd.	385
Ormond Engineering Co., Ltd.	359
Peto-Scott Co., Ltd.	313
Pickett Bros. (Cabinets)	387
Ready Radio, Ltd.	335
Reproducers & Amplifiers, Ltd.	309

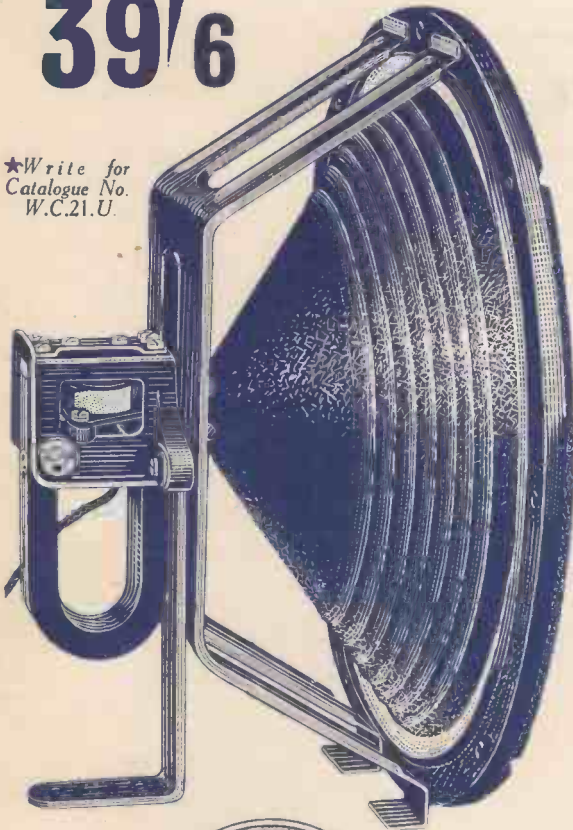
Standard Telephones & Cables, Ltd.	Page 363
"Storyteller"	364
Taylor, C.	386, 387
Telegraph Condenser Co., Ltd.	360
Telsen Electric Co., Ltd. 339, 340, 343, 344, 347, 348, 351, 352, 353, 356	
Technological Institute of Gt. Britain	387
Tunewell Radio, Ltd.	384
Varley Products	336
Ward & Goldstone, Ltd.	367
Westinghouse Brake & Saxby Signal Co., Ltd.	372
Wilkins & Wright, Ltd. (Utility)	368
Wingrove & Rogers, Ltd.	372
Wright & Weaire, Ltd.	372

All communications concerning advertising in "Wireless Constructor" must be made to John H. Lile, Ltd., 4, Ludgate Circus, London, E.C.4. Telephone: City 7261. FOR ADVT. RATES SEE PAGE 368.

POINTS THAT SELL BLUE SPOT 100U

39/6

★Write for
Catalogue No.
W.C.21.U.



Blue Spot

TRADE MARK

BLUE SPOT 100U
(Price, complete, 39/6)

has been specially recommended by
J. SCOTT-TAGGART for the "S.T.300"
RADIO-GRAM.

- 1 Can be used with normal or Pentode valves—no matching transformer required.
- 2 Exceptionally sensitive even to small inputs—therefore ideal for battery-operated as well as all-mains Sets.
- 3 Special reinforced scientifically designed cone.
- 4 Complete mounted to carefully designed chassis—ready for screwing to baffle board or fixing in cabinet.
- 5 Tone equal to any good moving-coil Speaker.
- 6 Astonishingly *natural* reproduction; upper register not sacrificed at the expense of the lower.
- 7 Particularly suited for all popular kit receivers.
- 8 Costs only 39/6 complete.
- 9 Obtainable in handsome oak cabinet, Model 100D, for 57/6.
- 10 Tried, Tested, Proved.
- 11 Guaranteed for twelve months.
- 12 Can be bought on Hire Purchase.
- 13 **BRITISH MADE.**

THE BRITISH BLUE SPOT COMPANY LTD

BLUE SPOT HOUSE, 94/96 ROSOMAN ST., ROSEBERY AVENUE, LONDON, E.C.1
Telephone: Clerkenwell 3570. Telegrams: "Bluspot, Isling, London."
Distributors for Northern England, Scotland and North Wales: H. C. RAWSON
(Sheffield and London), Ltd., 100, London Road, Sheffield; 22, St. Mary's
Parsonage, Manchester; 44-46, High Bridge, Newcastle; 37, 38, 39, Clyde
Place, Glasgow.

"GIVING THE FIRST CLASS SERVICE WHICH WAS EXPECTED OF THEM"

"... Radio enthusiasts can purchase them with every confidence. Their outputs are above the average and they give a clean, steady output"

says the Technical Editor of "Popular Wireless"

You can end all your H.T. battery troubles—you can take all the uncertainty out of battery buying, for Ediswan H.T. Batteries are now GUARANTEED against failure to give absolutely satisfactory service. No battery manufacturer could afford to give such a guarantee unless he had complete confidence in his product. Every single cell in every Ediswan battery must successfully pass four separate tests before it leaves the factory, and special precautions are taken to ensure perfect insulation between cells.



60 VOLTS	6.9	120 VOLTS	13.5
----------	-----	-----------	------

Standard Capacity. Where the anode current required does not exceed 10 M/a these batteries will give highly satisfactory service. If super-power valves are used, the super-capacity type should be used.

Super Capacity. These batteries have twice the capacity of the standard type, and, owing to their large reserve of power, last nearly three times as long when used as a replacement to a battery of standard capacity.

Look for the Ediswan Authorised Dealer sign when you buy!

Send for your FREE copy of "How to get the most out of your H.T. Battery." Full of useful data, hints and tips.

Guarantee

The Edison Swan Electric Co. Ltd. guarantee that Ediswan Batteries are of full voltage and capacity. Should any Ediswan Battery fail to give satisfactory service, we undertake to deal with customer's complaint within 24 hours of receipt of the defective battery.

EDISWAN

the Guaranteed

RADIO H.T. BATTERIES

