

The Wireless 6^d Constructor

RADIO CONSULTANT-IN-CHIEF CAPT. P. PECKERSLEY M.I.E.E.

Vol. XIII.

JANUARY, 1932.

No. 63.

"Makes any Set a World's
Programme's Catcher"

The KELSEY
ADAPTOR
(1932)

FULL
DETAILS
INSIDE

ALSO THIS MONTH

THE "VI-KING" SHORT-WAVER
THREE SELECTED SETS

JOHN SCOTT-TAGGART—

An Important Announcement

THESE ALLIES OF THE MOST SUCCESSFUL RECEIVERS—



SPAGHETTI FLEXIBLE RESISTANCES and the

LEWCOS^{REGD.} SUPER H.F. CHOKE

ARE SPECIFIED FOR THE "VI-KING" SHORT-WAVER and THREE SELECTED SETS DESCRIBED IN THIS ISSUE



LEWCOS Spaghetti Resistances have already proved their popularity. They are popular because their backing of over fifty years' experience in wire manufacture makes them supreme. Twenty different Resistance values from 300 to 100,000 ohms are made and range in price from 9d. to 1/6 each.

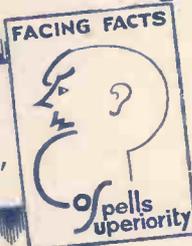
The LEWCOS Super H.F. Choke is generally recognised as an ideal Choke.

A fully descriptive leaflet Ref. R.33, giving tested values and a diagram showing the performance of this choke as compared with other makes, will be supplied on request

THIS IS THE ACTUAL SIZE OF THE LEWCOS SUPER H.F. CHOKE PRICE 6/-



THE LONDON ELECTRIC WIRE COMPANY AND SMITHS LIMITED Church Road, Leyton, London, E.10.



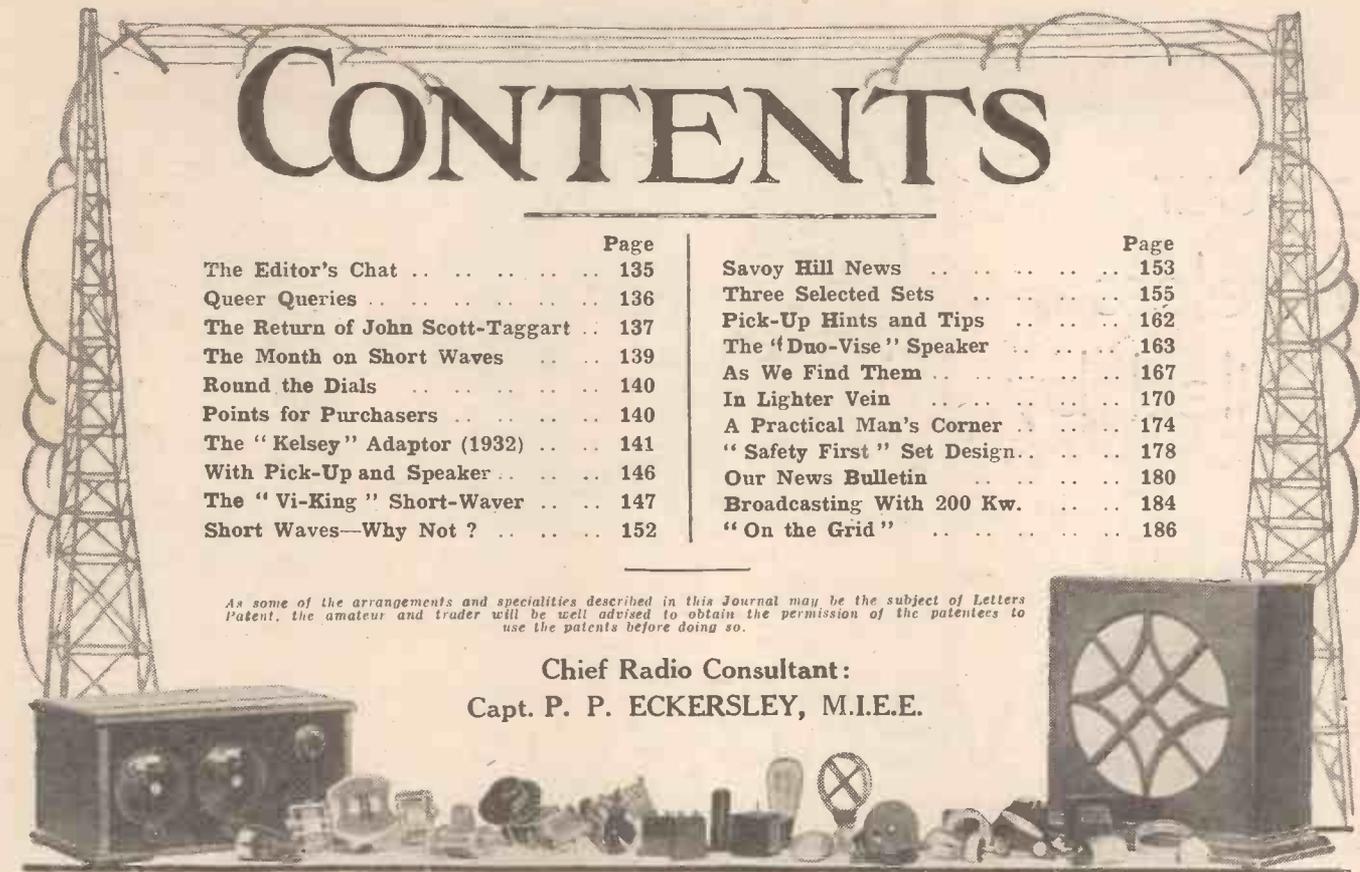
CONTENTS

	Page
The Editor's Chat	135
Queer Queries	136
The Return of John Scott-Taggart	137
The Month on Short Waves	139
Round the Dials	140
Points for Purchasers	140
The "Kelsey" Adaptor (1932)	141
With Pick-Up and Speaker	146
The "Vi-King" Short-Waver	147
Short Waves—Why Not?	152

	Page
Savoy Hill News	153
Three Selected Sets	155
Pick-Up Hints and Tips	162
The "Duo-Vise" Speaker	163
As We Find Them	167
In Lighter Vein	170
A Practical Man's Corner	174
"Safety First" Set Design	178
Our News Bulletin	180
Broadcasting With 200 Kw.	184
"On the Grid"	186

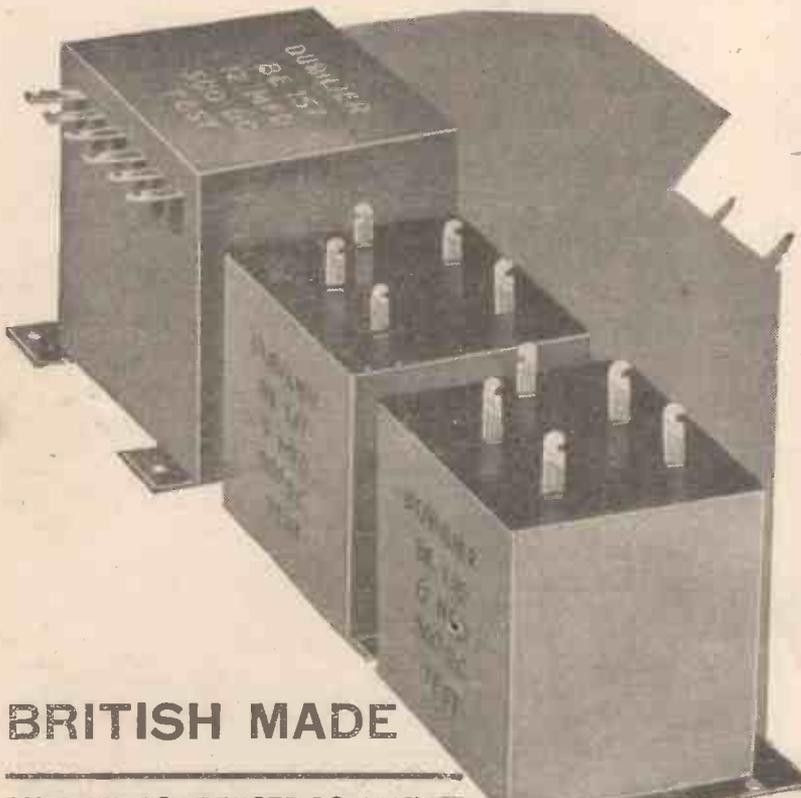
As some of the arrangements and specialities described in this Journal may be the subject of Letters Patent, the amateur and trader will be well advised to obtain the permission of the patentees to use the patents before doing so.

Chief Radio Consultant:
Capt. P. P. ECKERSLEY, M.I.E.E.



ENSURE RELIABILITY *by using*

DUBILIER PAPER CONDENSERS



Dubilier Condensers have earned a reputation for reliability second to none. The most modern manufacturing methods, long experience and that scrupulous attention to quality which characterises all Dubilier products, are features recognised and appreciated by leading set designers and radio manufacturers.

Where paper condensers in particular are required it's far safer to purchase condensers you can trust, *therefore—BUILD WITH DUBILIER.*

BRITISH MADE

Is your
Wireless
spoiled by
Station

Overlap★



★Selectivity is
to-day's great
Radio problem

CRISP, clear-cut programmes—free from irritating background noises and overlapping transmissions from other stations—are what everyone wants to-day. But you can't expect your Set to be selective if its Screened Grid Valve (or Valves) is inefficient. The Screened Grid Valve has a very great influence upon selectivity.

Due to its design and unique Mica Bridge Construction the Cossor Screened Grid Valve is exceptionally efficient. Its record low grid-anode capacity (of the order of .001 micro-microfarads) is not approached by any other valve. Its high stage gain enables it to give a big all-round improvement to any Screened Grid Receiver. Every Cossor S. G. Valve is available with a metallised glass bulb which improves selectivity still further at no extra cost.



COSSOR

ALL-BRITISH
**SCREENED GRID
VALVES**

A copy of the 72-page Cossor Wireless Book B11 will be sent you free on application to A. C. Cossor Ltd., Melody Dept., Highbury Grove, London, N. 3.

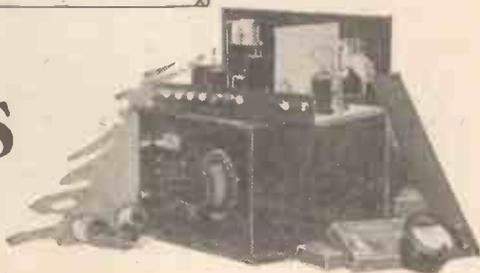
THE VALVES WITH THE MICA BRIDGE CONSTRUCTION

The WIRELESS CONSTRUCTOR

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



THE EDITOR'S CHAT



The B.B.C.'s recent decision to provide an adequate broadcasting service for the Empire has resulted in an increased interest in short-wave working, and readers attracted to this fascinating aspect of radio are specially catered for this month. In addition, we present constructional details of three receivers chosen from the "77 Selected Circuits" given away last month.

THIS issue of the WIRELESS CONSTRUCTOR might aptly be termed a short-wave number, for, as you will see, we are devoting a good deal of space to the needs of short-wave enthusiasts.

Hardly a day goes by without short waves attracting more and more attention in the ranks of amateurs as well as among professional engineers. And the B.B.C.'s recent decision to build a brand-new Empire short-wave broadcasting station lends emphasis to the ever-growing importance of this branch of radio.

For Short Waves

The "Kelsey" Adaptor (1932 Model) is therefore of special interest. You will find it cheap and extremely easy to build; and with it you can quickly transform any set into a first-class, efficient short-waver.

The "Vi-King" Short-waver is a special little two-valver which has been designed by Mr. Victor King in response to numerous requests from readers of this magazine. If you have made up your mind to build yourself an economical and thoroughly reliable short-waver, you cannot do better than construct Mr. Victor King's model. It is O.K.

Another feature which one would like to draw your special attention to deals with three representative circuits chosen from our gift book, "77 Selected Circuits." These three circuits are the basis of three fine receivers. Full constructional details are given.

New Empire Station

The fact that the B.B.C. has decided to build a special short-wave

station will undoubtedly stimulate home-constructors' interest in short-wave sets.

Correspondence received from overseas has clearly demonstrated the demand for such a broadcasting service from the home country.

The Proposed Service

Ever since the inauguration of the short-wave service from 5SW at Chelmsford, Essex, the B.B.C. has

an important part of the scheme is the provision of a service at hours suitable to various places. Here is the outline of the plan submitted to the Imperial Conference:

One hour between 10 a.m. and 12 noon (British time) for an evening programme to Australia and New Zealand.

Two and a half hours between 2 and 6 p.m. for a "Colonial" programme, ending with a News Bulletin and Big Ben.

News as Well

A two-hour evening programme for South Africa, selected from the British home programme, but with a proportion of special matter such as a news bulletin.

1 a.m. to 2.15 a.m., a Canadian programme, including (for the benefit of the West Indies) a repetition of the Second News Bulletin.

Special items such as running commentaries on important home events.

An Immediate Improvement

B.B.C. programmes are still being broadcast from 5SW from 1 to 2 p.m. and from 7 p.m. to midnight, excluding periods when news is transmitted. Up to the present, National programmes have been selected for this service, but recently a change was made in this policy, so that either the London Regional or the London National programme might be sent out.

The wave-lengths used will at first be experimental, but will probably all be within the 20-to-30 metre band. The 5SW station at present works on 25.53 metres.

GREAT SUCCESS OF THE "I.E."

A UNIQUE TRIBUTE FROM THE TRADE.

"THE MOST POPULAR SET OF THE SEASON."

The Editor, "Wireless Constructor."

Dear Sir,—I am pleased to inform you of the success of the "I.E." From our experience there is little doubt that this receiver has had a much stronger appeal than any others described in the Technical Press this season.

Yours faithfully
(for Ready Radio, Ltd.),
IVOR W. E. HUSTLER,
Managing Director.

And thus we have one further proof of the pre-eminent position held by the "Wireless Constructor."

been spending about £20,000 a year on supplying the Empire with programmes from home.

It is believed that a full service would do much to foster trade with Great Britain, and the present B.B.C. plan is justified from this point of view.

Details of the type of programme to be sent out from the Empire station have still to be settled. But

QUEER QUERIES



Some details about unusual radio faults and some suggestions that may help you towards better reception.

By P. R. BIRD.

Is It Worth Bothering About?

RATHER an interesting question is that asked by a Croydon reader, who gets a "prolonged purrrp" when switching on. His set is a first-rater for quality, he says, and uses A.C. valves.

To quote his own words: "When I switch on there is first a long pause, then a prolonged purrrp, and then the programme coming in and quickly getting up to full strength and beautiful quality. What is the cause of the purrrp, and is it anything worth bothering about?"

The cause is temporary instability, due to the rapidly-altering conditions whilst the heaters of the A.C. valves are warming up to their work. If the set is a well-decoupled one, and its quality is really good, it is quite likely that when one of the valves is replaced ultimately the effect will disappear.

In any case, as it is only a momentary effect, and the normal reproduction is of "beautiful quality," it is hardly worth bothering about.

The S.G. Volume Control

"What I cannot make out about my H.F. volume control (screen H.T.) is that when I turn it full on results are never quite so good as when I 'go back' a shade, leaving one-tenth of the resistance cut out.

"At first I did not rumble this, but lately I have always kept the control turned back a little, and it certainly gives better distance that way. What is wrong?"

This question, recently raised by an Edinburgh reader, has often been asked before, in one form or another. And the answer is that nothing is wrong in most cases.

When volume control of an S.G. stage is effected by the potentiometer method, conditions are not the same as regards maximum-volume position

as they are on, say, an L.F. transformer's potentiometer across the secondary. In that instance the maximum volume is invariably obtained at the end of the slider's travel, intermediate positions giving corresponding intermediate results.

Where the potentiometer controls the voltage applied to the screen of

This right S.G. voltage may easily be somewhat lower than the maximum applied when the volume control is "hard over," so better results should be, and are, obtained when the voltage control is turned back to drop the applied volts a little.

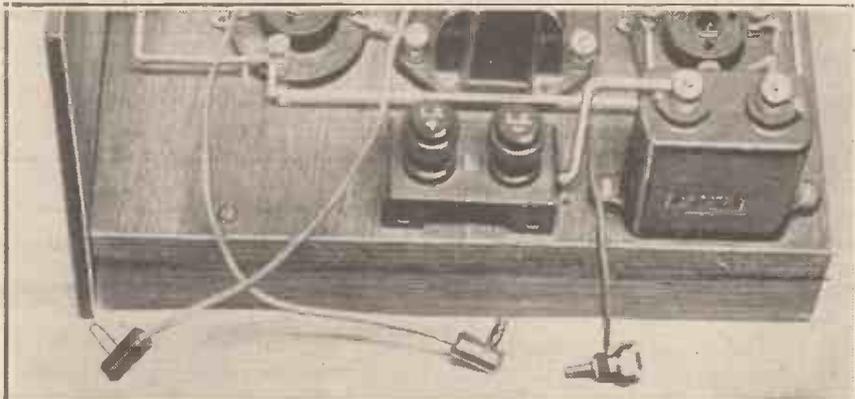
Disappointed With His Trickle-Charger

A Liverpool reader's disappointment with the results of trickle-charging has raised a question that has not been mentioned much of late, but which was sometimes emphasised when the trickle-charging system first came into vogue.

The point is this: Trickle-charging is an extremely good method of keeping a healthy accumulator in tip-top condition indefinitely, but normally it will not re-condition a badly run-down accumulator.

This Liverpool correspondent had not given the method a fair chance, because he had started it off with a discharged accumulator. If he had

USING A RAISED BASEBOARD



Easy wiring is greatly aided by a raised baseboard, as used in many "Wireless Constructor" designs. But be sure to employ good flex for the "down under" connections, as a bad contact here is an unmitigated nuisance hereafter!

an H.F. valve, however, an increase in applied screen potential may result in a slight drop in strength. This is because maximum amplification depends not on maximum volts being applied, but rather on the correct screened-grid volts for that particular valve at the anode voltage being used.

first had it charged at a service station, and then kept it in condition by trickle-charging, he would not have blamed that excellent system for being "inefficient."

His mistake was in supposing that it could give the necessary big charge to a badly run-down accumulator.

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, "Wireless Constructor," 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 Fleetway House or Tallis House.



I HAVE very much pleasure in announcing in this issue of the WIRELESS CONSTRUCTOR that I have persuaded Mr. John Scott-Taggart to return to radio-journalism. Old readers of the WIRELESS CONSTRUCTOR will, of course, need no introduction to Mr. Scott-Taggart, for he was the founder and editor-in-chief of the WIRELESS CONSTRUCTOR, and also of "Modern Wireless"; but new readers will be interested to know something about a man who has done so much for the science of wireless and who in the past has been responsible for some of the finest wireless sets ever designed.

Having successfully founded the WIRELESS CONSTRUCTOR, "Modern Wireless," and "Wireless" (the latter is now incorporated with "Popular Wireless"), Mr. Scott-Taggart very rapidly achieved a great reputation with all those interested in the art and hobby of home radio construction.

He Founded This Magazine

For several years he devoted his energies almost entirely to radio journalism, but eventually he decided—for a time, at any rate—to retire from radio journalism in order to confine himself to professional consulting work.

On several occasions I endeavoured to persuade him again to associate

BY THE EDITOR

Mr. John Scott-Taggart, the famous inventor, engineer, and author, is to design a series of special "S.T." receivers exclusively for the "Wireless Constructor."

Everyone will remember his famous "S.T.100" set, which achieved a colossal popularity a few years ago, and no doubt there will be many who have first-hand knowledge of his many and varied contributions to the transmitting side of radio.

During the past three or four years "S.T." has travelled widely, and has paid several visits to the United States of America to study foreign radio and broad-casting conditions in order to obtain a world-wide perspective.

Mr. Scott-Taggart's "return" is no emergence from retirement of an old pioneer past his prime, but the return of a virile, alert figure to a concentrated attack on the problems of radio reception as they concern the home constructor. In short, the "Wireless Constructor" is to have the full benefit of his renewed specialisation, and he brings to this task all the accumulated experience and wisdom of the past full years.

himself with the WIRELESS CONSTRUCTOR, but was unsuccessful. Now at last I am happy to say I have succeeded in persuading Mr. Scott-Taggart to place his experience and inventive talent at the disposal of our readers.

In brief, I have been able to induce Mr. Scott-Taggart to enter into an arrangement whereby he designs a limited number of very special receivers for exclusive description in the WIRELESS CONSTRUCTOR. Before agreeing to my proposals, Mr. Scott-Taggart stipulated that the number of sets should be strictly limited in each year, so that he could concentrate on the design and inventive work required for each receiver. I at once concurred, and readers may rest assured that these special sets will be of really outstanding merit and performance, and fully worthy of Mr. Scott-Taggart's reputation.

The S.T. 300!

The first of these receivers, the S.T.300, will be described exclusively in the next issue of the WIRELESS CONSTRUCTOR, on sale January 15th. I am not going to give away any secrets now, but I can tell you this—that the S.T.300 is a very remarkable three-valve set. Beyond adding that a full-sized blue print of this receiver will be given away with every issue of the WIRELESS CONSTRUCTOR, I am not going to let the cat any farther out of the bag!

And now for a word or two about Mr. Scott-Taggart himself.

Those who to-day work with valves in a routine manner are apt to forget

The Return of John Scott-Taggart—continued

the pioneering work done by Mr. Scott-Taggart in expounding the theory and practical applications of the valve. His articles on the subject began to appear in 1917, and, although subjected to military censorship, were extraordinarily revelatory of the new technique of valves.

An "Early Starter"

In 1918 appeared the first comprehensive treatise on valve curves published in this country. It was a brilliant piece of original work, based on hundreds of measurements.

By the end of 1919 Mr. Scott-Taggart had become recognised as a leading authority on valves and their circuits. In that year Sir Ambrose Fleming (then Professor Fleming), the inventor of the two-electrode valve, paid striking tribute in his book, "The

which were probably the first valves specially designed for amateur use. The valves ordinarily used then were of the Army "R" type, or French valves.

His work from 1920 onwards followed three courses. As a technical author he wrote some dozen books, and over 500 articles, and he founded several wireless periodicals. The fact that over 750,000 copies of his books have been sold, and that the joint circulations of his papers reached 500,000 readers, shows the extent of his share in popularising broadcasting.

World Famous

As a specialist on wireless inventions, both from a technical and legal aspect, he achieved international fame. He became consultant to the Radio Communication Company,

practised, preferring to remain a consulting engineer.

Readers of this journal will probably be most interested in Mr. Scott-Taggart's third activity, viz., inventing and designing. The general public, who naturally do not study patent specifications, do not realise the wide extent of his inventions.

Much Useful Work

Mr. Scott-Taggart has over thirty patents to his credit, and these mostly cover broad principles. Their importance is best judged by the standing of the companies who have acquired them, e.g. Edison Swan Electric Co., Ltd., Radio Communication Co., Ltd., the Marconi Co., Telefunken (Germany), La Radiotechnique (largest valve manufacturers in France), Hazeltine Corporation of America, Marconi Co. of Canada, Commercial Cable Co., etc.

Hundreds of ships have been fitted with radio apparatus under his patents. Probably two out of three American receivers were at one time licensed under the Hazeltine Corporation group of patents, which include Mr. Scott-Taggart's U.S.A. patent for neutralising. Professor Hazeltine, the inventor in America of the neutrodyne, told a gathering of British manufacturers: "Mr. Scott-Taggart has done in England what I did in America."

Many of Mr. Scott-Taggart's inventions were published in the wireless papers he owned. The famous S.T.100 set, described in "Modern Wireless," had an enormous vogue, and was the first of a series produced either by himself or under his direction.

In "Solodyne" Days

His thoroughness was exemplified by his establishment of the Elstree Laboratories, of which he was Technical Director. He gathered together a group of able engineers, and sets of unusual merit were evolved, e.g. the "Elstree" Six, and the "Solodyne." With the latter set, both one-knob tuning and screened coils were introduced to the public. Yet these features are now so commonplace that we are inclined to forget their origin.

Mr. Scott-Taggart's record does not suggest that he is one to be satisfied with past laurels, and readers can look forward to benefiting to the utmost from his inventive genius.

(Continued on opposite page.)



"S.-T." TO-DAY

A photo taken a few weeks ago at Tallis House. New readers will no doubt be astonished that such a young man can have achieved so much; but then the science of radio itself is still youthful in years.

Thermionic Valve," to "Mr. Scott-Taggart's excellent articles," and the book contained numerous extracts, all duly acknowledged.

By the end of 1919, also, Mr. Scott-Taggart had already a reputation which resulted in his becoming wireless book critic to both the "Electrician" and the "Electrical Review," the leading journals of the electrical industry.

Designed Many Valves

In September, 1919, he became head of the Government Valve Department at the Ediswan works, and was responsible for the manufacture of different types of valves for the Government services. He also designed, and the Ediswan Company marketed, the E.S.2 and E.S.4 types of valves,

Ltd., Mullard Radio Valve Co., Ltd., The Gramophone Co., Ltd. (His Master's Voice), and other concerns.

He has acted in an advisory capacity for the Huth Gesellschaft (Germany), the De Forest Co. (U.S.A.), the Independent Radio Manufacturers, Inc. (the vast U.S.A. combine).

His reputation abroad may also be judged by the fact that the Radio Manufacturers' Association of America (the great society of manufacturers in that country) chose him as one of three British radio experts to advise them on valve matters.

In 1928 he was, after obtaining a high position in the Bar Final examinations, called to the Bar—a logical development of his interest in the legal side of inventions and patents. Although he is a barrister, he has never

THE MONTH ON SHORT-WAVES

"CONSTRUCTOR" short-wave fans, 'Shun! Hats off to our first "H.M." He is L. J. M., of London, W. (so modest a gent. that he asks me not to publish anything but his initials!).

His report is undoubtedly the best of those received on the first "H.M." test, and his initials (and, s-s-h! his name!) have been duly entered on my list of "Fans I would like to meet."

An "H.M." "Beanfeast"?

Who knows, perhaps one of these days when the list is long enough we can arrange to meet and have a combined "chin-wag" and "beanfeast." But more about that when the time is ripe, and when a few more of you CONSTRUCTOR fans have become "H.M.'s." (The more the merrier!)

Meanwhile, let us get down to business. This month, what with the really "hot-stuff" short-wave

designs, and the general "high-frequency" atmosphere of the whole issue, I'm confident that we shall be

THIS MONTH'S "H.M." STATION

Note for Newcomers.—Every month in these columns details are given of a short-wave transmission which readers are invited to receive and, if successful, to report in detail to the WIRELESS CONSTRUCTOR. Those sending in the best reports receive "honourable mention" in these columns, and are thereafter styled WIRELESS CONSTRUCTOR "H.M.'s." The station selected for this month's test is a particularly easy one, for the benefit of those who have not previously handled a short-wave set.

Location: Lisbon, Portugal.
Call-sign: C T 1 A A.
Wave-length: 42.9 metres.
Time of Transmission: From 10 p.m. G.M.T. every Friday.
(Announcements are made in five languages, including English.)

welcoming a great number of newcomers to our short-wave "family circle."

So, fellow-hams, what about giving them a really practical welcome by telling them—straight from the horse's mouth, as it were—how, when, and where we find the more important stations? Good idea, eh? Then let us begin with our real "punch-merchants"—you know the ones, W 2 X A D and Co.

The "Punch Merchants"!

The first important station is W 2 X A D, Schenectady, on 19.56 metres. Programmes are radiated from 6-8 p.m. on weekdays, and from 6-9 p.m. on Saturdays and Sundays (also on 25.25 metres from 5 p.m. to 3 a.m. on Sundays).

Just above this station, on 19.72 metres, you will find W 8 X K, and he can be heard on Wednesdays and Saturdays from 12 noon to 4 p.m.

Then there is Rome (3 R O), on 25.4 metres; Chelmsford (G 5 S W), on 25.53 metres; Sydney, Australia (V K 2 M E), on 31.28 metres (transmissions are on Sundays from 5-7 a.m., 9.30 a.m. to 3.30 p.m., and 7-9 p.m.); W 2 X A F, Schenectady, N.Y., on 31.48 metres (this is the "punch merchant" - in - chief), programmes from 10.30 p.m. to 4 a.m. daily; Melbourne, Australia (V K 3 M E), on 31.55 metres (transmissions are from 10-11.30 a.m. on Wednesday and Saturday), and Lisbon (C T 1 A A), on 42.9 metres, from 10 p.m. every Amami night!

THE RETURN OF JOHN SCOTT-TAGGART

—continued from page 138

The last three years have been full of technical activity for Mr. Scott-Taggart. Each year he has gone to the United States and studied radio developments there, both at the New York annual show and amongst engineers and the trade generally. Famous laboratories have been visited, and the trend of work discussed. In Europe he has studied radio developments in France, Switzerland, Austria, Italy and Germany.

As well as the first published description of his new receiver, the S.T.300, Mr. Scott-Taggart will also contribute a special article to our next issue which will undoubtedly create widespread interest among home constructors.

And apart from designing sets exclusively for future issues of the WIRELESS CONSTRUCTOR, Mr. Scott-

Taggart will also write regular exclusive features. I feel sure old and new readers of this famous radio magazine will join with me in extending a very hearty welcome on the occasion of "The Return of John Scott-Taggart."

MR. SCOTT-TAGGART'S INVITATION

Mr. John Scott-Taggart has suggested that in view of the work he is going to do for the "Wireless Constructor," readers in different parts of the country should have an opportunity of testing out thoroughly his S.T.300 and subsequent sets. He is prepared to give personal demonstrations, and readers who desire to take advantage of this generous offer should at once send a postcard (on which is merely put the reader's name and address) to Mr. Scott-Taggart, c/o "The Wireless Constructor."

Mr. Scott-Taggart will communicate direct with a limited number of readers chosen at random from his list.

THE "EXHIBITION" FOUR

Sir,—Having been intensely interested by your description of the "Exhibition" Four, which appeared in the October issue of the WIRELESS CONSTRUCTOR, I built this set for myself; and it is the only wireless set which I have ever constructed.

I can fully endorse your remarks on its sensitiveness, for in my house, which is situated in a particularly bad district for good reception, I have received signals with a 2-ft. indoor aerial, and have had Daventry at full loud-speaker strength with only my finger on the aerial terminal of the set and no aerial wire connected at all! Surely this is remarkable? I am extremely pleased with the way the set handles and with the tone of reproduction—in fact, it leaves little to be desired. Hoping that these remarks may be of some interest to you.

Yours faithfully,
DENYS SHOPPEE

Somerset. (Commander, R.N.).



ROUND *the* DIALS

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

So many of the medium-wave foreign stations are coming over extremely well at the time of writing that it is difficult to award the palm to any particular one. Unless, perhaps, it is Trieste.

“Rahdio Tree-est-ay”

Reports from all over the country place this station high in order of merit, and a large proportion of listeners find “Rahdio Tree-est-ay” not merely easy to get, but difficult to get rid of!

Like all really long-distance stations, Trieste is liable to strong “fading” variations, but as one harassed listener who could not shut him out remarked: “He nearly

always seems to fade in, and hardly ever weakens at all.”

Officially, Trieste is using 15 kw. on 247.7 metres, but both power and wave-length spread would certainly seem to be on a lavish scale. In daylight, however, he generally gives pride of place to Hilversum, which has been singularly good of late (298.8 metres). * * *

The new Prague station at Cesky Brod is another martinet of the medium waves. Many listeners who have not definitely identified this station will be able to do so if they remember that in the call Prague is pronounced “Praha.” Wave-length, 487 metres.

Budapest and Vienna are still

doing well, whilst Muhlacker, Heilsberg and some of the other Germans seem better than ever. Curiously enough, neither of our old favourites, Rome nor Stockholm, has been so strong of late, but Turin, Toulouse, Sottens, Katowice, Brussels, and Co., have made ample amends for that!

Long-Wave Conditions

On the long waves the results have been as good as ever before in the history of radio I should imagine. Even in daylight on a quite ordinary set it is often possible to rope in a round half-dozen or so, and the programme value is definitely high.

Radio Paris on a Sunday afternoon is so well known that few will need to be reminded of the pleasant music obtainable from this source. And now that Rex Palmer—formerly “Uncle Rex” of Savoy Hill—is to announce the sponsored programme from that station on Sunday, it is likely that even more listeners in this country will turn to Paris for their early afternoon entertainment.

The Warsaw “War”!

Warsaw seems determined to push all other long-wavers off the dial. Kalundborg is in mighty form, Oslo and Motala are doing fine, and the only blot on the long waves is—whisper it low—our own 5 X X. Not bad, of course—but certainly not good enough for present-day standards. F. F. C.

Highly Complimentary

An extraordinary compliment has been handed to the modern dry-battery—by the Alpine ice! It will be recalled that after Professor Picard’s famous balloon-ascend to the upper atmosphere he came down on a glacier and was rescued in dramatic circumstances.

Months after this two dry batteries which formed part of the expedition’s equipment were salvaged from the glacier, and found to be in perfect condition. They were Hellesen’s—and it says something for the modern battery that it retains its kick when buried in 15 ft. of ice!

A Useful List

Belling-Lee have just issued an attractive folder describing their many good lines for this season. These include the famous wander-plugs and plugs and sockets, of course; but familiar as constructors are with these, it is likely that they will find other equally handy gadgets among

POINTS FOR PURCHASERS

Interesting details from manufacturers about recent trade activities.

the fuse-holders, connectors, mounts, etc., that are listed in detail.

Applications for the list should be made to the firm at Queensway Works, Ponders End, Middlesex.

Polar Condensers

Students of condenser-development, as well as practical constructors, will be interested in the catalogue of the “Polar” condensers for this season.

Eleven different single types for tuning, half-a-dozen “gangs,” as many reaction condensers, and so forth, show how specialised this side of radio has become, and constructors will certainly find plenty to interest them in this catalogue.

(It is obtainable from Wingrove &

Rogers, Ltd., Arundel Chambers, 188-9, Strand, London, W.C.2.)

Dubilier Products

We are notified by Dubilier’s that supplies of their showcards, as well as of a new folder describing their products for the current season, can be obtained by the trade upon application to the Dubilier Condenser Co., Ltd., Ducou Works, North Acton, London, W.3.

Mains Receivers and Radio-Grams

The whole “Square Peak” range of mains receivers and radio-grams is described in an attractive folder obtainable from Varley (Oliver Pell Control, Ltd.), Kingsway House, London, W.C.2.

The descriptions include that of a 4-valve mains receiver (using 2 S.G.’s, power-grid detector, and super-power valve), and—among others—of a console radio-gramophone, the radio side of which is based on the same 4-valver circuit.

The KELSEY ADAPTOR (1932)



IN conversation with a friend recently I happened to mention that I was getting into the habit of using one of the American stations as my alternative programme.

The expression of surprise on my friend's face developed into a broad grin. "H'm," he muttered, "that's a good one, but I hadn't before realised how closely radio was allied to fishing!"

"In any case," he added, "even if I could assume—which I am afraid I can't—that the cost of the apparatus you are using wasn't prohibitive from the point of view of the home-

By G. T. KELSEY
(*"Wireless Constructor"* Technical Staff.)

"The Wireless Constructor" has great pleasure in presenting this full description of the latest "Kelsey" Short-Wave Adaptor. As is now generally known, Mr. Kelsey originated the ingenious idea of adapting ordinary sets for short waves by means of a simple "plug-in" unit. He freely gave the invention to the world, since when it has been copied in every country by countless manufacturers.

constructor, I fail to see the alternative programme value of a station

that does not come over until some unearthly hour in the morning."

To cut a long story short, that did it! I asked him to come round one evening to see and hear for himself.

He Couldn't Believe It!

So he came round, and when he arrived he saw me take a tiny unit—which could be balanced on the palm of one hand—and attach it to the side of the set cabinet. He saw me take the detector valve out of my set and put it in the unit.

He saw me put a plug attached by a flexible lead to the unit into the

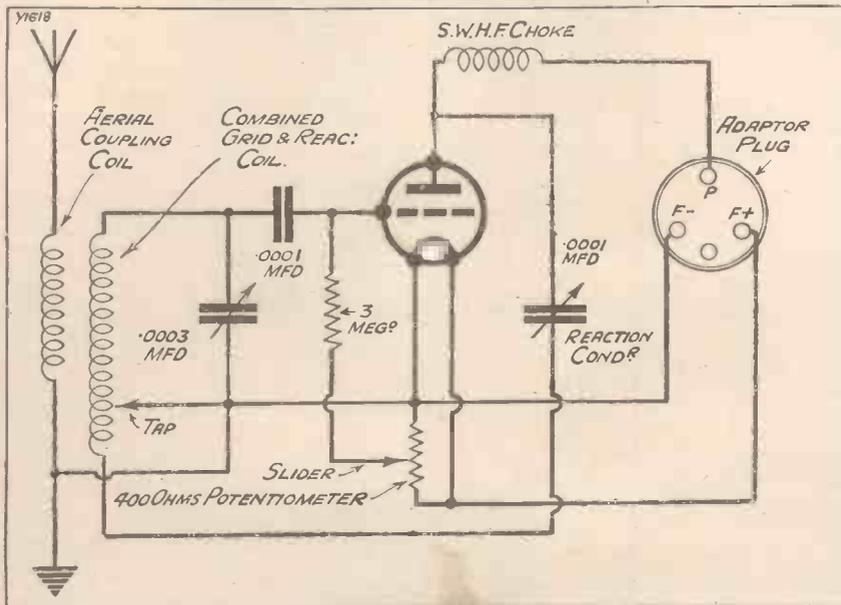
THE FEW PARTS NEEDED FOR THE UNIT

- 1 Strip of ebonite, 8 in. × 4 in. × $\frac{3}{8}$ in. (Peto-Scott, Goltone, Permeol, Parex, Lissen, Wearite).
- 4 Pieces of wood, sizes as follows: Two 4 in. × $3\frac{1}{2}$ in. × $\frac{3}{8}$ in., one 4 $\frac{1}{2}$ in. × 8 in. × $\frac{3}{8}$ in., and one 8 in. × 4 in. (the last of three-ply wood).
- 1 .0003-mfd. variable condenser (Utility, J.B., Cyldon, Polar, Lotus, Dubilier, Formo, Igranic).
- NOTE.—The condenser should not have a vernier drive unless it can be adapted to an extension handle.
- 1 .0001-mfd. air-dielectric reaction condenser (Polar, J.B., Peto-Scott, Formo, Cyldon).
- 1 Set of short-wave coils (see text). (Atlas, Igranic).
- 2 Single-coil mounts for plug-in coils (Bulgin, Wearite, Magnum, Ready Radio).
- 1 .0003-mfd. grid con-

denser, small type (Dubilier type 665, Formo, Ormond, Graham Farish).

NOTE ITS INGENIOUS SIMPLICITY

- 1 Valve holder (Graham Farish, Telsen, Igranic, Lotus, Lissen, Clix, Bulgin, Formo, Wearite, Dario).
 - 1 3-meg. grid leak and holder (Wearite, Dubilier, Telsen, Ferranti, Ediswan, Igranic, Varley, Graham Farish, Watmel).
 - 1 Short-wave H.F. choke (Magnum, Igranic, Wearite, Bulgin).
 - 1 400-ohm potentiometer (Ready Radio, Igranic, Sovereign, Lissen).
 - 2 Ebonite extension handles 4 in. overall in length (Bulgin).
 - 1 Slow-motion dial (Utility, Igranic, Ready Radio, J.B., Lissen, Lotus, Formo).
 - 1 Adaptor plug (see text) (Lissen).
- Wire, flex, screws, crocodile clip, copper strip (see text), etc.



The circuit of the adaptor is that of a complete detector, and it replaces that of the set which is being "adapted," and so makes the latter a short-waver with L.F. amplification.

The "Kelsey" Adaptor (1932)—*continued*

detector valve's socket in my set, and change over the aerial and earth leads.

And within ten minutes from the time he had arrived we were listening to America—*on the loud speaker!* Not, as my friend had suggested, at some "unearthly hour in the morning," but at 9.18, to be precise, in the evening.

That tiny unit was my 1932 short-wave adaptor!

How It Works

And that tiny unit, which can be built—using the best of everything—for something less than two pounds, can be added to *your* set and will enable you, too, to hear the American

stations, and dozens of others as well, from all parts of the world!

Interested? Good, then let me tell you some more about this fascinating little unit with its absolutely unlimited range of reception.

In order of importance, perhaps the first thing to bring forward is the fact that in order to use it you do not have to make a single alteration to your existing set. Nor do you have to touch the controls of your existing set—apart, of course, from having to switch it on—when searching on short waves.

Then we come to the question of operation. A year or so ago, when most of the world's short-wave

stations used only very low powers, tuning unquestionably was a very difficult matter.

But nowadays, with some of the stations using as much as 60 kilowatts of power (as much as the modern regional stations!), well, candidly, there's nothing in it.

So Simple!

It may take you an evening or two to get used to short-wave operating and generally to "feel your way about," but after that you will find it no more difficult to tune-in stations from America, Africa, Australia, in fact; from all over the world, than it is to log some of the more elusive continentals on the ordinary broadcast band. In any case, I am certain that there isn't a single one of you CONSTRUCTOR readers who couldn't tackle it successfully!

The same thing applies, only perhaps more so, to the question of construction. There is not more than an evening's work in the whole thing—you need only refer to the diagrams for confirmation of that fact.

Having, I hope, made clear the purpose of a short-wave adaptor for the benefit of new readers, I want now, before passing on to the construction, to say a word or two as to how this 1932 "hotted-up" adaptor surpasses the one I described in the WIRELESS CONSTRUCTOR some months ago.

No Hand-Capacity

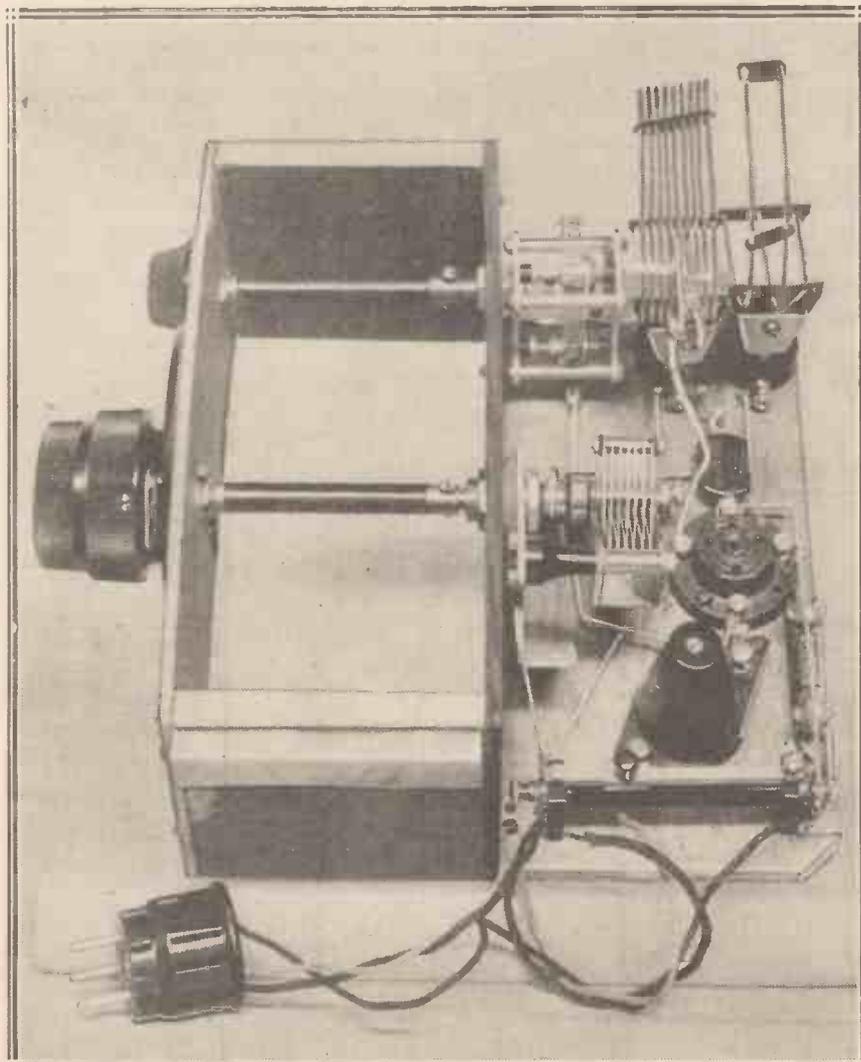
Many of you will no doubt remember the earlier model, possibly many of you are actually using it at the present time. Well, although perhaps the earlier model can truthfully be claimed to be as much of a "station-getter" as the 1932 version, there is no doubt at all that my new adaptor is streets ahead of it!

And the real secret of the improvement lies in the fact that with the new adaptor hand-capacity effects are absolutely non-existent!

Having tuned in a station, it is possible to take the hands right away from the tuning controls without it making the slightest bit of difference. And that is not all.

The mere fact that the hands are having absolutely no effect upon tuning means to say that it is possible to tune in weak stations very much more easily—even perhaps to tune in stations which you have not heard before.

ANYONE CAN TUNE IN THE SHORT-WAVERS!



The "Kelsey" Adaptor is so designed that there is complete freedom from hand-capacity effects by means of extension spindles on the two controls. You will find that it is almost as easy to tune in across-the-world stations on this unit as to tune in near-at-hand stations on the ordinary controls of the set.

The "Kelsey" Adaptor (1932)—continued

So that whether you are comparatively a newcomer, or whether you are an old adaptor fan, the 1932 adaptor is just the unit you want for an all-Empire Christmas, and a "DX" New

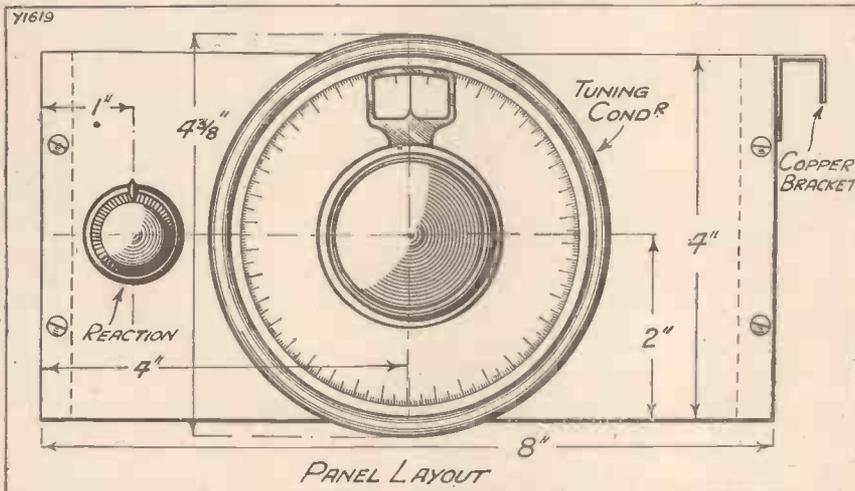
tuning condenser extension handle), and the small reaction control knob.

The layout of components on the baseboard is a very simple matter, especially if you refer to the "back-

to see that when the coils and valve are inserted into their respective holders they do not foul either the tuning or reaction condensers.

As for wiring, there is precious little of it, and what few connections there are to make you will be able to follow from the diagram.

ONLY TWO ADJUSTMENTS



All the normal controls on your set give way to the two knobs on the unit when this is in use. But don't imagine you will find the unit less selective than your set—whatever kind it is—for there is no difficulty in separating the short-wave stations.

Year as well. And, remember, it can be used with any two-, three- or four-valve set of the battery-driven type irrespective of the circuit employed.

All the details that you are likely to require with regard to components can be obtained from the special list given elsewhere in the article.

Commencing Construction

The actual construction should be commenced with the marking and drilling of the ebonite strip. (Shall we call it, for reference purposes; the panel?) And when you have done this (the necessary dimensions are given in the appropriate diagram) place it on top of the three-ply wood so that all four edges are absolutely flush, and then drill holes in the plywood corresponding exactly with those in the panel.

Next screw the panel to the baseboard (the 4 1/2 in. by 8 in. piece of wood), mount the tuning condenser and the reaction condenser on the panel, and fix the panel to the wooden side-pieces.

Before you screw the plywood front into position, first fix the extension handles to the two condenser spindles. When this is done it is then quite a simple matter to fix the plywood front, the slow-motion dial (which goes, of course, on the main

of-panel" diagram. But there is one thing that you should watch when you arrive at this stage, and that is

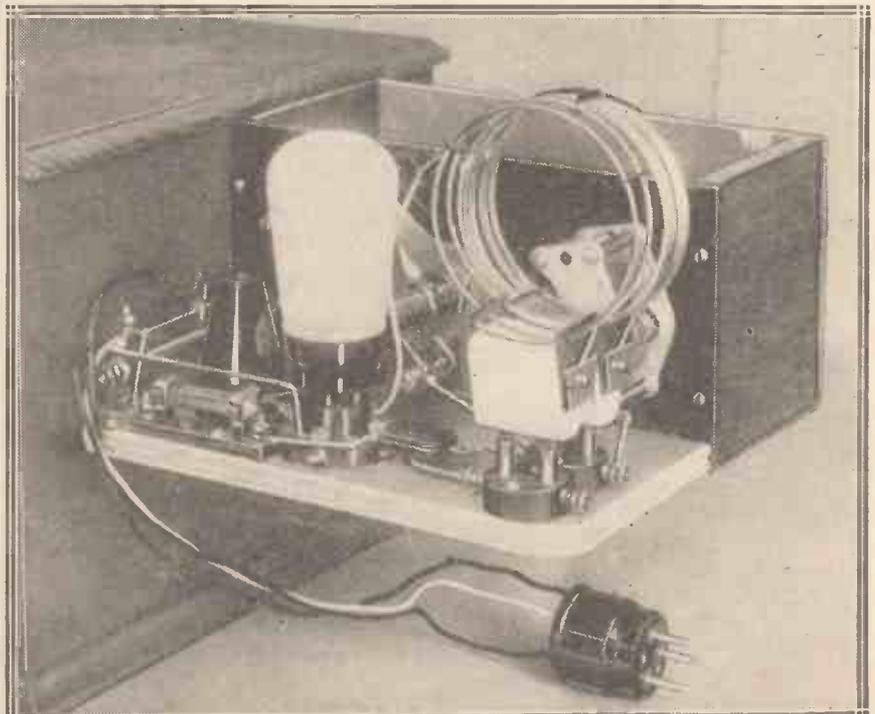
The Plug Connections

Now a word or two about the adaptor plug and the flex connections by which the unit is joined up to your set. The actual plug you can make yourself, if you wish, from the base of a defunct valve. Alternatively a suitable plug can be bought all ready for use, and it is what is commonly known as a gramophone pick-up adaptor plug.

The grid pin of this adaptor plug is not used, the anode pin should be joined by means of a piece of flex to the vacant terminal on the H.F. choke, and the two filament pins should be joined one to either side of the potentiometer.

For best results it is desirable that the end of the potentiometer nearer the panel should be joined to the adaptor-plug filament pin which, when the plug is inserted into the

IT HOOKS ON TO THE SIDE



All you have to do to place the adaptor in commission is to attach it to the side of your set's cabinet—a simple task, as explained in the article—and insert the plug in the detector valve holder. You can use your existing detector valve in the unit, as shown here.

The "Kelsey" Adaptor (1932)—continued

detector valve holder of your set, is joined to L.T. negative.

There is no limit, within reason, to the length of the flex leads joining the unit to your set, but there is no sense in having them any longer than is necessary to reach to the detector valve holder when the unit is attached to the side of your set cabinet.

Fixed in a Tick

The method of attaching the unit to the set cabinet, by the way, is very simple. It simply consists of a strip of metal screwed to the side of the adaptor, and bent over so that it just fits the piece of wood forming the side of the cabinet.

To put the unit into use is the work of a few moments. You first remove the detector valve from your set (if your set employs one or more H.F. stages the H.F. valves should be removed as well), and put it into the valve holder of the unit. Next you put the plug from the adaptor into the detector valve holder of the set (this applies whether the set employs H.F. stages or not), and change over the aerial and earth leads from the set to the unit.

Incidentally, with regard to the valve for the adaptor, if your present detector valve is something of an "old-stager" it might be a good scheme to buy a brand-new one specially for use on the short waves.

This would ensure of you getting the very best results, although, of course, a new valve is not essential unless your present detector valve has been on "active service" for a long time.

Among the valves that have been tried with very satisfactory results in the original adaptor may be mentioned the Mazda H.L.2 and H.L.210; Marconi H.2 and H.L.210; Cossor 210 H.F.; Mullard P.M.1 H.F.; Osram H.2 and H.L.210; and Six-Sixty 210 H.F.

The aerial should be connected to the terminal on the right of the coil holder nearest the back of the base-board (regarding the set from the back) and the earth to the other terminal on the same coil mount.

Put a 9-turn plug-in short-wave coil in the coil holder nearest the panel, and a 2-turn coil in the other one. The crocodile clip should be attached to a point about midway on the 9-turn coil, and all that you then have to do is to switch on.

For the first day or two when you have built the adaptor you would be wise to use 'phones instead of the loud speaker for searching, and they should be connected to the normal output terminals of your existing set.

It is only right to point out that 'phones will in any case have to be used for the very distant stations unless conditions happen to be exceptionally good, but after a day or two's practice you shouldn't experience much difficulty in receiving the more powerful American and almost all

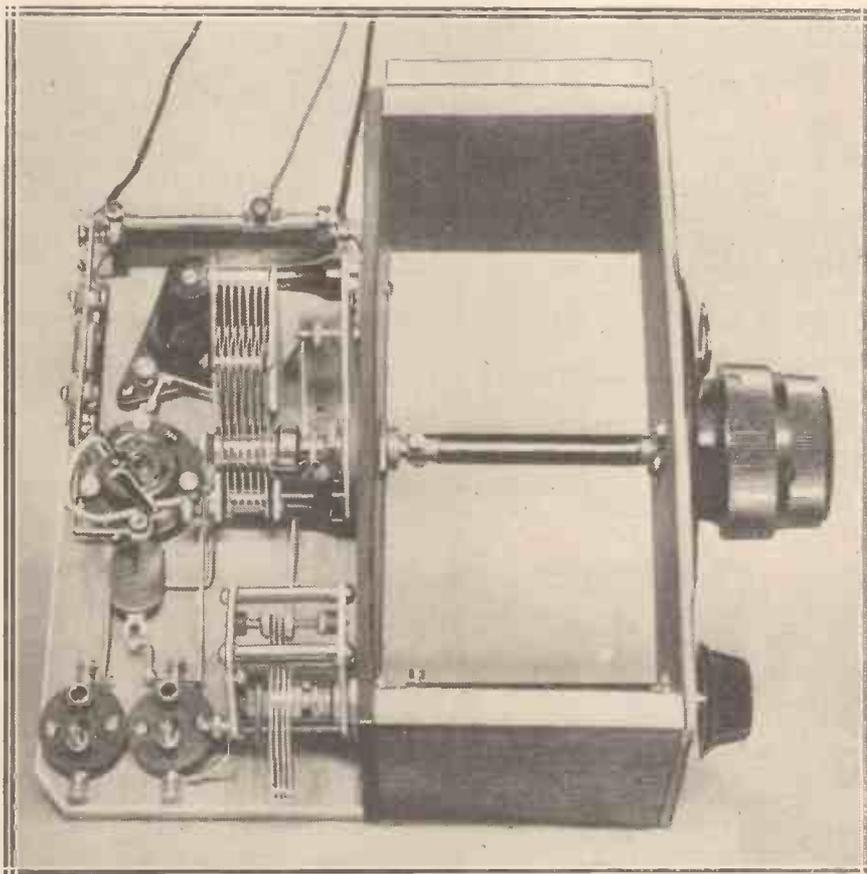
should be decreased until the set just stops oscillating, and by slight readjustment of the tuning condenser you should hear whatever happens to be on.

Some helpful notes regarding the adjustment and operation of the adaptor in order to get the very best results will be given in the feature "The Month On Short Waves" in the next issue of the WIRELESS CONSTRUCTOR.

The Wave-length Ranges

Meanwhile, to cover the very low waves (from 20 metres upwards) when

THE SECRET OF ITS SUCCESS



The overwhelming success of each previous "Kelsey" Adaptor was, of course, due to extreme simplicity in construction and operation, and the ease and rapidity with which it could transform any loud-speaker set into a short-waver of a highly efficient character. The 1932 model is even superior to its predecessors in this regard, while it is very inexpensive.

of the Continental short-wavers on the loud speaker.

Remember, when searching, that the tuning condenser *must* be rotated very slowly, and to simplify matters it is quite a good scheme to search with the set in an oscillating condition. Then, when you receive a carrier-wave (or, in less formidable terms, a howl), the reaction control

you have explored the band covered by the 9-turn coil, replace it with a 6-turn coil, using the crocodile clip, as before, at about the centre point. The 2-turn coil need not be changed.

The 6-turn coil should cover the band between about 20 and 40 metres, and with the 9-turn coil in use the adaptor should tune up to well over 70 metres.

WITH PICK-UP *and* SPEAKER



By
A. JOHNSON-RANDALL

H.M.V. Three-Valve Radio-Gram—A Handy Pick-Up.

WHEN writing in our Show number I gave a brief description of some of the H.M.V. radio-gram apparatus for 1932. Having at that time just visited the Gramophone Company's works at Hayes, and having seen for myself the great care taken to make the finished article a really high-grade product, I was naturally anxious to try out one or two of the new models.

Solid and Well Finished

I have now had the opportunity of testing the model 501 radio-gramophone, and I think that this three-valve "all-electric" instrument is the most compact radio-gram of its type that I have seen.

It is a solid-looking job, finished in walnut and designed to stand upon the table. The circuit comprises a screened-grid valve, and a power-grid detector, followed by a pentode.

The high-frequency stage is designed both for sensitivity and selectivity, a band-pass tuner being included in the aerial circuit.

There is a rather ingenious ganged sensitivity control which operates the reaction condenser, while at the same time varying the screening-grid voltage. It goes without saying that automatic wave-changing is provided.

High Sensitivity

After rectification the low-frequency impulses are amplified by a 7-1 ratio transformer, and then applied to the grid of a Marconi M.P.T.4 output valve. A permanent-magnet moving-coil loud speaker is included in the equipment.

Every effort has been made to create a receiver whose high sensi-

tivity is not marred by difficulty in manipulation. There is, for instance, one main tuning control which is calibrated in wave-lengths, and has an illuminated scale. This is conveniently placed near the turntable.

There are also two further controls, one for the aerial series condenser and the other for adjusting volume. In addition there is a combined wave-change, on-off, and gramophone switch.

VERY ATTRACTIVE



A first-class design. The H.M.V. model 501 "all-mains" receiver incorporates a moving-coil speaker and a complete gramophone equipment.

Although the set is intended for use with a conventional outdoor or indoor aerial, provision is also made for a mains aerial.

The pick-up is the standard H.M.V. No. 15, and the electric turntable motor is of the induction disc type of new design.

The results on test proved the receiver to possess good sensitivity and selectivity. The set is capable of bringing in most of the stations worth listening to on the medium and long wave-bands.

The power on the gramophone side is all that can be desired, and the reproduction sets a very high standard.

With the lid of the cabinet closed no sounds can be heard from the pick-up itself.

I have also tried the No. 11 pick-up unit, which is a pick-up having a universal adaptor enabling it to be fitted to any existing acoustic gramophone tone-arm.

This pick-up is supplied with a neat volume control. The makers realise that all amplifiers do not have similar response curves, and so they have provided the volume control with a clip to which can be attached resistances of different values. This feature permits the listener to adjust the tonal balance to suit his individual requirements.

An Adaptable Pick-Up

The pick-up is sensitive and gives very good results. I can recommend it to those who wish to adapt their existing acoustic gramophones for electrical reproduction. Used in conjunction with a decent two-valve amplifier it should give plenty of volume for domestic purposes.

Another item sent along by the H.M.V. people was a compact playing disk consisting of an electric motor (A.C. or D.C. as required), pick-up, and volume control. With the lid of the cabinet closed the outfit is dead silent in operation.

The "Vi-King" Short-Waver—continued

HERE ARE THE PARTS YOU WILL REQUIRE

- | | | |
|---|---|---|
| <p>1 Panel, 14 in. × 7 in. (Permcot, Goltone, Ready Radio, Lissen, Peto-Scott, Beecol, Wearite).</p> <p>1 Cabinet for above panel size, with baseboard 10 in. deep (Ready Radio, Camco, Pickett, Osborn, Peto-Scott).</p> <p>1 Sheet of copper foil for baseboard, 14 in. × 10 in. (Parex, Ready Radio, Peto-Scott).</p> <p>1 .0002-mfd. series-gap type short-wave condenser (Cyldon).</p> <p>NOTE.—If ordinary variable condenser is preferred, choose from following makes: Polar, J.B., Lotus, Igranic, Dubilier, Utility, Formo, Ormond. Condenser MUST be of slow-motion type, or fitted with vernier dial.</p> <p>1 Slow-motion dial (Igranic "Indigraph," Telsen, Ormond, J.B., Lotus, Formo).</p> <p>1 .0001-mfd. reaction condenser, air-</p> | <p>dielectric type (Formo, Polar, Cyldon, Peto-Scott).</p> <p>1 On-off switch (Bulgin, Goltone, Ready Radio, Lissen, Igranic, Lotus, Colvern, Peto-Scott, Telsen, Graham Farish).</p> <p>1 Neut.-type series aerial condenser (Peto-Scott, Magnum, J.B.).</p> <p>2 Valve holders (Telsen, Igranic, Lotus, Lissen, Clix, Graham Farish, Bulgin, Formo, Wearite, Magnum).</p> <p>2 .0003-mfd. fixed condensers (Ferranti, Telsen, Dubilier, T.C.C., Ediswan, Igranic, Mullard, Watmel, Goltone, Graham Farish, Formo).</p> <p>2 Short-wave type H.F. chokes (Magnum and Igranic in set, or Wearite).</p> <p>1 L.F. transformer of medium ratio (Lotus, Climax, Telsen, Igranic, Lissen, Varley, Ferranti, R.I., Lewcos, Goltone, Atlas, Formo).</p> | <p>1 2-megohm grid leak and holder (Graham Farish, Dubilier, Telsen, Ferranti, Ediswan, Igranic, Mullard, Varley).</p> <p>1 2-mfd. fixed condenser (Telsen, Formo, T.C.C., Igranic, Dubilier, Ferranti, Hydra).</p> <p>1 400-ohm potentiometer, baseboard-mounting type (Ready Radio, Igranic, Sovereign, Lissen).</p> <p>1 25,000-ohm Spaghetti resistance (Bulgin, Ready Radio, Lewcos, Varley, Magnum, Peto-Scott, Sovereign, Graham Farish, Telsen, Goltone, Igranic).</p> <p>9 Engraved-type terminals (Clix, Belling & Lee, Igranic, Bulgin, Eelex).</p> <p>1 Set of C6pex short-wave coils, with special base (Peto-Scott).</p> <p>2 Packets of Jiffilix (Ready Radio).
Screws, flex, crocodile clip, etc.</p> |
|---|---|---|

fundamentally the circuit is quite straightforward, and as a matter of fact it is the refinements which contribute more than anything else to the success of short-wave ether-searching.

What is perhaps one of the most interesting features about this new short-waver of mine is the way in which it is tuned. Have a look at the circuit diagram, and you will notice that the moving vanes of the tuning condenser appear not to be connected in circuit at all! As a matter of fact, they are not!

The tuning condenser is really two condensers connected in series with a maximum effective capacity of .0002 microfarad, and by connecting these condensers, as shown in the circuit diagram it is possible not only to reduce hand-capacity effects (that alone would justify the scheme), but, what is of greater importance, absolutely do away with all mechanical and electrical noises due to the condenser itself.

Other Refinements

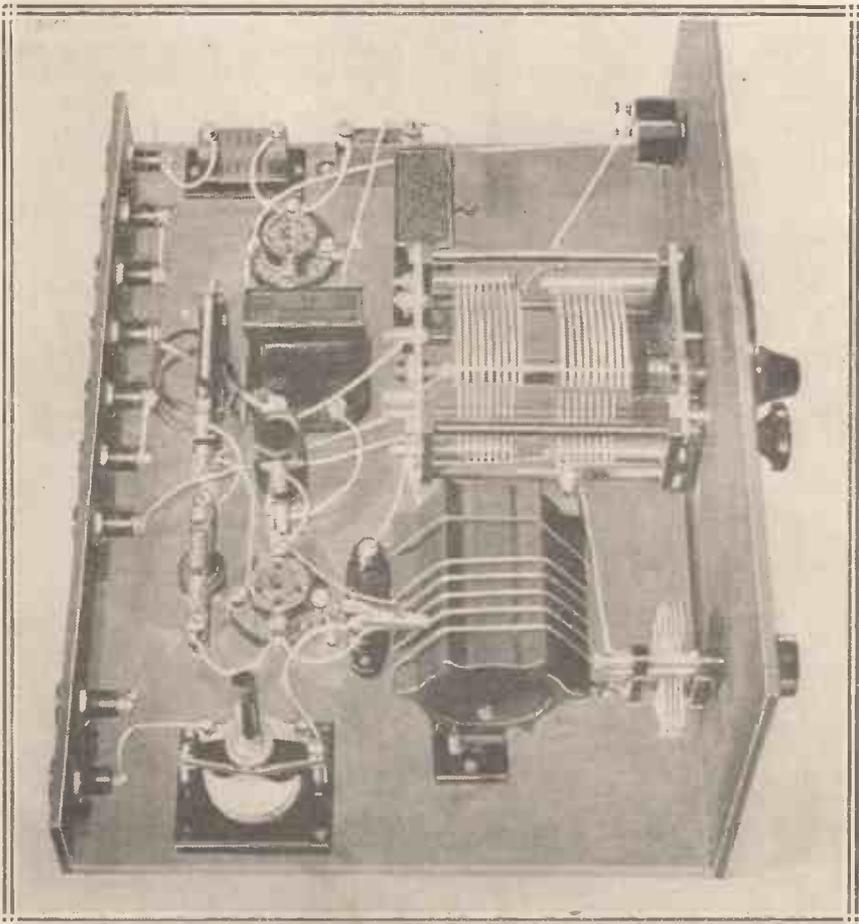
I think it is only fair to say that such noises do not occur with all ordinary types of tuning condensers, and, in any case, it is necessary to point out that these noises never show up with any condenser of reliable make on any but these very short waves. So don't go trying series-gaps, as they are called, in your ordinary broadcast set, for if you do you will be writing to tell me that they make no difference!

The other refinements of interest in this new design are, first, the inclusion

of a grid-leak potentiometer by which it is possible to make reaction as smooth as possible (a very necessary

feature for successful short-wave searching), and, secondly, an H.F. filter in the output circuit to reduce

YOUR TICKET TO THE COLONIES



The extremely high efficiency of this set is due, to a large extent, to the special "series gap" tuning condenser. It consists in effect of two .0001-mfd. variable condensers (shown above) connected in series, giving an effective capacity of .0002 mfd.

The "Vi-King" Short-Waver—continued

hand-capacity effects to an absolute minimum.

Thus, what with the series-gap condenser and the H.F. filter, it is obvious that this is no ordinary short-waver. It's a "hot-stuff" short-waver that you can make, and with which you can tune in those fascinating stations thousands of miles away.

My advice is to have a shot at it, and I'll go so far as to say that you will not have a single regret from the moment you first switch it on. At least, you will probably have one regret—that you have not previously had a short-waver!

A Recommendation

You will find a list of the components with which to build this set elsewhere in the article, and as you will have gathered from my previous remarks, you are not absolutely bound to use a condenser of the series-gap variety, though, candidly, you have my strongest recommendation to follow the original in this respect.

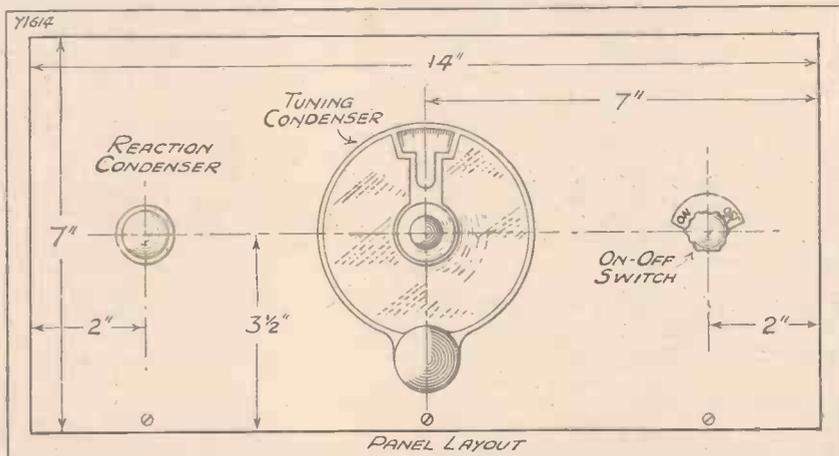
If you do use an ordinary condenser, choose one of the many excellent makes advertised in this journal. I

say that in all sincerity, because I happen to have tried them all.

When you have collected the various

mount any of the panel components, cover the whole of the baseboard with a layer of copper foil.

A PLEASING PANEL LAYOUT



There are only three components to mount on the panel, and as they are all arranged on the one central line you should experience no difficulty in the drilling. Make sure that you fix the vernier dial firmly, because in a short-waver there is nothing worse than a "sloppy" tuning control.

parts, commence by drilling your panel in accordance with the diagram provided, screw the panel to the baseboard, and then, before you

The baseboard components, which should be fitted as soon as you have finished securing those on the panel, will hold the copper foil in place, but to prevent it curling up at the edges it is a good scheme to tack it all the way round.

By the way, when securing such components as the coil mounts, the valve holders—in fact, any of the components in which there is a possibility of the metal parts being shorted on the foil-covered baseboard—cut a piece of thick brown paper to the appropriate shape and insert it between the component and the foil.

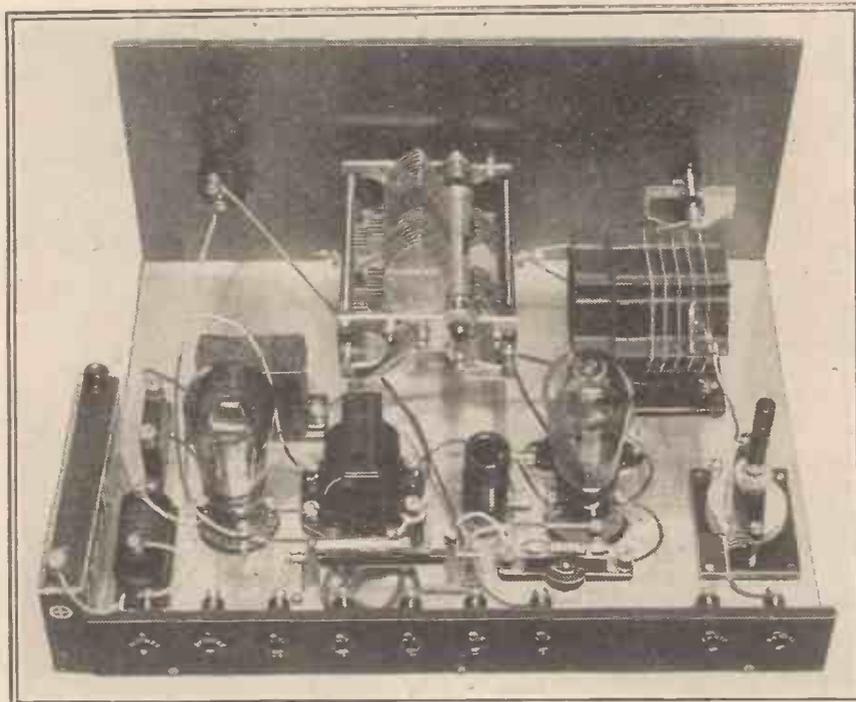
The Simple Coil

With regard to the coil and its base, the spacing of the pins and sockets is not very critical, and so long as you follow the same general arrangement as that shown in the wiring diagram you will not be likely to go very far wrong.

The coil itself, which should be wound on a 3-in. length of ribbed ebonite former measuring 3 in. in diam. to the outside of the ribs, is quite simple to make, although the commercial model available is a very nice job, and will not cost you very much more than if you make it yourself.

The grid coil, which is the spaced winding, consists of five turns of No. 18 gauge tinned copper wire, with about a 1/4-in. space between each

ARRANGED FOR EASY WIRING



The layout of this set has been arranged so that every wire is as short as possible, the work of connecting is therefore greatly simplified. This photograph shows very clearly the short-wave coil and the series coupling condenser. The direct method of joining these up to the aerial terminal should be noted.

The "Vi-King" Short-Waver—continued

THE "WIRELESS CONSTRUCTOR" "VI-KING" SHORT-WAVER (Circuit: Det. and 1 L.F.)

VALVES.

1st (nearest coil): Special detector or H.L. or H.F. type.
2nd: L. or L.F. type.

NOTE.—2-, 4-, or 6-volt valves can be used satisfactorily in this set.

VOLTAGES.

L.F.: 2, 4, or 6 volts, to suit valves.
H.T.+1: 50 to 80 volts (adjust this voltage to obtain smooth reaction control).
H.T.+2: 100 or 120 volts.
G.B.: 1½ to 6 volts, depending upon valve used for V₂ (see maker's recommendation).

CONTROLS.

(Working from left to right of panel.)

1st: Reaction control (turn in clockwise direction to increase).
2nd: Main tuning control. Should always be moved very slowly.
3rd: On-off switch.

ADJUSTMENTS.

Attach clip from series aerial condenser to grid coil winding, and adjust position for best results. Clip should be used as near to baseboard-edge end of coil as possible, providing set will still oscillate satisfactorily. If set will not oscillate, try (1) varying series aerial condenser; (2) adjusting slider of potentiometer; (3) altering position of tapping clip; (4) higher voltage on H.T.+1, and (5) (only if other remedies are not successful) different valve in detector position. For best results potentiometer slider should be used as near to detector end of potentiometer as is consistent with smooth reaction control. If reaction is "ploppy" or sudden, try (1) adjusting potentiometer slider; (2) varying series aerial condenser; (3) altering position of tapping clip, and (4) lower voltage on H.T.+1.

turn. The ends are joined to the two widely-spaced pins, the end nearer the edge of the former to the pin nearer the same edge.

The reaction coil consists of four turns of No. 26 D.S.C., commencing ½ in. from the finish of the first winding, and wound in the same direction. This latter point is very important.

Tuning Ranges

The ends of this winding are, of course, connected to the two remaining pins, taking care, as in the previous case, to join the end of the wiring nearer the edge of the former to the pin nearer the edge.

With this coil it is possible to tune from about 18 to 46 metres, in which band are to be found almost all of the important short-wave stations. But there is quite a lot of interest to be heard above 46 metres, and so, if you want to tune to the higher-wave stations (up to about 90 or 100 metres), make a second coil with twelve turns for the grid winding (the one that is done with the tinned copper wire) and about four or five turns for reaction, connecting the ends in exactly the same way as for the first coil.

Minimum of Wiring

With regard to the wiring, this is very simple in any case, because there is so very little of it, but it becomes still more easy if you use those handy little "Jiffilix" for connecting purposes.

You will notice that certain of the connections are made direct to the copper foil. That is a little dodge to reduce the wiring to a minimum, and

down to it by means of a washer and an ordinary wood-screw.

When you have finished the wiring (and it won't take you more than about half an hour) you can proceed to give the set a try-out. So follow the instructions given in the operating panel, join up a pair of 'phones and your aerial and earth, and switch on.

First of all, run round the dial very quickly, stopping at every ten degrees or so to ascertain whether the set will oscillate.

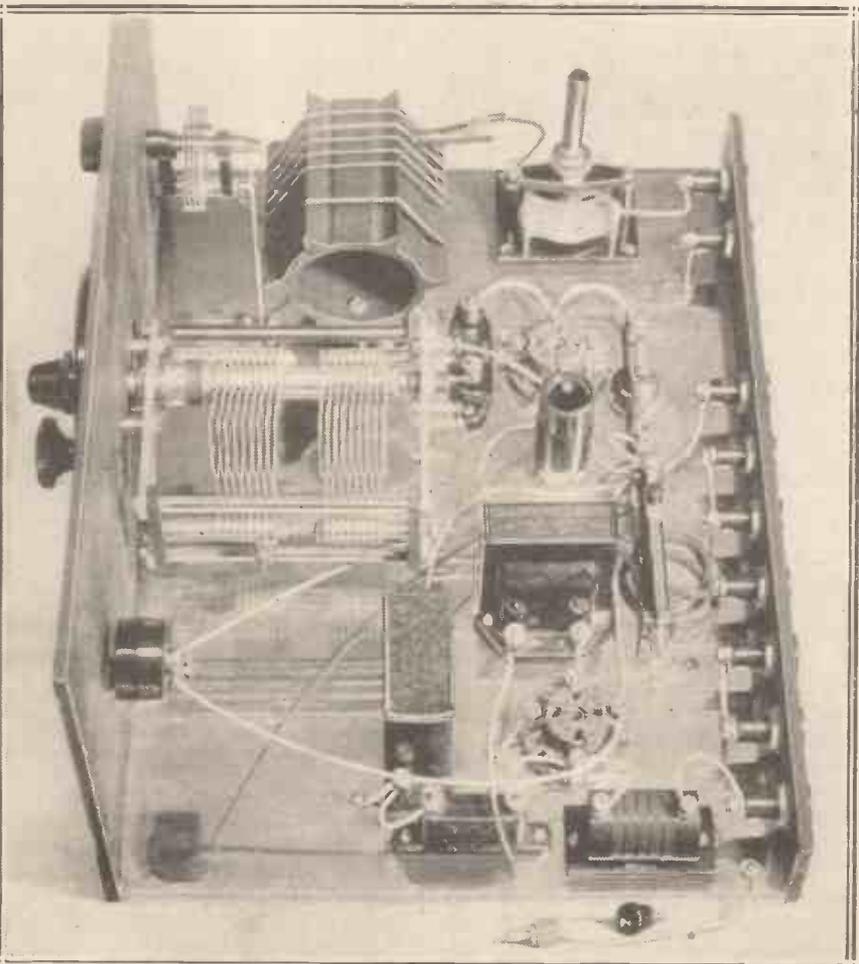
To do this you simply advance the reaction condenser at every ten degrees of the tuning condenser, noticing whether the set oscillates.

If you are in doubt as to whether the set is oscillating, touch with a moistened finger the fixed plates of the tuning condenser farthest removed from the panel, and

(Please turn to page 188.)

all you have to do where these connections occur is to scrape the foil, and screw the bared end of the wire

HAND-CAPACITY REDUCED TO A MINIMUM



To the right and in the foreground there is a small H.F. choke which is connected in series with the negative 'phone lead. It is largely to this component and the small condenser near it that we must attribute the set's remarkable freedom from hand-capacity.

SHORT WAVES—WHY NOT?

If you are new to short waves, or if you are wondering whether to take the plunge and build a receiver for the reception of stations on the higher frequencies, from all parts of the world, you will find this article contains many helpful hints.

By A. S. CLARK.

PERSONALLY, I think that when the majority of listeners go on to the short waves for the first time they are very sceptical about what they are going to hear. As they dig a pair of dusty 'phones out of the junk-box they have the idea that they are going backwards, going back to the sort of game they played when they used telephones to hear their local!

"Oh, Yeah!"

Of course, deep down, although they will not admit it to themselves even, they are hoping they are wrong and that some American station or the other will turn up with a nasal-toned announcer. Actually, if the set is a good one, such as the "Vi-King" short-waver described on other pages, there is not much chance of their failing.

Short waves seem to poke their noses in anywhere, the smallest aerial does not miss their notice, as they rapidly rebound from the Heaviside layer. Do you know, I borrowed Mr. King's latest the other night, and I picked up an American broadcasting station on a piece of D.C.C. wire round the room and a gas-pipe earth!

Not bad, did you say? No, it wasn't, but it was hardly fair on the electrons! But though short waves are so obliging, there is no reason why we should not do our part, for there is a rich reward for the enthusiast who goes about things in the best manner.

Like a "Lost Soul"

At first, the new listener on short waves feels something like a man in a foreign country who has lost his way and does not know anything at all about the language. So a few timely hints and tips may provide a short cut to the "destination" of world-wide results.

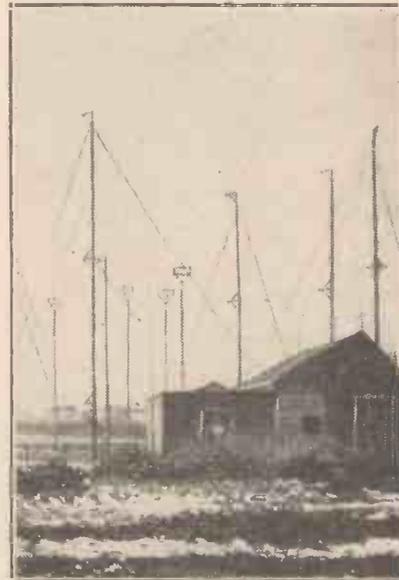
Well, first of all, you must listen when the stations you are after are on. That's easy, just like ordinary-wave listening. But next you must listen at the right times so far as conditions are concerned. That's a new one, isn't it?

It's very much the same, though, as the effect of light and dark on medium-wave broadcasting stations. No one tries for weak continentals until it gets dark, or at least until it begins to get dusk.

On short waves it is not so much a matter of light and dark over here only, for some bands will die out as it gets dark. And, again, the time of day at which various wave-lengths fade is largely governed by the time of year.

The moral to all of which is that when things seem dull on one short-wave band, just explore another, they may be just the opposite there. You will soon get to know the times to listen, and plenty of helpful hints are published on the subject.

HEARD EVERYWHERE!



These are some of the short-wave aeri-als at P C J, Holland, one of the most popular short-wave broadcasting stations. Just at present it is closed for the purpose of rebuilding.

As regards the pick-up system, use an outdoor aerial if you can. It need not be a long one and it need not be high; keep it away from things and insulate it well. And the earth—well, "the better the better."

Let's imagine you have just put the last wire on the fine short-waver I just mentioned, have connected up

and adjusted as instructed. The set oscillates all round the dial after a little adjustment, and by the time these have been made I expect you will have discovered at least one thing. The reading of the reaction, to keep the set just oscillating, is much more dependent on the tuning than it is with an ordinary set.

It's no more critical really, but you want to remember to use both your hands at once when tuning, and another thing is to move the tuning dial very slowly. If you don't, you may swish right through that very American that you are looking for.

Chase Every Chirp

Investigate every chirp you hear, because no matter how faint it is it may grow out of all recognition as you reduce the reaction and then stop the set oscillating. And having read that, don't turn to another page and say: "It's going to be much too difficult for me."

The first time you come across a station at really good strength—and such is not a red-letter occasion to be marked up on the wall—you will get the shock of your life. Not only will tuning not be critical, but you will find that you can hear him without the set oscillating, and before you actually reach his tuning position. Just like a powerful continental on medium waves.

You will find that with the two coils mentioned you can search through the whole of the short waves up to around 90 metres in a matter of minutes, and during that search you will find out where things are most lively; and that is the spot on which to concentrate for the time. Just one tip about this inspection search, and it concerns the keeping of the set just on the oscillating point.

Two Knobs to Twiddle

As you turn the tuning dial the set will no doubt go out of oscillation at some points, unless you are very "tricky" in the twisting of knobs, and so you increase the reaction a little and carry on. Now, it is just possible that in that moment that the receiver is not oscillating that you turn the tuning dial through a degree, and in that degree—"bang may go a station."

So when the set stops oscillating, stop turning the dial until you have increased the reaction enough to make the set oscillate at the very point that it stopped. Then you will be able to get everything that's going, just like an old hand, and the more you hear the more you will want to hear.

SAVOY HILL —NEWS—



Broadcasting House—B.B.C. and the Trade—Empire Broadcasting—More Raids?—Television Development—B.B.C. Auditions—Broadcasting and Labour—Aloof from Europe—Regional Progress.

Broadcasting House

THE change over from Savoy Hill goes on quietly and steadily.

It is now practically certain that the move will be complete by March 1st. But there will be no ceremonial occasion until May or June, when it is hoped that Royalty may visit Portland Place.

Incidentally, the rumours about unexpected "snags" in connection with the acoustics of the new studios have been grossly exaggerated. There were some minor adjustments, but rather less than were expected, and for the most part the studios have worked out admirably. Also the difficulties of adapting inside room to offices have been largely overcome.

B.B.C. and the Trade

The B.B.C. has become definitely more anxious than before to help and befriend the wireless trade. The standardisation of the mid-day demonstration transmissions throughout the country is a notable advance; the period 12 to 2.30 being occupied by useful transmissions, including adequate alternatives for the needs of traders and agents generally.

I hear the B.B.C. and its Trade Advisory Committee have under consideration a plan for simple technical education by radio to serve a two-fold object, namely, to make listeners better able to deal with interference and more disposed to buy British sets and apparatus.

Empire Broadcasting

I have been talking about the plans for Empire Broadcasting with friends in the B.B.C. The plans on the technical side seem to leave nothing to be desired. Mr. Ashbridge has gone about his task thoroughly and comprehensively.

I wish I were as happy about the programme side. The trouble is that the B.B.C. hopes to manage somehow to get along without any special or new programme organisation. This would be a fundamental, perhaps a fatal, error.

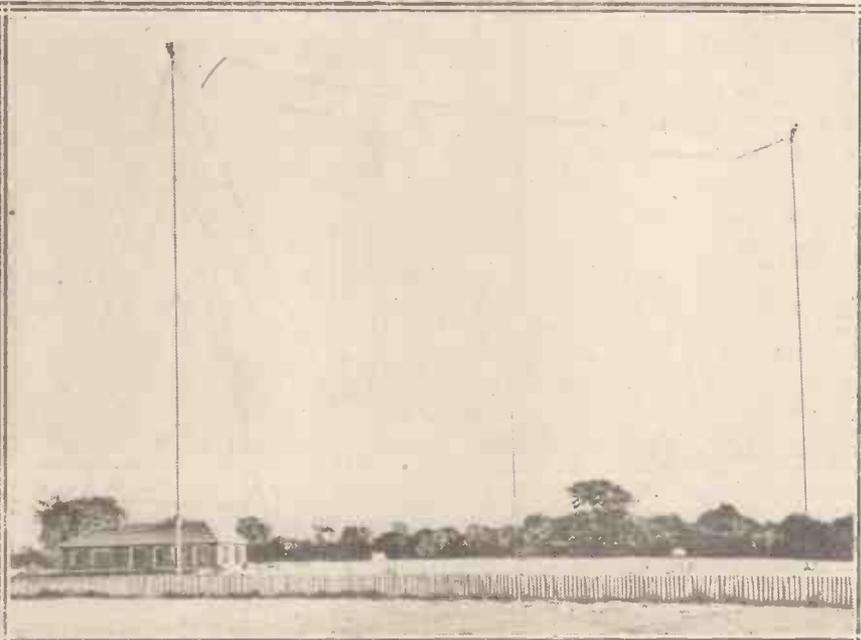
Among its numerous and conspicuous virtues a sense of "Empire" has never been marked in the programme attitude of the B.B.C., old or new. No doubt there will be much material

that could happen would be for Sir John Reith himself to get the service going.

It is unlikely, however, that Sir John could spare the time to do more than exercise general supervision, and this no doubt he will do in any event. Then if nobody from outside is to be brought in, I think the B.B.C. should make a special appointment.

Major Gladstone Murray, who now

THE NEW TUBULAR MASTS AT TATSFIELD



Tatsfield, the B.B.C.'s Kentish listening post, is being "gingered up" in readiness for the transatlantic relays which are anticipated during this winter. The photograph shows the new 120-ft. masts which have been installed there recently.

that can be simply relayed from the ordinary programmes.

But all of the material should be appropriately touched up. Here is a specialist job for someone of real Imperialist sensibility, and, frankly, I don't believe there is such a person on the programme staff of the B.B.C. at present.

No, it will not do for the B.B.C. to pretend to take this enterprise "in its stride." Perhaps the best thing

handles public relations, is a former Rhodes Scholar from Canada, and has the quality of ardent Imperialism that is wanted. Could he and would he be "seconded" or transferred for the special task of concentrating on the inauguration of Empire broadcasting? He at least would be careful to avoid the dangers of "patronage" and lapses of tact of which Mr. Gerald Barry is so fearful.

Savoy Hill News—continued

More Raids?

With the astonishing recent increases in the numbers of licensed listeners, the B.B.C. is already assured of a normal income next year and the year after, despite the new Treasury incursions. Of course, this presents a new danger in the possibility of a further and much more extensive raid in the spring.

Already the Treasury has its eyes on the growing total of receipts from licences. It is to be hoped that the B.B.C., having reached agreement for

B.B.C. Auditions

The Music Advisory Committee of the B.B.C., which is presided over by Sir Hugh Allen, has been concerning itself again with the conditions under which auditions are carried out at Savoy Hill.

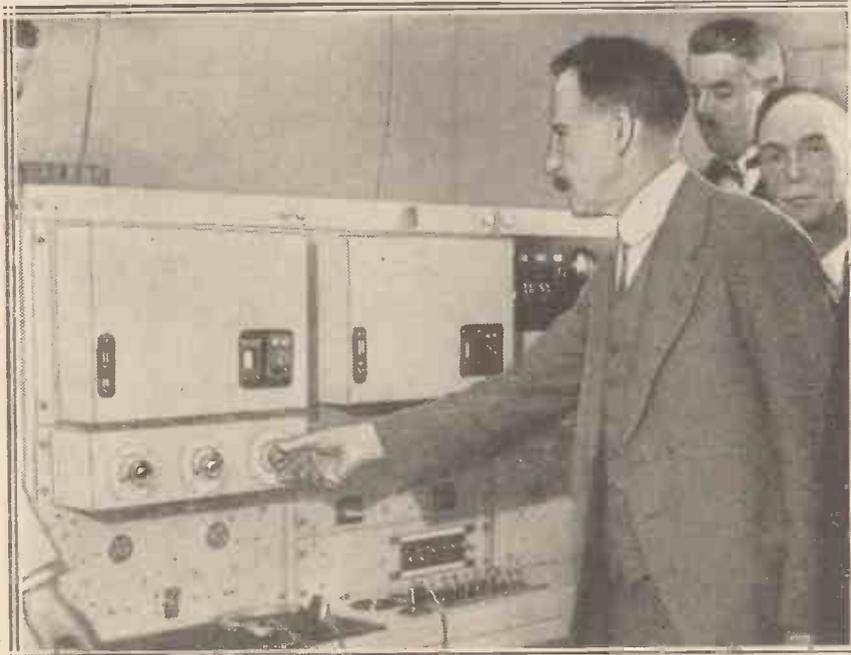
There is still a marked cleavage of opinion about the right function of the B.B.C. with regard to new talent. The "stick to your broadcasting last" school maintains that the B.B.C. should concern itself entirely with the requirements of the micro-

phone. has not made much impression on parliamentary or public opinion. It has, however, suggested to the other parties that if and when Labour is returned to power they may find themselves deprived of access to the microphone.

A move is on foot to safeguard the independence of the B.B.C. more than is done by the present Charter and Licence. It is also advocated in political circles that the "key men" at Savoy Hill should be held on long-term contracts to safeguard them against possible political victimisation.

I presume they mean the Director-General and the branch chiefs of Control Board standing. The Governors present a more difficult problem because they are actually political appointments. Therefore, the only real safeguard is through establishing the permanent staff in such a way that it need not fear political rancour or intrigue.

EXETER INSTALS A RADIO EXCHANGE



Radio Exchanges are springing up all over the country, and the latest city to adopt this system of distributing wireless programmes is Exeter. The Exchange was opened by the Mayor, who spoke to listeners over the "mike," and afterwards switched in the National Programme.

this year and next, will stand firm and resist any change until at least 1933.

Television Development

Next year there will be an important change in the attitude of the B.B.C. towards television. I understand that no final decision has yet been taken, but the issue rests between the possible abandonment of all television and the possible development of it independently of any outside company.

I believe the latter course will be taken with due caution, the deciding argument being that even if service television is still remote, the B.B.C. cannot afford to ignore its possibilities.

phone, leaving the profession outside to look after itself.

The "ministry of the fine arts" school, on the other hand, thinks the B.B.C. has a much wider obligation both to the profession and the individual artist.

The latter would impose upon the B.B.C. responsibility for selecting, and helping all good artistic material whether it was good for the microphone or not. The controversy is likely to become public in the near future.

Broadcasting and Labour

The attack on the B.B.C. by the Trade Union Congress because of alleged bias in the General Election

Aloof From Europe

The failure of the Rome Conference effectively to mitigate the wave-length situation has led to a new atmosphere of aloofness on the part of the B.B.C., which is now of opinion that nothing can be hoped from unofficial international action until Madrid next year.

The Empire broadcasting decision has also helped to re-orient B.B.C. policy towards the Dominions, and Colonies. How far the change will go it is impossible now to forecast, but my view is that it will go a long way. In future the B.B.C. will concern itself increasingly with helping purely British interests, and endeavouring to maintain a self-contained existence within the borders of the English-speaking world.

Regional Progress

There is now no doubt that economy measures have affected Regional programmes. There has been a noticeable change in the character of the North Regional transmissions, which are much less local than they were. On the other hand, the application of the idea of pooling and exchanging Regional material has been much better received than a reversion to the old "London S.B.?" principle would have been. The new tendency of B.B.C. programme policy is towards two main contrasts, the one provincial and the other metropolitan.



THREE SELECTED SETS

Selecting sets is tremendously interesting, isn't it? Evidently it must be, for we selected no less than 77 circuits, and gave details to every reader in the free book presented with last month's "Wireless Constructor"; and our readers then promptly selected certain ones they specially needed and asked for more details of layout, etc.! So this month we are giving brief how-to-make details of a two-, a three-, and a four-valver, based respectively on Circuits 23, 34, and 51 of the Free Book. And the descriptions are all-sufficient and self-contained, so you can start in on any of these straight away.

YOUR SHOPPING LIST—WITH NOTHING MISSED!

- | | | |
|--|---|--|
| <p>1 Panel, 12 in. × 7 in. (Peto-Scott, Lissen, Becol, Goltone, Wearite, Permeol).</p> <p>1 Cabinet, with baseboard 9 in. deep, to fit (Pickett, Camco, Osborn, Peto-Scott, Ready Radio, Gilbert).</p> <p>1 .0005-mfd. variable condenser (Lotus, Lissen, J.B., Igranic, Dubilier, Ready Radio, Formo, Polar, Cyldon, Ormond).</p> <p>1 .00075-mfd. solid-dielectric condenser (Ready Radio, Telsen, Ferranti).</p> <p>1 .0001-, .00013-, .00015-mfd. differential reaction condenser (Polar, J.B., Lissen, Igranic, Ready Radio, Wearite, Telsen, Graham Farish, Lotus, Magnum, Parex, Ormond, Cyldon, Formo).</p> <p>1 Three-contact switch (Ready Radio, Wearite, Magnum, Colvern, Telsen, Graham Farish).</p> <p>1 L.T. switch (Ready Radio, Telsen, Igranic, Lissen, Goltone, Lotus, Magnum, Bulgin, Wearite, Colvern).</p> | <p>1 "P.W." dual-range coil (Ready Radio, Magnum, Peto-Scott, Wearite, Parex, Goltone, R.I., Tunewell).</p> <p>1 .002-mfd. compression-type condenser (Sovereign, Formo, R.I., Goltone, Lewcos, Graham Farish, Polar, Igranic).</p> <p>1 25,000 Spaghetti resistance.</p> | <p>1 .0003-mfd. condenser (Ready Radio, Telsen, Formo, Mullard, Ediswan, Dubilier, T.C.C., Ferranti, Goltone, Sovereign).</p> <p>1 2-meg. leak and holder (Telsen, Dubilier, Ediswan, Lissen, Mullard, Ferranti, Igranic, Graham Farish).</p> <p>2 Valve holders (Benjamin, Igranic, W.B., Telsen, Lotus, Bulgin, Formo, Magnum, Wearite, Graham Farish, Dario).</p> |
|--|---|--|

ALL SET FOR THE "TWENTY-THREE" TWO



Selected Circuit No. 23 is a "hot" two-valver, and here the parts are shown correctly positioned. (1) is the differential reaction condenser; (2) Brookmans condenser, and (3) the dual-range coil. The pointing finger shows the .002 compression-type condenser and Spaghetti resistance that form the "Interleave" coupling.

- 1 H.F. choke (R.I., Telsen, Lewcos, Lissen, Lotus, Dubilier, Ready Radio, Peto-Scott, Climax, Tunewell, Graham Farish, Wearite, Parex, Magnum, Igranic, etc.).
- 1 L.F. transformer (Lissen Super, Igranic, Varley, Telsen, Ferranti, R.I., Mullard, Lewcos, Lotus, Graham Farish, Climax, etc.).
- 9 Terminals (Belling & Lee, Igranic, Clix, Eelex, Bulgin, Goltone).
- 1 Terminal strip, 12 in. × 2 in.
- Flex. wire, plugs, screws, etc.
- Glazite, Jiffilix, Quick-wire, Laccoline.

Three Selected Sets—continued

OUR free gift booklet given away with last month's issue has aroused enormous interest and we have received a very large number of requests from readers for constructional details of the various circuits described in the booklet.

Representative Circuits

Unfortunately it is quite impossible to deal with them all—such a proceeding would require several complete issues of the WIRELESS CONSTRUCTOR.

We therefore decided to choose three representative circuits and to give a few hints regarding the construction and operation of these sets.

Why did we pick on these particular circuits in preference to any of the remaining seventy-four?

Each of the seventy-seven different circuit arrangements has undergone exacting tests at the hands of our Research Department, and has emerged successfully.

Each circuit is practical and straightforward and can be relied upon to give excellent results.

Inexpensive to Build

In selecting a representative two-, three- and four-valver we were guided in the first instance by considerations of cost. Secondly, by simplicity, both in construction and operation. Thirdly, by the fact that

the three circuits are real "Stars," and especially suitable for use as domestic receivers on the medium and long broadcast wave-bands.

Suppose we deal with each individual circuit in detail. The first of them is Circuit No. 23, taken from page 9 of the booklet.

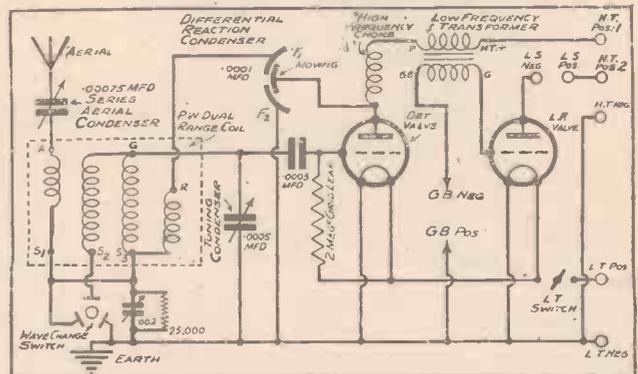
This is a beautifully simple and easily built two-valver of conventional type, and it embodies the famous "P.W." dual-range coil, a compact wave-change unit providing surprising sensitivity and splendid selectivity on both broadcast wave-bands.

"The "P.W." dual-range coil is so well known that it is unnecessary to give any other than a very brief description of its salient features. The unit comprises four windings. There is a main former around which are wound 48 turns of No. 24 D.S.C. wire, forming the medium-wave secondary, and over this is a 12-turn aerial winding.

Inside the main former there is a ribbed former containing the long-wave grid winding and the reaction winding.

Wave-changing is carried out by means of a three-point push-pull switch, which puts the long-wave grid winding in parallel with the medium-wave secondary when the knob is pulled, at the same time short-

USES A DUAL-RANGE COIL



Here is the circuit used in the two-valver, and it will be seen that a dual-range coil and switch render coil changing unnecessary.

circuiting the .002-mfd. compression condenser and the 25,000-ohm Spaggetti resistance.

"Interwave" Coupling

When the switch knob is pushed for the long waves the "Interwave" coupling is simultaneously brought into operation. Readers will doubtless ask: "What is interwave coupling?"

Well, it is a method which the Research Department devised in order to overcome a trouble known as medium-wave "break through."

With the increase in power of the local Regional transmitters it was found that in many districts, especially those within thirty miles or so of a Regional station, these transmissions had a nasty habit of forcing their way through and becoming audible over a portion of the long-wave tuning range.

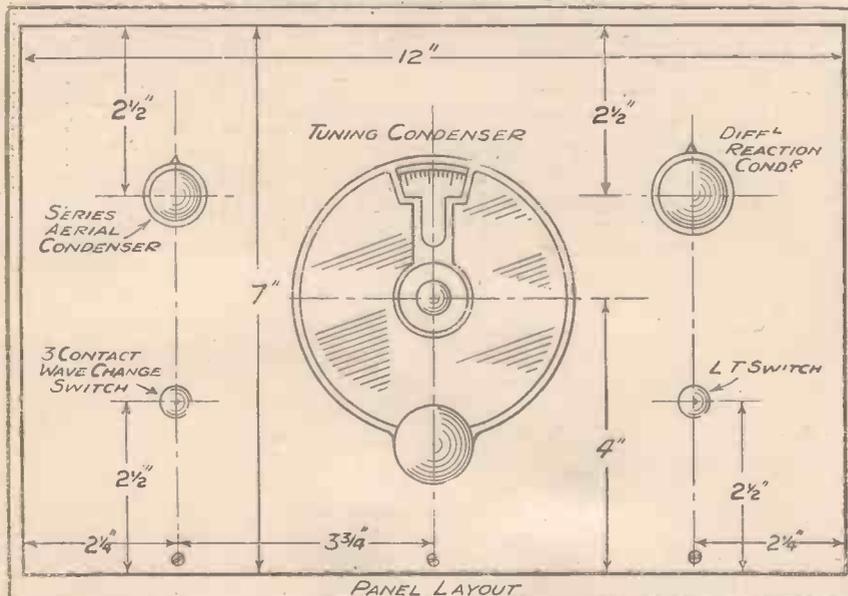
This interference was very irritating, since it made long-wave reception practically impossible in some cases.

Cures "Break Through"

So the Research Department set to work and finally produced a simple scheme which completely cured the trouble as far as normal conditions are concerned. Of course, this method is only applicable to the dual-range coil, and there is an alternative scheme for other types of circuits.

You will note that the circuit includes a .00075-mfd. variable condenser in series with the aerial; that

THE PARTS ON THE PANEL



All the dimensions required for drilling are clearly shown, and it will be seen that a pleasingly symmetrical panel layout has been provided.

Three Selected Sets—continued

is, between the aerial terminal and the "A" terminal on the coil unit.

This is a selectivity control, and the idea is to keep the condenser at maximum capacity when you can, and only reduce it when you want exceptional selectivity. By setting it to a comparatively small value and applying reaction judiciously you can get quite remarkable selectivity when required. It is generally best, however, to keep it at rather larger settings if you can do so without getting too much interference from the local. Volume is usually best in this way.

Exceptionally Simple

The rest of the circuit is quite straightforward, and so we will now proceed to give a few constructional notes.

The panel is a standard 12 in. by 7 in., and you will have no difficulty in drilling it correctly if you follow the dimensions given in the panel layout diagram.

There is no need for me to describe the drilling procedure in detail, because those of you who can follow a theoretical diagram will also have had previous experience in marking out and drilling panels.

The layout is shown in the photographs and is very easy. As a matter of fact, the positions for the various components are not at all critical, and any slight variations will not have an effect upon the working of the set.

For wiring up you can use ordinary Systoflex-covered, tinned-copper wire, Glazite, or those very convenient "Jiffilinx" which the Ready Radio people supply already cut to different lengths. These make the job extraordinarily simple and completely eliminate any necessity for soldering.

Testing Out

When the receiver is finished and ready for test you will want the necessary working data. The detector valve should be of the "H," "H.L.," or special detector type, and the L.F. of the power type. The detector valve holder is the one nearer the coil unit.

The H.T. voltages should be some 60 to 80 on H.T. Pos. 1 and 100 or 120 on H.T. Pos. 2. Grid bias should be in accordance with the maker's instructions for the particular power valve you have chosen.

There are no special points in connection with the working of the set, except, perhaps, in regard to the "interwave" coupling.

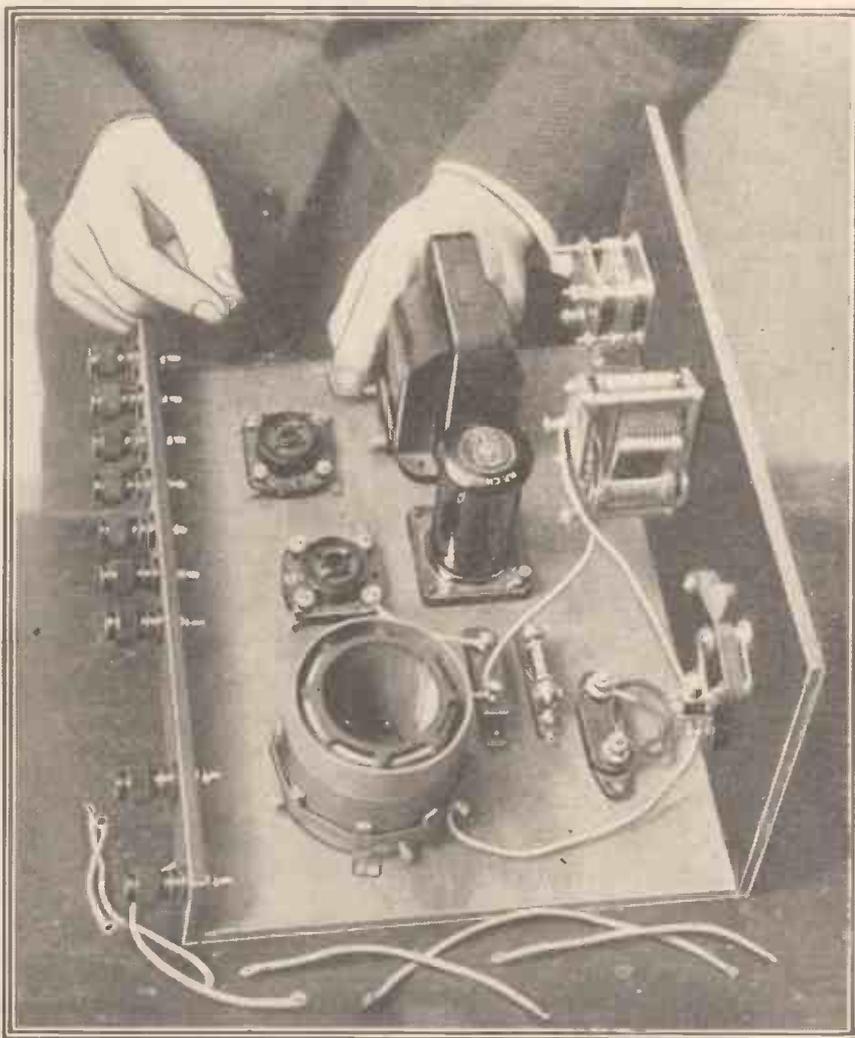
The .002-mfd. compression condenser should be adjusted to give maximum volume coupled with adequate selectivity on the long waves. If any "break through" does occur,

selectivity lies in the coils and the aerial circuit arrangements.

The Three-Valver

If you glance at the theoretical circuit you will notice that the incoming signals first of all have to pass through a Selector coil. This is a solenoid winding with tappings taken

WIRING THE "TWENTY-THREE TWO"



This shows the layout for Selected Circuit 23, and also the easy wiring, made possible by the use of flexible insulated connectors.

a slight re-adjustment by screwing down the adjusting knob should remedy this.

Now for the three-valver. This is Circuit No. 34 in the booklet, and it is a thoroughly sound design, comprising a detector followed by two L.F. stages, the first being R.C. coupled and the second transformer.

Here, again, the secret of the set's amazing reaching-out powers and high

to studs to which connection can be made by means of a rotating switch arm joined to the terminal marked "A." By placing the arm on the requisite stud a marked increase in volume will be obtained together with enhanced selectivity.

For local work and for searching the switch arm is placed on stud "B," which cuts the "Selector" out of circuit.

Three Selected Sets—continued

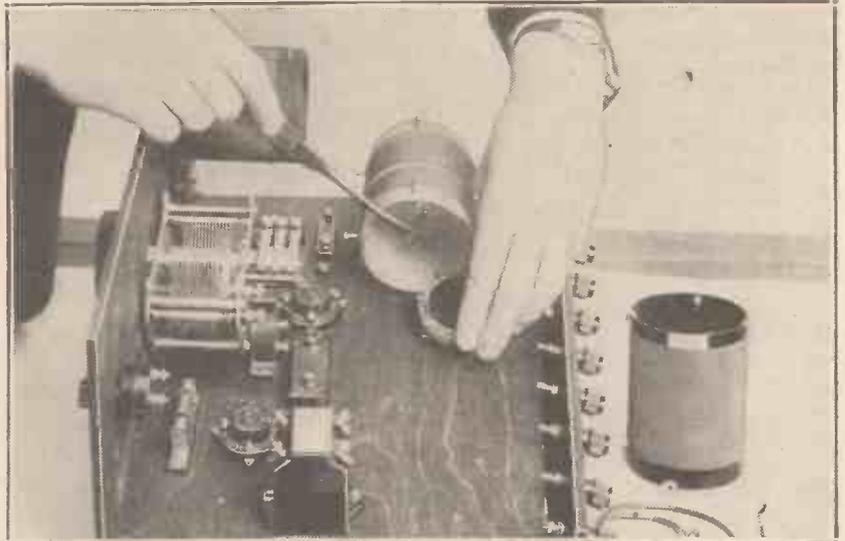
The Selector coil is only intended for use on the medium wave-band, where high selectivity is essential, and on the long waves all the selectivity required is provided by the long-wave aerial winding.

The medium- and long-wave coils are known as the P.V. type and are very efficient indeed.

Efficient Coils

In fact, it is difficult to improve upon these inductance units for all-round work on both long and medium waves. Moreover, they readily lend themselves to the "Extenser" system of wave-changing which is incorporated in this circuit. Most readers will already be familiar with this. Briefly, it is a method of instantaneously switching from one wave-band to another as part and parcel of the tuning operation. That is to say,

FITTING THE CONTRADYNE COIL

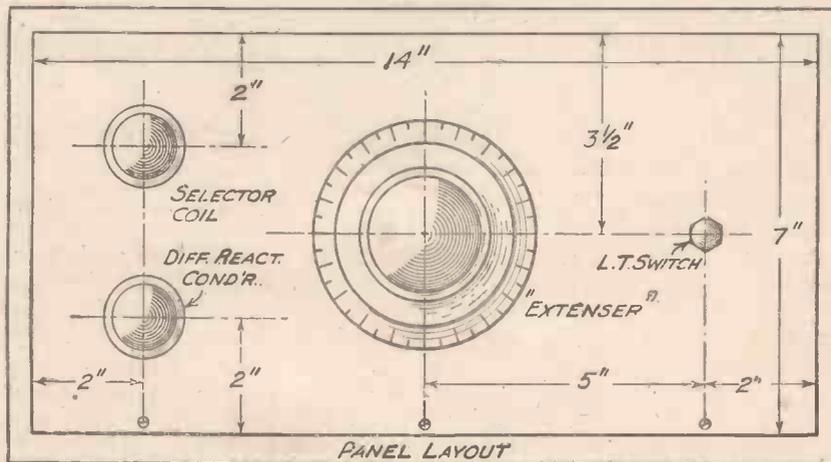


One of those handy little coil quoits is used as a former, and this is easily fixed to the baseboard by a couple of screws.

SELECT YOUR COMPONENTS FOR CIRCUIT 34

- | | | |
|--|--|---|
| <ul style="list-style-type: none"> 1 Panel, 14 in. × 7 in. (Permeol, Peto-Scott, Ready Radio, Wearite, Becol, Goltone, Parex). 1 Cabinet, and baseboard 10 in. deep (Camco, Pickett, Osborn, Gilbert, etc.). 1 .0005-mfd. Extenser (Cyldon, Wave-master, Formo). 1 Selector coil (Wearite, Ready Radio, R.I., Goltone, Parex, Magnum, Peto-Scott). 1 .00013-mfd. differential reaction condenser (Ready Radio, Lotus, Telsen, Formo, Parex, Magnum, Wearite, J.B., Dubilier, Lissen, Igranic, A.W., Cyldon, Ormond, Polar, Wavemaster). 1 P.V.1 and 1 P.V.2 coils (Goltone, Wearite, Ready Radio, Parex, R.I., Peto - Scott, Formo, Lewecos, Sovereign). | <ul style="list-style-type: none"> 1 H.F. choke (Telsen, Lewecos, Peto-Scott, R.I., Ready Radio, Parex, Varley, Dubilier, Lissen, Lotus, Wearite, Magnum, Tunewell, Climax, Atlas). 1 L.F. transformer (Varley Niclet, Telsen, R.I., Igranic, Ferranti, Lotus, Mullard, Lewecos, Climax, Goltone, A.W., Lissen). 1 100,000-ohm Spaghetti resistance (Telsen, Ready Radio, Igranic, Graham Farish, Lissen, Varley, Dubilier, Sovereign). 1 25,000-ohm Spaghetti resistance (Bulgin, etc.). 1 1-megohm grid leak and holder (Dubilier, Graham Farish, Telsen, | <ul style="list-style-type: none"> Ediswan, Ferranti, Mullard, Igranic, Lissen, Loewe, Ready Radio). 1 2-meg. grid leak and holder (Dubilier, or as above). 1 .0003-mfd. fixed condenser (Sovereign, T.C.C., Telsen, Mullard, Formo, Watmel, Ready Radio, Igranic, Dubilier, Ediswan, Graham Farish, Ferranti, etc.). 1 2-mfd. fixed condenser (T.C.C., Dubilier, Lissen, Ferranti, Telsen, Formo, Hydra, Igranic, Sovereign). 1 .01-mfd. fixed condenser (Lissen, etc.). 1 Terminal strip, 14 in. × 2 in. 9 Terminals (Belling & Lee, Ealex, Igranic, Goltone, Bulgin, Clix). |
|--|--|---|

SIMPLIFIED TUNING WITH THE EXTENSER



- 1 Coil quoit (Peto - Scott, Wearite, Ready Radio, Goltone, Sovereign, A.E.D., Graham Farish).
- 2 oz. of 24 D.S.C. for Quoit if not supplied ready wound.
- 3 Valve holders (Graham Farish, Bulgin, Telsen, Clix, W.B., Igranic, Wearite, Darlo, Lissen, Lotus, Formo).

- 1 On-off switch (Bulgin, Ready Radio, Goltone, Lissen, Igranic, Lotus, Peto-Scott, Colvern, Ormond, Wearite, Magnum, W.B.).
- Wire (Glazite, Lacoline, Quickwire, Jifflix).
- Screws, flex, etc.
- G.B. and L.T. plugs and spade terminals (Clix, Ealex, Belling & Lee, Igranic).

There is no wave-change switch to bother about, the tuning dial giving long waves over all three-figure readings, and medium waves on all settings below 100.

Three Selected Sets—continued

the best results. Incidentally, the position of the arm is sometimes critical on certain stations, owing to the sharp tuning, so you may find that a little practice is required here.

The last of the three circuits is No. 51, on page 19 of the booklet.

This time it is a four-valver, and a real good one, too. A circuit endowed with truly wonderful reaching-out powers and a remarkably high degree of selectivity.

Circuit No. 51 is based upon the "P.W." dual-range coil, and two of these are employed. One S.G. H.F. stage is used and the detector is followed by one resistance-capacity and one transformer-coupled stage.

Long-Wave Coupling

"Brookmans" coupling is used for each tuned circuit on the long waves, and in the case of the first circuit is variable by means of the compression-type .002-mfd. condenser.

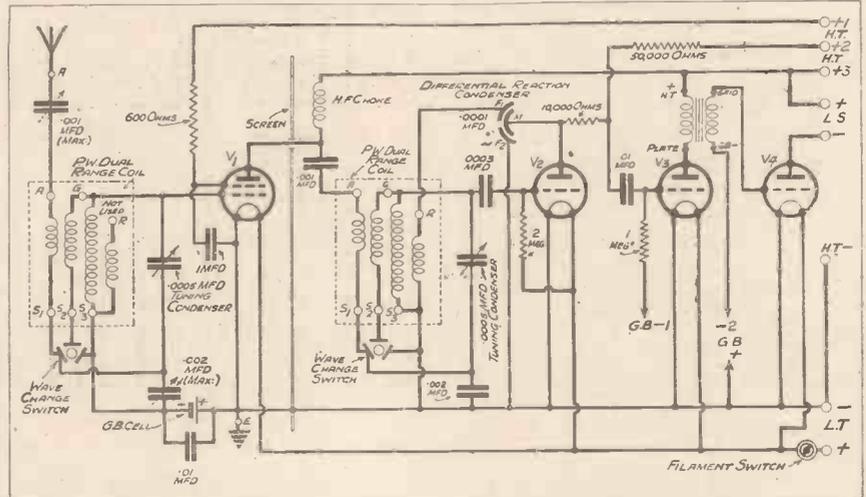
As in the case of the two-valver already dealt with, the wave-change switches are of the three-contact type. In this type of switch the three contacts can all be separated by pushing the knob, or all joined together by pulling the knob. The correct type of switch is essential in this circuit.

This set is really no more difficult

to build than the two and the three. There are more components and more connections to make, but everything is quite straightforward if you go about it in the right way.

by the way, like all similar diagrams, shows the front of panel, and as it is best to work a drill from the back you must not forget to "reverse" the dimensions given. Thus the

AN S.G., DET. AND 2 L.F. CIRCUIT



This powerful combination uses an S.G. valve for H.F. amplification, and a resistance-transformer pair of low-frequency amplifying stages. (Circuit 51.)

Get all the components together first, before commencing the mounting on panel or baseboard.

The panel drilling is carried out in accordance with the dimensions given in the panel layout diagram. This,

reaction condenser will be six inches from the left, and not the right as it is when you look at the front of the panel.

The drum condenser is the most tricky component to mount. The hole in the panel for the escutcheon plate and the projecting drums is best made by using the escutcheon as a template and cutting out the required area by means of a fretsaw.

Mounting the Condenser

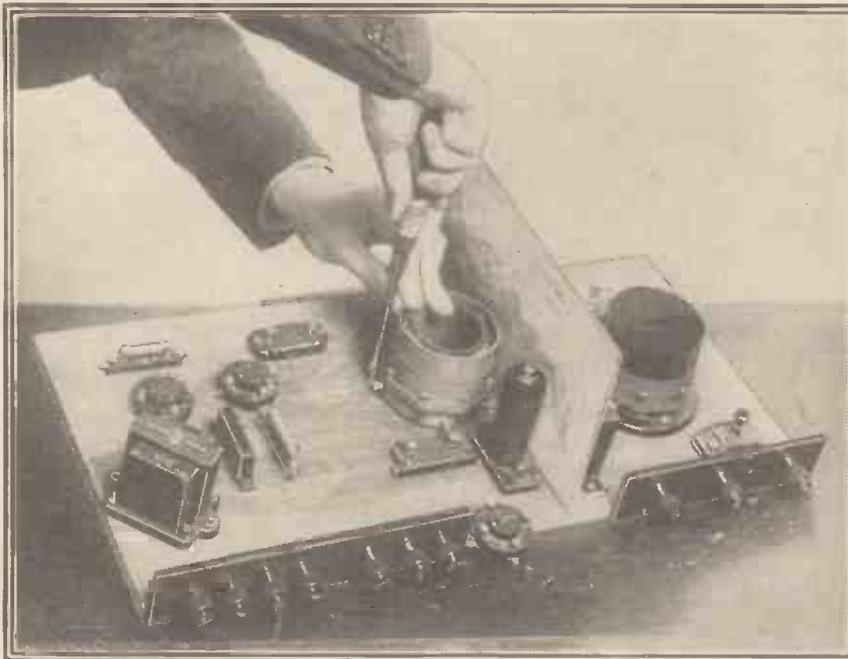
It is advisable to leave the actual mounting of this condenser until later, and to carry on and complete the remainder of the panel mounting together with the baseboard layout.

This is because unless you leave the condenser until you have all else mounted except the screen, and the three leads to each of the wave-change switches in position, you may find it difficult to connect up these switches.

So it is as well to do these first of all, after you have finished the baseboard layout. Then you can mount the condenser and finally fit the screen into position, its edge nearest the panel going between the two drums of the dual condenser.

If this condenser has a metal panel plate this should be earthed only if it is not connected anywhere to the

WHAT IS WRONG WITH THIS PICTURE?



This constructor is not going to get good results because he is doing something wrong. Can you see what it is? Well, it's the position of that coil. He has placed it far too close to the metal screen, not realising that the set can't work well if the screen is interfering with the magnetic field round the coil-winding.

Three Selected Sets—continued

moving vanes. If it does make contact with the moving vanes then leave it alone. You can, if you wish, use two separate condensers of conventional type in this receiver.

Take particular care to keep the dual-range coil units well away from the metal screen. If you place either of them in close proximity to the screen you will introduce losses.

H.F. Grid Bias

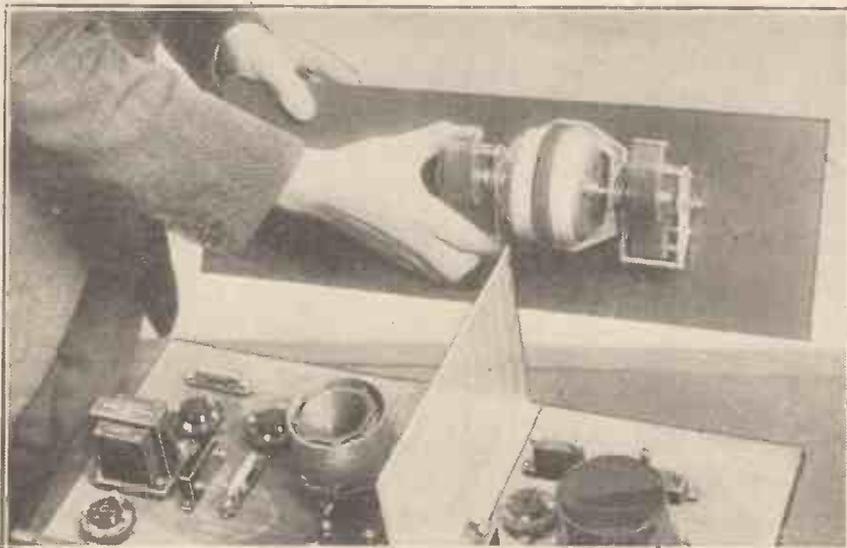
Do not forget to insert the small $1\frac{1}{2}$ -volt dry cell for biasing the S.G. valve. It is joined across the .01-mfd. fixed condenser next to the .002-mfd. compression condenser on the baseboard.

The valves you will require are as follow: H.F. valve—S.G. type; detector valve—"H," "H.L." or special detector; 1st L.F.—"H.L." or "L." type; last stage—power or super-power.

Voltage Values

Grid bias will depend upon the

MAKING SURE OF THE SCREENING



As the screen separates the two tuning condensers care must be taken to get the relative positions just right, so that when the panel is fixed the screen goes snugly into the slot.

valves and also the H.T. voltages. Follow the valve-makers' instructions on this point.

H.T. voltages: H.T.+1, 70-80 volts; H.T. + 2, 60-80 volts; H.T.+3, 120-150 volts.

YOUR SHOPPING LIST FOR A FINE FOUR-VALVER

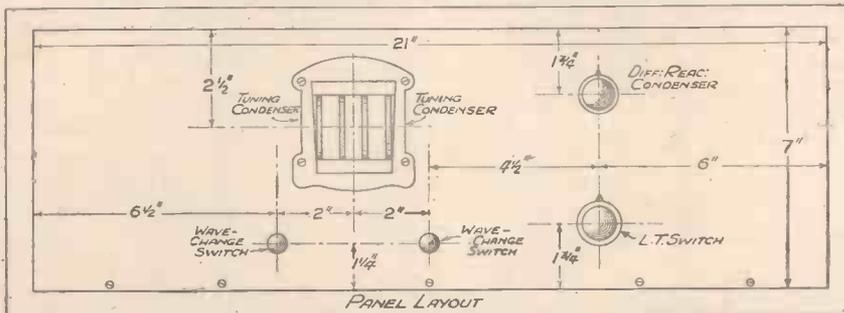
- 1 Panel, 21 in. x 7 in. (Goltone, Lissen, Wearite, Peto-Scott, Permol, Becol).
- 1 Cabinet, with baseboard 10 in. deep to fit (Pickett, Cameo, Gilbert, Peto-Scott, Ready Radio, Osborn).
- 1 .0005-mfd. double drum condenser with escutcheon (Polar Ideal, J.B., Cyldon, Lotus, Wavemaster).
- 1 .0001-mfd. differential reaction condenser (Ready Radio, J.B., Lotus, Igranic, Ormond, Lissen, Dubilier, Formo, Par-ex, Graham Farish, A.W., Cyldon, Telsen).
- 2 3-point wave-change switches (Bulgin, W.B., Ready Radio, Wearite, Peto-Scott, Telsen, Magnum, Ormond, etc.).
- 1 3-pole change-over switch (see text) (Wearite).
- 2 "P.W." dual-range coils (Formo and Ready Radio, Wearite, R.I., Peto-Scott, Goltone, Magnum, Tunewell, Parex, etc.).
- 4 Valve holders (Lotus, Telsen, Clix, W.B., Igranic, Graham Farish, Dario, Lissen, Formo, Magnum, Wearite, Bulgin, etc.).
- 1 H.F. choke (Lewcos, Peto-Scott, Tunewell, Sovereign, Telsen, R.I.,

- Ready Radio, Varley, Dubilier, Lissen, Lotus, Wearite, Parex, Watmel).
- 1 .001-mfd. max. compression-type condenser (Telsen, R.I., Lewcos, Polar, Formo, Lissen, Graham Farish, Sovereign).
- 1 .002-mfd. max. compression-type condenser (Sovereign, etc.).
- 1 .0003-mfd. fixed condenser (Du-

- Helsby, Ferranti, Hydra, Peto-Scott, Telsen).
- 1 1-meg. grid leak and holder (Lissen, Dubilier, Mullard, Ferranti, Telsen, Ready Radio, Graham Farish, Loewe, Igranic).
- 1 600- or 500-ohm Spaghetti resistance (Ready Radio, Bulgin, Varley, Igranic, Telsen, Peto-Scott, Lewcos, Graham Farish, Sovereign).

- 1 2-meg. grid leak and holder (Lissen, Graham Farish, Ferranti, Dubilier, Ediswan, Igranic, Mullard, Loewe, etc.).
- 1 L.F. transformer (R.I. Dux, Ferranti, Telsen, Varley, Lissen, Lewcos, Igranic, Lotus, Mullard, etc.).
- 1 10,000-ohm Spaghetti

CIRCUIT "FIFTY-ONE" IN ITS PRACTICAL FORM

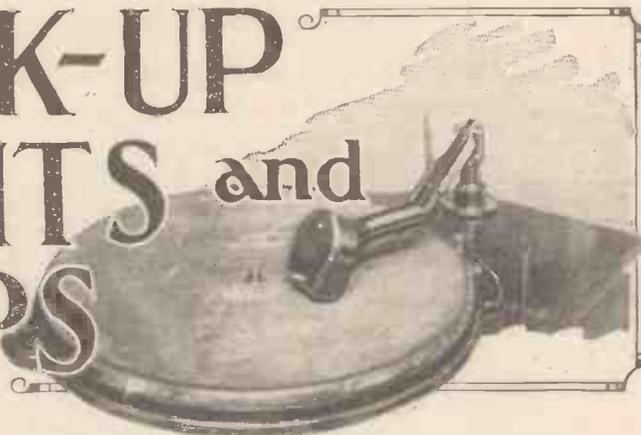


This is the panel arrangement resulting from the disposition of the parts as illustrated by the photograph above and that on the preceding page. A good-looking layout, don't you think?

- bilier, Telsen, Ready Radio, Ediswan, Lissen, Ferranti, Graham Farish, T.C.C., Mullard, Sovereign, Formo).
- 1 .002-mfd. fixed condenser (Lissen, etc.).
- 2 .01-mfd. fixed condensers (Lissen and T.C.C., etc.).
- 1 .001-mfd. fixed condenser (Lissen, etc.).
- 1 1-mfd. fixed condenser (Dubilier, Lissen, T.C.C., Mullard, Formo,

- resistance (Ready Radio, as above).
- 1 50,000-ohm Spaghetti (Varley, etc.).
- 1 Screen, 10 in. x 6 in. (Peto-Scott, Parex, Ready Radio, Magnum, Wearite).
- 1 Terminal strip, 9 in. x 2 in.
- 1 Terminal strip, 7 in. x 2 in.
- 10 Terminals (Belling & Lee, Igranic, Eelex, Clix, Bulgin, Goltone).
- Flex, screws, etc.
- Jiffilix, Glazite, Quickwire, Lacoline.

PICK-UP HINTS and TIPS



Interesting notes on various practical aspects of radio-gram reproduction.

By A. BOSWELL.

How many times do you use a needle? If you are like most people—including myself—I expect you have used the same needle for two or three playings before now. If you have, I do not advise you to do so in the future. I tender this advice after having had demonstrated to me the danger of employing the same needle more than once.

One Needle Per Side

The ordinary steel needle will just play one side of a record, according to my informant, who, incidentally, happens to be one of the technicians at the new H.M.V. recording studios.

By the time the record has finished playing the point is badly worn and no longer beds upon the bottom of the grooves.

In consequence, if the same needle were employed for a second playing the sides of the needle would tend to rest against the sides of the grooves on the record, and this would considerably shorten the useful life of the disc.

Records cost money and needles are inexpensive, so don't forget to change your needle every time you play another tune.

A Tungsten Point

If you find this constant changing inconvenient there is no reason why you should not use a "Tungstyle" needle.

This is a semi-permanent needle, and the H.M.V. people say that it can be used 100-150 times, but these figures, of course, depend upon the nature of the music.

Loud recordings wear the needles more quickly than soft ones.

An approximate guide is to change the needle directly the music sounds at all rough.

The main difference between the "Tungstyle" needle and the ordinary steel one is that the fine tungsten wire employed in the former has parallel sides, whereas the steel needle is tapered. It will be readily seen that a tapered needle must thicken out and fill a greater space in the sound channels as the point wears away. This does not apply to a parallel-sides needle.

TRY THESE

RECORDS WORTH HEARING.

- Dance.
- Just One More Chance. Columbia
- Jack Payne
- Got a Date with an Angel. Broadcast Super Twelve
- Jack Harris and Grosvenor House Band
- It Always Starts to Rain. Broadcast
- Bldgood's Good Boys
- Whistling in the Dark. Zonophone
- Rhythmic Eight.
- Smile, Darn Yer, Smile. H.M.V.
- Ambrose and His Orchestra
- Organ.
- You are my Heart's Delight. Broadcast Super Twelve
- Beaufort Cinema Organ, Birmingham-
- Orchestral.
- Echoes of the War. H.M.V.
- New Mayfair Orchestra and Male Chorus
- Fantasia of Irish Airs. Columbia
- Albert Sandler and Orchestra
- Further Selections of Famous Waltzes. Broadcast Super Twelve
- Viennese Light Orchestra
- Vocal.
- Walter Glynn Faery Song H.M.V.
- Vaudeville.
- Honeymoon Lane. Zonophone
- Solemn and Gay
- Whistling in the Dark. H.M.V.
- Derickson and Brown
- Star of My Night. H.M.V.
- Winnie Melville and Derek Olubam H.M.V.

Have you ever had trouble with your L.F. amplifier? I am thinking of instability and not distortion, or poor volume through incorrect H.T. or grid-bias voltages.

If you do come across a "spot of bother" with your amplifier take a

look at the layout, especially if you are using a transformer-coupled stage and an output filter or output transformer.

The other day I was shown an amplifier that could just be stabilised by reversing the leads to the secondary of the L.F. transformer. The circuit consisted of an R.C. stage followed by a stage of transformer-coupled, and terminating in a choke filter output.

The R.C. stage and transformer were arranged in a straight line from left to right, and the output filter together with the output valve holder were placed so that the wiring had to be taken *back* from right to left parallel with the R.C. stage and the transformer.

About the Layout

I don't know whether I have made myself clear, but perhaps you will be able to visualise the layout when I tell you that this particular positioning of components was brought about by the desire for compactness.

The designer had endeavoured to cut down panel and baseboard length, and arranged his layout something after the fashion of the letter "U."

With the normal connections to the transformer secondary the amplifier howled its head off. With the reversed connections it was stable, but you had the feeling that things weren't quite right.

Straight-Line Connections

I suggested altering the layout, and the owner agreed to do so as an experiment. So he arranged the valve holders and couplings in a straight line—input one end and output the other. Result—everything as it should be, with perfect stability.

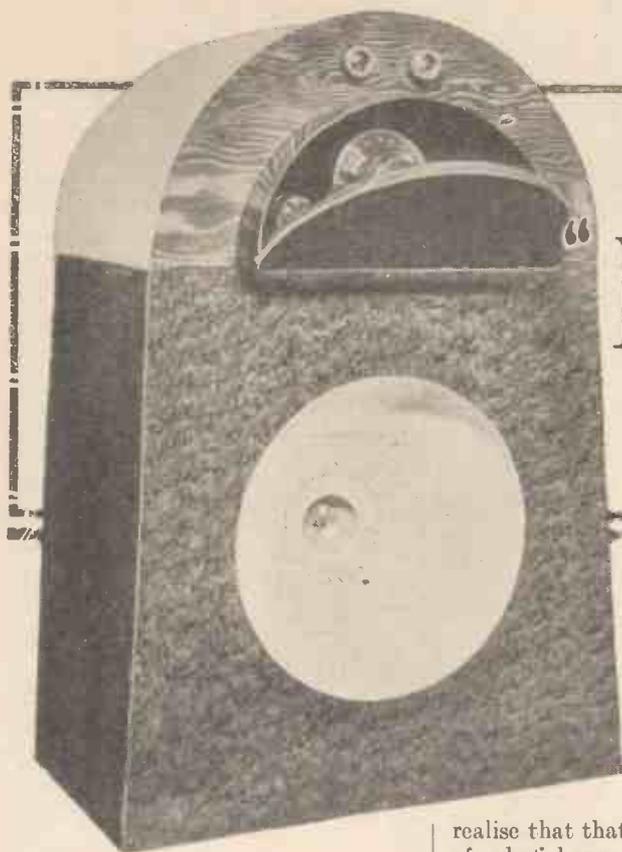
This is an excellent example of the importance of layout, and indicates the care necessary in arranging the wiring when alternating currents are being handled.

That is why it is so risky to allow the loud speaker or pick-up leads to trail across the set or to run parallel with each other.

R.C. for Pick-Up

I am sometimes asked whether I favour resistance coupling for pick-up work. Personally, I am of the opinion that this method of L.F. amplification has many points of superiority of other forms of coupling.

The chief snag, of course, is the low magnification per stage, and it is often necessary to use a pentode output in order to obtain sufficient punch.



The DUO-VISE 'SPEAKER'

This speaker has been specially designed so that it will "line up" with the "Duo-Vise" Two described last month. At the same time it is equally suitable for other receivers, which will show up at their best on this sensitive instrument with its high-class quality.

Described by G. T. KELSEY.

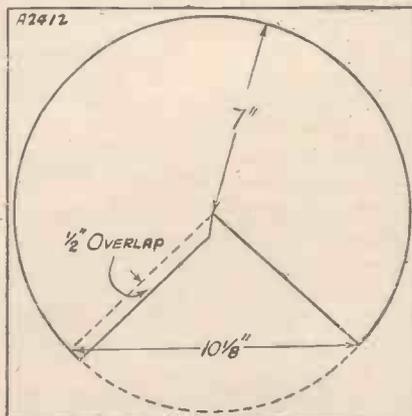
CAN you imagine what it would be like if you went to the cinema and saw a standard-size picture projected on to a screen only half the normal width?

You would probably see a beautifully clear image of the middle part of the film, with a sort of blurred and indistinct effect on either side where it overlapped the curtains and drapings.

A Parallel Case

Such an idea, with films as we are accustomed to seeing them, is not far short of absurd. And yet, do you

HOW TO CUT THE CONE



This is the diagram which you mark out on your cone paper, after which it is cut out and joined up in the form of a cone with adhesive.

realise that that is an excellent simile of what happens when you use an inefficient loud speaker in conjunction with a good set?

We can presume that the output from the majority of good sets is giving a full width "sound projection" of the "talking film" at the transmitting station, but unless the loud speaker responds to the whole width of this "projection"—in other words, unless it can reproduce faithfully the whole of that part of the musical scale that matters—the edges (the high and low ones) will be blurred and indistinct, and only the middle register will be represented in its true colours.

It is easy to see from this that the loud speaker to give the most faithful reproduction is the one that will give in addition to the middle not only the low notes, but the high notes as well.

It is an easy matter to design a cone that will give a preponderance of low notes, and it is easier, if anything, to produce one that "peaks" at the top end of the scale. But it is not quite such a straightforward matter to design one that will give uniform response to all that is coming out of the last valve.

Question of Design

The WIRELESS CONSTRUCTOR Research Department some months ago devoted a considerable amount of time to this important question of cone construction. And dozens of different ideas which looked on paper as though

they ought to work were actually tried out before we arrived at the "Brytacone" scheme, which was first described in these columns a few months ago.

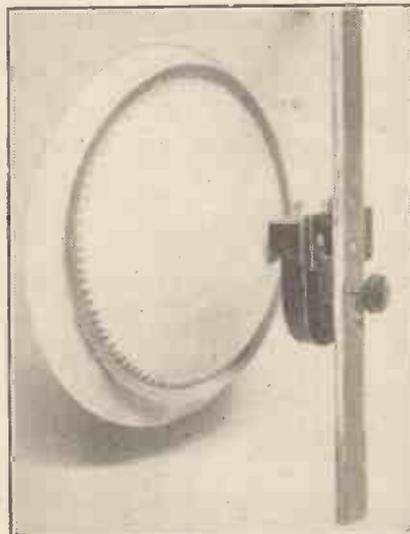
The "Brytacone" loud speaker, as we explained at the time, gave results comparable with the best cone speakers we had heard.

Splendid Results

As a result of further experiments we have now arrived at an arrangement which gives even better results than our earlier models!

Perhaps we should explain at this juncture that the present loud speaker

ALL THERE IS TO IT



Apart from the cabinet there is only one piece of wood, the upright seen in this photograph.

The "Duo-Vise" Speaker—continued

was primarily intended to go with the "Duo-Vise" receiver described last month. The pleasing nature of the resulting combination is obvious from the photographs accompanying this article.

Suits any Set

But the finished loud speaker gave such a very high standard of results in our laboratory tests that we felt we could not possibly limit its scope of appeal by making it suitable only for those readers who have built a "Duo-Vise" set.

So it has been designed in such a way that it can be built by all. As a self-contained loud speaker it has quite a pleasing appearance, and if you want to use it in conjunction with the "Duo-Vise" receiver, well, it is just the right size for the set to stand on the top, and there is room inside the actual loud-speaker cabinet for the batteries.

For whatever purpose you build our latest loud speaker, we are confident that you will agree with our conclusion that it ranks in performance with the very best of the modern cone-type loud speakers.

As for cost, the whole outfit, including the wood for the cabinet, which is quite an easy home-constructor's job, need not cost a penny more than thirty shillings. The biggest item is, of course, the actual loud-speaker unit, and upon your choice of this will largely depend the cost of the finished loud speaker.

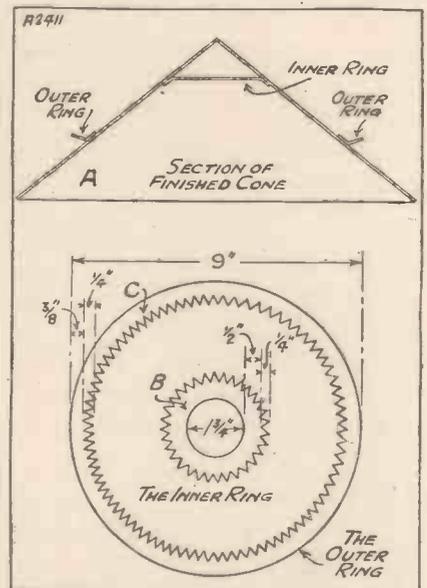
We used an Ormond unit in the original model, but almost any of the standard units, which vary in price from about 5s. 6d. to 30s., can be adapted quite successfully to this new principle of cone construction.

Special Construction

The secret of the high- and low-note response in this new loud speaker of ours is the way in which the cone is constructed to obtain great rigidity and strength without appreciably adding to the weight that has to be moved by the reed. A lot depends upon the baffling of the cone, and it is chiefly in this respect that we regard the new arrangement as an improvement over the earlier models.

The actual cone and the two strengthening rings are made from what is known as "Kraft" paper. It

THE RIGID "PYRAMID"



Two rings of cone paper, one fixed inside the cone and one outside, by serrations, hold the completed cone remarkably rigid.

is obtainable in a variety of thicknesses, and in order to get the same material as was used for our original cone it is necessary to specify "Kraft" paper of the 120 lb. to the ream category. You will then be sure of getting the right thickness.

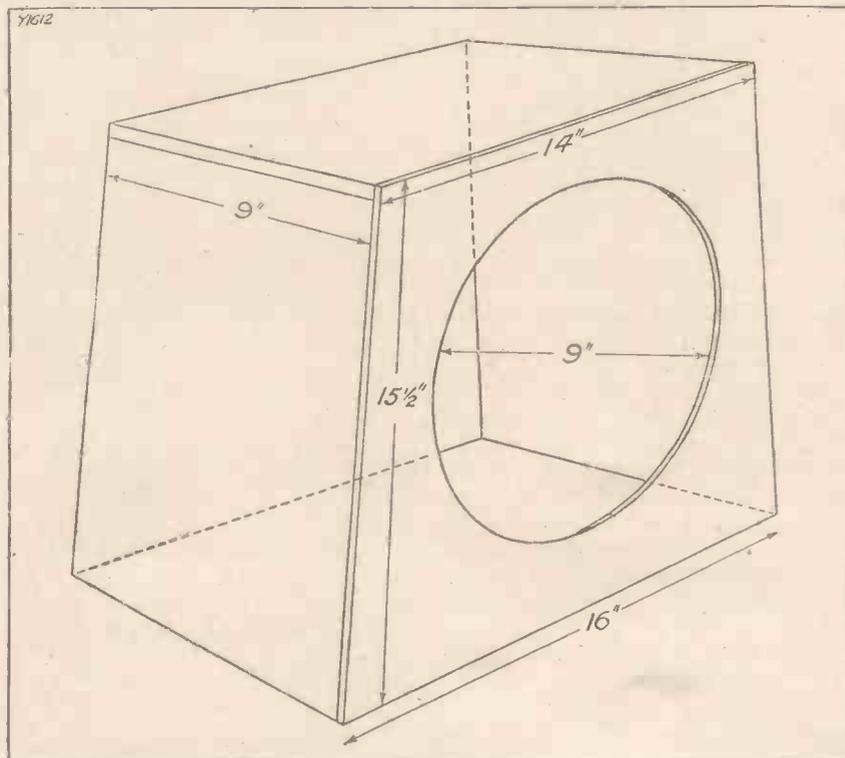
When you have obtained the material (one full-size sheet should be ample), cut out a circular piece 14 in. in diameter and mark on it a V-shaped area $10\frac{1}{8}$ in. wide across the periphery. Before you cut this V-shaped piece out, mark in the $\frac{1}{2}$ -in. overlap as shown in the diagram of the main cone flattened out.

Forming the Cone

You can now proceed to form the paper into a cone shape by Seccotining it along the $\frac{1}{2}$ -in. flap. The main cone can then be placed on one side to dry while the strengthening rings are prepared.

These rings, although a little difficult to describe clearly in words, are quite easy to make if you follow the special diagrams provided. With regard to the "teeth" edges, in order to obtain a reasonable amount of uniformity you will probably find it best to mark the inner and outer extremities of the "teeth" with pencil compass lines first of all. You can then sketch in the actual "teeth" before you start work with the scissors.

IT TAKES BATTERIES AS WELL



The dimensions for the speaker's cabinet are shown in this diagram. As you can see, the cabinet is on the generous side, thus enabling the batteries to be contained in it, as illustrated by the photograph on the opposite page.

G. P. KENDALL TESTED KITS

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Kit "A"

(less valves and cabinet) **£3:19:0**
or 7/3 down and 11 monthly payments of **7/3**

Kit "B"

(with valves less cabinet) **£4:18:0**
or 9/- down and 11 monthly payments of **9/-**

Kit "C"

(with valves and cabinet) **£5:15:6**
or 10/9 down and 11 monthly payments of **10/9**

If you are interested in one of the "Three Selected Receivers," write to us for details and Price Lists.

THE "VI-KING" SHORT-WAYER

	£	s.	d.
1 Ebonite panel, 14" x 7", drilled to specification	4	6	
1 Polished oak cabinet, 14" x 10" x 7"	17	6	
1 Sheet copper foil, 14" x 10"	1	9	
1 Cydon .0002 series gap short-wave condenser	18	0	
1 ReadRad slow-motion dial	2	6	
1 J.B. .0001-mfd. reaction condenser, air dielectric	4	6	
1 ReadRad "On/off" snap switch	2	9	
1 Peto-Scott Neut-type series aerial condenser	3	6	
2 Junit valve holders	1	4	
1 T.C.C. .0003-mfd. fixed condenser 34	1	6	
1 T.C.C. .0003-mfd. fixed condenser 34	1	6	
1 Bulgin short-wave choke	2	6	
1 ReadRad short-wave choke	3	9	
1 Lotus L.F. transformer	5	6	
1 ReadRad 2-meg. leak and holder	1	4	
1 T.C.C. 2-mfd. fixed condenser, Type 50	3	10	
1 ReadRad 400-ohm B.B. slide potentiometer	2	9	
1 Lewcos 25,000-ohm Spaghetti resistance	1	6	
9 Belling-Lee engraved terminals, type R	2	3	
1 Peto-Scott set of Copex short-wave coils (w/base)	10	6	
1 Pkt. Jiffilix for wiring	2	6	
2 Valves: 1 P.M.2.DX, 1 P.M.2A	19	0	
Flex. screws, etc.			9
	£5	15	6

JIFFILIX FOR SIMPLER WIRING

Always use Jiffilix for wiring. They eliminate soldering, they give perfect contact and are the most convenient, rapid and neat method of wiring a set. Forty Jiffilix in various lengths, fitted with shake-proof connectors—price 2/6. Send for a packet to-day.

1932 "KELSEY" SHORT-WAVE ADAPTOR

	£	s.	d.
1 Ebonite strip, drilled, 8" x 4"	1	6	
4 Pieces of wood (3-ply): Two, 4" x 3 1/2" x 1/2"; One, 8" x 4 1/2" x 1/2"; One, 8" x 4" x 1/2"	1	0	
1 J.B. .0003-mfd. variable condenser, Popular Log	5	9	
1 J.B. .0001-mfd. air dielectric condenser	4	6	
2 Lotus single-coil mounts	1	4	
1 T.C.C. .0003-mfd. fixed condenser M	1	0	
1 Junit valve holder	8		
1 ReadRad 3-meg. leak and holder	1	4	
1 ReadRad short-wave choke	3	9	
1 ReadRad 400-ohm B.B. potentiometer	2	9	
2 Ebonite extension handles, 4"	3	6	
1 ReadRad slow-motion dial	2	6	
1 Bulgin adaptor plug	1	6	
1 Pkt. Jiffilix	2	6	
1 Mullard P.M.2.DX valve	8	6	
1 Set "Atlas" S.W. coils	10	0	
Flex. screws, croc. clips, etc.			11
	£2	13	0

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Our new 100-page fully-illustrated Catalogue contains details of all modern radio products. You need a copy. Price 1/-, post free. Be sure to read Kendall's book entitled "10 Hows for Modern Radio Constructors." Send four 1 1/2 stamps now.

"KELSEY" ADAPTOR

Kit "A"

(less valves and cabinet) **£2:4:6**
or 8/3 down and 5 monthly payments of **8/3**

Kit "B"

(with valves less cabinet) **£2:13:0**
or 9/6 down and 5 monthly payments of **9/6**

COMPLETELY ASSEMBLED RECEIVER

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To INLAND CUSTOMERS—Your goods are despatched Post Free of Carriage Paid.

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CASH or C.O.D. ORDER FORM

To **READY RADIO LTD.**, Eastnor House, Blackheath, S.E.3.

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

for which { (a) I enclose (b) I will pay on delivery (Cross out line not applicable) £.....

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

W.O.1/32.

To **READY RADIO LTD.**, Eastnor House, Blackheath, S.E.3.

EASY PAYMENT ORDER FORM

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

for which I enclose first deposit of £.....

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

W.O.1/32.

The "Duo-Vise" Speaker—continued

When the rings are ready, bend the "teeth" up to approximately the right angle (see the diagram in which the finished cone is shown in section), and proceed to secure them to the main cone.

The smaller ring should be fitted first, and it is important to see that every single "tooth" is properly Seccotined, as a loose one in the finished loud speaker may give rise to all sorts of unpleasant buzzes.

Fitting the "Rings"

You will find it best when fitting the outer ring to work with the main cone placed apex upwards on a flat surface. Then, when you have gummed the "teeth," you can simply drop the ring into position over the top of the cone.

The method of fixing the cone to the reed will obviously depend upon the fittings supplied with the particular loud-speaker unit chosen. But make a special point of tightening up the nuts as much as possible without stripping the thread. To prevent them working loose under operating conditions it is quite a good scheme to secure them with sealing-wax or Seccotine when they have been tightened up.

With regard to the construction of the actual cabinet, you will find all the necessary dimensions in one of the diagrams. In our original model there was no back to the cabinet, because opinion was divided as to whether the loud speaker gave best results with or without a back.

We therefore advise you to experiment for yourself in this connection, but if you decide against having a wooden back it might be advisable to cover the opening with a piece of silk or other suitable material to protect the loud-speaker unit from dust.

Method of Mounting

The method of mounting the cone and unit assembly inside the cabinet again will depend upon the particular unit chosen. But it should be carried out in such a way that the edge of the cone just rests *lightly* against the inside of the front of the cabinet, which, by the way, must be covered with blanket-cloth or a similar heavy material.

This blanket-cloth covering should only be placed over the inner surface of the front baffle, and should not, of course, extend beyond the edge of the

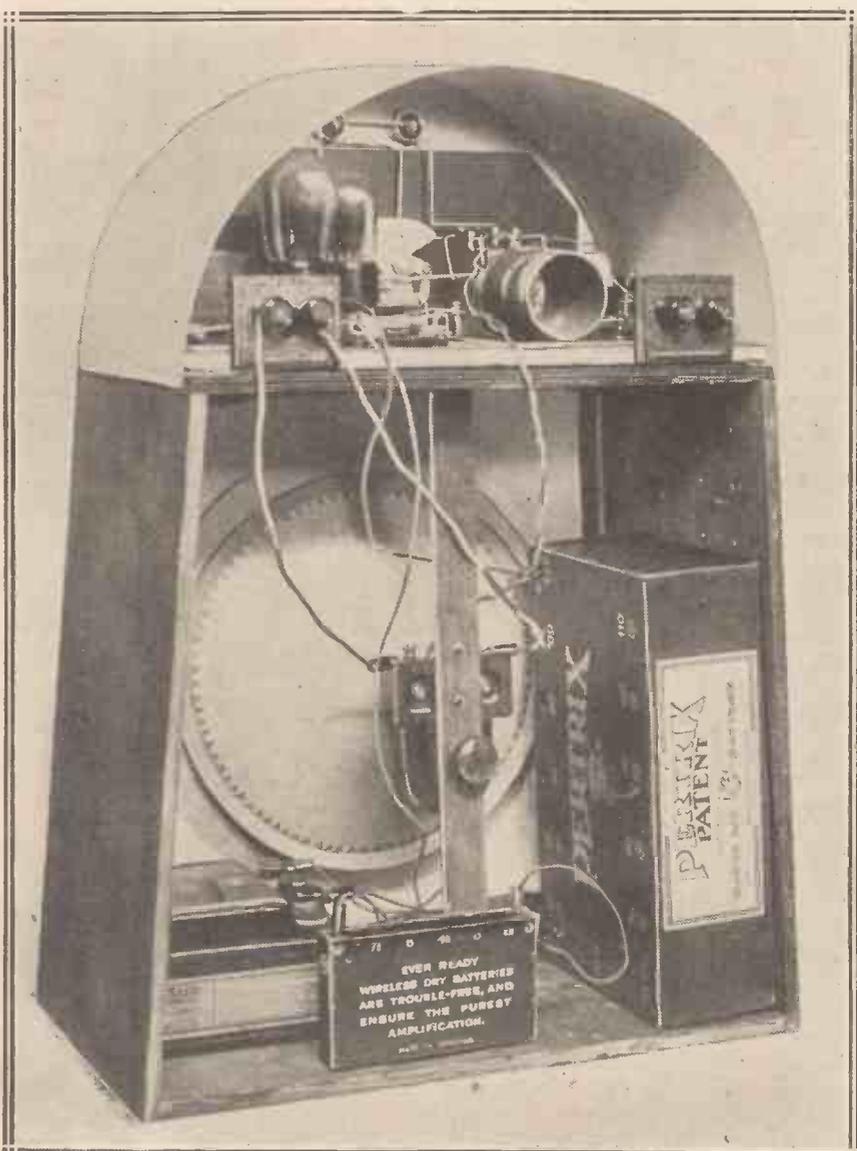
opening. Its purpose is to prevent the cone from chattering, and it acts as a "damper" between the edge of the cone and the inside of the front of the cabinet against which the cone is lightly pressed.

As a matter of fact, it is possible by varying the degree of pressure between the cone and the damping material to reduce or increase within certain limits the high-note response, although the pressure should not under any circumstances be too heavy, as otherwise the sensitivity of the finished loud speaker will suffer.

When you have arranged for the mounting of the cone and unit assembly your loud speaker is finished and can be tried out, and if you don't fall in love with it from the first moment you hear it, well . . . !

Just a final remark regarding the fixing of the cone and unit assembly. This must be done in such a way that the unit is absolutely rigid when in position. We found it best first to mount the unit on to a strip of wood, which was then screwed in the appropriate position inside the set.

AN INEXPENSIVE BUT ELEGANT TRANSPORTABLE



If you decide to make both the speaker and "Duo-Vise" Two up for use as one unit, a very neat joint between the two can be made as shown here by arranging the copper top of the set to run below the set's baseboard and so overlap the top of the speaker cabinet.



AS WE FIND THEM NEW APPARATUS TESTED

The "Instamat" Transformer
IN producing the "Instamat" output transformer Messrs. Ready Radio have aimed at placing upon the market an instrument capable of giving an instantaneous matching of valve impedance to loud-speaker load.

FOR MOVING COILS



The two knobs on the top of the "Instamat" enable the ratio to be altered in a moment.

Most readers are probably aware that in order to obtain the maximum amplification from an output valve, together with high-quality reproduction, accurate matching is essential.

With the "Instamat" the ratio can be altered in a "jiffy" simply by rotating two knobs, with the result that the ear does not have time to forget the tonal effect of one ratio before changing over to the next.

Upon examining the transformer it is immediately evident that Mr. G. P.

Kendall, the chief engineer of Ready Radio, and the designer of the instrument, has spared no pains to ensure a high-grade production.

The primary D.C. resistance is only 40 ohms, and the secondary 2 ohms. Some idea of the massive construction of the "Instamat" can be gathered from its weight, which is 4 lb.

It is said that the "goodness" coefficient of a transformer is dependent upon the amount of iron in the core, and the designer of the "Instamat" is apparently one who believes in this doctrine, for he has certainly not skimped matters.

In any case, where the cost permits, the procedure is a wise one, because output valves frequently require heavy anode currents, and an instrument which saturates on the slightest provocation is of little use in the output circuit.

In operation we found the transformer fascinating to handle and giving a power transformation fully up to standard.

The price of the "Instamat" Major (for moving-coil speakers) is 37s. 6d., and it is a thoroughly well-made component. The ratios obtainable are 10-1 to 25-1, and the makers, Messrs. Ready Radio, Ltd., Eastnor House, Blackheath.

Magnum Volume Control

The latest Magnum volume control is considerably smaller in size than its predecessor. The diameter is now 1½ in. and the overall depth ¾ in. Two resistance values are available, viz., ½ megohm and 2 megohms, and the price of either type is 5s.

The 2-meg. model is suitable for use in R.C. and transformer-coupled low-frequency amplifiers and the ½-meg. type can be employed with transformer coupling.

The sample submitted was found to be smooth in movement and silent in operation.

The makers are Messrs. Burne-Jones & Co., Ltd., 296, Borough High Street, London, S.E.1.

Zonophone Kit Set

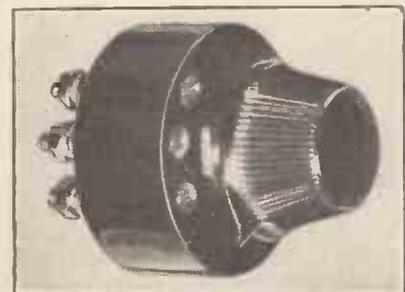
We have recently had an opportunity of trying out one of the "Zonophone" constructor's kit sets. The receiver is a compact design, the loud speaker being included in the cabinet.

The circuit comprises three valves, viz., a grid-leak detector and two R.C. stages. The output valve is a pentode P.T.240.

It is evident that the circuit has been arranged for clarity and stability, together with a good degree of selectivity.

The aerial is fed through a fixed condenser (there are alternative sockets

A NEAT VOLUME CONTROL



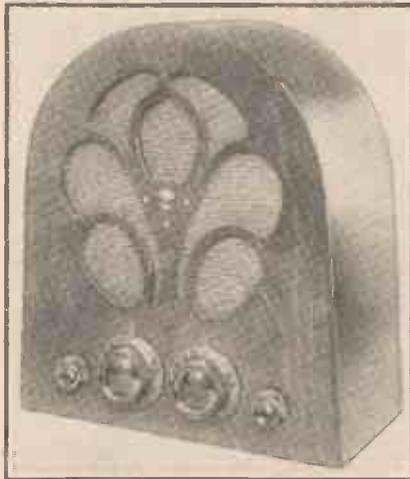
The Magnum volume control can be obtained in two resistance values. It is a very compact little component.

As We Find Them—continued

giving different degrees of selectivity) to a coupled, fully tuned, wave-change circuit; reaction being applied to the grid coil.

There is a stopping resistance in series with the grid of the first L.F. valve to prevent stray H.F. currents from wandering into the L.F. stages and producing instability.

EASY TO MAKE



The "Zonophone" kit set utilises a three-valve band-pass circuit, and the loud speaker is included in the cabinet.

Pick-up sockets also are provided, and the loud speaker is a sensitive cone unit.

Using an average outside aerial, situated some 25 miles from Brookmans Park, we were able to bring in the Regional and National transmissions at excellent strength, and with the aerial plugged into the socket giving least selectivity there was a considerable gap between the two stations. No reaction was necessary.

With the aid of reaction a number of the more powerful continentals could be brought in at good volume, although the absence of an H.F. valve and the use of R.C. coupling imply that the design is primarily intended for the satisfactory reception of the Regionals rather than distant continentals.

The receiver is easy to build, in fact only a screwdriver and pair of pliers are necessary in the way of tools.

A clearly-written instruction book makes the task simple, and there is little likelihood of even the veriest novice going wrong.

The tone is good and the selectivity adequate for all normal conditions.

The kit, including valves, retails at

£6 6s. 0d., and at this price it can be regarded as a value-for-money product.

Celestion Moving Coil

We have tested a number of Celestion speakers in the past and we have always found them to be high-grade productions. Therefore, when the firm submitted one of their latest R.P.M.12 speakers we expected something good—and we were not disappointed.

The R.P.M.12 is a permanent-magnet moving-coil speaker embodying the results of modern research in magnet steels and comprising a 10-in. reinforced cone diaphragm.

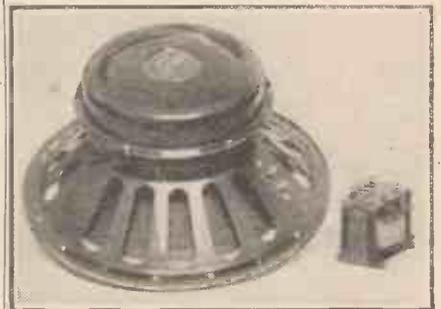
The surround is of thin leather and by employing a shallow cone the makers claim a wider distribution of sound than is usual, i.e. less focussing. For testing purposes we mounted the unit on a large baffle of non-resonant type, and in view of the many enquiries received from readers as to the sensitivity of this type of speaker we used a simple set consisting of a straightforward detector with reaction, followed by two low-magnification resistance-capacity-coupled L.F. stages. The valves were two of the two-volt H.L. type and a super-power. At a distance of approximately 25 miles from the Brookmans Park transmitter, and with very little reaction, the volume given by the R.P.M.12 was amply sufficient for ordinary domestic purposes, and so it may be stated that the sensitivity of this particular model is of a very

high order indeed. The reproduction over the musical frequency range is excellent. The bass is good without being boomy, and the upper register is crisp and bright.

Speech is natural and the workmanship very good indeed.

The price of the R.P.M.12 unit is £6 and tapped output transformer £1. The makers are Celestion, Ltd., London Road, Kingston-on-Thames.

A SENSITIVE SPEAKER



The Celestion permanent-magnet moving-coil speaker, and its tapped output transformer.

Radiophone Condenser

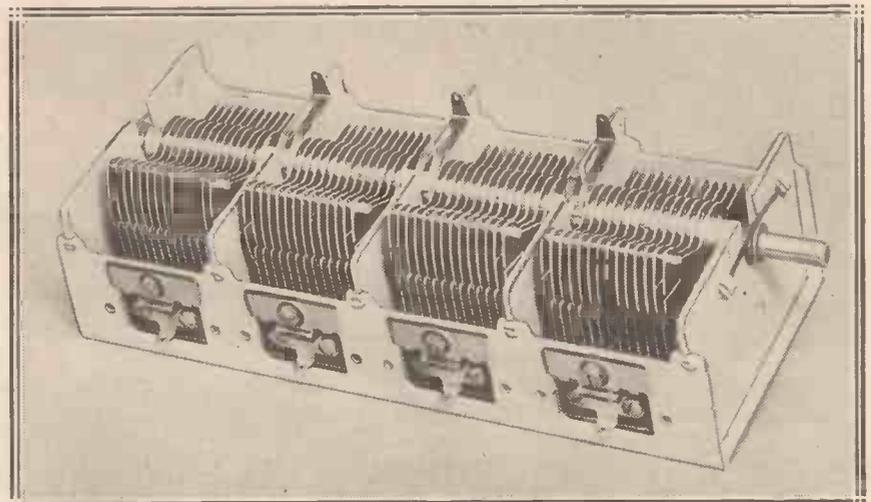
Messrs. The British Radiophone, Ltd., Aldwych House, Aldwych, London, W.C.2, have sent us one of their condenser units.

These units are obtainable in either two-, three-, or four-gang assemblies, and a very high degree of accuracy in matching is claimed for them.

The condensers are supplied with or without dustproof metal covers.

(Please turn to page 187 for further details.)

A GOOD FOUR-GANG CONDENSER



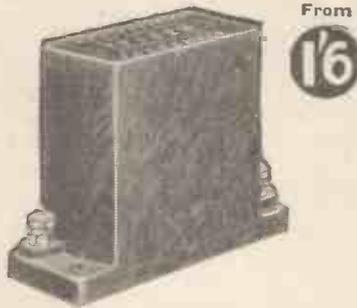
This is the British Radiophone gang condenser unit. It will be seen that the end vanes of each section are segmented. Very accurate matching is claimed.

TELSEN RADIO COMPONENTS



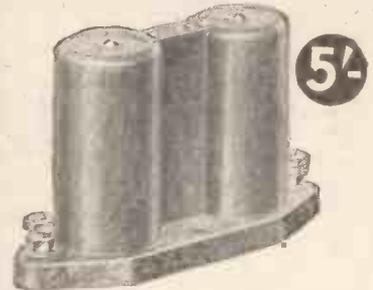
TELSEN VALVE HOLDERS (Prov. Pat. No. 20286/30). The Telsen four- and five-pin valve holders embody patent metal spring contacts, which are designed to provide the most efficient contact with split and non-split valve legs, and are extended in one piece to form soldering tags. Low capacity and self-locating.

Telsen 4-pin Valve Holder Price 6d.
Telsen 5-pin Valve Holder Price 8d.



TELSEN MANSBRIDGE TYPE CONDENSERS

Made in capacities from .01 to 2.0 mfd. From 1/6
Telsen Fixed Condensers are made in capacities from .0001 to .002 mfd. Price 6d.



TELSEN BINOCULAR H.F. CHOKE

Hailed unanimously by the leading experts as the perfect H.F. Choke. The Telsen Binocular Choke is called for wherever highest efficiency is desired. Its highest inductance (180,000 microhenrys) and exceptionally low self-capacity (.000002 mfd.) ensure a very high impedance at all wave-lengths, and its excellent efficiency curve is free from parasitic resonances. Price 5/-



TELSEN LOUD-SPEAKER UNIT

The Telsen Loud-Speaker Unit is pleasing to the most sensitive ear. The deep notes of the bass, the brilliance of the soprano, and the crispness of diction are clearly reproduced without distortion.

It employs cobalt steel magnets, and the detachable rod which carries the cone is fitted with cone washers and clutch. The entire unit is enclosed in a beautifully moulded bakelite dust cover Price 5/6

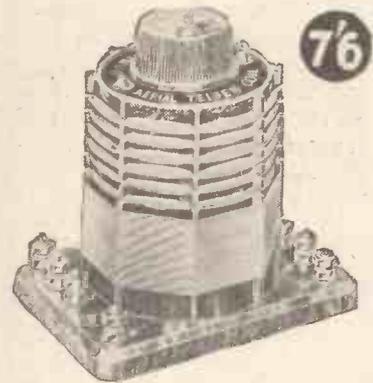
TELSEN

ALL-BRITISH RADIO COMPONENTS

Also include:

Output Transformers	12/8
H.F. Chokes	2/-
Output Chokes	8/-
Power Grid Chokes	8/-
L.F. Coupling Chokes	5/-
Slow-Motion Dial	2/6
Fixed Condensers	6d.
Pre-set Condenser	1/8
Variable Condenser	4/8
Spaghetti Resistances	6d.
Loud-Speaker Chassis	5/6
Fuse Holder	6d.
Grid-Leak Holder	6d.

Send for the "Telsen Radio Catalogue" and book of "All-Telsen Circuits" to The Telsen Electric Co., Ltd., Aston, Birmingham.



TELSEN DUAL-RANGE AERIAL COIL

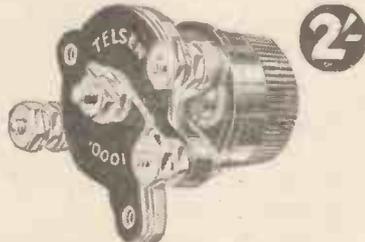
It incorporates a variable series condenser and is suitable for all districts. It has been tested in various parts of the country, and down to distances of five miles from Regional stations a single tuned circuit will definitely separate the Regional programmes. A reaction winding is provided Price 7/6
Telsen H.F. Transformer and Aerial Coil. Price 5/8



TELSEN GRID-LEAKS

Telsen Grid-leaks are absolutely silent and non-microphonic, and practically unbreakable. They cannot be burnt out and are unaffected by atmospheric changes. Telsen Grid-leaks are not wire wound and therefore there are no capacity effects. Their value is not affected by variation in the applied voltage.

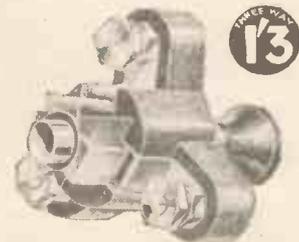
Made in values from 1/4—5 megohms.
Telsen Grid-leak Price 9d.



TELSEN BAKELITE DIELECTRIC CONDENSERS

The moving vanes are keyed on to the spindle and there is a definite stop at each end of the travel. The connection to rotor is made by a phosphor-bronze pigtail so there is no crackling due to rubbing contacts. The connection to the stator vanes is absolutely positive—a very important point. All Telsen Bakelite Condensers are supplied complete with knob.

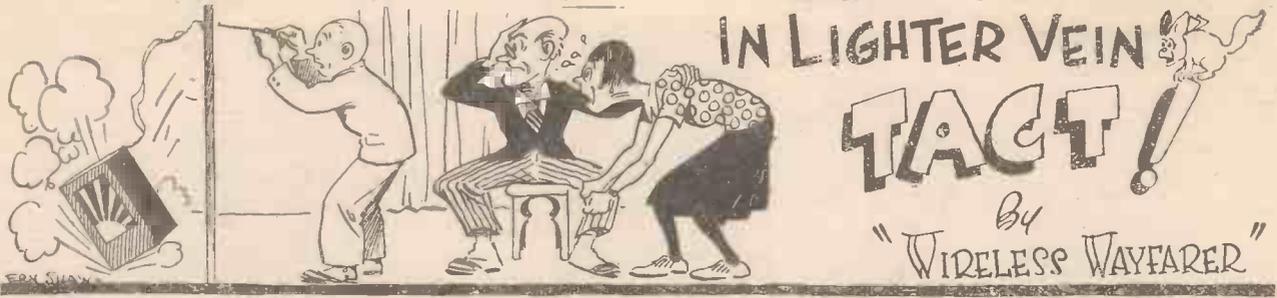
Differential Condenser—
Capacities .0003, .00015, .0001, Price 2/-
Reaction Condenser—Capacities .0003, .00015, .0001, Price 2/- .00075, .0005, Price 2/8.
Tuning Condenser—
Capacities .0005, .0003, Price 2/-



TELSEN PUSH-PULL SWITCHES

(Prov. Pat. No. 14125/31).
The Telsen Push-Pull Switches employ a proper electrical knife switch contact and are soundly constructed on engineering principles. The centre plunger is wedge-shaped so that as it is pulled out it forces the inner fixed contacts outwards, tightly gripping the moving contacts. There is no fear of crackling with Telsen Push-Pull Switches. Their low self-capacity makes them suitable for use in H.F. circuits.

Two-point Price 1/-
Three-point Price 1/3
Four-point (2 pole) Price 1/6



"I'M in the soup," moaned the Professor.

"Potage or consommé?" I inquired with kindly solicitude.

"The absolute mulligatawny."

"Cheer up, old friend," I cried, slapping him on the back so hard that his teeth rattled. "You know that I will stand by you through thick or clear. Tell uncle freely and frankly just what you have been doing, you naughty boy."

ALTERNATIVE "CHANNELS"!



"I took my hat off to the pillar box, and pushed the letter down her throat . . ."

The Professor's shoulders heaved, either on account of a sob or because they were still a bit tender after my smack. "It's Miss Worple," he quavered. "I have been and put my foot right in it. You know what a big mouth she has."

"Look here," I said, "if you've been stuffing your foot into Miss Worple's mouth the thing is really rather beyond a joke."

Technical Copy

"No, no," said the Professor, "it wasn't my foot; it was the manuscript of an article that I had just finished entitled: 'Should Grids Be Screened; If So, Why Not?'"

"This," I said, "is getting more and more complicated. Would you mind starting from the beginning and explaining what did happen?"

"Well, you see it was this way. I had written this article, for which readers of the WIRELESS CONSTRUCTOR were waiting with bated breath."

[*Says you.—ED.]

"How does one bate one's breath?"

"Shut up. Having only three minutes in which to catch the midday post, I dashed from the 'Microfarads'

into the High Street, and just as I reached the pillar-box Miss Worple came out of a shop. In my agitation I took off my hat to the pillar-box and pushed the letter down her throat—she was doing her movie-star smile at the time. These little things will happen, you know."

Initialed Valves

With the Professor they will, indeed. Well do I remember the time when he flung Tootle's cat into the fire, which was fortunately extinct, and sat for an hour stroking a large lump of coal. There was the occasion, too, when he laid little Bingo to rest in his bed and himself slept in the dog kenne!

"Well," I said, "what do you want me to do about it?"

"I've got to make my peace somehow," sighed the Professor, "and I believe that with your well-known tact you could help a lot if you would come round with me to see Miss Worple."

Tact has always been my long suit, if I may say so without undue immodesty. Few people, I think, could have dealt as I did with Sir K. N. Pepper when he discovered inside my set three valves on which he had cut his initials with a diamond some weeks before as a little precaution before asking me to tea. I proved to him so conclusively that the initials were a forgery committed by Goshburton-Crump, to stir up trouble between the chairman of the Wireless Club and myself, that he went away firmly convinced that I would never pinch a valve, even if the owner wasn't looking.

Making a Start

"Very well," I said, "let us go at once to call upon Miss Worple. Leave it entirely to me and you will come through with flying colours."

At "Sweet Thoughts," Miss Worple's charming villa, we were admitted by what would-be society novelists are apt to call a trim maid. Grim, though, would have been an equally appropriate adjective both for

her and for her mistress, into whose presence she introduced us. The Professor showed some inclination to stage a fade-out. Having placed his coat over my arm and his hat in my hand, he proceeded to hang himself up on a peg in the hall, but I gently unhooked him and took him in with me.

"How do you do, Miss Worple?" I cried, running forward with outstretched hand. "Oh, damn!"

The last reprehensible exclamation was torn from me as I tripped over Tweedlums, Miss Worple's beastly peke, which arose suddenly from the hearthrug and got all mixed up with my feet. There followed a series of complicated ballet steps, and before I knew what I was doing I had brought up with my arms round the lady's neck.

A High "Peke"

Matters were made more difficult by the Professor, who, always ready to back up a pal, caught Tweedlums a boot, which shot him clean out through the french windows. The fact that the windows happened to be shut at the time was, of course, still more unfortunate.

It took us some little time to get Miss Worple soothed down a bit. Then the Professor butted in again.

A WRONG CONNECTION



He proceeded to hang himself on a peg in the hall.

"I asked Wayfarer to come round with me on account of his well-known tact," he smiled, "to help me in what you will understand is rather a difficult business."

"If that was a sample," sniffed Miss Worple, "I don't think I like this cave-man brand of tact."

"Dear lady," I said, "we have

METEOR III

The new ALL-WAVE Quality Receiver



The most interesting receiver ever designed! Possesses all the most attractive features of a modern 3-valve, plus a number of unique advantages.

SENSITIVE AND POWERFUL—so that you may be sure of a good choice of programmes from home and abroad at excellent strength.

ADJUSTABLE SELECTIVITY—so that each programme may be received free of interference even under the most difficult conditions.

QUALITY—so good that you will *really* enjoy the programmes you receive.

EASY TO TUNE—single knob tuning with slow-motion control.

SLOW-MOTION REACTION—of wonderful advantage when tuning in distant stations.

RADIO-GRAM SWITCHING—with connections for pick-up, and, in addition

ULTRA SHORT-WAVE TUNING, enabling you to enjoy the fascination of Short-Wave reception—AMERICA, AUSTRALIA, AFRICA, THE CONTINENT, etc.

No need for the expense and inconvenience of a separate Short-Wave Set—build a Meteor and you have a receiver which covers ALL wavelengths, with single dial tuning.

EQUAL IN APPEARANCE TO A 15 GUINEA MODEL METEOR III KIT

Full set of Components with polished panel (cut and drilled), baseboard, Jiffilinx, screws, etc.

PRICE 75/- or

9/- DOWN and 7 monthly payments of 10/6

METEOR STANDARD CABINET MODEL

Kit as above with Standard Cabinet.

PRICE 89/6 or

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METEOR CONSOLETTA CABINET MODEL

Kit as above with Consolette Cabinet, as illustrated.

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Mullard Valves are Specified for High Efficiency.

FREE

FULL SIZE 1/- PLAN

and complete building instructions.

Go to your radio dealer. Ask him for your FREE copy of the Meteor Folder. Read all about this fascinating ALL-WAVE, ALL-PURPOSE Receiver. See how easy it is to build.

We are distributing 100,000 Meteor Folders FREE. If your dealer is out of stock, post coupon now.

The EASIEST SET TO BUILD. The full size Meteor Folder will prove to you how easily and quickly the Meteor can be built. No cutting or drilling—the polished panel is all ready cut and drilled. No soldering—Jiffilinx of correct lengths are supplied ready to drop into position. A screwdriver and pliers are the only tools you need.

G. P. Kendall, B.Sc., designed the Meteor Three. His name alone is sufficient guarantee that the Meteor is a "Super" in all except price.



To: READY RADIO Ltd., Eastnor House, Blackheath, S.E.3.

Please send me Meteor III Folder FREE.

NAME.....

ADDRESS.....

READY RADIO

READY RADIO Ltd., Eastnor House, BLACKHEATH, S.E.3.

Showrooms:—159, Borough High Street, S.E.1

In Lighter Vein—continued

come round on a delicate mission, and you must bear with us. We want you to realise that the Professor made a terrible mistake to-day for which he is more than sorry."

Miss Worple bowed a trifle icily.

"You see," I continued, "it was a perfectly natural mistake."

Miss Worple's eyebrows shot skywards.

Poor Results

"I mean," I added hastily, "you know what the Professor is. The idea that was uppermost in his mind when he left home was that he must post his manuscript into the great gaping mouth—"

Miss Worple's eyebrows positively disappeared, and I realised that matters were becoming more and more involved.

UNMUSICAL MOVEMENTS



"How do you do, Miss Worple?" I cried.

"... of a pillar-box. You see, in these days of lipsticks, ladies' mouths and those of pillar-boxes have a kind of family resemblance, and, if you follow what I mean—"

"I think," said Miss Worple, in her most frigid tones, "that you had both better go."

Similar Design

"No, no," I said. "Do sympathise with my hard task and hear me out. Do believe that I am trying to show you just how this regrettable incident occurred. Think for a moment. With its red hat and its general shape, a pillar-box is easily mistaken for a woman to-day, and that beautiful smile of yours, Miss Worple—no, that's not quite what I mean! You see—er—well, hang it all, this doesn't seem to be going too well. Anyhow, I hope that the manuscript didn't give you indigestion."

When you are dealing with men, tact is, of course, the finest thing in the world, but so illogical are women that it hardly seems to get you anywhere. Miss Worple's countenance became positively contorted with

fury. Then I had an inspiration.

"By the way," I said, "if we may now leave this unfortunate incident, which is now, I trust, satisfactorily explained, may I show you the very latest thing in gadgets for constructors?"

Though she wanted to be right up on her high horse, Miss Worple could not resist the temptation.

"I know," I went on, "that you are just making a set, and I have brought with me a wonderful screwdriver. It is called a spiral ratchet. A marvellous invention. Driving in screws or taking them out becomes as easy as playing a trombone."

"My Pet Screwdriver"

From my hip pocket I drew Alfred, my pet spiral-ratchet screwdriver, and handed him over in his folded-up position.

Unable to preserve her haughty attitude, Miss Worple took him in her hand and examined him with some interest.

"Just turn that little ring," I instructed her.

She did so, and it was unfortunate that the Professor should have been peering forward at that moment to examine the gadget. Alfred shot out to his full length, removing as he did so the lobe of the Professor's left ear.

Working Instructions

"What a magnificent screwdriver!" cried Miss Worple, full of girlish enthusiasm. "I must have one of these. Now, could you possibly be so kind as to order me half a dozen from the shop from which you got yours?"

Whilst the wounded Professor retired to a corner, I proceeded to instruct Miss Worple in the workings of this wonderful driver. On the table stood her new set, half-finished.

"To withdraw that screw, for instance," I said, "all that you have to do is to push this little catch here; you then place the blade of the screwdriver in the nick of the screw and just simply push."

A Spoilt Panel

I pushed. With a sickening noise the blade flew out of the nick and skated over the surface of a beautifully polished panel, scoring a scratch that must have gone nearly half-way through.

"Tut, tut!" I said. "I am so

sorry. I ought to have pulled this little jigger up instead of pressing it down. That was really the screwing-in position."

"I see," said Miss Worple.

"Now I will just show you how it really does work when extracting a screw."

Moving the Moving-Coil

Very carefully I arranged the catch in the screwing-out position and attacked a screw that I saw in one of the folding doors that separate her drawing-room from her boudoir. I gave one hefty push and the screw simply flew out by the roots. That same instant there came a resounding crash from the next room.

THAT LOOSE SCREW!



"What a magnificent screwdriver!" cried Miss Worple.

"That," said Miss Worple, in chilly tones, "was the screw that holds the bracket on which my boudoir loud speaker stands."

"That is a moving-coil loud speaker—that was," I murmured sadly.

"Most unfortunate," I said aloud. "Everything seems against us to-day. However, I will really show you how this instrument drives in screws. Why, here's the very thing—a screw in your skirting board that is nearly half an inch out."

On the Main

Slipping down the slide-thing, I stuck the edge of the blade into the screw and pushed hard. In went the screw like a red-hot skewer into a cheese. There was a kind of noise that occurs when you prick a bladder, and the next instant the room was filled with a strong smell of gas. I mean, how was I to know that the silly gas-pipe was just under the point of that screw?

"And that," panted the Professor, as we went away at a steady double down Miss Worple's drive, "and that, I suppose, is what you call tact."

There are some people who will never understand.

SEVEN GIANT T.C.C. CONDENSERS

used by 200 k.w.

PRAGUE



Here is illustrated one of the seven giant 5 mfd. condensers standing 6 ft. 6 ins. high.

WITH an output of 200 K.W. Prague becomes the world's most powerful medium-wave broadcaster—and it has come to Britain for its condenser equipment. Each of the 7 T.C.C. Smoothing Condensers has a capacity of 5 mfd. with a working load of 25,000 volts D.C. Other T.C.C. equipment supplied to this station includes H.F. Condensers—mica dielectric immersed in oil—which are called upon to work up to 50,000 volts peak load!

This order was secured in open competition and is a remarkable testimony to the efficiency and reliability of T.C.C. All-British Condensers.

T.C.C.

ALL-BRITISH

CONDENSERS

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



A PRACTICAL MAN'S CORNER

In these pages our contributor gives many valuable hints and tips on all phases of constructional work.

By R. W. HALLOWS, M.A.

IT has always seemed strangely interesting to me that an old Scottish name for a small nail is a dam. In fact, long before I knew that this was so I had frequently used the name when the hammer descended upon my thumb nail! I have no doubt that readers, too, have earned bad marks in the Recording Angel's notebook when engaged in trying either to hammer in small nails or to drive in tiny screws.

At Last!

Well, here is a tool (Fig. 1) which may save many a bad mark. It is, as you will see, a pair of pliers made with curved handles so that the jaws with the nail or screw firmly held between them may be laid flat on the work. They thus replace the human forefinger and thumb, the only difference being that you can hit the pliers as hard and as often as you like with the hammer, or let the blade of the screwdriver slip out of the nick on to them, without doing any damage.

The pliers are made by the Atalanta people, and they cost 3s. 6d. At one penny per bad word they would save their cost in no time! The only criticism that I have to make is that the jaws are a little too thick, so that you cannot use them as they stand for those very short screws which are the most infuriating of all. Three-eighths of an inch is the shortest that they will handle. Perhaps the makers will take further pity on us wireless folk and give us pliers with thinner jaws.

British-Made

This tool is entirely British-made and it is a very pretty piece of work, being made of forged steel. There are three sets of notches of different sizes

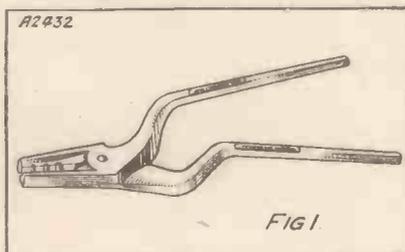
in the jaws, so that so far as the gadget is concerned they will handle any small nail or screw that the wireless constructor is likely to come across.

I have received recently a very acceptable present in the form of a soldering iron of an entirely new kind.

A New "Iron"

As it is not yet on the market I won't give the name of the makers and it isn't a bit of good your writing to me to ask it. As soon as it is in production it will be advertised. The firm in question became dissatisfied, like a good many of us, with the ordinary copper bit. You spend a long time in putting a nicely tinned point on to it

SAVES YOUR FINGERS!



This handy pair of pliers will enable you to hold screws and bolts in awkward places. No more cut or bruised fingers!

and it looks beautiful when you have finished.

Then in one of those moments of aberration that happen to all of us you quite forget that you have left it in the flame of the spirit lamp or bunsen burner. When you remember you find the iron red-hot and the tinning vanished. You have to file up the bit and to re-tin it. Then all goes well until . . .

The new bit is not made of copper. I don't know its exact composition, but I understand that it is an alloy and it looks rather like brass. The

great thing about it is that once you have tinned the point it remains tinned indefinitely. You can heat the iron red-hot without doing any harm and that would seem to be good enough. But this enterprising firm tells me that they are not yet satisfied. They want to produce a soldering iron which can be brought to something approaching white heat without damage to the tinning.

What with this soldering iron and the pliers already mentioned, the ranks of wireless constructors will soon become a splendid recruiting ground for the Anti-Swearing League!

To tin one of these new irons you heat it up in the ordinary way and treat it with a special liquid flux. The solder then goes on as easily as butter on to hot toast and in the matter of a minute or two you have a beautifully tinned bit.

Special Flux

I confess, though, that I am always a little afraid of these liquid fluxes for wireless work. Nearly every flux—liquid, solid or paste (with the exception of resin)—has a strongly acid reaction, and in the past I have had trouble with joints made with such fluxes when fine wires were concerned.

I wrote, therefore, to the firm to ask whether this might not be a bit of a snag. Their reply is most reassuring. They told me that they had used this flux for soldering wires for several years now and that they cannot find the slightest signs of deterioration in any joints that they have examined. "Yes," I said, "but have you tried it on No. 40 S.W.G.?"

The reply was that they hadn't actually tried that size, but since it didn't appear to do any harm to

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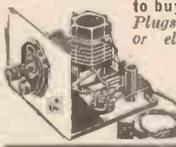
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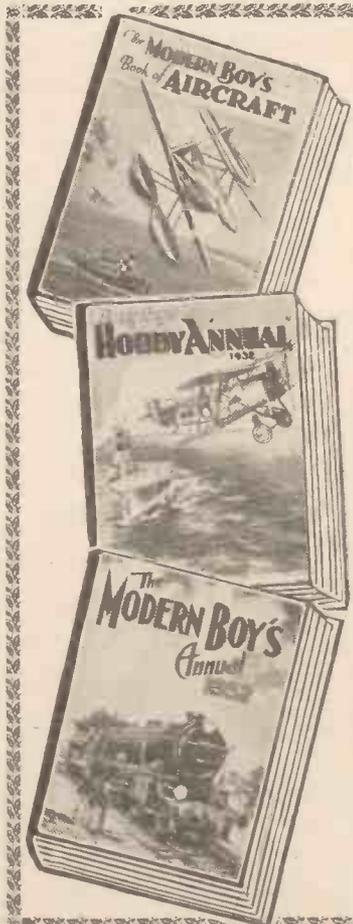
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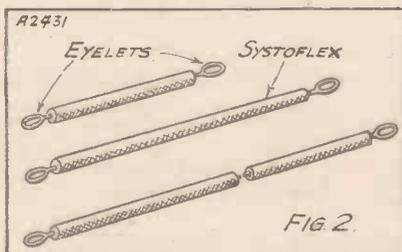
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A Practical Man's Corner—continued

No. 47 they thought that it would be all right with No. 40. With this I cordially agreed, for No. 47 is finer than the average human hair. If this flux doesn't hurt such cobweb stuff as No. 47 it will certainly be all right for ordinary wireless jobs.

From time to time I have given tips for saving time in the process of wiring up sets or smaller pieces of wireless apparatus. Though I say it myself, these have been of a useful kind, but I frankly admit that none of them is such a trouble-saver as the Jiffilinx invented by Ready Radio.

USEFUL LINKS



The wiring of a receiver is usually the longest job of the whole constructional work. With the aid of these "Jiffilinx," however, the time can be greatly reduced.

The name is exactly right. With them you can make your links in a jiffy. They are made up in packets at half-a-crown apiece. When you open the packet you find that it contains forty assorted lengths of wire covered with Systoflex sleeving.

Both ends of each link are provided with eyelets, and so practical a firm is Ready Radio that these actually do slip comfortably on to 4 B.A. terminals. I will not labour that point; every constructor will understand fully what I mean.

Various Lengths

The lengths in the packet have been carefully chosen so as to provide exactly what you are likely to want in wiring up a three- or four-valve set. A masterly piece of thoughtfulness is to provide in addition a small supply of plain wire and Systoflex to enable a few odd-sized connectors that may be wanted to be made up. Jiffilinx, by the way, range in length from 2½ in. to 12 in.

Which method do you use for wiring up your own sets? There are, of course, quite a number. There is the all-corners system, in which every lead runs parallel with the edges of

the baseboard or vertically to it and every bend takes the form of a perfect right-angle. Some years ago, when it was the fashion to use bare wire in the most expertly-constructed sets, wiring up took hours and hours, for you had to be most careful to see that no lead came within possible touching distance of any other.

A Neat Job

The all-corners method is quicker nowadays since we use sleeved wire of some kind. It certainly makes a very neat job and makes for efficiency, so long as you are careful to see that none of your "hot" or high-potential leads run closely parallel. Some people simply wire their sets with flex, but that is not the kind of job that makes a very wide appeal, for it does not look very neat and it does turn trouble-hunting into something like an attempt to unravel a tangled skein of wool.

Myself, I am rather in favour, when a quick but neat job is required, of what I call the "here to there" wiring system. This has a great many advantages, for since you take all your leads by the most direct routes you keep them as short as possible. And it is astonishing what a difference an inch or two knocked off the high-frequency grid leak can make at times.

If you use the "here-to-there" system there is one point that you should be extremely careful of. I know from experience, because it caused me a good deal of trouble the other day. This concerned the control grid leads of S.G. valves. It really is most important to keep them short, and to keep them well away from any bits and pieces of the plate circuit.

The trouble I referred to in the last paragraph was a three-valve set consisting of a screened-grid valve, a grid-leak detector and a pentode. Owing to its design and the components used the circuit should have been stable enough, but tests soon showed that it was not so good as it ought to have been in that respect.

Keep Them Short

The trouble was eventually traced to the control grid lead of the screened-grid valve, which had been made rather too neat looking. Its path lay over-close to the plate lead, and unwanted feed-back effects were occur-

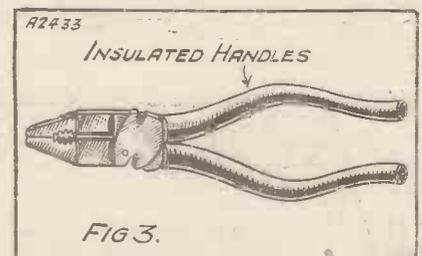
ring with the result that the set was unstable.

If you don't watch this point you can nullify one of the main advantages of the S.G. valve. As you know, it enables bigger magnification to be obtained because of the very small capacity between control grid and plate. If you put back the capacity by keeping leads of the kind mentioned close together, then either the valve will be unstable or you will not be able to get much amplification out of it.

Insulated Handles

You can buy at almost any ironmonger's what are known as electricians' pliers. These are very useful in their way, for they have insulated handles which prevent you from getting a shock if you should happen to place the jaws on an H.T. positive point whilst your hand is resting on something that is earthed.

SHOCK-PROOF!



Insulated pliers are extremely useful in radio work, for it is sometimes necessary to make adjustments inside the set while it is switched on.

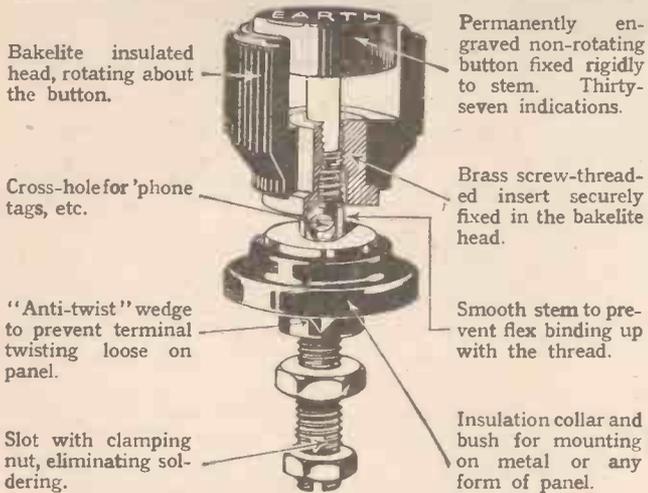
But such pliers are not ideal for use inside a wireless set, for a short-circuit may have much more serious consequences than just giving you a shock. What we really want are pliers insulated all over except on the faces of the jaws. Obviously you cannot cover them with rubber. What is to be done about it?

Well, here's a tip that I have found useful myself. The paint known as Brunswick black, which is used for stoves and fireplaces, is a good insulator. It has the further virtue of drying very quickly. Select the pair of pliers that you intend to keep for doing jobs inside the set, and give them three coats of Brunswick black.

You must, of course, allow each coat to dry thoroughly before the next is put on. You must also open and shut the pliers two or three times

(Please turn to page 186.)

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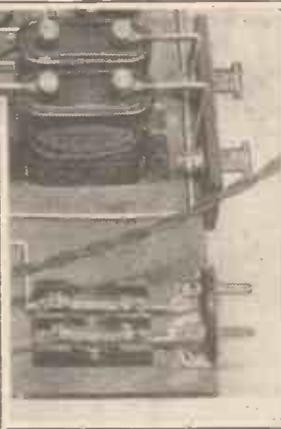
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"SAFETY FIRST" SET DESIGN

BY VICTOR KING.



Practical guidance for constructors by one of Britain's most successful set designers.

THERE are many set designs which possess large "margins of safety." That is to say, you can vary their layouts and even component values quite a lot without seriously interfering with their efficiency.

But there are also receivers with which you cannot take such liberties, where, indeed, exactitude in assembly is vital.

Liberties with the Layout

However, you will notice that designers very seldom disclose the fact that any particular one of their sets falls within the first category; they prefer that every constructor should tend to think that every set is in the critical class!

Experience has taught them that if you give some constructors—and I'm not saying that such form a majority—half an inch latitude in the disposal of a component, they will take anything up to half a yard!

I well remember that I once said in one of my articles that it didn't matter, "within limits," if a certain item were shifted one way or another on a baseboard. Some time after a reader's query dealing with that particular set was brought to my notice. He had shifted the component in question the full length of the baseboard; had, in fact, taken it out of the H.F. end of the set and placed it in the L.F. end.

Peculiar People!

It being a very "H.F." article, terrific instability had set in. He expressed surprise, but I did not!

You who follow wiring diagrams carefully would be unable to credit the peculiar departures from specifications that people keep on making, and people who should know better, too.

I've had versions of my sets built up even by wireless traders, and have almost been unable to recognise any evidence of my original planning in them.

It is tragically common to find a component of wrong value stuck in, perhaps for the reason that those of right value were not easily obtainable at the time.

And all because it is apparently possible, on occasions, to change things in a set without any appreciable alteration in results.

What seems to be overlooked is the cumulative effect two or more

such departures may have on the overall effectiveness of a set. You can throw away half the effective voltage at a certain point in a set without the ear being able to detect the loss, but throw away half of another voltage at another point, and the set becomes a mere ghostly echo of its true self.

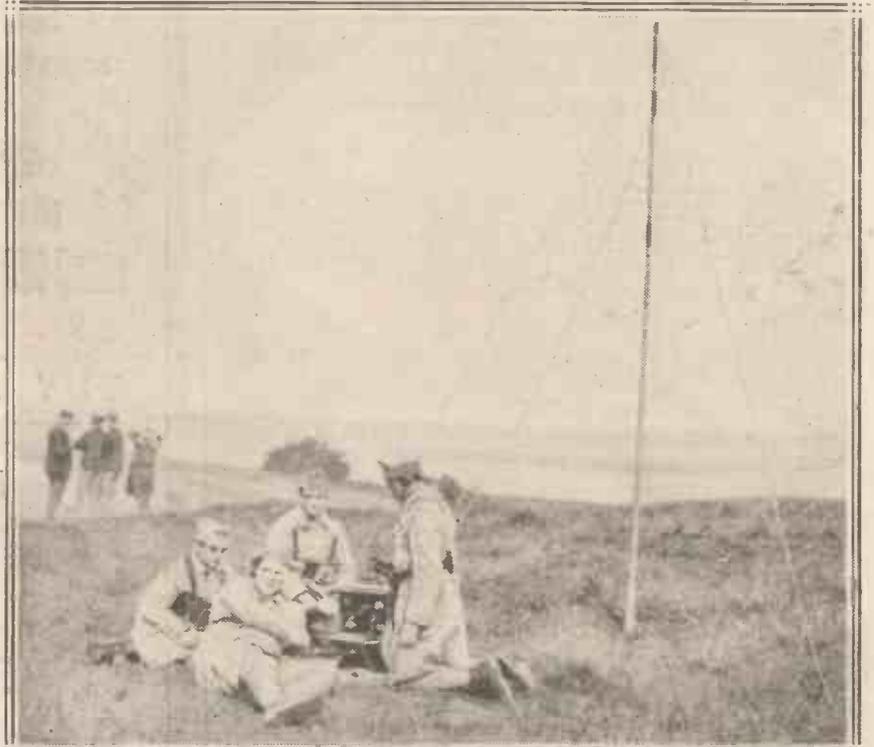
Throwing the Wheels Away

"Yes, I changed this and it made no difference, and I have changed that in other sets, and that, too, made no difference," is the kind of thing I've actually heard being said. My reply has been a gentle reminder that you can throw away one wheel of a six-wheeled lorry and the lorry will still roll along quite well, but that if you start throwing away many more of its wheels you will tend to approach a point where a most noticeable difference in the lorry's rolling power will be registered!

I can assure you that the disposition of components and the choice of their values in any set evolved by a man who knows his job is a matter of considerable thought. If that receiver is copied by another technician who is as well up in the art as the original designer, it may be possible to alter things here and there, perhaps even make improvements; but that is the admissible absorption

(Continued on page 188.)

RADIO ON ARMY MANOEUVRES



A portable radio station which is playing a prominent part in the French Army manoeuvres.



DUAL-RANGE COIL

As specified in this issue for
CIRCUIT "FIFTY-FOUR"
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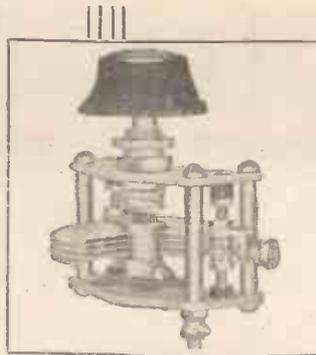


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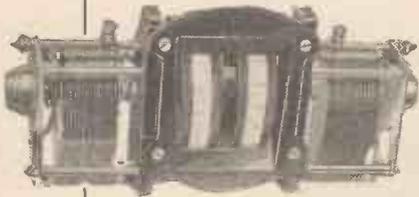
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OUR NEWS BULLETIN

Bristol's Record

It is claimed that Bristol has more wireless sets in its homes per head of the population than any large centre in Great Britain.

There are about 80,000 houses in Bristol, and at the end of the October reckoning more than 52,000 wireless licences had been taken out in the Bristol area.

The population of the city is 400,000, so that there is one set for fewer than eight persons.

"H.G.'s" Opinion

Mr. H. G. Wells holds the opinion that the United States has much to

learn from the progress of broadcasting in Great Britain.

Four years ago he predicted the speedy decline of broadcasting. He now admits that it has possibilities which he did not foresee in 1927.

One for the U.S.A.

"What has happened is that a new use has been found for radio," he stated in an interview recently. "I had better climb down and admit broadcasting has many possibilities I had not thought of in 1927. However, I think America is still back in 1927 in the matter of broadcasting. The British Broadcasting Corporation could teach your American exploiters of the air a lot they have still to learn."

Money Talks

The cost of the debate between Oxford and Harvard Universities, on

the cancellation of war debts, will be about £8,000 to £9,000. It will be borne by the American National Broadcasting Company.

Big Ben in N.Z.

Advices from New Zealand show that the broadcast of the Cenotaph service from Chelmsford was successfully relayed there. Listeners heard Chopin's Funeral March and the chimes of Big Ben, followed after the Silence by the Last Post, the hymn and prayers and the National Anthem, with greater clearness than at previous similar broadcasts.

Pocketed by Police!

Scotland Yard experts have started official tests with a pocket wireless set which it is claimed enables policemen to keep in constant touch with headquarters while patrolling their beats.

The inventor is Mr. C. L. P. Dean, a young engineer, of Slough, Buckinghamshire.

Experiments have been carried out during the last few weeks, and messages sent out by Scotland Yard on a special wave-length have been received up to a distance of five miles. The results are considered satisfactory.

(Continued on page 182.)

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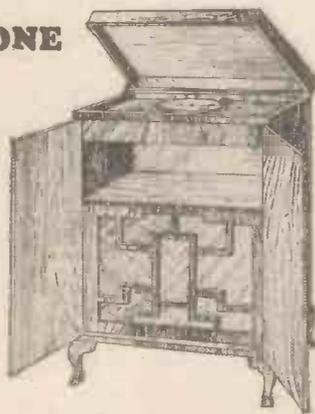
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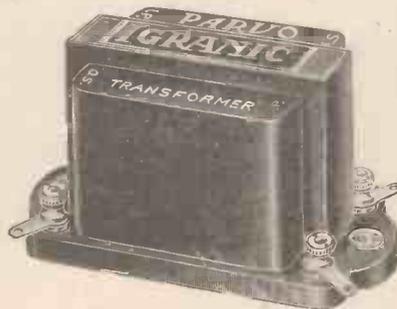
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CONCERNING CABINETS

How to fix moulding and ornaments.

By W. W.

MANY cabinet constructors will welcome the appearance of composite mouldings and ornaments, chiefly on account of their being cheaper and more artistic than carved or pressed hardwoods. But an important factor overlooked by manufacturers of these goods is the method of fixing. No provision is made, and no instructions are given, consequently purchasers are left to avoid potential troubles.

Glues and gums are, in many cases, ineffective. Compositions such as bakelite, ebonite, and so on, being "hot pressed," absorb no moisture, and as a result any glue applied dries as a semi-individual mass, retaining the would-be fixture for a short time.

Several Snags

Screwing, and nailing openly, leaves holes. The stopping up of these has to be considered. Warping, twisting and bending are to be overcome.

There is a further point to be remembered, and that is that where nails and screws are not going to be used, a method must be found to retain the mould or ornament in its position while the jointing media sets.

After various experiments with most compositions I find the following tips workable and satisfactory.

Preparing Surfaces

Before attempting to fix composite additions with common fish glue, sandpaper or scratch the glue receiving surface. After roughening it, rub over with a piece of soft wool soaked in hot (not boiling) water, and this will remove any remaining compression gloss. Use only the most clean, thin, hot glue, and be sparing in use.

It is necessary to coat the whole surface, a patch here and there is useless. If possible, the mould should be rubbed against its receiving surface. This to squeeze out superfluous glue and any air bubbles. Apply glue to the frame as well as the mould.

Those unsuccessful in making surface joints with wood might take these tips to heart. In this case no roughening should be done.

How the addition is to be held in position while the glue is hardening must be previously determined.

Circumstances, designs and different materials make it impossible to be peremptory, but an adaptation of this principle will mostly be found effective.

Within the adhesive limits of the surfaces to be combined, bore out several holes that will face each other when the materials are placed in position. These, if possible, should be about $\frac{1}{4}$ in. diameter, but it is not essential that they be round.

Fixing Their Positions

Fill the mould holes with sealing

concerns the depth of the holes in the mould. Care must be taken not to go too deep, or the nail head will force through the face.

Any nail holes can generally be filled satisfactorily with sealing wax. An even better method is to melt a piece of the composition, fill, level off, and then polish with a mixture made from the white of an egg and milk (equal proportions).

Rectifying Warping

It is as well to remember that the filling of clean-cut circular holes in grained compositions are more noticeable than roughly-shaped diminishing slits. If it is a grained composition use fine "oval" nails.

Warping can be rectified by an application of heat, and then twisting to the normal shape with the fingers. Heat will make most of the very

RADIO IN RURAL GERMANY



German peasants sitting in the sunshine outside their cottage and listening to broadcasting via what appears to be a particularly up-to-date set.

wax, or glue and sawdust; meanwhile, insert a small nail so that its spike end protrudes to nearly the depth of the corresponding hole. The latter, if the material is other than wood, should be filled with a soft wood plug.

How the trick is accomplished will be evident. Starting holes in the wood plugs or material, make it convenient for finding the exact position after the glue has been brushed on.

A point to note, however, when using this or a similar method

brittle compositions plyable, but care must be taken not to do the melting trick; and whatever the composition being used take precautions against fire. Regard everything as highly inflammable. **USE A LAUNDRESS'S "FLAT" IRON, NOT A LIGHTED GAS RING OR CANDLE.**

Circular work, such as round corners, can in this way be accomplished. A few saw-kerfs in the unseen side will do much to help, especially on wide surface work.

OUR NEWS BULLETIN

—continued from page 180

Kamchatka Calling

A high-power wireless transmitting station has just been completed at Petropavlovsk, on the lonely peninsula of Kamchatka.

Experimental transmissions have proved highly satisfactory; reception was excellent not only Kamchatka, but in places as far afield as Habarook and Vladivostok.

The new station will use a wavelength between 59-61 metres.

The Bishop's View

The Bishop of Durham (Dr. Hensley Henson), preaching at Westminster Abbey recently, made a critical reference to broadcasting.

"It is a potent instrument for disseminating ideas and distributing information," he said, "but as an instrument of teaching it is profoundly unsatisfactory.

"Since brevity and compression are essential in broadcasting addresses, and since there can be no opportunity for questioning or challenging or explaining what is said, the listeners are

entirely dependent upon their own power of discrimination.

German Records

No more gramophone recitals are to be broadcast from German stations because the record makers believe that the frequent broadcasting is

WHEN WRITING

to the "Wireless Constructor" please remember the following:

Technical Queries (see page 136) should be addressed to The Fleetway House, E.C.4.

Applications for Blue Prints or Back Numbers to the Back Number Dept., Amalgamated Press, Ltd., Bear Alley, Farringdon Street, E.C.4.

All initial inquiries should contain a stamped, addressed envelope.

spoiling their sales and affecting their legal rights. They recently sent an ultimatum to the broadcasting authorities forbidding the use of their records.

Buy British

Thousands of new wireless shops have been opened all over Great

Britain in the last three months, all selling a large proportion of British goods.

Trade experts estimate that £25,000,000 will be spent on radio entertainment this year.

Congratulations

Mr. John L. Baird, the British television pioneer, and Miss Margaret Cecilia Albu, the British concert pianist, were married at Coney Island's principal hotel a few weeks ago.

Municipal Judge Murray Hearn conducted the ceremony in Mr. Baird's suite, the bride's age being given as 24 and the groom's as 43.

Mr. Baird was suffering from the effects of a severe attack of influenza and the ceremony was consequently a private one. We offer Mr. and Mrs. Baird our congratulations and heartiest good wishes for the future.

A Great Artiste

In the very early days of broadcasting Wish Wynne was appearing at a music hall when she made a contract to broadcast for the B.B.C.

The manager of the music hall tried to stop her from broadcasting, but she had her own way, with the result that she broke down a sort of

(Continued on page 184.)

12/6

45/-

LET EXPERT OPINION GUIDE YOU

"Wireless Trader" Test Report, Nov. 14th, 1931—

"In power-handling capabilities the R. & A. "100" is above the average of its type, and will deal with 5w. undistorted A.C. with no signs of trouble. At upper end of the scale the reproduction is very good. The tone given by this speaker will appeal to a wide public . . . plenty of bass and no shrillness. . . Will work well with quite a modest output valve . . . excellent value for the money."

The R. & A. "100" will satisfy YOUR most critical demands.

Ask your dealer to demonstrate and refuse a substitute. Write us for descriptive leaflet. Post Free.

REPRODUCERS & AMPLIFIERS LTD.
Frederick Street, Wolverhampton.

The R & A "100" PERMANENT MAGNET MOVING COIL REPRODUCER

MAGNUM H.F. CHOKE

As specified for the "Vi-King" Short-Waver and the "Kelsey" 1932 Adaptor.

Price **7/6**

MAGNUM NEUTRALISING-TYPE CONDENSER

For the "Vi-King" Short-Waver. Price **4/-**

WE SPECIALIZE

in the "Vi-King" Short-Waver, "Kelsey" Adaptor and all "Wireless Constructor" Sets. Supplied ready wired and tested or as constructional kits.

A comprehensive range of lists, including a booklet on the Stenode, also a list of leading short-wave stations—Free on request.

BURNE-JONES & CO. LTD.

"MAGNUM HOUSE," 296, BOROUGH HIGH STREET, LONDON, S.E.1
Telephones: Hop 6257 and 6258.

Scottish Agent: Mr. Ross Wallace, 54, Gordon Street, Glasgow.



GIFTS THAT ALWAYS PLEASE

Easy to Pack
Cheap to Post
Certain to Please

Take This List When
You Go Shopping

British Books for Boys and Girls of All Ages

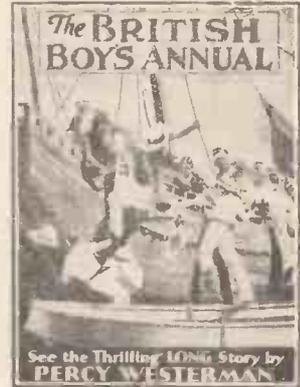


A book for girls who are still at school. Adventure and school tales, also entertaining articles. Lavishly illustrated. **6/-** Net.

That ever-perplexing question, "what to give," is easily solved if you give books this year—they are the best gifts and never fail to please. Here are the best books for boys and girls of all ages, packed with lively fun in picture and story. They are strongly bound in brightly coloured covers, and most of them contain beautiful coloured plates and many pages printed in colours. If you want a present that will thrill any boy or girl you should choose one of these famous All-British Annuals—on sale at all Newsagents, etc.



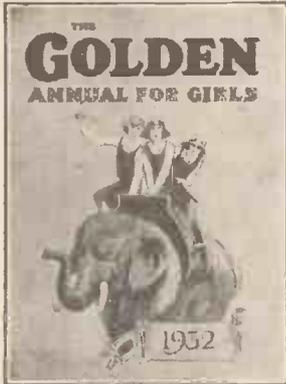
A fascinating book for boys and girls. Packed with school and adventure stories, articles and 250 illustrations. Coloured plates. **5/-** Net.



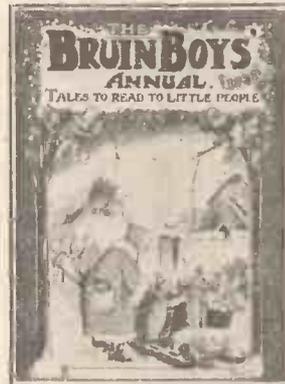
The ideal book for boys from 10 to 17. Thrilling stories of school, sport, mystery, and adventure. Useful articles. **5/-** Net.



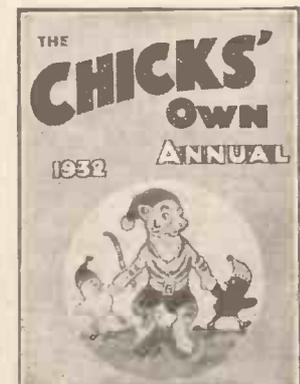
Entertaining stories and articles, lovely coloured plates and illustrations. A treasure trove of reading for all schoolgirls. **6/-** Net.



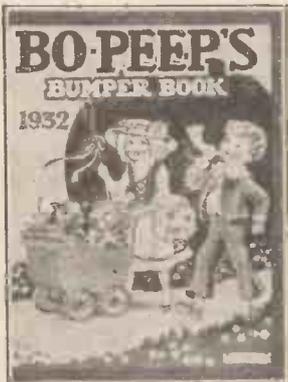
Full of stories of school home life, adventure and mystery, etc. Splendidly illustrated. A book for schoolgirls of all ages. **4/6** Net.



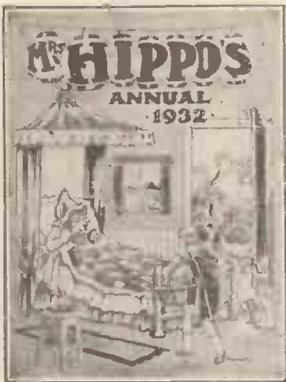
An admirable collection of well-illustrated stories for reading to little people. Pages of pictures of the Bruin Boys. **3/6** Net.



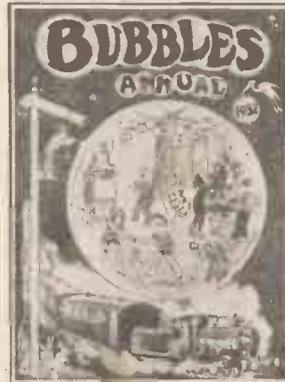
A novel book for little girls and boys just beginning to read. Printed in large, clear type. Pictures to paint. **3/6** Net.



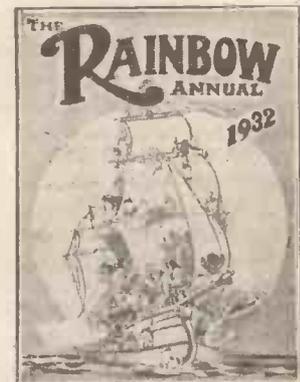
Bright stories and dainty verse concerning humans and fairies, birds and bunnies, and all those characters whose adventures young children love. **3/6** Net.



For children up to 12 years of age. Pictures of the funny Bumpy Boys and other PLAYBOX characters. **3/6** Net.



One hundred large pages containing every variety of feature entertaining to young folk. Many illustrations in full colour. **3/6** Net.



The Bruin Boys and the Pickles from the picture-paper, RAINBOW, appear in this Annual for children of all ages. Stories, jokes and puzzles. **3/6** Net.

Charge your own ACCUMULATORS

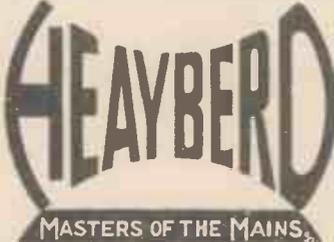


at Home

Why incur trouble, expense and waste of time by sending your accumulator to a service station? Install the Heayberd Trickle Charger—Model A.O.2—switch on to your Mains—and do the job quicker and cheaper yourself. Charging 2, 4 or 6 volts at .5 amp. Fitted with neat cover-case and incorporating

Westinghouse Metal Rectifier..... Price **35/-**

Send this "Ad." with 3d. in stamps for List 948, and others giving Circuit Diagrams of great value to Amateur Constructors.



10, FINSBURY STREET, LONDON, E.C.2.
(One minute from Moorgate Und. Stn.)

HETERODYNES?

OUR EASILY FITTED LOW-PASS FILTER GIVES SHARP CUT-OFF TO FREQUENCIES OVER 4,000 CYCLES, REMOVING WHISTLES WITHOUT AFFECTING SPEECH & MUSIC. (Stamp for details) In several types, from 7/6
POSTLETHWAITE BROS.,
KINVER, STAFFS.

RADIO FURNITURE DE LUXE PICKETTS

Usual Price	Maker's Price
£3-15-0	£6-18-0
£7-7-0	£5-10-0
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Famous experts, B.B.C., 3,000 clientele. Sent ON APPROVAL FREE—return at OUR expense if not delighted. Deferred Terms 10% or £1 monthly. Photographs and List FREE | PICKETTS Radio-Furniture(C.W.) Albion Road, Bexleyheath.



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.

The Picture Paper with the MOST News—

SUNDAY GRAPHIC
and SUNDAY NEWS.

OUR NEWS BULLETIN

—continued from page 182

tacit boycott of broadcasting which had grown up in music-hall circles.

Perhaps she was even more successful on the wireless than on the stage, for her character sketches of humble people were almost entirely of the voice, and her's was particularly suited to broadcasting.

It is a very great audience that regrets her death.

The New Radio Paris

Radio Paris is now the most powerful wireless broadcasting station in France. The power has been greatly increased. This is the first step in the realisation of a plan to bring French broadcasting in line with that of other nations so far as power and efficiency are concerned. The strongest broadcasting station in France has had a power of only 17 kilowatts, as compared with stations of 50 and 75 kilowatts in Germany, England, and Italy.

This new Radio-Paris can employ a power of 120 kilowatts. It occupies a site of 214 acres on a plateau which is the highest point in the Department of Seine-et-Oise, and the transmitting post is linked with the studios in Paris by thirty miles of cable.

* **Making a Cabinet** *
* **Some Practical Suggestions** *

XYLONITE is a capital cabinet and fret material which, however, is either unknown or reluctantly used. The cause of this is that xylonite is not widely advertised, and retailers only generally bother to stock the material in white and black.

Numerous art shades are available, including imitations of expensive hard woods. There are cloth textures in all colours. "Ivory grain" is an almost perfect imitation of ivory.

Sizes and Styles

Tones of marble and "trazo" are many, whilst gold, copper bronzes, mother-of-pearl and tortoiseshell are a delight to the cabinet maker who desires to be individual; 3 mm. and 5 mm. are the most convenient thicknesses. Sizes reach 1 yard square, and can be cut with a worn-out hack-saw blade. Prices vary in accordance with colours. Most art dealers' and colourmen's shops stock xylonite.

W. W.

* **BROADCASTING WITH** *
* **200 KILOWATTS** *
* **By A. S. CLARK** *

ALTHOUGH we cannot claim actually to possess the most powerful broadcasting station in Europe, British firms are largely responsible for its construction and design. The station in point is the new 200-kw. broadcaster at Cesky-Brod, near Prague.

The equipment was designed by the International Telephone and Telegraph Laboratories, and built by the Standard Electric Co. of Prague, both associated companies of the British firm known as Standard Telephones and Cables, Limited. Also, many of the component parts are entirely of British manufacture.

For Reliable Results

Practically all of the condensers of this leader of powerful stations have been made by the Telegraph Condenser Company, a firm with which all home-constructors are quite familiar through those neat, green, fixed condensers with the letters T.C.C. inscribed on them.

It is a great credit to this British firm that it should supply such a large percentage of the condensers, particularly as in the official description of the station it is explained that every step has been taken "to obtain as nearly perfect 'Reliability' as possible."

But to get down to some more general details of the giant. The main feature of the station is the remarkable degree to which automatic control has been obtained.

The Safety Cut-Outs

There is only one main switch-board and just one control desk. In many cases, if faults develop they are instantly made known by the lighting of indicator lamps, and some of the valves automatically cut themselves out of circuit should their anode current become too high.

The studios are situated at Prague, which is about 20 miles away, and the land-lines and input apparatus is capable of dealing with the range of frequencies between 30 and 10,000 cycles. The power for this mighty voice of the ether starts off at a single 1-watt crystal-controlled valve.

We can roughly divide the transmitter into two distinct sections. The

(Continued on page 185.)

BROADCASTING WITH 200 KILOWATTS

—continued from page 184

first is in itself a complete transmitter capable of delivering a power of 250 watts!

The second part consists of powerful push-pull amplifiers that take this input and magnify it up to the 200 kilowatts that the station pumps out. A magnification of 800 times the power!

Every precaution is taken to make it impossible for the engineers to receive shocks from this tremendous wattage; in fact, every possible thing has been done to make the station as super in efficiency as in power.

AS WE FIND THEM

—continued from page 168

In the Radiophone condenser submitted we were very favourably impressed by the extremely rigid construction and the accurate spacing of the vanes.

The frame itself is of substantial build, and self-cleaning spring contact tongues provide a noiseless connection to the moving vanes.

To balance out any external circuit effects there is a trimmer for each section.

The movement is free from stickiness, and we were unable to detect any side- or end-play in the sample submitted.

The insulation resistance between the frame and fixed vanes, measured at 500 volts, was "infinity." This condenser assembly is a very fine example of its type.

Screened Wiring

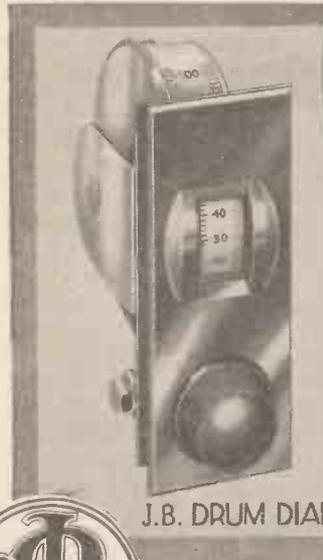
Messrs. Ward & Goldstone, of Pendleton, Manchester, have sent us a sample of their "Goltone" screened connecting wire. The wire is of the conventional rubber-covered type, but possesses an outer sheathing of metal, which can be earthed at any point along its length.

A conductor made on these lines is invaluable in a mains receiver, and its use is to help to ensure freedom from hum and other troubles. It is interesting to note that the metallic covering does not impair the flexibility of the conductor, this fact adding further to its utility.

The makers state that each coil of wire is tested at 500 volts before despatch.

(Continued on page 186.)

NO SLIP OR BACKLASH



J.B. DRUM DIAL

PRECISION INSTRUMENTS

Advertisement of Jackson Bros., 72, St. Thomas' Street, London, S.E.1. Telephone: Hop 1837

Read your condenser settings at a glance with the J.B. Illuminated Vernier Dial. Takes panels up to 1/2 in. Fitted easily—only one round hole to cut. Scale mounted neatly behind panel. Smooth action.

Price 5/-, complete with lampholder. In black or mahogany finish.

J.B. DRUM DIAL. Smooth, powerful friction drive, ratio 16/1. Drum completely insulated from condenser, forms an anti-capacity shield. Ivorine scale flush with panel for easy reading. Bronze or oxidised silver finish.

4-in. diam. drum, 10/6. 3-in. diam. drum (Ratio 12/1), 9/6.

Illuminated models same price.

TYPICAL!

Only a Push Pull Switch, but made with that care in design and attention to manufacturing detail that in other departments of Electrical Engineering besides Radio has made the name Benjamin world famous.

The Benjamin Electric Ltd.,
Tariff Road, Tottenham, N.17

BENJAMIN

SOLVE ALL H.T. TROUBLES

WET BATTERIES

TAYLEX

— SELF GENERATING —

Per doz.	No. 1. No. 2.
Jars (waxed) -	5. d. 1. 6
Sacs - - - -	1. 2 1. 9
Zincs - - - -	1. 0 1. 1
Rubber Bands(24) 4	4
Terminals - -	8 1. 0

Trade Supplied.

LONG LIFE : SILENT : ECONOMICAL

Sample doz. (18 volts), complete with bands and electrolyte. No. 1, 2/1; No. 2, 5/-; post 9d.; terminals extra. No. 3, with terminals, 7/6 (10,000 milli-amps), sample unit 6d. Orders 10/- carr. paid. New illustrated catalogue post free.

FREE Bargain List of Receivers, Amplifiers and Components

C. TAYLOR, 57, Studley Road, Stockwell, London.

FIX A PIX IN YOUR AERIAL

AWAY WITH WAVE TRAPS

Put this neat 3 in 1 gadget in your aerial and get knife-edge selectivity. Cut out the "local" and bring in those elusive foreigners. Control volume down to a whisper without distortion and improve the tone of your set beyond belief. Nothing like it ever offered before. Super-het selectivity on a three-valve set!!! British Made.

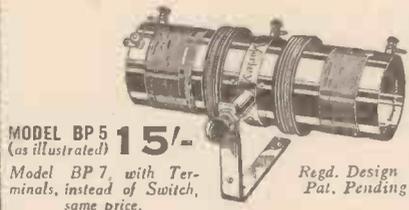
From your Wireless Shop or direct from

Select Patents, 14, Newgate Street, London, E.C.1.

PLEASE be sure to mention "WIRELESS CONSTRUCTOR" when communicating with Advertisers. THANKS!

"SQUARE PEAK"

(LARGE RANGE MARK)



MODEL BP 5 15/-
(as illustrated)

Model BP 7, with Terminals, instead of Switch, same price.

Regd. Design Pat. Pending

THE VARLEY "SQUARE PEAK" COIL.

The ideal pre-selective device for every set—S.G., Reacting Detector or Superhet

Gives 9 kilocycle separation over both wavebands. Makes wave-traps unnecessary. Needs no screening.

Varley

Write for the section of the Varley Catalogue that interests you.

SECTIONS B and C: "Square Peak" Coils, H.F. Chokes, Resistances, Potentiometers, Volume Controls, R.C. Components, Pick-up and Tone Arm. SECTION D: L.F. Chokes and L.F. Transformers (Intervalve, Push-Pull, Output, etc. SECTION E: Power Transformers and Chokes, Power Resistances, Power Potentiometers, Thermal Delay Switch, etc., etc.

"SQUARE PEAK" MAINS RECEIVERS AND RADIOGRAMS. Amazing selectivity with superb reproduction. Illustrated Colour Booklet free on request.

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



A useful and economical gift—**CLIX CONSTRUCTOR'S KIT**

Contains an assortment of nineteen fittings specially selected for "Wireless Constructor" receivers.

3/5 VALUE FOR 3/-

See list of contents on lid.

From all dealers or direct. Folder 'C' Free.

Cheapest PERFECT Contact

Lectro Linx, Ltd., 254, Vauxhall Bridge Road, S.W. 1

AS WE FIND THEM

—continued from page 185

We therefore applied this test to the sample submitted, and the insulation resistance between the conductor and metallic sheathing proved to be "infinity" at the voltage stated.

Becol Formers

Messrs. The British Ebonite Co., Ltd., Hanwell, London, W.7, have recently sent us a selection of "Becol" ribbed formers.

The formers are supplied in every conceivable type and size, and only high-grade ebonite is used in their construction.

There is a former for every purpose, no matter whether the inductance is to be an H.F. choke or a low-loss tuning coil.

Those listeners who prefer to wind their own coils should certainly obtain full particulars of these excellent formers. The prices are very moderate.

Wearite Switch for the "Duo-Vise" Two

We have received a communication from Messrs. Wright and Weaire with reference to their advertisement in last month's issue of the WIRELESS CONSTRUCTOR. This advert. contains details of a four-pole switch of the type used in the "Duo-Vise" Two design.

The switch is described as a "D.P.D.T., panel-mounting type, G.6, Price 2s.," whereas the right switch for that set is their 4-pole 1-24 type with terminals, and costs 5s.

A PRACTICAL MAN'S CORNER

—continued from page 176

after each coat to see that the moving parts don't get clogged. Brunswick black sets into a good hard coat which lasts well. If it gets chipped here and there in time all that you have to do is to give your pliers an occasional touch up.

For "Inside" Work

I don't think that you can do better than select for work inside the set a small pair of electricians' pliers of the shape illustrated in Fig. 3. The handles are already insulated, and all that you have to do is to black over the exposed metal parts.

If you want to use the pliers for wire-cutting use the side cutters be-

hind the jaws. Pliers of the kind illustrated will do nearly any job you want within the set, for besides their flat noses they have a corrugated curved grip, which is very useful for tightening up the milled nuts of terminals or loosening off those that have become too tight to be dealt with by the fingers. Six inches is the size that I recommend.

If you cannot obtain electricians' pliers in your locality, buy a pair of milliners' pliers, but see that they are of good quality. Some of the cheap pliers of this kind that one sees on sale are absolutely useless, since they are made of soft material—so soft, in fact, that if you try to take a good grip on a nut you will probably find that the handles come together whilst the jaws remain apart!

You can cover the handles of milliners' pliers with the thin rubber tubing that chemists sell for sprays. And here's a tip about putting on this tubing. You will find that it slides on quite easily if you use plenty of French chalk.

* "ON THE GRID" *
* A peculiar fading effect—Some un- *
* expected bangs—Up-to-date dance *
* records. *

As a rule the fading of continental stations is nothing less than a jolly old nuisance, to put it politely. But the other night I came across a case which proved the Heaviside layer theory in a remarkable manner.

It happened like this. The set was tuned to a fairly powerful German broadcaster that "stayed put" for quite a considerable time and then disappeared for a shorter period, moderately slow fading taking place.

Freak Fading

But the thing that was out of the ordinary was that in the intervals of fading another transmission would build up in strength for a little while and then disappear as the original came dancing back again. The second "voice" was apparently from a French transmitter, and both seemed to be working on the same wave-length.

According to the Heaviside layer theory, waves from a station travel upwards at an angle and are reflected back from the layer in the same way as a mirror reflects a light. But the layer is continually changing

(Continued on page 187.)

"ON THE GRID"

—continued from page 186

position, or swinging, just like a dressing-table mirror that is pivoted can be swung.

In the case I have just described, as the "layer mirror" changed its angle so one station was reflected to another point and the second one was reflected down to my aerial instead. I have no doubt that as the first johnnie went from my realm he arrived within the range of somebody else's set, just as a spot of light would move from one point to another.

When Wearing 'Phones

Well, to come down to earth a little more, as it were. If you value your ear-drums, don't have a bare wire lead-in on a set that is used for telephones.

It's all very well to make an efficient aerial by having the same piece of 7/22 running right through the lead-in tube and along to the set, but wait till that metal knob on your telephone comes in contact with it!

I was bending over a receiver under these conditions the other night when there was a bang in the 'phones fit to deafen a water-tank riveter. It's obvious enough when you remember that the telephones go to H.T. positive, and a potential of that value on the grid of the detector is bound to make the electrons start jumping about some!

Making Your Own

I've had a brain-wave! Whether it's a practical sort of brain-wave or not remains to be seen. It all depends upon the results I can get with the home-recorder that has come my way.

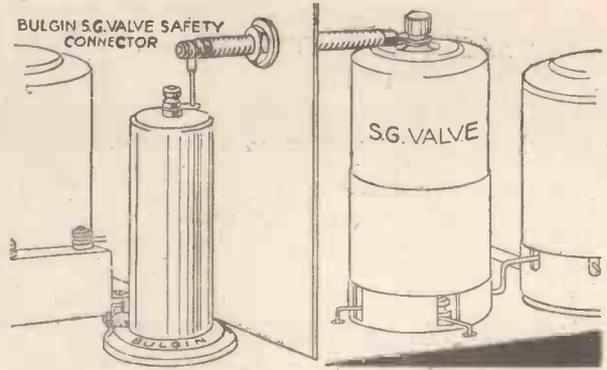
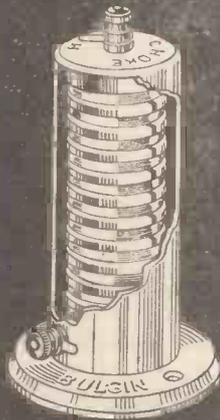
As you all know, dance tunes are of but fleeting interest. They are for ever changing in popularity, and to be up to date with a selection of dance records requires a small fortune. My idea is simply this.

On the radio one hears all the latest in dance numbers, and each listener can make his own records from radio reception. All one does is to take records of the more famous tunes, and there it is—a complete selection.

Of course, the records won't last long, but neither will the tunes!

A. S. C.

Use only S.G. Choke here →



S.G. Valves require special chokes of high impedance. Such chokes require careful design if they are to be really efficient, and it is essential to study carefully the value of self-capacity, which is the deciding factor in a good Choke. The Self-Capacity of the Bulgin S.G. Choke has been kept down to 3 M/mfds., an exceptionally low figure, indicating scientific design and extreme care in choice of materials and construction. The characteristic curve shows a complete freedom from peaks and from blind spots over the whole range from 200 to over 2,000 metres.

PRICE **5/6**

Bulgin S.G. Valve Safety Anode Connector, as shown. PRICE **1/-**

Send 2d. postage for 75-pp. Illustrated Catalogue and Manual with details of the Bulgin Technical Service.

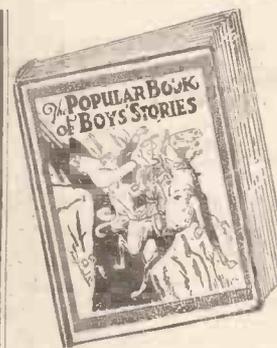
A. F. BULGIN & Co. Ltd.
Abbey Rd., Barking, ESSEX. Telephones: Grangewood 3266 and 3267. London Show-rooms: 9, 10, 11, Cursitor Street, Chancery Lane, E.C.4. Telephone: Holborn 2072.



PERMCOLO

Nothing looks worse than a dull and discoloured panel. Use mirror polished PERMCOLO, the new Ebonite which is guaranteed never to discolour. Its beauty and polish will delight you, and its cost is less than 1d. per square inch. Don't spoil that set. but insist on PERMCOLO, the modern permanent colour Ebonite. From all dealers or direct The British Hard Rubber Co., Ltd., Middlesex. Ponders End.

Make **The DAILY SKETCH** YOUR Picture Paper.



Grand Stories of Gripping Adventure

A Bumper Book at a Bargain Price.

The **POPULAR BOOK OF BOYS' STORIES**

is packed with thrilling adventure stories that are too good to be missed. Here you can revel in gripping sea mysteries, stirring tales of the Wild West, and exciting tales of sport, etc.—in fact, every phase of adventure is represented in this grand all-fiction Annual which is splendidly illustrated

The POPULAR BOOK of BOYS' STORIES

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VI-KING SHORT-WAYER

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CYLDON SERIES GAP CONDENSER—the greatest contribution towards practical short-wave tuning. No pistalls, no backlash, lowest minimum loss and absolute silence in operation ensures the wonderful success of the Vi-King Short Waver. Send for the Cyldon Catalogue.

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"SAFETY FIRST" SET DESIGN

—continued from page 178

of the clear-cut and logical ideas of another expert, rather than what I have termed "departure from specification."

There are scientific laws governing the proximity of radio components, and even their orientation, and those who are not acquainted with them will be well advised rigidly to "stick to the book."

Freedom of the Circuit

In no other sphere of human activity is that old axiom of "a little learning is a dangerous thing" truer than in radio; although, mind you, a "little learning" applied *discriminately* can save you a great deal of bother.

It is when the possessor of that "little learning" does not also possess a modicum of humility, and realise that it is, in fact, "little" and not "great," that trouble is apt to arise.

When you can immediately visualise the effect of specification changes in terms of scientific accuracy, then yours is the freedom of the circuit. But if you can say no more about such things than "it seems to do this or that," then you must tread warily.

And the "bigger" the set, the more carefully should you tackle the job of its assembly. It *might* be possible to take quite a few liberties with a small set of the nature of the "I.E." Two, but careless wiring can play havoc with a high-efficiency outfit of the calibre of the "Exhibition" Four.

But that does not mean you should be less conscientious in your treatment of an "I.E." Two than with an "Exhibition" Four. The golden rule of home-construction is to regard every design as the most critical construction ever planned.

A RADIO SENSATION!

In next month's "Wireless Constructor"

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returns to radio journalism.

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* FROM THE RADIO TRADE *
* Some items of interest to the purchaser. *

Two new leaflets have been issued by the Electrical Trading Association, Ltd., dealing with Eta valves.

One is a "replacement" list showing seven ranges of valves for American all-mains sets; the other describes B.Y.1210, B.X.604, B.Y.2020, and D.3-50B., four of the latest Eta valves.

These, or the full "Eta" list, can be obtained on application to the firm at Aldwych House, Aldwych, London, W.C.2.

THE "VI-KING" SHORT-WAVER

—continued from page 151

if the set is oscillating you should hear a double click in the 'phones, one upon touching and one when withdrawing the finger.

If you hear only a single click, it is an indication that the set is not oscillating, in which case you should try (1) adjusting the position of the series aerial condenser; (2) increasing the voltage on the H.T. plus 1 tapping; (3) altering the position of the clip on the grid coil, and (4), only if all other remedies fail, another valve in the detector position.

It is possible—in fact, it is quite likely—that you will find small bands here and there over which the set will not oscillate. This is an effect produced by the damping of the aerial, and it is nearly always possible to eliminate the dead spots, or at least to move them, by varying the series aerial condenser.

Always Tune Slowly

When searching for distant stations, remember that the tuning condenser *must* be moved very slowly, and if you are not used to handling a short-wave set you will probably find it helpful at first to search with the set actually—but only just—oscillating. Then when you find a carrier-wave, slowly decrease the reaction condenser setting until the set just stops oscillating.

That is all there is to it, and after a couple of evenings you will be as familiar with short-wave searching as if you had owned a short-waver for years, and so all that remains for me to say is "Good luck"!

INDEX TO ADVERTISERS

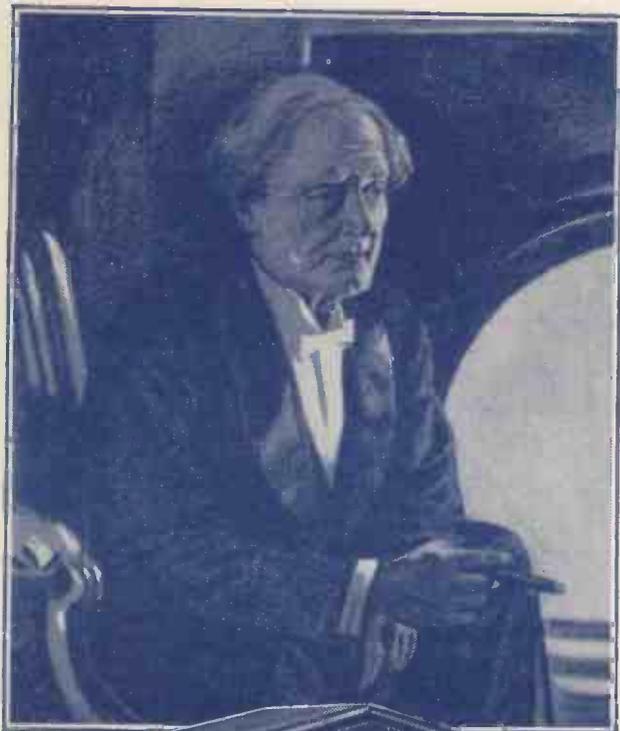
	PAGE
Amalgamated Press Annuals ..	175, 183
Belling & Leo, Ltd.	177
Benjamin Electric, Ltd.	185
Bird, Sydney S., & Sons, Ltd.	187
British Blue Spot Co., Ltd.	Cover iii
British Hard Rubber Co., Ltd.	187
Bulgin, A. F., & Co., Ltd.	187
Burne-Jones & Co., Ltd.	182
Carrington Manfg. Co., Ltd.	180
Cossor, A. C., Ltd.	134
Dubilier Condenser Co. (1925), Ltd.	133
Edison Swan Electric Co., Ltd.	Cover iv

	PAGE
Formo Co.	179
Gilbert, J. C. (Cabinets)	180
Harlie Bros. (Edmonton), Ltd.	179
Heayberd, F. C., & Co.	184
Igranic Electric Co., Ltd.	180
Jackson Bros.	185
Lectro Linx, Ltd.	186
London Elec. Wire Co. & Smith's, Ltd.	Cover ii
Peto-Scott Co., Ltd.	175
Pickett's Cabinets	184
Postlethwaite Bros.	184
Popular Book of Boys' Stories	187
Ready Radio, Ltd.	165, 171
Reproducers & Amplifiers, Ltd.	182

	PAGE
Select Patents	185
Taylor, C.	185
Telegraph Condenser Co., Ltd.	173
Telsen Electric Co., Ltd.	169
Varley Products	186
Westinghouse Brake and Saxby Signal Co., Ltd.	177
Wingrove & Rogers, Ltd.	179
Wright & Weaire, Ltd.	177

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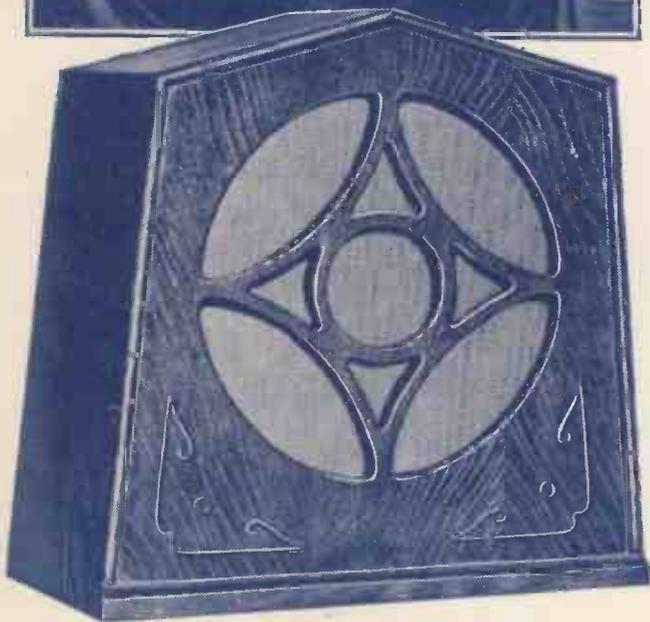
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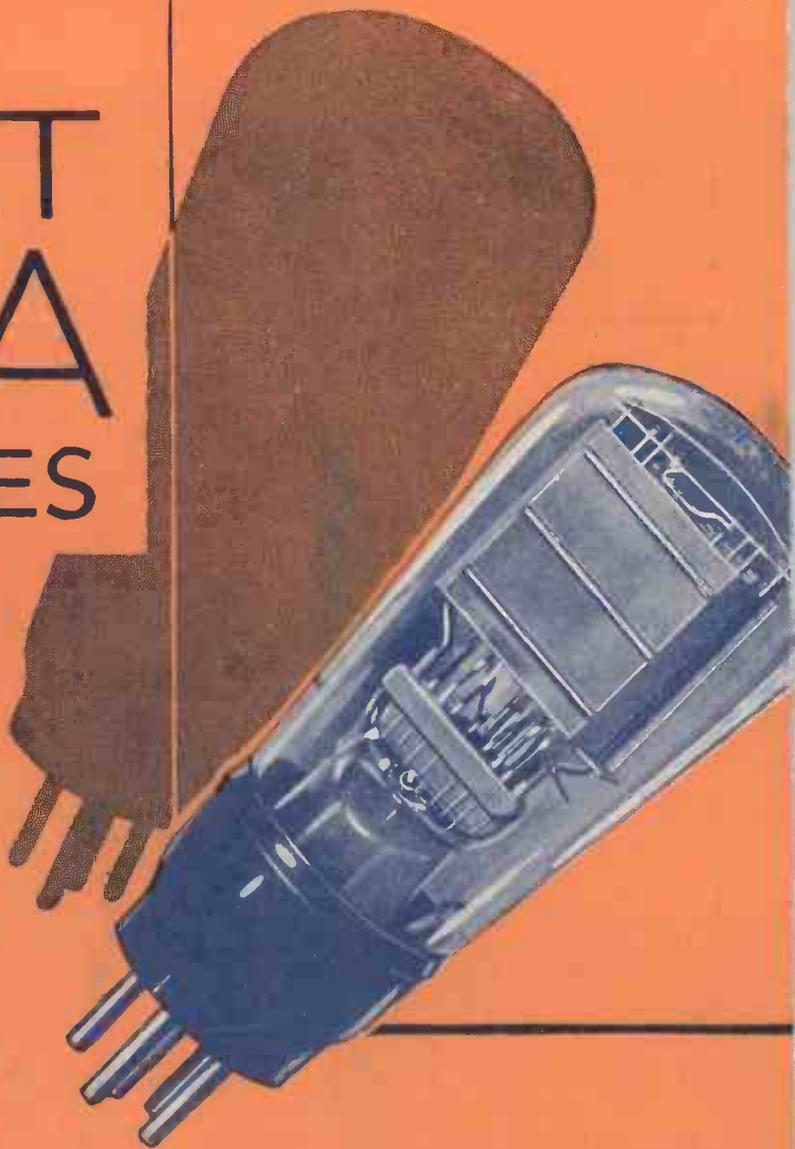
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