

# The Wireless Constructor

Vol. XV.

JANUARY, 1933.

No. 75.

MORE ABOUT THE

# "S.T. 400"

*The Triumphant  
Success of the Year!*



JOHN  
SCOTT-TAGGART  
also writes  
**FROM MY  
ARMCHAIR**

DIFFERENTIAL  
ANODE  
COUPLING

**"MY SET ON  
YOUR AERIAL"**

and full details for  
PLAYING  
RECORDS ON  
YOUR "S.T. 400"

# Lewcos S.T.400

REGD.

## QUALITY COMPONENTS

Lewcos precision-made components are designed and constructed by experts.

A kit-set of Lewcos components (see below) for use in the S.T.400 is now available at a reduced price and is a guarantee of brilliant results from this outstandingly successful receiver.

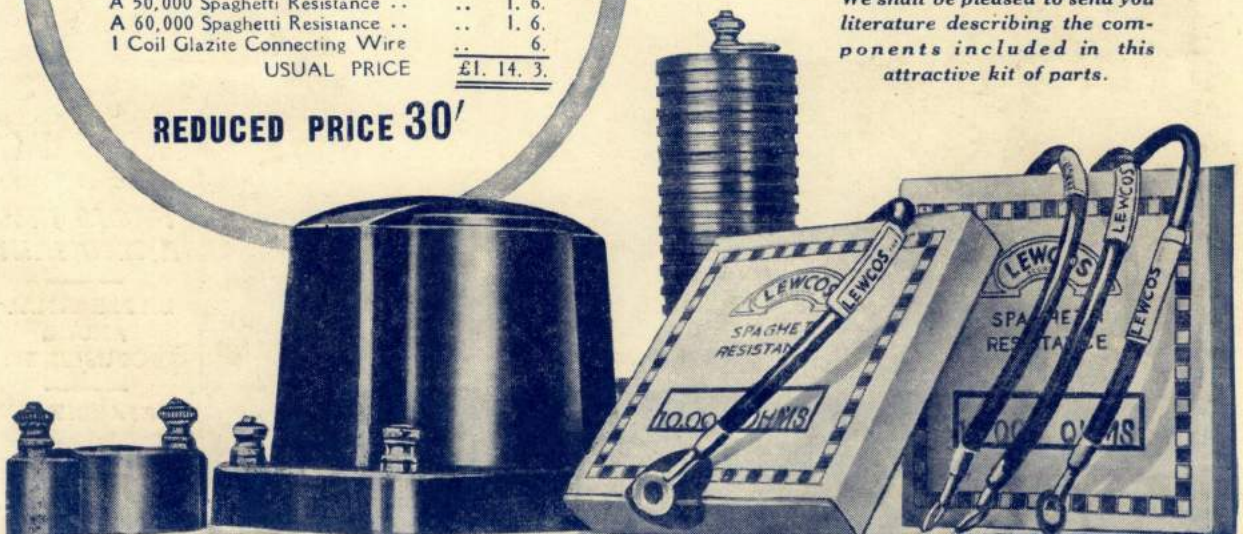
The  
**LEWCOS S.T.400 KIT-SET INCLUDES:**

	Price
The Lewcos L.F. Transformer (Ref. LFT6A) .. .. .	10. 0.
The Lewcos H.F. Choke (Type MC) .. .. .	2. 6.
The Lewcos H.F. Choke (Type II) .. .. .	6. 0.
The Lewcos Aerial Coil .. .. .	5. 0.
The Lewcos Anode Coil .. .. .	5. 0.
A 1,500 Spaghetti Resistance .. .. .	9. .
A 20,000 Spaghetti Resistance .. .. .	1. 6.
A 50,000 Spaghetti Resistance .. .. .	1. 6.
A 60,000 Spaghetti Resistance .. .. .	1. 6.
1 Coil Glazite Connecting Wire .. .. .	6. .
<b>USUAL PRICE</b>	<b>£1. 14. 3.</b>

**REDUCED PRICE 30'**

*If the Lewcos S.T.400 Kit-Set is not obtainable from your dealer, please write to Radio Publicity Dept. C.W., giving his name and address.*

*We shall be pleased to send you literature describing the components included in this attractive kit of parts.*



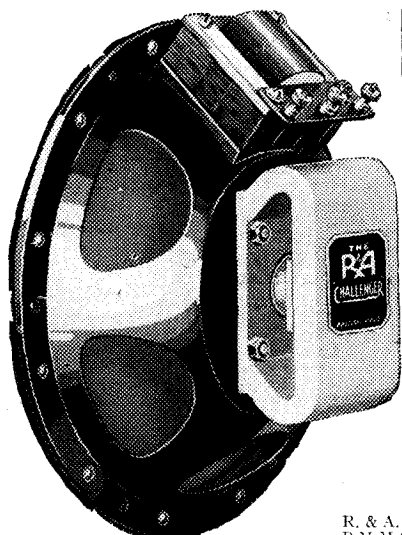
**LEWCOS RADIO PRODUCTS FOR BETTER RECEPTION**

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

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

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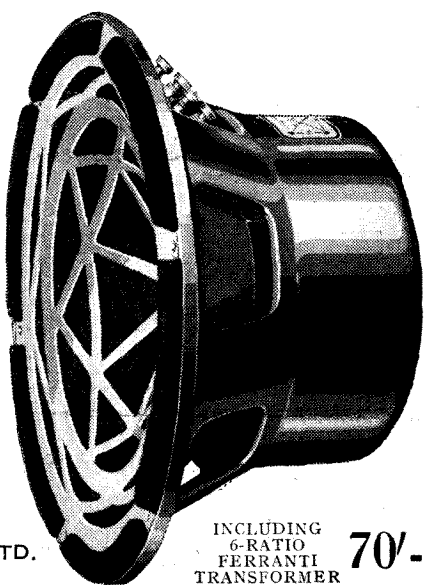
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Perfect reproduction of speech and music throughout the whole orchestral range is characteristic of every R. & A. Reproducer. Nothing short of this can give you complete satisfaction.

**To hear speech and music as reproduced by an R. & A. is to hear reproduction at its best**

R. & A. "CHALLENGER" P.M.M.C. REPRODUCER is undoubtedly the most popular low-priced reproducer on the market. *Wireless World* states:—"Quite definitely above the average."

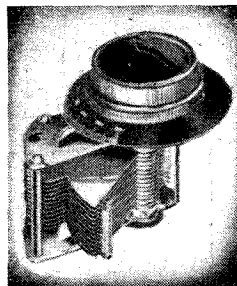
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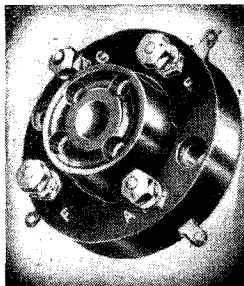
INCLUDING 6-RATIO FERRANTI TRANSFORMER **70/-**

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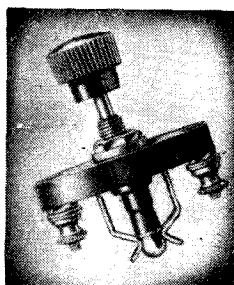


**SLOW MOTION CONDENSER.** Specially suitable for Superhets. Types S.M.3, capacity '0003; S.M.5, capacity '0005. Price, each **6/6**

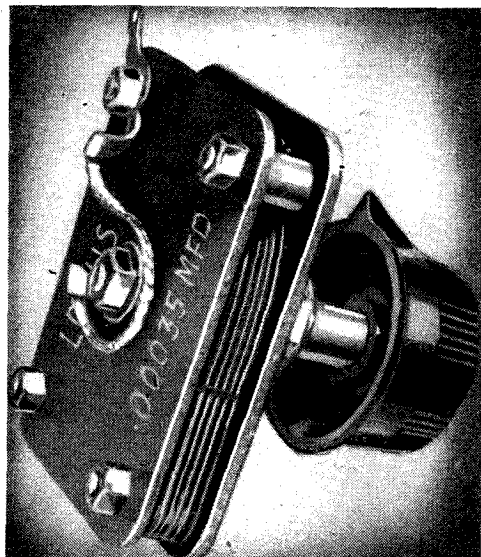


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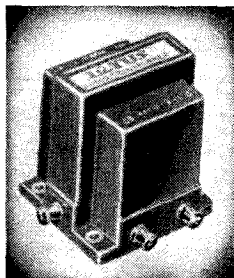
Here are five components (some of the LOTUS range of forty-five) which are specified in the "S.T.400."



**BATTERY SWITCH.** Type B.S.20. Price **1/6**



**MINIATURE DIFFERENTIAL CONDENSER.** Types M.D.15, capacity '00015; M.D.35, capacity '00035. Price, each **3/-**



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LOTUS GUARANTEED COMPONENTS, specified by all the leading designers of the day, offer a short cut to certain success in Set building. They are matched to work in perfect unity, and the result is absolute fidelity and balance. Building a modern Radio Receiver is like forming a Symphony Orchestra—each member and each instrument must be picked for individual performance, and the whole must work in complete harmony and under perfect control. When you build with LOTUS Components, you guarantee the performance of the completed Set.

**Be sure you specify . . .**

# LOTUS

**GUARANTEED**

# COMPONENTS

SEE THE OTHER 40

To LOTUS RADIO LIMITED, LIVERPOOL.

Please send illustrated lists of LOTUS Guaranteed Components and 'Landmark 3' Kit. I enclose 6d. for 'Landmark 3' Wiring Chart. (Strike out if not required.)  
 NAME.....  
 ADDRESS.....

6d. stamp only if envelope is unsealed, and Wiring Chart is not required. W.C.15.12.32.

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**FREE** Full Size Blue-Print with every Complete Kit  
and copy "Wireless Constructor," S.T.400 issue

**IMMEDIATE DELIVERY FROM STOCK**

WHY be satisfied with higher or lower priced KITS that do not contain ZONE TESTED FIRST SPECIFIED COMPONENTS. A

**PILOT AUTHOR KIT** is the only exact replica of Mr. John Scott-Taggart's ZONE TESTED SET advertised in this Book.

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Advertised on Page 253.

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

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

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

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Exact to Mr. John Scott-Taggart's ZONE TESTED FIRST SPECIFICATION

**Guaranteed to fit the 'Wireless Constructor' OFFICIAL Blueprint**

This is the List of Parts first specified by Mr. John Scott-Taggart. ANY PARTS SUPPLIED SEPARATELY. If value over 10/- sent Carriage and C.O.D. Charges Paid.

1	PETO-SCOTT low minimum Aerial Coupler, "00004"	3	6
1	LISSEN Hypernik I.F. Transformer	12	6
2	COLVERN coils, "S.T.400" type	9	10
2	ORMOND "0005" variable condensers, type R.493	15	0
1	POLAR "0003" differential condenser	3	0
1	LOUIS "00035" differential condenser, type MD.35	3	0
2	TELSEN "0003" preset condensers	3	0
1	READY RADIO "0001" differential condenser	2	6
3	BENJAMIN Vibroder valve holders	2	0
1	W.B. Universal valve holder	1	0
2	TUNEWELL 2-point switches	1	8
1	TELSEN binocular S.G. choke	5	0
1	LEWCOS reaction choke	2	6
1	GOLTON "0003" fixed condenser	1	0
1	GRAHAM PARISH "006" fixed condenser	1	0
1	DUBILIER "006" fixed condenser, type 670	1	6
2	IGRANIC 2-mfd. fixed condensers, Nonda	5	6
1	DUBILIER 1-mfd. fixed condenser, type 9200	2	9
1	FERRANTI synthetic grid resistance, 1 megohm, with holder	1	6
1	IGRANIC 1,500 spaghetti resistance	1	6
1	IGRANIC 50,000 spaghetti resistance	1	0
1	IGRANIC 20,000 spaghetti resistance	1	0
1	LEWCOS 60,000 spaghetti resistance	1	6
1	BULGIN toggle switch, type S.80	1	6
1	BELLING & LEE terminals, marked	2	3
1	10" x 6" screen, drilled to specification	1	9
1	PETO-SCOTT baseboard, 16" x 10" with 10" x 7" aluminium foil ready mounted	2	0
1	RED TRIANGLE black ebonite panel, 16" x 3 1/2" x 1 1/2", ready drilled	3	3
1	RED TRIANGLE black ebonite terminal strip, 16" x 1 1/2" x 3/16ths, ready drilled	9	
1	Each BELLING & LEE anode connector and twin tap plug, together with wire, screws, flex	2	1
1	FULL-SIZE BLUEPRINT, with copy "Wireless Constructor," S.T.400 issue	GRATIS	

CASH OR C.O.D. KIT "A" .. £4 15 0

● All panels and terminal strips accurately drilled to specification. Matched knobs for all panel components.

**Buy by Post! Its Quicker. Send Coupon now and build your self an Exact Duplicate of Mr. John Scott-Taggart's S.T.400**

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Dear Sirs,—Please send me CASH/C.O.D./H.P. ....

PILOT AUTHOR KIT, S.T.400 { KIT "A" (less valves and cabinet) £4.15.0.  
KIT "B" (with valves less cabinet) £6.14.3.  
KIT "C" (with valves and cabinet) £7.11.3.

for which I enclose £ ..... s.....d. CASH/H.P. Deposit.

NAME .....

ADDRESS .....

W.C.1/33

DELIVERED Carriage Paid CASH or C.O.D. KIT "A"

**95/-**  
with FREE Full size Blueprint & Copy Wireless Constructor

KIT "A" DELIVERED CARRIAGE PAID ON FIRST PAYMENT OF

Author's Kit of specified parts including FREE BLUE-PRINT, Ready drilled Panes and Foil-covered Baseboard, but less Valves and Cabinet. Balance in 11 monthly payments of 8/9 OR CASH or C.O.D. £4-15-0 Carriage Paid.

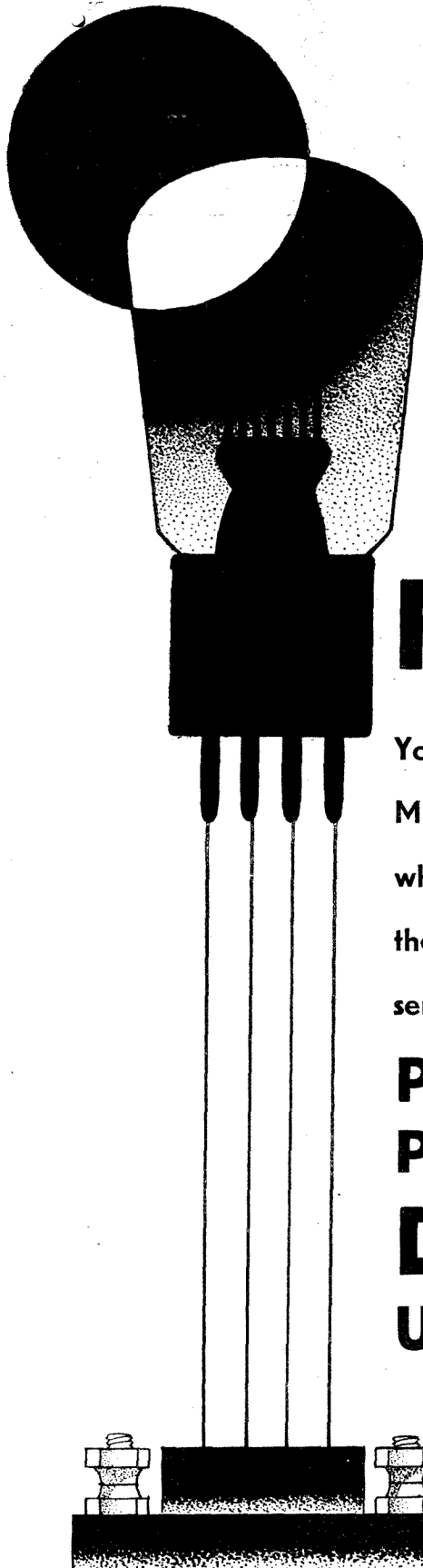
KIT "B"  
As Kit "A" but with valves less cabinet 12 monthly payments of 12/3 Cash or C.O.D. £6.14.3

KIT "C"  
As Kit "A" but with valves and cabinet 12 monthly payments of 14/- Cash or C.O.D. £7.11.3

If Super-Power Valve required instead of ordinary Power as specified, add 3/3 to CASH or C.O.D. Prices or 3d. to each monthly payment.

**FINISHED INSTRUMENT**  
S.T.400, Factory assembled, exact CASH or C.O.D. to Mr. John Scott-Taggart's Carriage Paid. specification; Aerial Tested, with Valves and Cabinet. £9-12-6 or 12 monthly payments of 17/9

**The Best S.T.400 Kit whatever the Price**



# FOR THE S.T.400

You remember the S.T.300? Here is its successor—and Mullard valves are again specified. There is a reason why Mullard valves are chosen by leading designers—their proved reputation for reliability and consistent service. The valves specified are:

**P.M.12A<sub>(MET)</sub> P.M.1HL<sub>(MET)</sub> P.M.2DX**  
**P.M.2A OR P.M.202**

**DO IT NOW —**  
**USE**

**Mullard**  
**THE · MASTER · VALVE**

# The WIRELESS CONSTRUCTOR

## The EDITOR'S CHAT

### GREAT SUCCESS OF "S.T.400"—OVER FIVE MILLION LICENCES—CONFISCATION OF SETS

THE enormous success of Mr. John Scott-Taggart's "S.T.400," which was comprehensively described in detail in our last issue, has proved among many other things the great interest still prevalent in this country in the hobby of the construction of radio receivers. And, among the many other things, was proved the indisputable fact that when "S.T." brings out a set every man and boy interested in the art of radio construction wants to build the receiver.

#### 210,000 Copies

At the time of writing this editorial, over 210,000 copies of THE WIRELESS CONSTRUCTOR, containing details of Mr. Scott-Taggart's "S.T.400," have been sold, and still the demand goes on. To any of our readers who found some difficulty in obtaining copies of THE WIRELESS CONSTRUCTOR we offer our profound regrets, but would ask them to realise that, despite the enormous printing preparations made to cope with the demand, the rush to read about S.T.'s latest set was, quite frankly, unprecedented.

In this issue there is another article by our distinguished contributor giving more details about the "S.T.400." It is unnecessary on this page to dilate at any length about this contribution. Obviously, it is of enormous interest to every constructor and potential constructor of the "S.T.400."

Mr. Scott-Taggart also contributes an article on Playing Records on Your "S.T.400," in which he gives complete details for fitting a radiogramophone switch. And, furthermore, we are delighted to welcome back again to our editorial pages his popular feature, "From My Armchair."

Again, next month, Mr. Scott-

Taggart will be contributing several important articles, including "Convert Your 'S.T.300' into 'S.T.400'" and "'S.T.400' Questions Answered."

#### Automatic Wave-Change

Also in this issue readers will find a description of The "Straight-Tune" Three, a receiver of the automatic wave-change type. This set has been designed specifically to provide easy handling; wave-changing is carried out by means of two Extensers, which also control the tuning of two circuits.

### "S.T.400"

#### The First Builder Gets 106 Stations First Evening!

95, Milton Road,  
Nunsthorpe,  
GRIMSBY.

16th November, 1932.

Dear Sir,

Allow me to congratulate you on a most wonderful set, far beyond our expectations, after completing it last night we logged 95 stations on the medium wave and 11 on the long, all clear and full strength. Not so bad for a start.

Yours truly,  
H. F. CULLEN.

The receiver is of the screened-grid, detector and output type, and is particularly easy to construct.

#### Anti-Pirate Campaign

It was interesting to note in the Press the other day the fact that nearly 145,000 new wireless licences were taken out during October. On the last day of October, 5,010,234 people possessed wireless licences, while a year ago the total was only 4,100,000.

There is not much doubt that the big increase in licence figures is due to

the anti-pirate campaign which was recently initiated by the Post Office.

In this connection, Bournemouth appears to be topping the list, for practically every home in that delectable spot now has radio. The last figure showed that there are 22,459 homes in Bournemouth and 21,039 of them have wireless licences.

#### Quite Legal

Writing of wireless licences reminds us of a case reported in one of the newspapers the other day about a controversy which was aroused when, at Wrexham, the Bench ordered an unlicensed wireless receiving set to be confiscated.

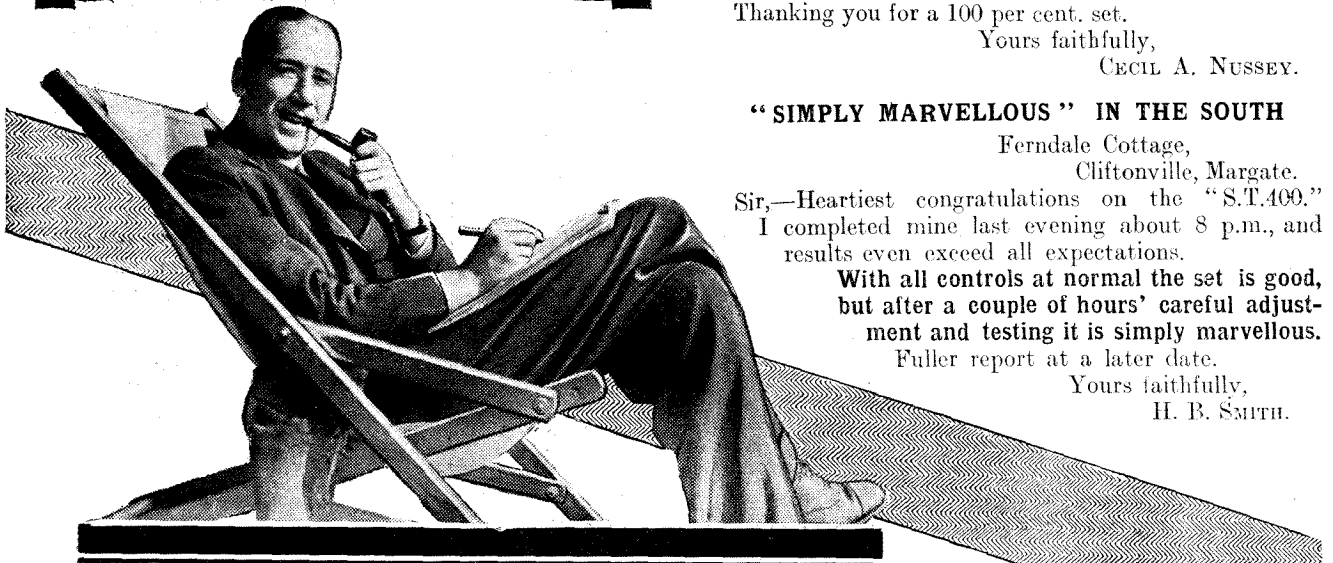
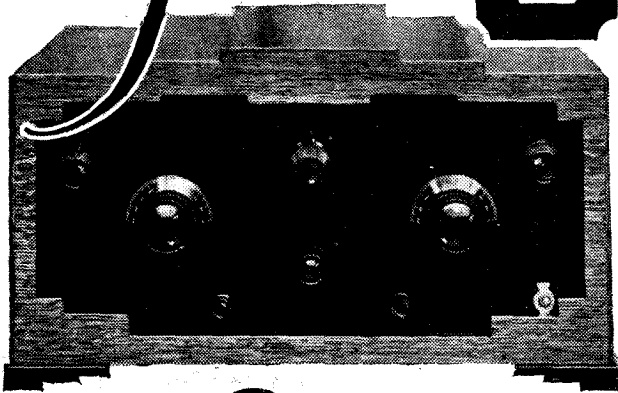
Judging from the wording of Clause 3, Section 1, of the Wireless Telegraph Act, 1904, the penalty was legal, as the clause below reveals.

#### "To Forfeit Apparatus"

"If any person establishes a wireless telegraph station without a licence in that behalf, or installs or works any apparatus for wireless telegraph without a licence in that behalf, he should be guilty of a misdemeanour, and be liable on conviction under the Summary Jurisdiction Acts to a penalty not exceeding £10 and on conviction or indictment to a fine not exceeding £100, or to imprisonment, with or without hard labour, for a term not exceeding twelve months, and in either case be liable to forfeit any apparatus for wireless telegraphy installed or worked without a licence, but no proceedings shall be taken against any person under this Act except by order of the Postmaster-General, the Admiralty, the Army Council, or the Board of Trade."

So any pirate who reads these words knows exactly what he is letting himself in for if he fails to take out a wireless licence!

# The S.T.400



## SOME TYPICAL REPORTS FROM READERS

Scott-Taggart to use my aerial in his demonstration prior to publication. Still, if he is my way any time, I shall be most happy to meet someone whom I take the liberty of calling my wireless friend.

Should you decide to give this letter a little space in your valuable paper, may I add that I shall be pleased to help or demonstrate to anyone in my district with either an "S.T.300" or "S.T.400."

Thanking you for a 100 per cent. set.

Yours faithfully,

CECIL A. NUSSEY.

### "SIMPLY MARVELLOUS" IN THE SOUTH

Ferndale Cottage,

Cliftonville, Margate.

Sir,—Heartiest congratulations on the "S.T.400."

I completed mine last evening about 8 p.m., and results even exceed all expectations.

**With all controls at normal the set is good, but after a couple of hours' careful adjustment and testing it is simply marvellous.**

Fuller report at a later date.

Yours faithfully,

H. B. SMITH.

### "WONDERFUL! MARVELLOUS!!" IN THE NORTH

57, Woodside Place,  
Burley, Leeds.

Sir,—I have been an amateur wireless constructor for ten years, and have built set after set in the hope of each one complying with my wants, i.e. selectivity and volume. Some passed at 10 per cent., others minus 10 per cent.!

In despair and hope I built the "S.T.300." In the first fifteen minutes I logged 33 stations I knew. Sharpness of tuning was fine and volume wonderful.

I was satisfied in every way with the "S.T.300." Believe me, I never touched it until last Monday, five minutes after I received my copy of the December WIRELESS CONSTRUCTOR.

Tuesday came and, bubbling with excitement, I put my last wire on my "S.T.400," connected up and—gasp!—I was nearly deafened!

To describe its capabilities is only to repeat the readers' comments.

It is wonderful! Marvellous!! A set which makes me feel I could stand on top of the world and shout "S.T.400"—build it! It's supreme!"

I am only too sorry I did not send in my offer for Mr.

[EDITOR'S NOTE.—Mr. H. B. Smith, a former Mayor of Margate, was a reader visited by Mr. Scott-Taggart on his tour.]

### SCOTTISH ZONE "B" READER'S 80 STATIONS ON FIRST TEST.

21, Greenrig Street,  
Uddingston, Lanarkshire.

Sir,—I write to tell you of an event: Breslau and Poste Parisien are now with Stuttgart and London Regional four distinct stations, thanks to the "S.T.400."

**I have only had this set going for four hours, and have 70 stations on the medium waves and 10 on the long waves.**

The volume is very good on 90 per cent. of these.

I have an aerial 25 feet high, 80 feet long, and no screening, and am about 15 miles from the Regional (Falkirk), which disappears in two degrees of the dials. I have had an "S.T.300" since March last, but the "S.T.400" has it beaten, which is not altogether to be expected, although you yourself say that a four-valve set must be superior to a three by the same designer.



# Another Triumphant Success!

I don't agree; I have had some! But "S.T." did not design them.

Thanking you, in conclusion, for this very fine set.

Yours faithfully,

WM. NELSON.

**"BUILD THE 'S.T.400' FOR STATIONS, SHARP TUNING, RICHNESS OF TONE AND GREAT POWER ON DISTANT STATIONS."**

81, Berridge Road,

Sheerness, Kent.

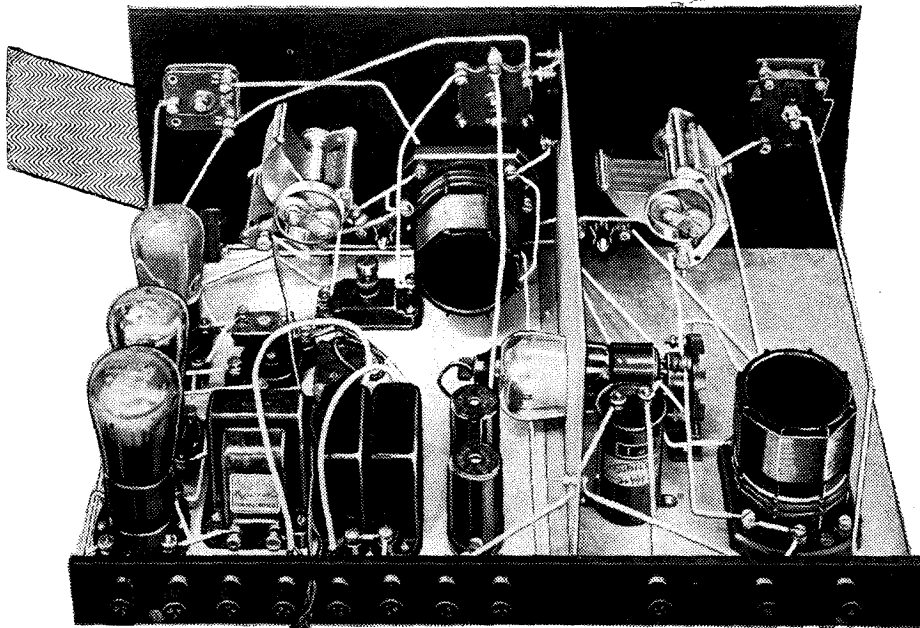
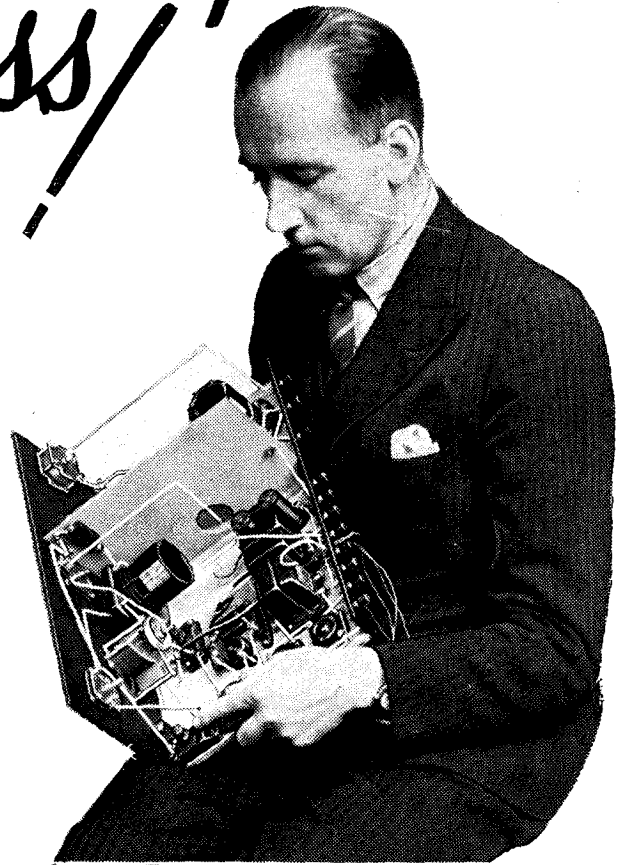
Sir,—Allow me to express my appreciation of the "S.T.400," surely the most perfect set. Station after station all round the dial, and with very sharp tuning and great power.

I first tested it for station receiving on Saturday, and received about forty very clear and with great power.

I built the "S.T.300" about two weeks after it came out, and thought it a good set; but my advice, after ten years of experimenting in various sets, is, build the "S.T.400" for stations, power, sharp tuning, richness of tone and great power on distant stations.

I do not know if I am the only one constructing this set in this district, but trust I am not, as they are missing a great set; and I hope, should my letter reach print, they will take my advice.

Thanking you for such a splendid set, which can be



Many readers pay tribute to the simplicity of construction of the "S.T.400," which is clearly illustrated by this photograph.

built by anyone without knowledge of construction by your plan and details.

Yours faithfully, G. H. EVANS.

**"VOLUME, QUALITY, AND NUMBER OF STATIONS—ALL REMARKABLE."**

Moreton,

Sydney Avenue,

Whalley, nr. Blackburn.

Sir,—Just a few lines thanking you for the "S.T.400" receiver. I built it yesterday.

I am pleased to say that I am delighted with the performance of the set. Volume, quality and the number of stations—all remarkable.

I will send full details later regarding the number of stations I can receive, for I am just getting the knack of selectivity with volume, and have only had the receiver finished twenty-four hours.

Thank you for the fine circuit you have produced for all of us, and with so small a loss of parts in the "S.T.300," and yet such a valuable gain in performance for so minimum a cost to extend to the "S.T.400." Many thanks to the one designer who understands the pocket and needs of the amateur constructor, and also

understands the performance an amateur likes to put up for his friends when called upon to do so.

Yours faithfully,  
HARRY HARGREAVES.

**ANOTHER SCOTTISH ZONE "B" SUCCESS.**

2, Merryburn Avenue, Giffnock, Glasgow.

Sir,—I have already converted my "S.T.300" into your new "S.T.400," and the results are equal to what they should be in my zone, and far beyond my expectations.

Wishing you many more successes like the "S.T.300" and "S.T.400."

Yours faithfully, S. WILSON.

**"UNDER THE WORST CONDITIONS THAT ANY SET COULD BE TRIED OUT."**

79, Wellfield Street, Springburn, Glasgow.

Sir,—With reference to the test of your new big set at my home on Saturday, August 27th, I wish to state first that the set was tested for receiving on a very



**"S.T.400" RESULTS IN THE HULL DISTRICT**

*This picture was taken on Mr. Scott-Taggart's great aerial tour, and shows him after landing at Hull from his aeroplane "S.T.5." An enthusiastic letter about the results obtained at Hull on this occasion was reproduced last month.*

such volume that one would have thought they were the only stations transmitting at the time.

The set, on the whole, behaved admirably under the worst conditions that any set could be tried out under, and of the 45 stations received each one had to be toned down; the volume was so great.

The selectivity of the set was most remarkable during the whole of the receiving test.

I am looking forward to building this new wonder set.  
Yours faithfully, CHARLES AIRD.

[ED. NOTE: Mr. Scott-Taggart informs us that this was the worst aerial on his whole tour.]

**"ALL THE DREAMS OF AN ENTHUSIAST COME TRUE AT LAST."**

88, Pembroke Road, Clifton, Bristol, 8.

Sir,—I write to offer you my very sincere thanks for the most convincing demonstration of broadcast reception, in its widest sense, that I have ever been privileged to hear.

May I say that I have been profoundly impressed. And that at a time when after "Radiolympia" and our local radio exhibition I was in a blasé and critical mood.

Your demonstration of last evening (October 22nd) was an amazing revelation, and I am anxious to tell you what conclusions I have come to regarding the "S.T.400" in consequence thereof.

In the first place I was immediately struck by the remarkable degree of sensitivity and balance displayed, which was only surpassed by the selectivity which at all volumes and throughout both wavebands was such as to prove to be the realisation of all the dreams of an enthusiast come true at last.

The "S.T.300" was—and is—good; good beyond compare for a 3-valver in my opinion, but this new set is vastly better in every way.

The circuit with its "divided reaction" and other entirely new ideas is undoubtedly a great advance.

While you were busy bringing in the stations I—as you may have seen—was quietly writing them all down as they were definitely recognised. I think you may be interested in the total, which came to 63.

I think this speaks for itself, especially in view of the fact that my aerial is not by any means the full 100 ft. and is in a poor position, being almost surrounded by high buildings.

I timed you, too, at first, and observed that you received and identified 24 stations in the first 25 minutes, which to my mind proved beyond all doubt the ease and simplicity of "tuning-in" on the "S.T.400."

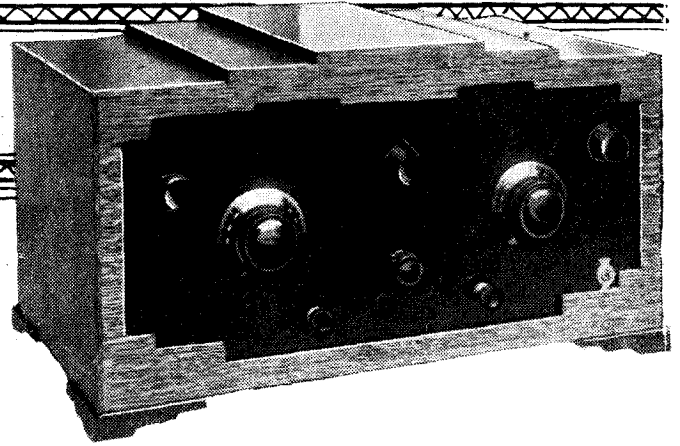
This was amply confirmed later when I tried my hand at "knob twiddling" whilst you were out of the room, which I feel bound to confess I did!

In conclusion, I repeat the "S.T.300" is good, but the "S.T.400" is superlative.

Again thanking you for your truly wonderful demonstration and for all the generous and self-sacrificing work you have done, and are still doing, for all home constructors, actual and potential.

I remain,  
Yours faithfully,  
A. MOORE-O'FERRALL.

# MORE ABOUT THE S.T.400



By

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

THIS is the second "S.T.400" number. It will be read by the great majority of home constructors in this country. It will be read by those who have built the "S.T.400," by those who are about to convert their "S.T.300's," by those who are converting their existing non-"S.T." sets, and by those who have never built a set before.

### Very Detailed

This particular article, however, is only for those who have read last month's issue, because it is more technical—far more detailed than is really necessary, but I believe in leaving nothing to chance—and the most expert is as likely to go wrong as the new-comer to radio; more so, perhaps, because technical people are sometimes

apt in their concentration on one aspect to forget another.

My Rapid Construction Guides are concentrated marvels; I admire them myself enormously! And yet some readers write me: "I never build a set except from the circuit."

Which brings me to my first point about the "S.T.400." The accompanying circuit is theoretically identical with last month's, but I have made a practical alteration for the benefit of those who *do* build from circuits. I have reversed the connections to the distributor fixed plates.

### For Circuit Constructors

If you turn the knob of the distributor to the right on the set, more reaction goes to the aerial and less to the anode. I felt the circuit should correspond. Circuit-constructors, please note.

Of course, last month's circuit was perfectly in order, but unfortunately some of those who build only from circuits would be apt to write in and say: "I have had my distributor over to 'normal,' as you say in the article, but find the set oscillates."

In the case of my "S.T.300" description, some readers who did not follow the article, but only the circuit,

obtained full anode coupling with coupler knob to the *left* (instead of to the right). Some readers did not know the effect they were getting, so they complained that they were not getting selectivity when they had the anode coupler to the left. No wonder!

### A Common Case

This shows that a little knowledge is a dangerous thing, especially about differentials. If you reverse the leads to the fixed vanes, which is what we are discussing, the set is just as good, but you have to rotate the knob the other way.

A common case is the reaction differential. On my tour I found several sets with differentials so connected that more reaction was obtained by turning the knob to the left: surely an unnatural movement!

On the "S.T.300"—and you may be certain it will happen again on the "S.T.400"—some readers (either because of building from the circuit only or using different types of differential anode couplers) complained of no

**106**  
STATIONS AT  
**GRIMSBY**  
by the first  
reader to build  
the "S.T.400."

## More About the "S.T.400"—continued

selectivity. If they had only turned their knobs the other way, all would have been well. One reader, a Dutchman, had reversed leads, and obtained a subtle effect which he warns readers against.

He moved aerial and anode couplings in the same direction always (which is O.K. with correct connections). The result on his set was that when the aerial selectivity went up, the anode selectivity went down—

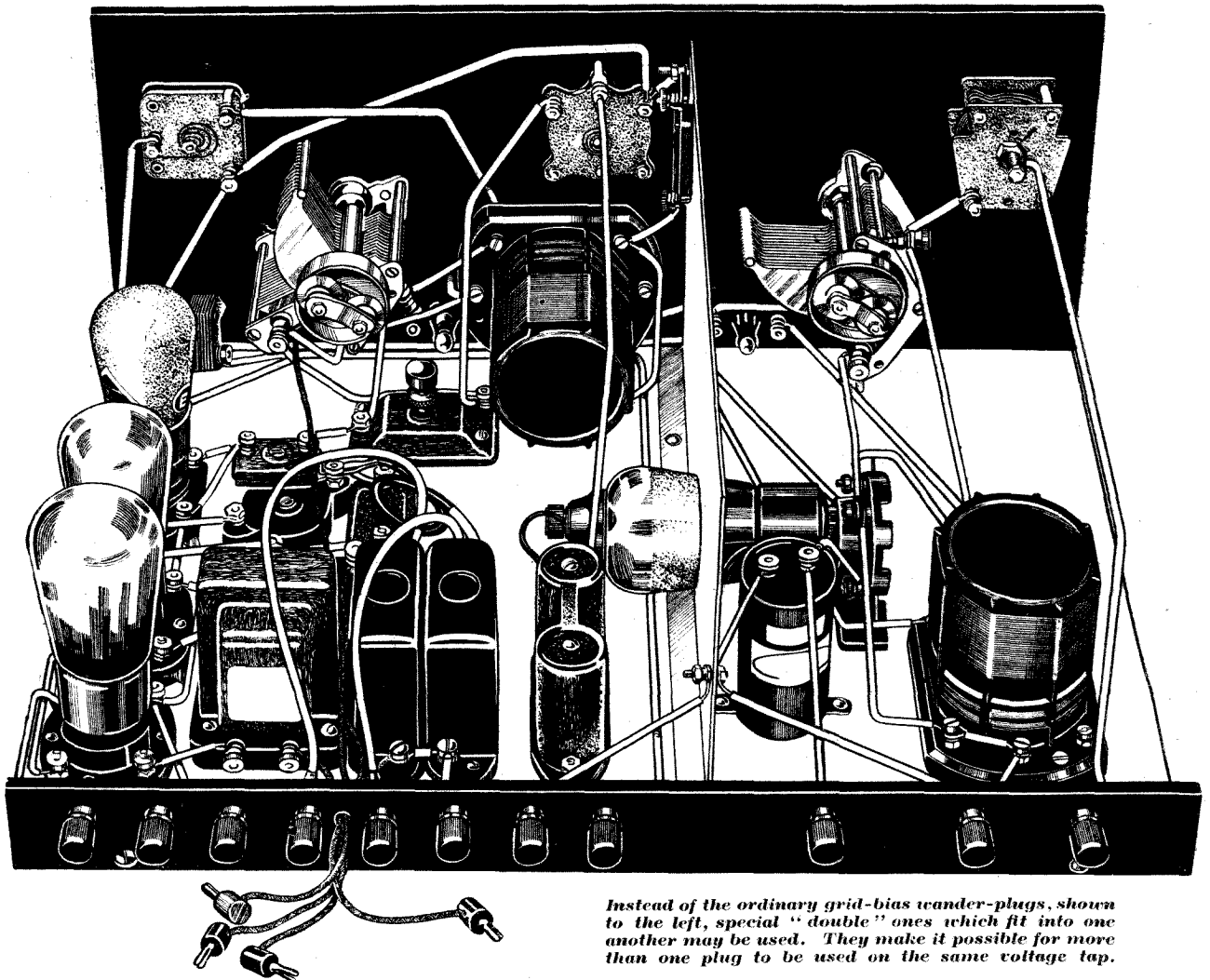
reversing the leads to the fixed plate terminals, or—what is usually better—turning the differential upside down, which results in a reversal of terminal connections when the wires are joined up.

*Summary.* All these remarks apply only to readers who either build from a circuit alone or use differentials with fixed vanes terminals in positions different from those of type actually used in my set. If you use this

"S.T.400" is obviously a matter of importance. And, *whatever you do*, see that your grid-bias wander-plugs fit properly. A bad contact will, as in the case of any set, result in distortion.

I hope you don't mind my giving you a few warnings. Someone once said to me: "Don't warn your readers of *anything*; it will only frighten them off building the set; and it is better for a few to get theirs

### "S.T.400"—A NATIONAL SET FOR INTERNATIONAL RECEPTION



*Instead of the ordinary grid-bias wander-plugs, shown to the left, special "double" ones which fit into one another may be used. They make it possible for more than one plug to be used on the same voltage tap.*

and vice versa! The final result was that the set's selectivity remained more or less the same!

#### Turn It Upside Down

Sometimes, as Telsen did, a manufacturer alters his position of differential "fixed" terminals. This may necessitate either turning the knob anti-clockwise for "increase," or

month's circuit and examine your set you will at once put things right.

A careful examination of the differential will show you opposite which set of fixed plates the moving vanes are placed when the knob is "full right" or "full left."

*Grid Bias.* The grid bias on the 2nd, 3rd and 4th valves of the

wrong than that thousands should avoid building a set because you've scared them."

#### Applicable to Any Set

Well, well! All I can say is I have a higher estimate of the intelligence of the home constructor. In any case, the kind of warnings I give are nearly all applicable to *any* set.

## The Opportunity for Economy

**70**  
STATIONS  
received at  
**LAND'S END**

But, to continue. The grid bias on the second valve (the detector) may be increased beyond  $-1\frac{1}{2}$  volts, but the H.T. on that valve (H.T.+2) should also be increased. And remember that there is every probability of the total reaction being reduced by more negative bias on the detector; there may still, however, be enough for the job.

As regards H.T., my experience is that you can use pretty well the maximum (150 volts on the 2-volt series) permissible by the makers on all the H.T. terminals except the S.G. screen-grid (H.T.+1), which may be varied from, say, 50 to 84 volts for experimental purposes.

There is, of course, merit in all sets in using more H.T. The output available (if your speaker can handle it) obviously goes up, but the sensitivity of the set does not improve very much.

In other words, you can get louder signals with 150 volts and, incidentally, rather better quality on strong signals.

On my aerial tour—on which the letters are based—I used 120 volts. For a demonstration in a hall I should probably use 150 volts.

The last valve of the "S.T.400," again as in all sets, is the one which takes the principal current, and it is here that you can economise to your ears' content.

But if you are a volume-of-noise maniac (as I am myself occasionally), your H.T. is going to run down all the sooner. My recommendation about the G.B. -3 plug is that if you are out

**64**  
STATIONS  
received at  
**AIRDRIE**

for economy you should put it in as much negative as you can (as much, perhaps, as  $-15$  volts, according to H.T. on the last valve and its type and make).

### Grid-Bias Tests

You can easily carry out tests with G.B.-3 by starting at  $-3$  volts (in case of small power valves), or  $-7\frac{1}{2}$  volts (in the case of the larger valves), and switching off the set while moving the plug alter the voltage  $1\frac{1}{2}$  volts at a time. When doing this, note particularly the quality and strength of signals, which, to start with, should be of approximately the desired volume.

Avoid the greatest bugbear of amateur reception—overloading the set. I cannot warn you too often

Where a lot of people make a mistake is that although they are content with moderate volume, they do not seize the opportunity for economy by putting more negative bias on the last valve.

My grid-bias voltages suggested last month must, therefore, be read in conjunction with the valve-makers' recommendations and the constructor's own idea of how loud he wants signals.

You can economise on H.T. by a reduction of H.T. voltages, especially H.T.+1, H.T.+3 and H.T.+4. Any fall in signal strength can often be brought up by more reaction and, perhaps, more anode coupling.

In fact, miracles of economy can be performed with the "S.T.400"; but one can, of course, become too stingy. In this latter case, you may get satisfactory results on "locals" but less satisfactory signals on weaker stations.

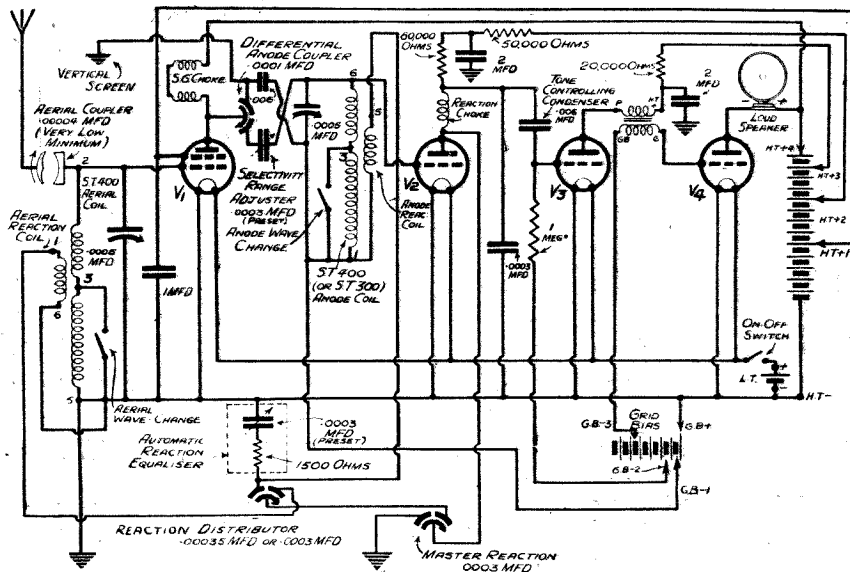
A correspondent is "amazed" at my assertion that the "S.T.400" takes less H.T. current than the average

S.G.3 set. "Even if the 'S.T.400' detector took no current at all, how could you justify such an assertion?"

My friend forgets the first L.F. This valve in the "S.T.400" has, say,  $-3$  volts on its grid. This means that my first L.F. takes much less current than a three-valver's detector, which operates around zero on the grid. My "S.T.400" detector having 110,000 ohms in its anode circuit, and working also with a negative bias, is an extremely economical valve.

**84**  
STATIONS  
received at  
**N. SHIELDS**

### REACTION DISTRIBUTION IN THE "S.T.400" CIRCUIT



If you turn the knob of the Reaction Distributor on the set to the right, more reaction goes to the aerial and less to the anode.

(I have to warn myself often enough!) not to overload the valves. The sure remedy is to reduce the value of the aerial coupler by turning the knob to the left.

### Mistake Many Make

If, for example, you are getting excellent quality and very loud signals, do not imagine that to save H.T. current all you have to do is to increase the negative grid-bias on the last valve. You will save current but produce distortion in most cases. You should start your "economy cuts" with only sufficient volume for comfortably loud reception.

**51**  
STATIONS  
received at  
**JOHN O'GROAT'S**

## How You Can Economise High Tension

Is it any wonder, then, that my detector valve and first L.F. valve (both being negatively biased) will take less H.T. current than the average single detector valve using grid-condenser rectification?

I have devoted considerable space to the H.T. and G.B. question, because

I know that many people take a pride in keeping their H.T. current as low as possible and because the extra valve in the "S.T.400" may appear, quite wrongly, as a last straw to the man who is already tired of the expense of new "H.T.'s."

The suggestion that the "S.T.400" takes more H.T. current than the average S.G.3 set will brand the maker of such a statement as technically ignorant of the circuit.

Before leaving this topic let me urge you, on bended knees, to see that your grid-bias plugs fit properly, and that your grid-bias battery is in proper condition. The need for this plea is due to the fact that you may still get reasonably good results with a bad connection and so not suspect the cause of trouble.

### Avoid Dust in Set

May I also make a very personal request? Please do not allow any "foreign matter" to drop into the set. The variable condensers are very vulnerable, and it is usually the most highly technical and experienced engineers who spill their cigarette ash (or even their cups of tea!) into the tiny gaps of a differential

when bending over the set. Your best friend—and certainly not the Query Dept. of this magazine—would

never dare to tell you some of the unsuspected causes of crackles or "no reaction."

In my own labs. smoking is not indulged in, and sets in course of construction or on trial are, after use, covered by a cloth as carefully as any canary.

### Avoid Overloading

Let us now deal with double-channel reaction. This development is, as explained last month, for the purpose of sharpening aerial circuit tuning. The effect will be either masked or not obtained if the set is overloaded. The cure is a reduction of aerial coupler.

The effect will also not be properly obtained unless both tuning dials are in tune to the desired signal. When

not hesitate to put that little finishing touch of retuning on the dials after altering either the reaction knob or couplers.

These finishing touches become instinctive to the wireless man with some experience. If someone published a Rapid Getting-up Guide, telling you every detail of how to get out of bed and get dressed, you would be so alarmed that you would never dare get up! It would seem so complicated and unnecessary.

The new-comer to wireless construction must therefore realise that "titivating things up" becomes second nature and only takes a few seconds.

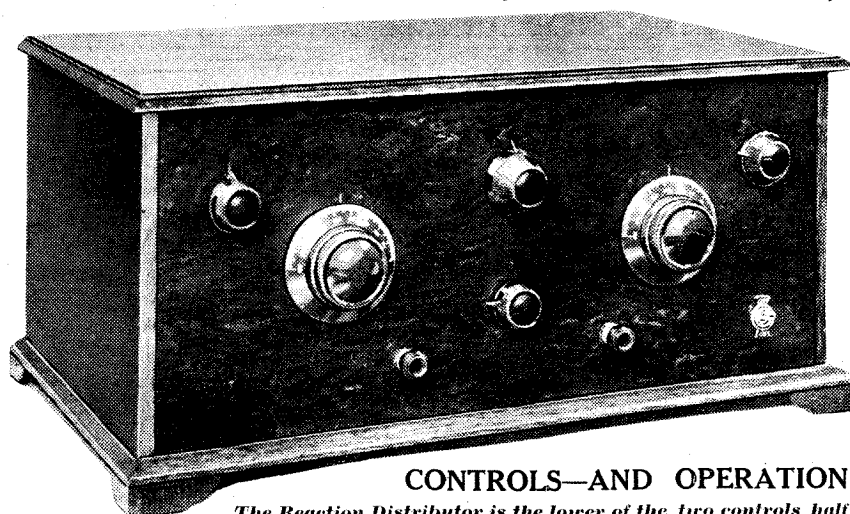
For connoisseurs, the following additional method of operating the "S.T.400" may be tried. Set Master Reaction at zero. Turn the Distributor full right so that all the reaction goes through aerial reaction coil. Now work the set in the ordinary way, using the Master Reaction for obtaining reaction effects (which will be obtained on

both aerial and anode tuned circuits). This system may be found to give very good results if, for selectivity purposes, you are working at very low (or even zero) anode coupling.

### Points Readers Raise

It is impossible in two issues to deal fully with all the possibilities of the "S.T.400." You will find out very rapidly the innumerable ways of obtaining unusually high selectivity and sensitivity.

You have been told ample in these two issues to get excellent results. Next month I hope to deal with points that readers may care to raise



### CONTROLS—AND OPERATION

*The Reaction Distributor is the lower of the two controls half-way between the tuning condensers, and as shown here it is over towards the left, differentiating in favour of anode reaction.*

reaction on any set is in full use, a "squelchy" effect is obtained as the dial is rotated. In the middle of the squelch you hear the station at full strength. (I am not referring to the *squelch* obtained when the set is *oscillating*.)

The squelch effect is unmistakable and is especially noticeable when handling weak inputs with considerable reaction. The same squelch effect is obtainable on the "S.T.400."

### Most Selectivity

On the anode tuning dial it is always obtainable. When you *also* get it on the aerial dial you are working the "S.T.400" in its most selective condition.

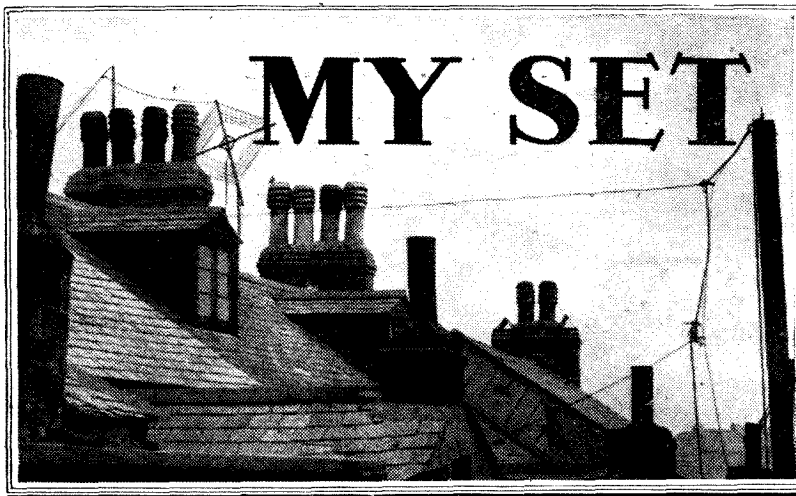
But remember: keep the H.F. input to the set reasonable and do

**80**  
STATIONS  
received at  
**MARGATE**

**67**  
STATIONS  
received at  
**GLASGOW**

**61**  
STATIONS  
received at  
**BETHNAL GREEN**

**85**  
STATIONS  
received at  
**HULL**



# MY SET on YOUR AERIAL

By *John Scott-Taggart*

**M**y pen has scratched through half a dozen titles to this article before the one above was chosen.

"My set on your aerial." How in five words could I better state what I have done in three months?

From town to town I have travelled like any gipsy. I am writing this late at night in the lounge of an hotel at Hitchin.

Funny place, Hitchin. As a practical joke on visitors they put their station miles—or what seems like miles—away from the market-place.

My 'plane, S.T.5, is cosily put to bed at Henlow Aerodrome, where I know quite well it is spending the night oiling up its plugs so as to delay my start to-morrow.

## One Train a Day

Henlow is only a few miles away, but there are only four trains a day—except on Tuesdays, when there are five. To-day is Thursday.

However, I have been with the "S.T.400" to places where they have one train a day, and others where only half the inhabitants have ever even seen a train.

Would you care to come with me on my tour? Right! No, sorry, you can't. I'd forgotten. You would have had to sit on the "S.T.400" in the front cockpit.

The Air Ministry would not have permitted it; it would also be rather too draughty—too much like the days when the flying kit of all the best

*Flying his own aeroplane (called the "S.T.5" since it is his fifth), Mr. John Scott-Taggart has travelled thousands of miles to meet readers and to demonstrate in their homes his new "S.T.400" set.*

*The results of this tour, which has given "S.T." experience of conditions in probably the very district where you live, will prove of permanent and incalculable benefit to all readers.*

*In the following article, "S.T." deals with the lighter side of a tour which has cemented even more firmly the friendship which exists between our famous contributor and his readers.*

pilots consisted of a bowler hat and a pair of trouser-clips.

However, let us *imagine* you are on tour with me. Do you like

## THE "400" FARTHEST NORTH



*Mr. John Scott-Taggart, with the "S.T.400," standing on Scotland's most northerly point during his recent great "Aerial Tour." He is on the actual site where John o' Groat's house once stood. If John o' Groat had lived to-day he would certainly have built the "S.T.400"!*

sausages? You are going to Helston with me and indulge in an old Cornish custom—eating skinless sausages.

"These are skinless sausages; I hope you don't mind." Thus spoke the mother of a 16-year-old radio enthusiast who had

invited me to call.

I had always felt a nude sausage was as improbable as a straight banana; but Cornwall has its own ideas on what to eat with "mashed."

(The night-porter has just come in and switched off one of the lights—a gentle hint, I suppose.)

Do you like pork-pies? We are going to eat braces of them—and like it. We are in Birmingham—centre of the heavy industries. And they believe in food to match.

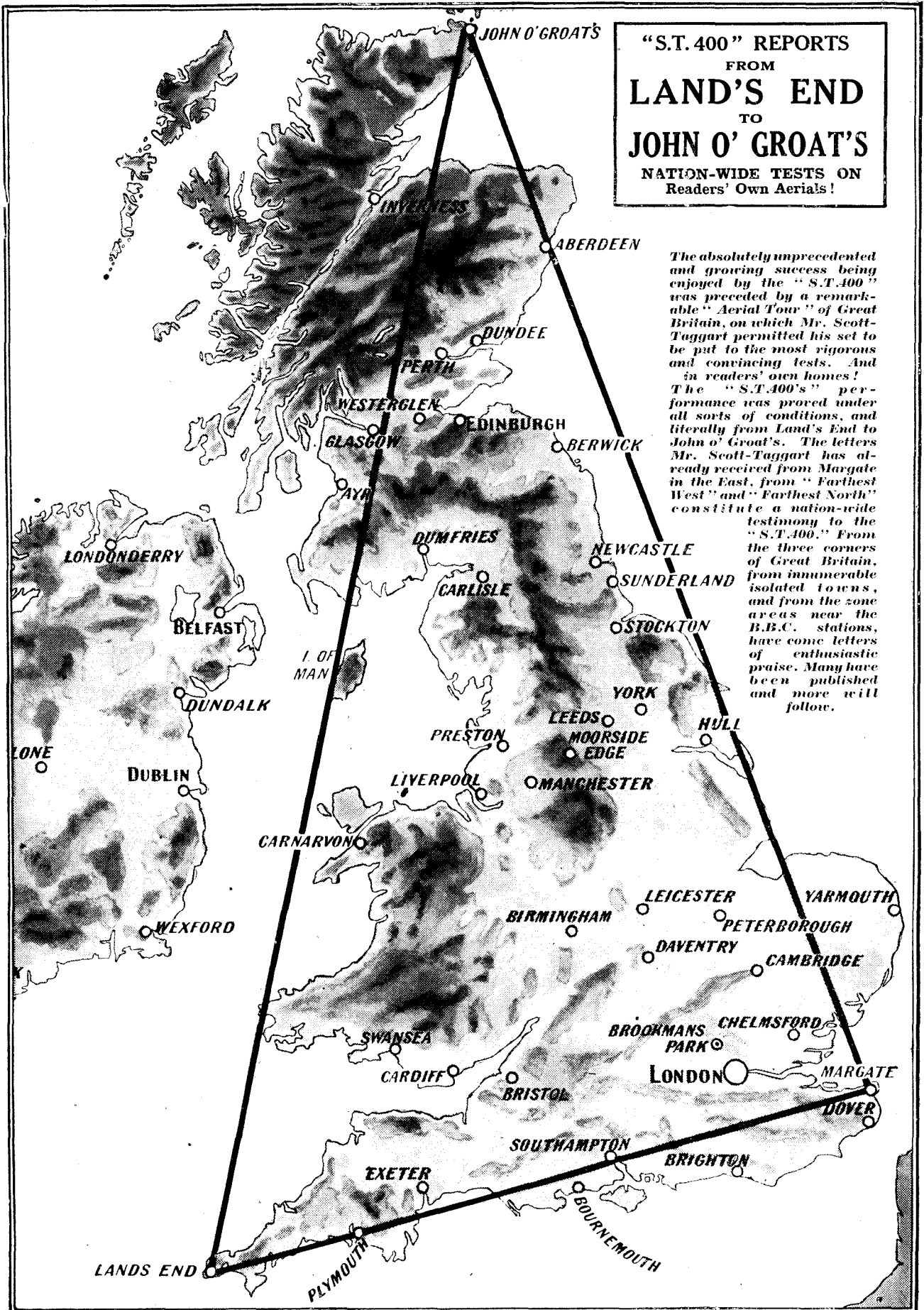
## What is Crowdie?

Ever eaten crowdie over a peat fire in a peasant's cottage? No? Well, if you had been with me you would have done—and eaten it ravenously.

(The night-porter has come in again and turned out all the lights except the one directly above my head. I do hate the way hotel people, restaurant owners, etc., make one feel so horribly uncomfortable by this shabby habit. Tactful, but infuriating. I'd much rather the porter came up to me and said: "Why the dickens don't you go to bed?")

What is crowdie? I don't know. It's white, it's Scotch, and you put it on bread. That's all I know. They go mad over it at John o' Groat's.

Still, they don't get much fun up there. The nearest town is Wick—twenty miles away—and anything



**"S.T. 400" REPORTS  
FROM  
LAND'S END  
TO  
JOHN O' GROAT'S  
NATION-WIDE TESTS ON  
Readers' Own Aerials!**

The absolutely unprecedented and growing success being enjoyed by the "S.T. 400" was preceded by a remarkable "Aerial Tour" of Great Britain, on which Mr. Scott-Taggart permitted his set to be put to the most vigorous and convincing tests. And in readers' own homes! The "S.T. 400's" performance was proved under all sorts of conditions, and literally from Land's End to John o' Groat's. The letters Mr. Scott-Taggart has already received from Margate in the East, from "Farthest West" and "Farthest North" constitute a nation-wide testimony to the "S.T. 400." From the three corners of Great Britain, from innumerable isolated towns, and from the zone areas near the B.B.C. stations, have come letters of enthusiastic praise. Many have been published and more will follow.



## Tone Tested—Zone Tested—Home Tested!

less wicked would be hard to imagine. It is the only completely "dry" town in Great Britain.

Nevertheless, at one demonstration of the "S.T.400," two natives of John o' Groat's were gloriously happy. (Both were enthusiastic "S.T.300" users, by the way!)

One was in the ecstatic silent state. I might have been giving a harmonium solo for all he cared. The other was talkative. He talked all through Breslau, Falun, Radio Paris, Budapest, London Regional—and jammed Mühlacker.

### As Originally Specified

His hand flourished a copy of the February CONSTRUCTOR. "It's never—'snever left ma pocket—fine set—day and night it's in ma pocket. You're Mr. Taggart, aren't you? Glad to meet you. This is your photograph, isn't it? You *are* Mr. MacTaggart, aren't you?"

Me: "Seventy-one degrees; that's Bordeaux-Lafayette."

"Never left ma pocket. Look at your picture every day. Fine set, the '300.' 'Snever left ma pocket. You *are* Mr. Mac——"

He compared my nose, eyes, chin, even examined my tie to see if it corresponded to that in the full-page portrait published (for some unknown reason) last January and which he tore out and placed embarrassingly close to my face.

All the components proving to be as originally specified (including the tie), he was finally convinced—while I was tuning in Madrid.

"Aye, you're Mr. MacTaggart-Scott all recht. 'Snever left ma pocket."

This enthusiastic supporter is a worker on the roads (I only hope he converts his "S.T.300" better than he converts the local roads).

However, although he had spoilt the test for that evening for both me and my host, he had seen Scott-MacTaggart.

### Not An Incendiary

(The landlady has just been in and looked meaningly at the solitary 30-watt lamp over my head. I knew what she meant. I once left an H.T. battery and accumulator on for a week without knowing it. She has clinched matters, however, by saying: "I hope you won't leave anything about to set the hotel on fire." I have

earnestly reassured her that I have no incendiary intentions. Better go to bed, however. Don't want to be blamed if the hotel burns down in the night. Great place, Hitchin).

\* \* \*

Next day:

*The hotel didn't burn down. All is well.*

\* \* \*

Back in London. Fireworks are banging, fizzing and crackling outside. November 5th.

What was I talking about at Hitchin? Oh, yes, the man at John o' Groat's. Well, things are very informal at the extremities of this country of ours. At one demonstration at Land's End there must have been fifty people in a huge room, most of them chattering, and all uninvited.

One man who sat next to me nearly drove me crazy by his reiteration of the phrase, "That's Schenectady" as

ought to console others. The station, however, closes early, and it was virtually daylight when I attempted to get him. Incidentally, it remains light longer in those latitudes.

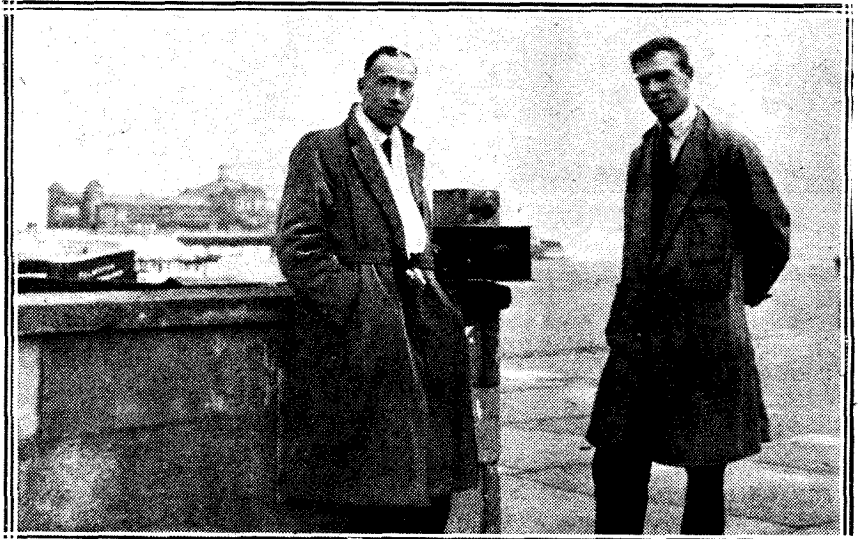
Don't imagine, however, that the John o' Groatsians are akin to Eskimaux! They are pretty well scattered (if two houses are nearer than a quarter of a mile apart they call it a village and give it a name), but they are in no need of any patronising words of mine. As for wireless, they are pretty hot stuff. "What will it do in the daylight?" was the cry.

### Praise Indeed

They are all super-hot, and multi-valve set people up there (most of the sets are commercial ones). The same applies to Land's End.

Not only do they need good sets, but wireless is a very big factor in their lives, and a tribute from

### IN THE ZONE OF THE RISING SUN



Practically every part of Great Britain was visited by Mr. Scott-Taggart in the course of his tour. Here is 'S.T.' with the "400" at Yarmouth, chatting with a millman reader who recognised him on the promenade. Note the wavemeter on top of the set.

each new station was tuned in. The nightingale interval signal of Florence was hailed with the same dogmatic, laconic statement which greeted the anvil strokes of Katowice: "That's Schenectady."

Only when I tuned in the final station of the test did he vary his opinion. It came out, however, just as firmly: "That's Pittsburgh."

As a matter of fact, I did receive America at Land's End, but curiously enough I did not receive Reykjavik (Iceland) at John o' Groat's. This

"Farthest North" or "Farthest West" in praise indeed.

There are certainly no flies on the wireless folk at John o' Groat's. Which reminds me, however, that they breed a very virulent type of midge. Clouds of these ravenous pests swept down on me and the "S.T.400" while outside the post-office. Even the robust postmaster could scarce forbear to swear.

I was told that Flit rubbed on the skin keeps off flying insects. But a trial application ("just a drop behind

**MY SET ON YOUR AERIAL**

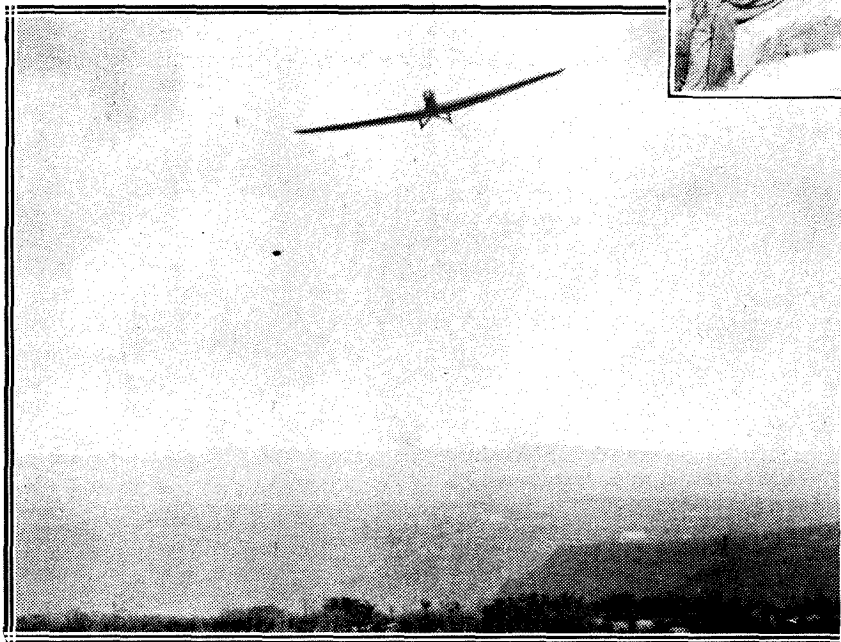
—continued from previous page

the ears") was unsuccessful. I then rubbed Flit (nothing to do with Filt, of course) generously all over my face and hands. I had just finished the process when a strong wind sprang up and blew the whole plague of midges away.

The photograph below was taken at Land's End by the official photographer, and shows Mr. Scott-Taggart's plane, S.T.5, piloted by himself, taking off from Land's End. He had just concluded the remarkable demonstration of the "S.T.400" which is referred to below.



In the background, picturesque Land's End. In the foreground, Mr. Scott-Taggart with the "S.T.400," seated beside Mr. A. Thomas, at whose house 70 stations were positively identified during a demonstration of the set. And Cornwall is a notoriously bad district!



the letters very much more valuable, because you can be certain that

there would be expression of opinion by the others.

It is one thing to be alone with a wireless man and quite another to parade the merits of a set before a critical audience of wives, mothers, sweethearts, Uncle Joes, brothers-in-law (a tough crowd), and a few neighbours who all think their own sets are the best ever.

**The Bubble Pricked**

The sneery-looking young man in the corner has got a seven-valve super-het., and is darned well going to see that, after paying pounds for it, he is not seduced by the "S.T.400."

One gets used to it, however. The

**FROM THE THREE CORNERS OF GREAT BRITAIN**

**FARTHEST NORTH \***

"... Beyond anything in my experience since radio began.

\* \* \*

Although ... I am conscious of the defects of my aerial system, the results obtained were to me a revelation. ...

\* \* \*

... Station after station brought in, as given in 'World Radio,' with un-failing certainty. ..."

A. MATHESON.

John o' Groat's, Caithness.

**FARTHEST EAST**

"... The best set I have ever heard. ...

\* \* \*

Power, range and selectivity are marvellous, and the fact that you were able to log 80 stations here, 'Farthest East,' free of interference, bears out that statement. ..."

H. B. SMITH.

Margate.

\* \* \*

(Local readers will recall that Mr. H. B. Smith was Mayor of Margate some years ago.—ED.)

**FARTHEST WEST**

"I must confess that I did not think the receiving of so many stations possible in this district. Now I have been convinced.

Exactly 70 stations were identified. All of these were received clearly on the loudspeaker without interference, and during B.B.C. transmitting hours.

\* \* \*

... It is miles ahead of any receiver that I have yet heard. ..."

A. THOMAS.

Land's End, Cornwall.

I still smell slightly of Flit. This tour has been a wonderful education. Conditions have been far more severe than one would imagine. In the first place the average audience was five or six people. As each test was carried out in a reader's living room, everybody who lived in it

formed part of the audience (although one reader sent his wife and children to bed at nine o'clock to get them out of the way!).

Out of all the letters published, there is only one from a reader who did not have other members of the family, or friends, there. This makes

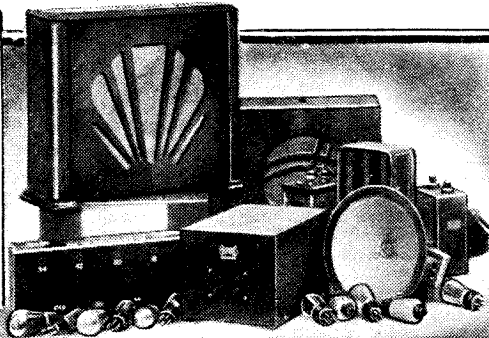
sneery individual, as likely as not, has his bubble pricked by a cheerfully tactless wife who turns to him and says: "Why, George, it's a lot better than ours!"

The mixed audience is certainly a mixed blessing. But it does result in

(Please turn to page 250)

# ABOUT ACCESSORIES

For the  
**'S.T.  
400'**



ACCESSORIES are an important part of any set installation, and it is essential that the correct types should be used if the very best results are to be expected. The "S.T.400" is not in any way a "critical set" where accessories are concerned, and it allows a very wide choice.

### Wide Latitude

Special care was taken by Mr. Scott-Taggart when designing it to give a very wide latitude in the accessories with which it will work. For instance, very ample decoupling is provided so that no bother will be experienced when using a mains unit.

Another feature which provides latitude in accessories concerns high-tension voltages and the S.G. valve. Whether or not a "lively" valve is used, and whether the maximum recommended H.T. voltage or some lower value only, is available—the selectivity range adjuster and differential anode coupler enable the best results to be obtained from the valves and batteries.

### Hear Before Buying

In view of this latitude in choice of components, and the wide variety of makes of accessories available, it is quite likely that the "S.T.400" constructor may have some suitable accessories on hand. The details in this article, and the illustrations which accompany it, will aid you in a wise choice of accessories.

To start off with loudspeakers, we can do no better than to reiterate Mr. Scott-Taggart's own urgent advice "to compare by hearing before

*There is a most bewildering maze of accessories on the market—all sorts of types and makes. Practical assistance is given in this article on picking out the right ones for the "S.T.400."*

By A. S. CLARK.

choice." The choice of a loudspeaker is so much a matter of personal taste, that it is impossible to give very close guidance in the matter.

of whatever type. Note sensitivity as well as quality before purchase.

### Range of Models

With this in mind you cannot go far wrong in choosing from the following makes: Blue Spot, Ormond, Celestion, Igranic, W.B., R. & A., Marconiphone, H.M.V., Atlas, Lanchester, B.T.-H., Ferranti, Epoch and Baker's Selhurst, etc. (As each has a range of different models, specific ones are not indicated.) When the speaker is of low resistance type a step-down

### FOR GOOD QUALITY USE GOOD H.T. SUPPLY

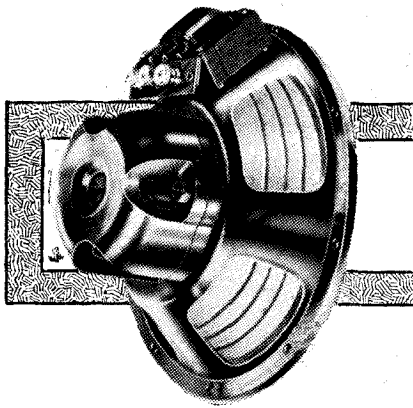


Four accessories that will stand you in good stead. Three sources of H.T. supply are illustrated, the Oldham H.T. accumulator, available in 10-volt units, the Lissen super-capacity 60-volt dry H.T. battery, and a Regentone mains unit for H.T. The loudspeaker is the Ormond R177 cabinet model.

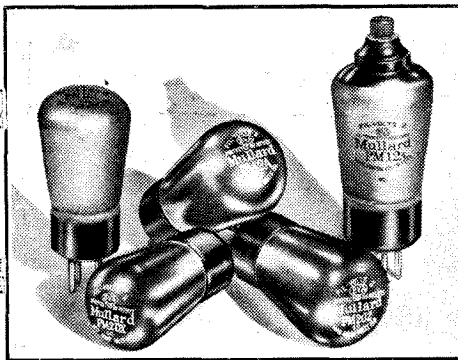
The ideal procedure, of course, is to choose the speaker after a test on the set. If this is impossible, it should be heard worked off a similar output valve. This advice applies to all sets

transformer is needed, but it is becoming common practice to include a transformer with such types of loudspeakers.

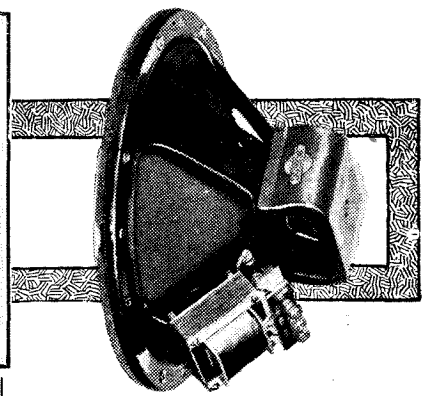
We need do hardly more in this



The Celestion "P.P.M.19" speaker is admirably suited to the "S.T.400." It is a moving-coil permanent-magnet type and incorporates an output transformer.



This is the complete range of Mullard valves for the "S.T.400," the types being P.M.12A, P.M.1H.L. (both metallised), P.M.2D.X., P.M.202, and P.M.2A.

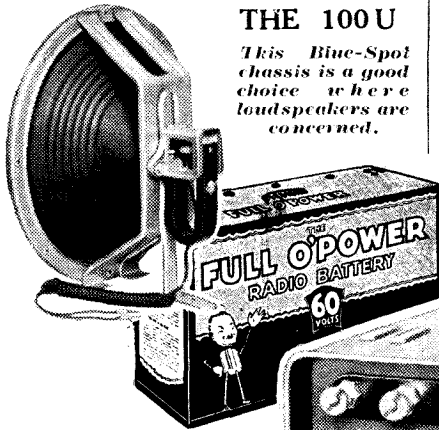


This permanent magnet moving-coil speaker, the Igranite D.9, costs only 32.6, and we can recommend it for the "S.T.400."

article than just mention the pick-up because there is a special article on this subject on other pages of this

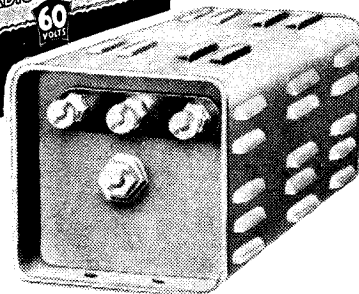
**THE 100 U**

This Blue-Spot chassis is a good choice where loudspeakers are concerned.



**LIVES UP TO ITS NAME**

Two of these 60-volt large capacity H.T. batteries are "just the thing."



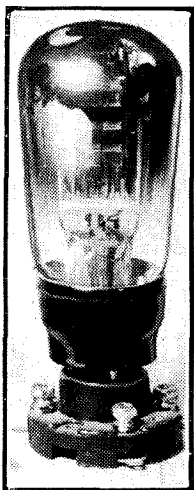
virtually all the power that is used in the receiver. Without good input from the batteries you cannot hope for a good output from the loudspeaker.

By "good input" we do not mean a lot of current—the "S.T.400" is a particularly economical receiver for its performance. What we infer is that a steady voltage and silent supply are very desirable, and to get these you need batteries of good make, such as Lissen, Ediswan, Siemens', Ever Ready, Pertrix, Milne's, Drydex,

**FOR YOUR MAINS UNIT**

Those who desire, can get instructions from the Westinghouse Company for making a mains unit for the "S.T.400," employing one of their dry rectifiers.

number. The Marconiphone, H.M.V., Celestion, B.T.-H. (Minor), British Radiophone, Ready Radio, G.E.C.,



**MAZDA VALVES**

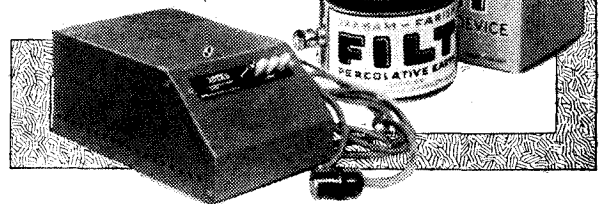
Suitable valves for the "S.T.400" in the Mazda range are 215B.(met.), H.L.2 (met.), L2, P.220 and P.220A. The one illustrated here is the P.220, which is the more economical one of the two power types.

Magnet, Marconiphone, Oldham, etc., where the high-tension and grid bias are concerned; and Oldham, Exide, Pertrix, Ever Ready, Lissen, Fuller, etc., where the L.T. is concerned.

A 9-volt or 16-volt grid-bias battery will be used, according to the valve-makers' grid-bias recommendations and the H.T. voltage used.

The H.T. battery should give 120 volts. It is advised that the latter should be of large capacity, namely, more than the average standard size. The H.T. current for the "S.T.400" will vary according to

To the left of this group is the "Atlas" mains unit A.C.214/S.T., specially meant for "S.T.400" users. The valves are the super-power, detector and S.G. of the Cossor "S.T.400" range, which consists of the following types: 220S.G.(met.), 210 Det.(met.), 210L.F., 220P., and 230X.P.



the volume output of sound desired. Owing to the employment of negative bias and anode resistances in the case of two valves, the "S.T.400" may be operated economically for an S.G. receiver.

**RELIABLE LOW TENSION**

This two-volt Exide accumulator has a glass container, and is supplied with carrying handle.



In some makes of H.T. battery, 120-volt super-capacity types are not made. But it is an easy matter to join two super-"sixties" together. Just run a wire from the maximum positive of one to the negative of the other.

As an alternative to the use of dry  
(Continued on page 254.)

An important item in the obtaining of good results, is a moist point of contact with the earth itself. This is assured by the Graham Farish "FILT" earthing device.



Varley, Igranite, are suitable pick-ups. The batteries are as important an accessory as any, for from them comes

# Playing Records on your S.T.400

THE growing interest in the electrical reproduction of gramophone records means that there are always thousands who desire to fit a pick-up to their sets.

The "S.T.400," because of its circuit, will lend itself admirably to record-playing even when insensitive pick-ups are employed.

### Automatic Switching

The last three valves are all used for gramophone reproduction, and the first valve (of S.G. type) is automatically switched off when records are being played.

The switch carries out in addition the switching over of the earthy end of the tuned-anode circuit from G.B.—1 to the pick-up terminal on the set.

The procedure, after adding the

By

**JOHN SCOTT-TAGGART,**  
F. INST. P., A.M.I.E.E.,

WHO SAYS:

*"I particularly bore in mind the alterations which would be required to fit a radiogram switch on this set, and you will see how snugly it fits in place. Even the angle of the anode tuning condenser was specially arranged to allow space. The wiring alterations are very simple."*

switch in accordance with the Rapid Construction Guide, which is given herewith, is as follows:

Connect pick-up leads across ends of a 50,000-ohm potentiometer (for volume control). Connect one of these ends to a new grid-bias wander-plug (negative), which is inserted in  $-1\frac{1}{2}$  volts tap on G.B. battery.

The merits of using wander-plugs which fit into each other, as recommended last month, may now be discovered.

The sliding contact (normally the middle terminal) on the potentiometer volume control is now connected to the pick-up terminal on the strip.

If the pick-up is provided with an earthing wire, this is connected to the side of the potentiometer connected to the grid-bias plug.

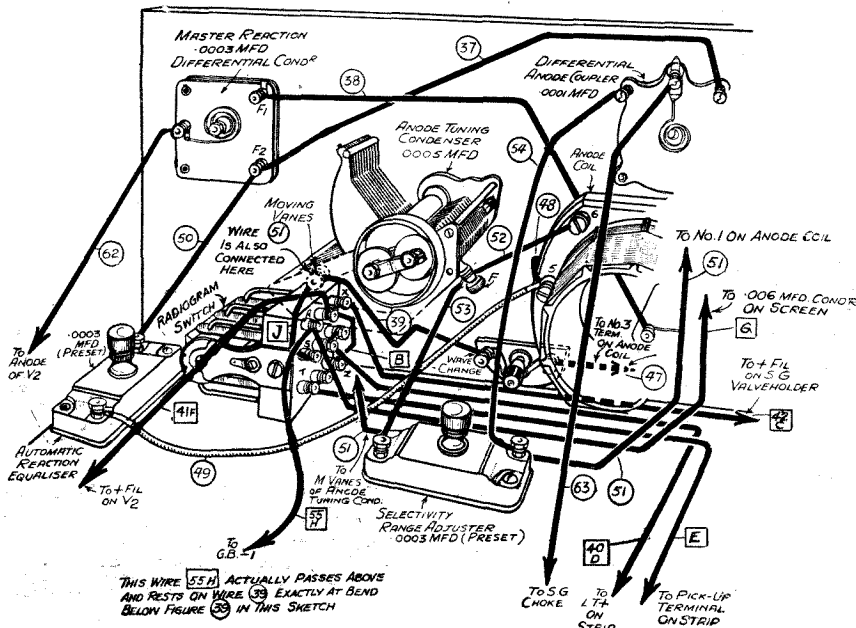
### All Ready

You are now all ready to go ahead. Switch over to "gram" and play your records, adjusting the volume by means of the potentiometer to suit your individual taste and the handling powers of your output valve and speaker.

## EASILY-ALTERED WIRING GIVES YOU ELECTRICAL REPRODUCTION

### THE FEW EXTRA PARTS

- 1 Radiogram Switch (Wearite, type 1.23, with terminals).
- 1 50,000-ohm Potentiometer (Wearite, Igranite, Leucos, Colverstat, Walmel, Varley, Bulgin, Graham Farish, R.I., Sovereign).
- 1 Gramophone Pick-up (Marconiphone, H.M.V., Celestion, B.T.-H. "Minor," British Radiophone, Ready Radio, G.E.C., Varley, Igranite).



### THE FEW EXTRA LEADS

As the original "S.T.400" was designed with its easy conversion to a radiogram in mind, the wiring alterations are completely straightforward and simple. The leads affected are plainly shown in this sketch and those on the following pages, the whole step by step conversion being made perfectly clear in the Rapid Radiogram Guide which is given overleaf.

# Playing Records on your "S.T.400"

## "S.T.400" Rapid Radiogram Guide

The following instructions are given on the assumption that an "S.T.400" set has been built as described last month. Obvious divergencies will be necessary where the reader has altered the design. Cross out each operation as carried out.

- (a) Remove all wires from the two terminals on the anode tuning condenser, i.e. the wires (55), (53), (52), (51) and (39).
- (b) Remove knob and dial from anode tuning condenser; remove anode tuning condenser from panel and lay aside temporarily.
- (c) Remove wire (50) and spaghetti (49) from Automatic Reaction Equaliser pre-set.
- (d) Remove Automatic Reaction Equaliser pre-set from baseboard.
- (e) Remove wire (41) entirely and discard.

### THE NEW NUMBERING.

You can distinguish all the original wiring of the "S.T.400" Blue-print very easily, because in this diagram the wires are numbered as before, each with its original number in a circle. The NEW leads necessary for radiogram reproduction have their distinguishing marks in squares, and each is described in detail in the Rapid Radiogram Guide. The wiring on aerial side of screen is not given, as it is identical with that on the blueprint.

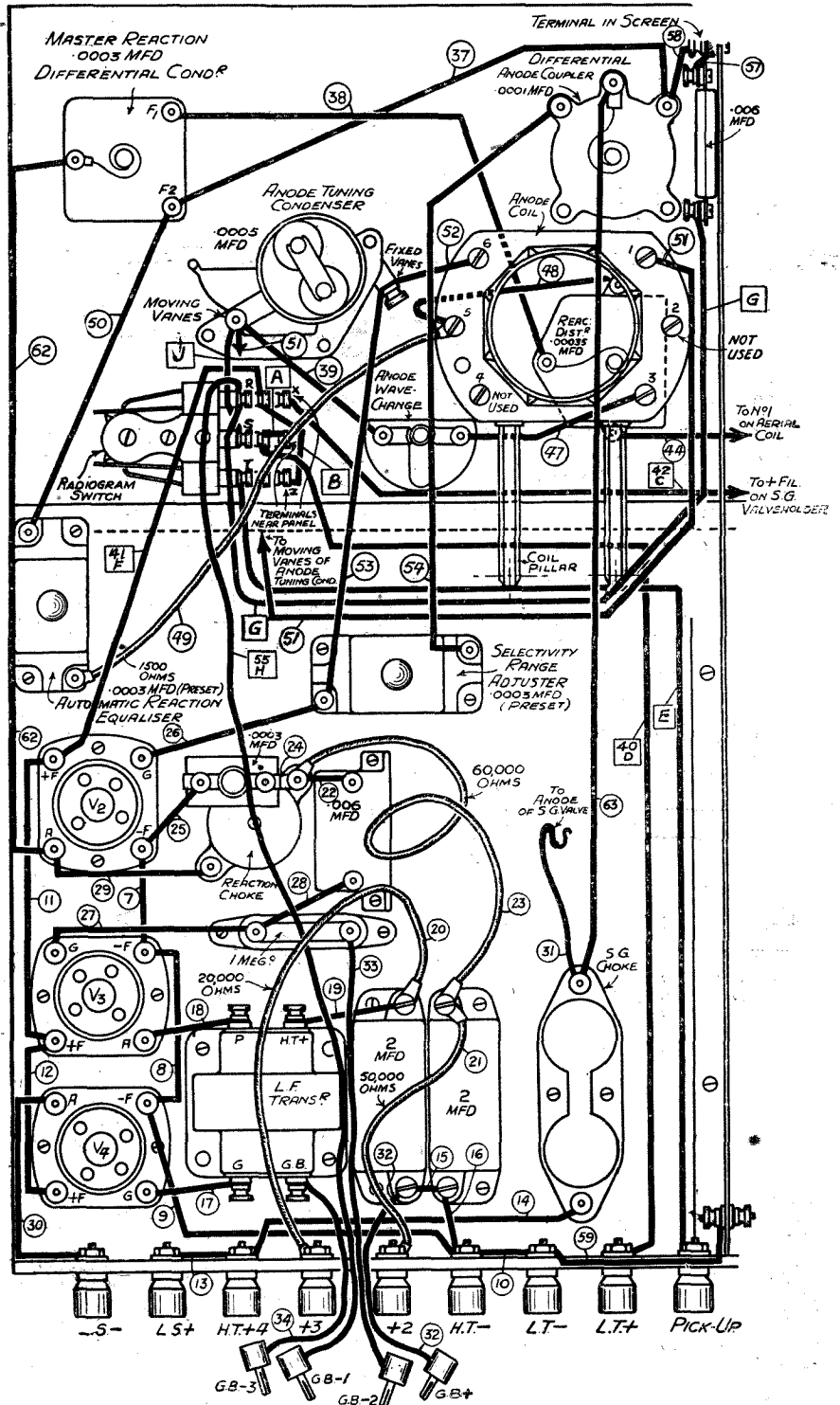
- (f) Disconnect ends of (40) and (42) from toggle switch (or radiogram switch if already fitted in accordance with suggestion made last month).
- (g) Remove toggle switch and put on one side. (If radiogram switch is fitted, take it off.)
- (h) Before fixing Wearite radiogram switch, fit wire A between terminals V and Y on it, tightening Y only (see sketch of switch).
- (j) Fit wire B between terminals U and Z on Wearite switch, tightening Z only.
- (k) Hold switch temporarily in the position it will ultimately occupy. Mark the lengths to which wires (42) and (40) will be shortened if necessary.

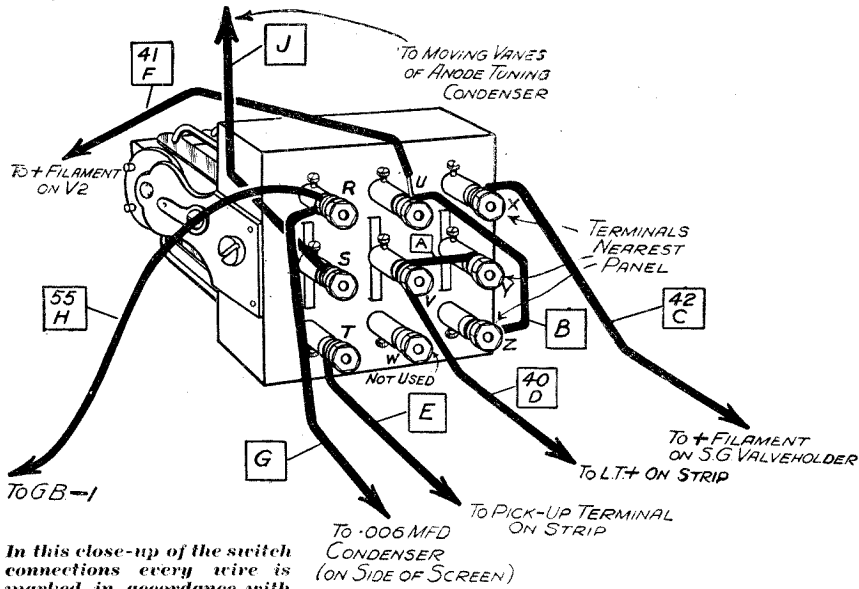
Wire (40) is more easily shortened if other end is temporarily removed from L.T.+ terminal on strip.

N.B.—Wire (42), after shortening, is called 42C. Wire (40), after shortening, is renamed 40D. In the sketches all numbers of new or modified connections are shown in squares,

- (l) Slip switch spindle through its hole in panel. Place indicating bracket on protruding switch spindle and tighten down with fixing nut. Fit switch knob,

## RADIOGRAM CONNECTIONS COMPLETED





In this close-up of the switch connections every wire is marked in accordance with the other diagram and the Rapid Conversion Guide. Note that the centre-bottom switch contact is left unweired. The photograph will help you during the conversion, and as a final check-up of the wiring. The new pick-up terminal is on the terminal strip just to the right of the L.T.+, and close to the screen.

noting that it indicates "off" when switch is in its middle position.

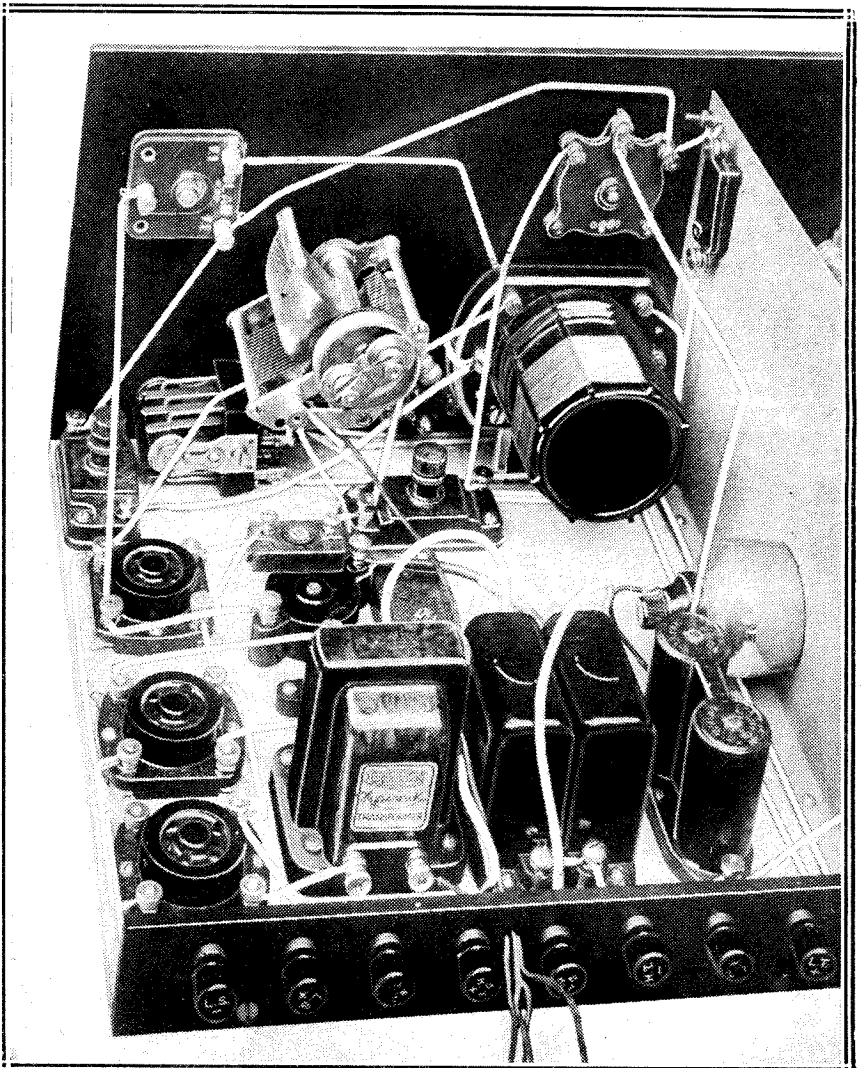
- (m) Connect **42C** to terminal X on switch.
- (n) Connect **40D** to V on switch.
- (o) Drill hole for pick-up terminal on terminal strip (see drawing for position). Fit terminal.
- (p) Connect wire **E** from T on switch to pick-up terminal on strip.
- (q) Connect **41F** from U on switch to valve holder  $V_2$  filament + (i.e. terminal F nearest baseboard edge).
- (r) Remove wire (56) and discard.
- (s) Connect wire **G** from R on switch to lower terminal of .006-mfd. Dubilier condenser which lies next to screen.
- (t) Connect flex **55H** to R on switch. (Other end of this flex, of course, is wander-plug G.B.-1.) This wire **55H** actually passes above and rests on wire (39) exactly at the bend below the figure (39) drawn on perspective sketch of wiring.
- (u) Prepare wire **J** for later connection between S on switch and anode tuning condenser (moving vanes terminal). Hold tuning condenser temporarily in position to check this wire's length and shape. Attach **J** to terminal S on switch, leaving other end of **J** free.
- (v) Fit anode tuning condenser on panel, refitting dial and knob.

- ing condenser moving vanes terminal.
- (y) Fit free end of **J** on anode tuning condenser moving vanes terminal.
- (z) Reconnect (52) to anode tuning condenser fixed vanes terminal (at side).
- (za) Replace (53) to anode tuning condenser fixed vanes terminal (at side).
- (zb) Refit Automatic Reaction Equaliser pre-set on baseboard.
- (zc) Reconnect spaghetti (49) to Automatic Reaction Equaliser (terminal farthest from panel).
- (zd) Reconnect (50) to Automatic Reaction Equaliser pre-set (terminal nearest panel).

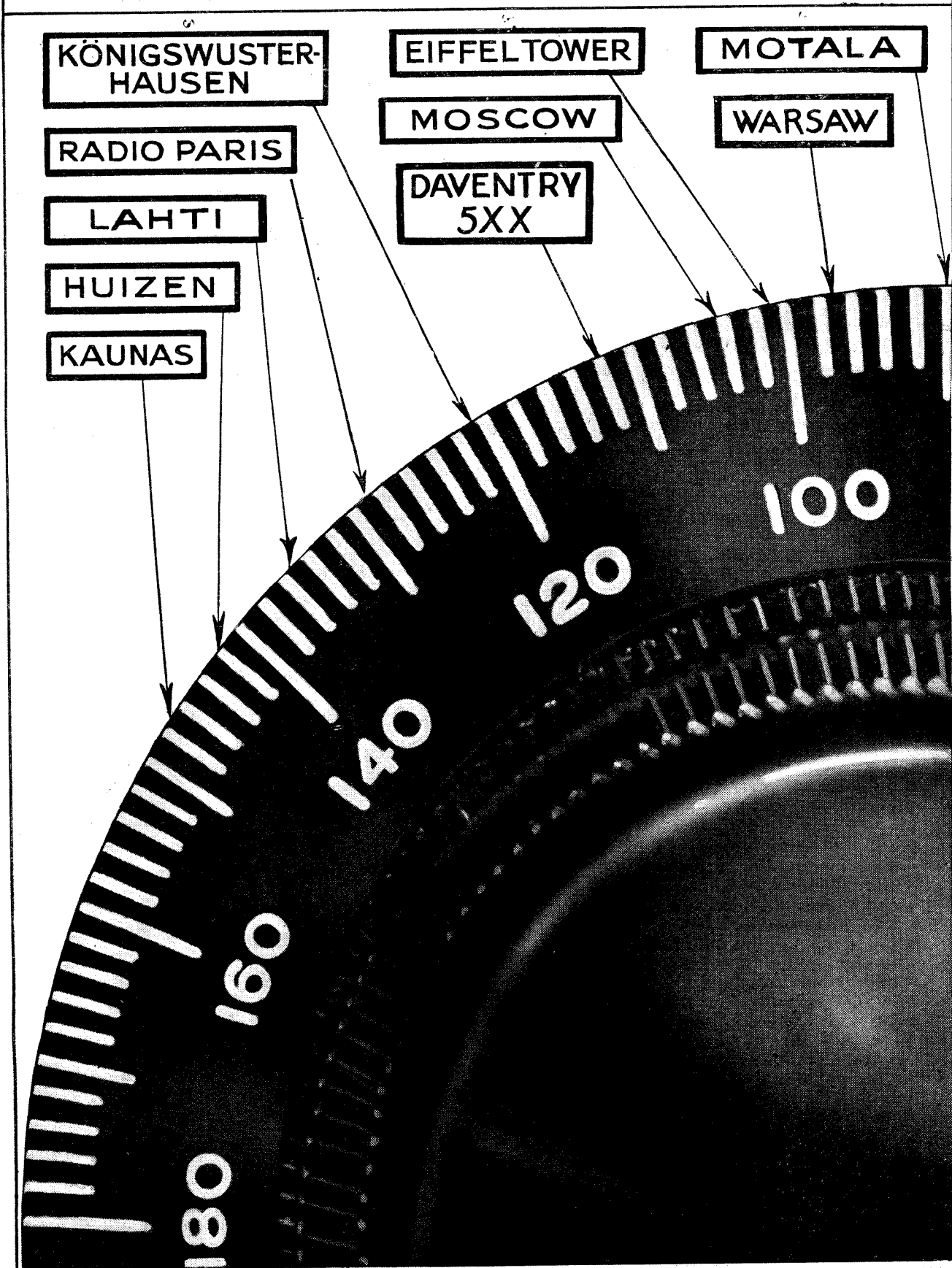
**THIS CONCLUDES THE CONVERSION.**

If the toggle switch fitted snugly in one corner it may be necessary to modify slightly this corner of the vignette to accommodate the radiogram switch.  
J. S.-T.

**FULL DETAILS OF SWITCH WIRING**

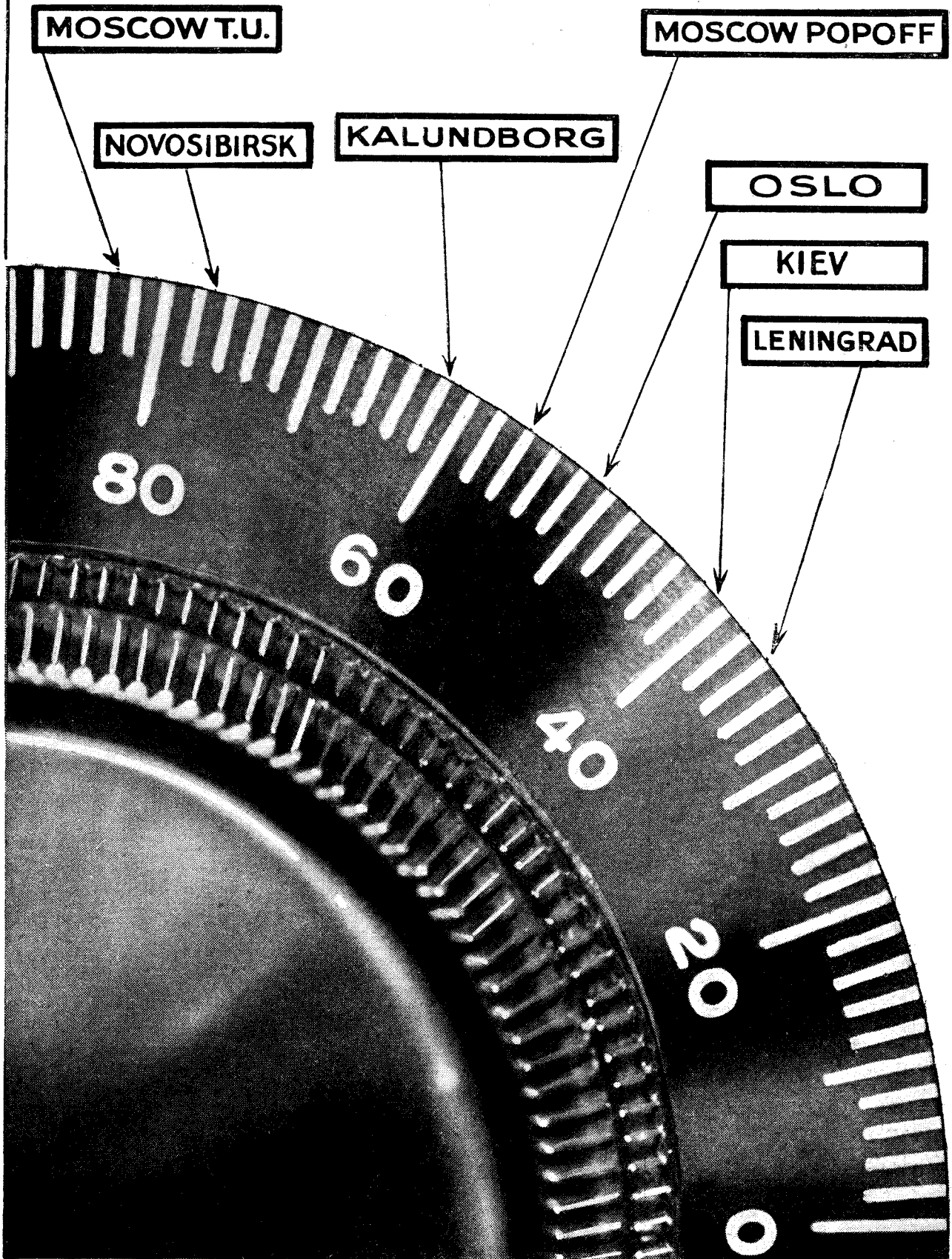


# LONG-WAVE STATIONS RECEIVED BY





# "S.T.400" ON READERS' AERIALS



# QUEER QUERIES

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

By P. R. BIRD

## Those Loose Grid-Bias Plugs

"As the quality seemed very bad," writes a New Brighton reader, "I looked over the set and found the grid-bias plug for power valve was not making contact, having sprung out owing to a stiffish wire being used. It seems all right again now, so I suppose no harm was done by running it like that for a time."

Such a "no harm" idea is entirely wrong. To allow power-valve grid bias to become loose and then expect "no harm" to come of it is very much on a par with looking for a gas-escape with a lighted candle. It is simply asking for trouble—and illumination!

That New Brighton valve may seem to be working all right, but its life has now been sadly shortened. Grid bias is always really important, and all bias plugs must fit into their sockets snugly and securely to prevent their bias voltage being removed.

Any reader who uses a "stiffish wire" that is liable to spring the plug out is hereby warned that he had better remove it and use flex instead. And everyone who has experienced trouble with bias plugs getting displaced accidentally should remember the good old stunt of slipping a strong elastic band round the bias battery to hold its flex leads firmly in position.

It always pays to attend carefully to grid bias.

## Will it Hurt the Carpet?

One reader raises a rather anxious inquiry which calls forth my special

sympathy, because my own experience was like his.

It was in connection with spilt accumulator acid. An accidental movement in his drawing-room upset an accumulator, which poured out "a small map of Europe" on a new carpet.

He rushed for the ammonia bottle, soused the stuff all over the acid, washed and re-washed that part of the carpet—and removed every trace of damage.

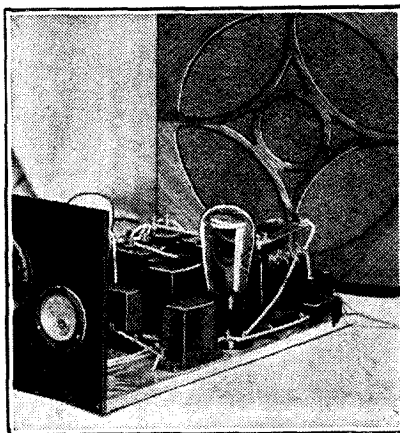
## Will It Last?

But, he asks himself, *will it last?* Or will that acid have eaten into the threads, weakening them, and developing into a hole in the distant future?

Well, I had exactly the same qualms over a nearly new carpet some five years ago. A carrying handle broke and spilt a patch of acid as big as a tea-plate in the centre of the carpet.

After the ammonia excitement was all over, and every trace removed, I still had a suspicion that that carpet would "go" in the middle some day. But it has been in use ever since, and there is not the slightest trace of damage yet, although that was in 1927. So I think we can take it that ammonia is a real cure.

## WHY IT HOWLS



One of ten unsuspected cause of howling is the standing of the loudspeaker too close to the valves. If the sound-waves are then strong enough to shake the electrodes they may "build up a howl" which will raise the roof!

A friend of mine who is blessed—or is it cursed?—with D.C. mains had a fault on his all-electric set that would have enlarged the vocabulary of a Billingsgate fish-porter! A fault that one could sit back and swear heartily at for hours, and still obtain no satisfaction.

The set was a big five-valver, with mains valves; and while the owner

(who had designed it and knew every wire in it) was keeping an eye on it himself, it behaved like a gentleman.

## Appearances are Deceptive

As soon as the owner went away and left it to a pal to keep an eye on, it played up. Wouldn't work at all, the pal reported, in a heartbroken letter asking for guidance. So he was instructed first to measure the heater current, as appearances suggested a failure in emission.

This was done, and it was found that half an amp. was flowing—the correct current. And then dozens of other suggestions, etc., were tried.

## HOW IS YOUR SET BEHAVING NOW?

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

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

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

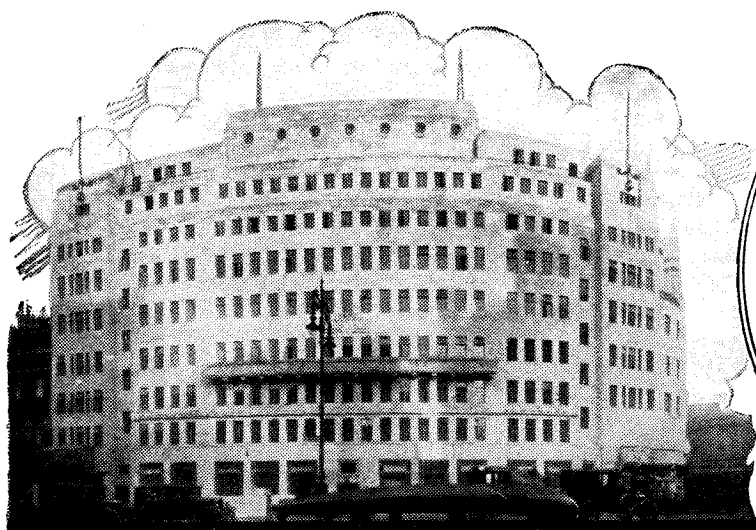
LONDON READERS, PLEASE NOTE. Application should not be made by telephone, or in person at Fleetway House or Tallis House.

Finally, the owner, whose holiday was threatening to develop into a correspondence course on wireless, began to suspect that "half amp. of heater current" once again. And then it came out as a result of further tests, that one of the smoothing condensers, connected across the heaters, was causing all the trouble.

## When Meters Fail

There was a partial short inside this condenser, and consequently when an ammeter-test was made in the heater circuit a current (of the correct half-amp.) was found to be flowing, so that apparently the heaters were O.K.

Actually that current was largely made up of through-the-condenser-current, which should not have been there at all. And by a piece of bad luck it totalled up to the correct figure. Which goes to show that you cannot even trust the frank and open face of an ammeter to tell the truth—or, at least, that you must not rely too blindly on it.



# B.B.C. NEWS

*Topical notes regarding British Broadcasting Stations and Programmes.*

**By Our  
Special Correspondent**

## The B.B.C. Dance Band

**T**HERE are a lot of rumours about the affairs of the B.B.C. Dance Orchestra. These are due in part at least to the secrecy in which certain important changes were made recently.

Mr. Gerald Cock, the enterprising Outside-Broadcast Director of the B.B.C., is in general charge of Dance Music, both inside and outside. It was he who "found" Henry Hall and brought him to the B.B.C. The idea was to develop a band on more restrained lines than that of Jack Payne, which, in its way, was enormously popular.

It seems, however, that the change of method has gone too far for the public taste, and considerable reorganisation and development are in progress, but this does not mean that the B.B.C. has lost faith in Henry Hall or his orchestra.

I look to see Mr. Hall ultimately rival the popularity of his great predecessor.

## Canadian Broadcasting

Mr. Murray Gibbon, the public relations officer at the Canadian Pacific Railways headquarters in Montreal, has just returned to Canada after a brief visit to London. Apart from his official duties, Mr. Murray Gibbon had been entrusted with a special mission by Mr. Hector Charlesworth, the newly-appointed Chairman of the Canadian Broadcasting Commission.

It is understood that Mr. Charlesworth asked Mr. Murray Gibbon to bring back a first-hand report of various aspects of B.B.C. work, particularly on the musical and organisation side. It is interesting to

recall that Mr. Murray Gibbon was one of the leading opponents of public service broadcasting under Government control in Canada. He is a distant relative of Sir John Reith.

## Television to Migrate

Acute problems of congestion at Broadcasting House have made it necessary to consider seriously whether television should not be carried on from some suitable place outside, and search is now being made.

grammes and the enterprise of Mr. Robb, the Television Programme Director, and of his able assistant, Miss Jean Bartlett, have added materially to general interest in television, and have enhanced the reputation of the B.B.C. both on the Continent and in America.

## Developing the News Service

I hear the B.B.C. is about to develop the staff of the News Department in order to cope with the

## PROTECTION FOR THE ROYAL MICROPHONE



*The Royal microphone, normally used only by His Majesty the King, leaving the premises of the Marconiphone Co., Ltd., prior to being sent to Belfast for the opening, by the Prince of Wales, of the new Northern Ireland Parliamentary buildings. Special permission for its use was granted by His Majesty.*

Several places are in mind, one near the Strand, and another on the south side of the river.

Despite no startling progress technically, the brightness of the pro-

additional demands created by the Empire Broadcasting Service. A prominent member of the staff of "The Times" newspaper may join the B.B.C. early in the New Year.

## B.B.C. News—continued

### Publicity Rules Relaxed

I notice a much more reasonable attitude on the part of the B.B.C. in the matter of publicity restrictions. A few months ago there was a general tightening-up, at least so far as members of the staff were concerned. Now, however, the cloud of anonymity is being dispersed here and there in the interests of common sense.

For instance, Mr. Cecil Graves, Director of the Empire Broadcasting Service, has had a lot of well-merited and well-calculated personal publicity. It remains to regularise the position so that the repressive measures may disappear from the statute book of Broadcasting House.

### Mr. Priestley and the B.B.C.

Any ill-will that may have been aroused as between the B.B.C. and Mr. Priestley over the loss of his typescript seems to have gone. Mr. Priestley is now in close personal touch with Mr. Charles Siepman, head of the Talks Branch, who is endeavouring to induce him to take a more active and continuous part on the literary side of broadcasting.

### Welsh from the North Regional

Reception problems in North Wales are exceptionally difficult. In the first place, Cardiff cannot be received at all; in the second place, the new West Regional station in Somerset,

which will replace the Cardiff transmitter in April, will not be adequate or reliable in North Wales.

In the third place, Daventry 5 X X is not consistent, and will not be

### READY FOR THE ROAD



*Quite apart from the controversy as to what the G.P.O. Private Vans can or cannot do, they certainly carry quite an amount of radio apparatus. As a matter of fact, it leaves only just room for the two operators.*

better until it is moved to Droitwich. And this will take two years at least to move. There remains to consider

the North Regional station at Moor-side Edge.

This, fortunately, is much better received in North Wales than any other existing station. After due consideration, the B.B.C. has decided to do something special and regular to cater from the North Regional chiefly for North Wales, but also for the thousands of Welsh people in the North of England.

There will be occasional feature programmes in Welsh, with the continuance of the monthly religious service, also in Welsh.

### Labour on Broadcasting

The Labour Party is seriously concerned about what it regards as a biased attitude on the part of the B.B.C., and is suggesting an early and drastic revision of the constitution to allow for more effective parliamentary control over the operations of the B.B.C. I am bound to say my view is that any legislative proposals designed to meet this end would almost inevitably defeat their purpose.

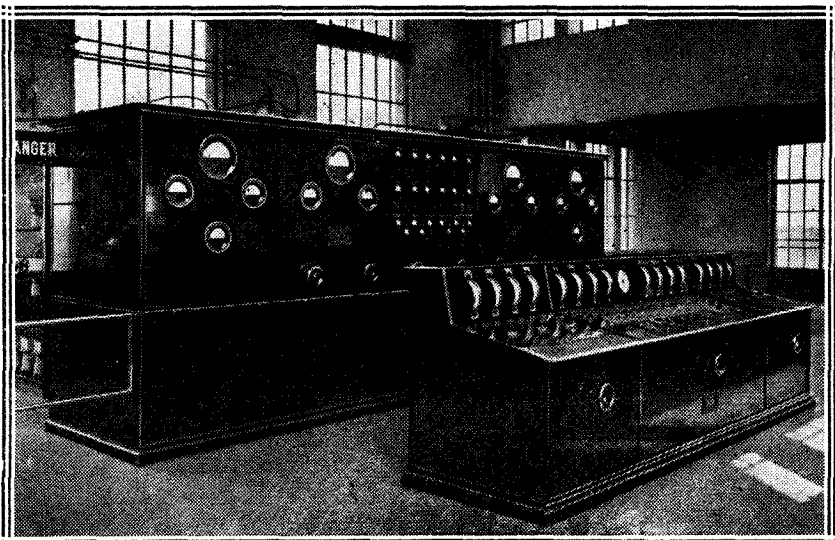
Parliamentary intervention in the conduct of the broadcasting service, apart from its general policy, would be a great mistake.

### The Study of Broadcasting

The B.B.C. has taken up the collection and safeguarding of the records and archives of broadcasting from the beginning. This step is perhaps somewhat belated, and I hope that all the important early records are available.

Fortunately, Sir John Reith's personal diary, which, I gather, has not been interrupted even for a day during the past twenty years, will fill in many of the gaps in the official records. The regular assembly and classification of records should form the basis for a progressive and scientific study of the theory and practice of broadcasting—a study which the intense preoccupation of the work itself has hitherto prevented.

### 60 KILOWATTS OF THE VERY BEST

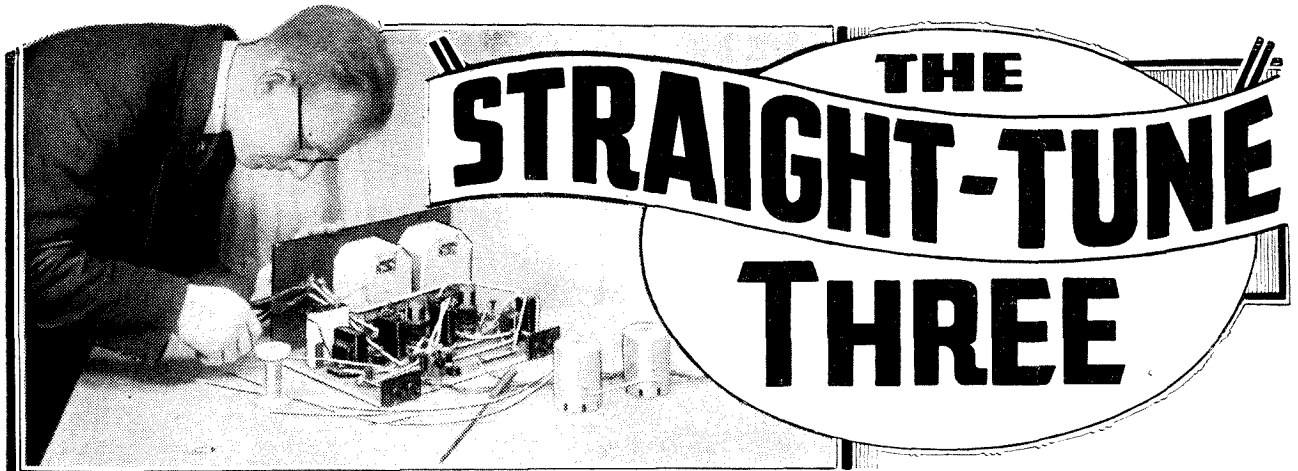


*With its high power, the Poste Parisien French Station on 328.2 metres comes over very well and is a firm favourite with long-distance listeners. A particularly neat arrangement is employed for the transmitter, and the control and checking "desk."*

### THE WIRELESS CONSTRUCTOR

is in a position to give listeners the latest and most authentic news with regard to B.B.C. activities and policies.

If you want to keep up to date—and what listener doesn't?—read these notes in **THE WIRELESS CONSTRUCTOR** Every Month.



*An extremely efficient arrangement of the popular S.G., det. and L.F. circuit, giving maximum performance with the minimum of trouble. Automatic wave-changing self-screened coils, tuned-anode coupling for H.F. stage, and transformer-coupled L.F., are features of this receiver, which will win great praise for the extreme simplicity of its operation.*

**Designed and described by VICTOR KING.**

THE term "household set" is one that has been "well thrashed" in the past. It has been used to designate receivers that are for local-station reception only; it has been employed to introduce sets that are of the one-dial control type, and it has appeared in connection with complicated receivers that have as their only claim to the term the fact that they are incorporated in some more or less picturesque piece of furniture.

In spite of all this I am going to use the term again to denote the characteristics of the "Straight-Tune" Three, full constructional details of which are given below.

The name of the receiver gives a very good idea of its main characteristic—ease of tuning, but there is more in the design than is apparent in the name.

### Easy Control Throughout

In order to be a real everybody's receiver, a set that father, mother, sister and brother can handle with *equal success*, it is essential that not only must the tuning be easy to operate, but the other controls too.

Mother can understand the meaning of a volume-increase control, or even reaction, when she remembers that this latter has the same apparent effect, but she is likely to be stumped if she is called upon to differentiate between a variable-mu control and a tone balancer, or some such collection of desirable but complicated controls.

In this set I have admittedly not gone out for the last ounce in the way of power or sensitivity. Instead, I have aimed at providing a three-valve

receiver that will get a number of stations at good loudspeaker strength, and will at the same time be easy to operate.

### The Main Essentials

There are three main essentials for this. The first is that the set in question shall be able to tune in stations on both the broadcasting wavebands used in Europe (that is, on the medium waveband between some 200 and 500 or so metres, and on the long waves between 1,000 and 2,000 metres).

The second is that some form of

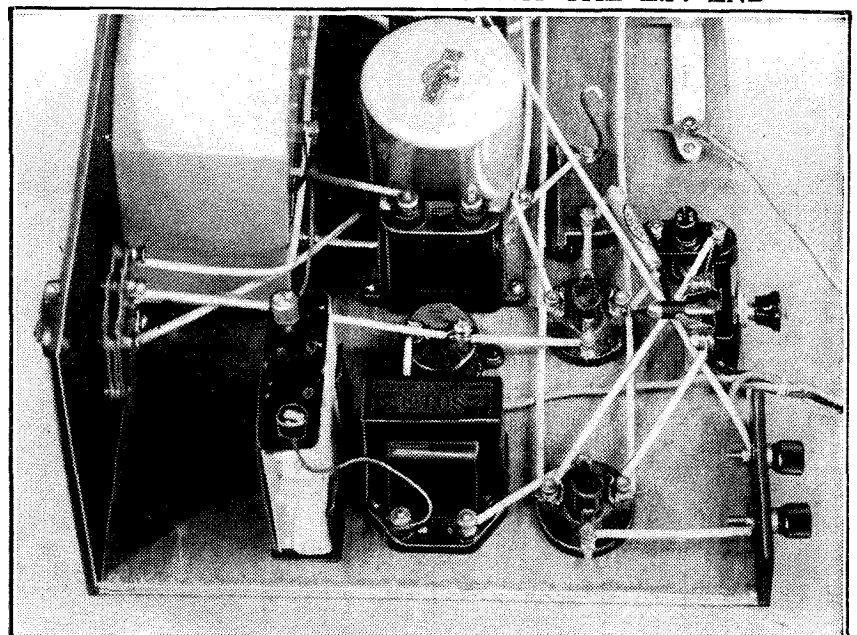
easy tuning control be arranged, with a device for increasing the sensitivity of the set when necessary (in other words, reaction must be included); and, finally, No. 3 requires that the set shall not be expensive, and shall be easy to build.

### Automatic Wave-Change

Let us take the three points in order. The wave-changing of a receiver to allow it to cover the two wavebands at present in use is not a particularly difficult task, but it usually necessitates one or more switches devoted to that task only. In many three-valvers two push-pull or rotary switches are used in order that the owner may be able to change from one waveband to the other at will.

This in itself is not a great hardship, but obviously it is advantageous to do away with the switches if possible. And by the use of the wonderful

### FEATURES THAT DISTINGUISH THE L.F. END



*Note the grid-bias battery in its clip next to the transformer, an arrangement which ensures really short leads, and the "on-off" switch which is placed at the rear of the baseboard.*

## The "Straight-Tune" Three—*continued*

tuning device called the Extenser this is feasible. There is no need for wave-change switches if Extensers are used for tuning the set.

### Changing Wavebands

These ingenious devices allow the set to be handled in the same way as it would were ordinary tuning condensers employed, with the advantage that the wave-change switching is carried out *automatically*.

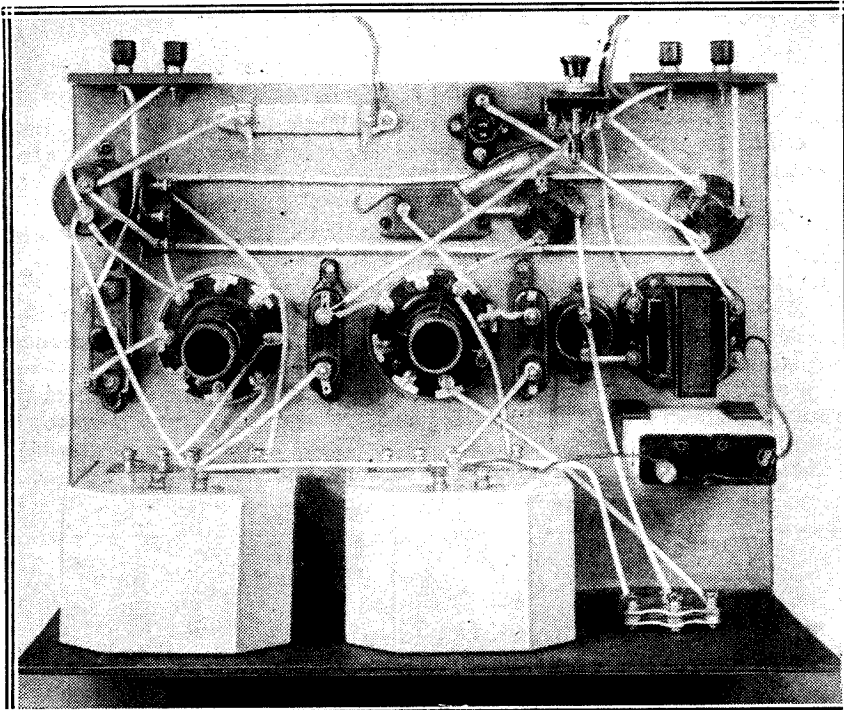
Suppose that we tire of the medium wavelengths, that nothing can be found to amuse us there. We want to go on the long waves and to try our

on the medium or long waveband. If the dial readings are between 0 and 100, the medium waves are being explored, and if the dial shows between 100 and 200, the long waves are the order of the day.

This automatic change is of particular use in a set that is to be used by all and sundry in the home, for it obviates the need of providing a duplicate table of dial readings so that stations shall be logged and the members of the family shall be able to tune them in.

Every station the set can get can be listed under a distinct dial reading,

### LOOKING DOWN ON A SET YOU WILL LOOK UP TO!



This "aerial" photograph of the "Straight-Tune" Three, combined with the wiring chart on the opposite page, makes it quite impossible to go wrong. You will find how the use of a battery cord does away with a lot of unnecessary work in fixing terminal strips, etc.

luck round Radio Paris, Motala, Huizen, and the rest of them.

In an ordinary set we would break off from our tuning, operate one or two switches and then start retuning. In the Extenser-tuned receiver we simply go on rotating the Extenser knob, and suddenly the dial readings will change from tens to hundreds—we shall be on the long waves.

### The Dial Readings

The change in dial readings is deliberately arranged so that one can tell at a glance whether one is tuning

so that the list will run from 0 to 200 straight off, giving a direct method of finding the station you want.

### Increasing Sensitivity

Thus it will be seen how a set having Extensers is particularly suited to be termed a household receiver, and it is because the set we are to describe includes Extensers that we have called it the "Straight-Tune" Three.

The second point that we raised was that easy tuning control should be arranged with reaction or some

### THE VALVES FOR THE BEST RESULTS

Make	H.F. Stage	Detector	Output	Mains Unit Output
Mullard	P.M.12	P.M.1H.L.	P.M.2A.	P.M.202
Cossor	220S.G.	210H.L.L.	220P.A.	230X.P.
Mazda	S.G.215	H.L.2	P.220	P.220A,
Marconi	S.22	H.L.2	L.P.2	P.2
Osram	S.22	H.L.2	L.P.2	P.2
Tungsram	S.210	H.210	P.220	S.P.230
Lissen	S.G.215	H.L.210	P.220	P.X.240
Eta	B.Y.6	B.Y.1814	B.W.604	B.W.602
Six-Sixty	215S.G.	210H.L.	220P.A.	220S.P.

such device for easy increase of sensitivity when it is required to listen for distant stations. This is supplied in the "Straight-Tune" Three by the addition of one control beside the tuning.

As a matter of fact, those three controls are the only ones used. The on-off switch cannot really be called a control; it is used only at the commencement and the end of a period of listening, and in this case it has been placed at the back of the set in a convenient position on a small bracket.

### Inexpensive to Build

Point No. 3 ordained that the set should be inexpensive and easy to build. The set under discussion is particularly cheap, and the construction is the simplest thing imaginable.

Awkward screens have been abolished, because with screened coils the old type of vertical screen is usually not necessary, and, in fact, it has almost sunk into disuse. Furthermore, in the set here described, the Extensers, as well as the

### ACCESSORIES FOR YOU TO CHOOSE FROM

**Loudspeaker.** W.B., Blue Spot, Marconiophone, Celestion, Baker's Selhurst, H.M.V., B.T.-H., R. & A., Epoch, Ormond, Lanhester, Igranie, Clarke's Atlas.

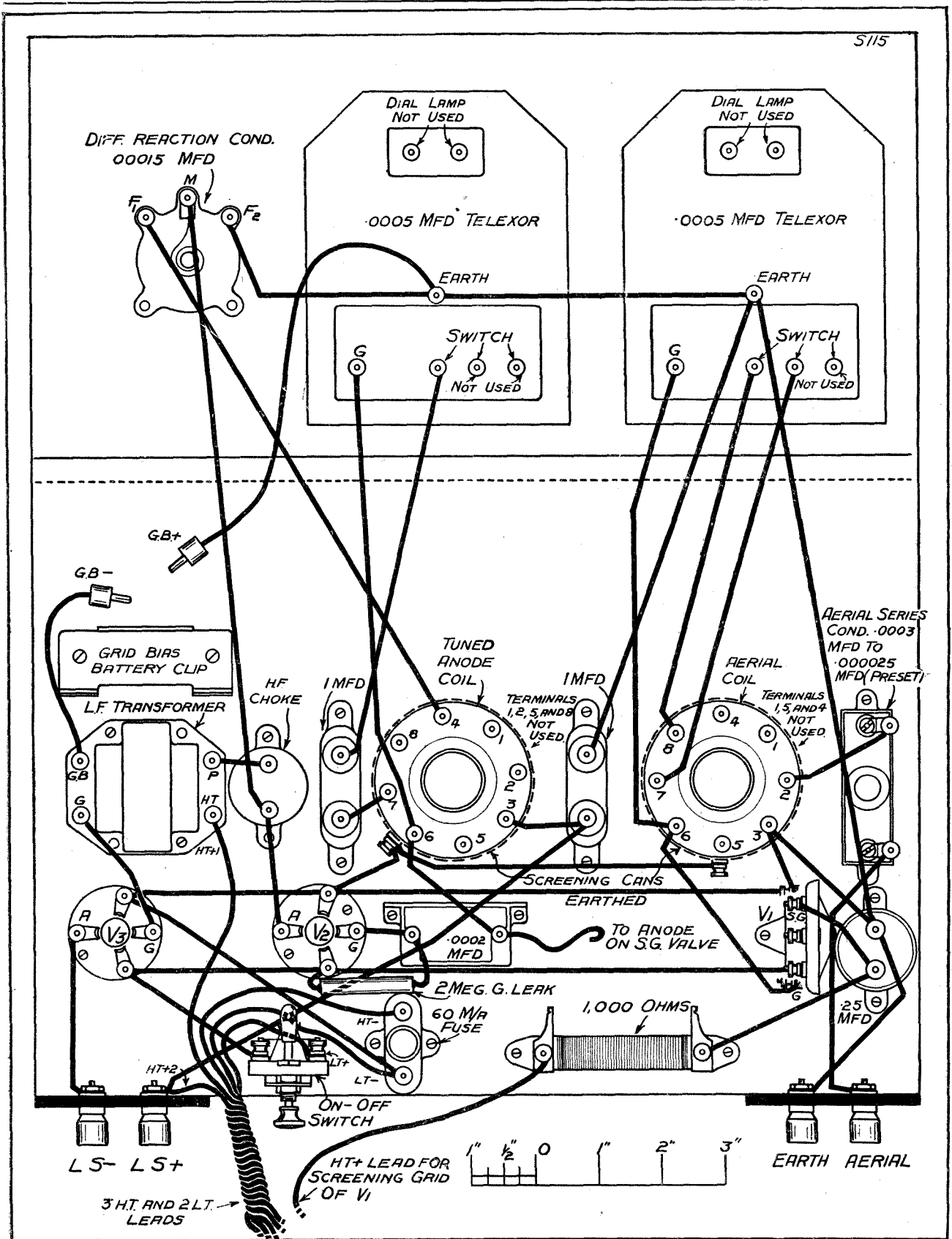
**Batteries.** L.T. accumulator: Ediswan, Oldham, Pertrix, G.E.C., Exide, Lissen.

H.T. Battery: This should be of ample size to deal with the requirements of the valves chosen (Lissen, Magnet, Pertrix, Ediswan, Marconiophone, Ever Ready).

**Mains Unit.** This should have three plus tappings with output to suit valves chosen (Hayberd, Ferranti, Atlas, Regentone, Ekco, Tunewell, R.I.).

**Recommended Aerial and Earthing Equipment.** Electron "Superial," Graham Farish "Filt" earthing device.

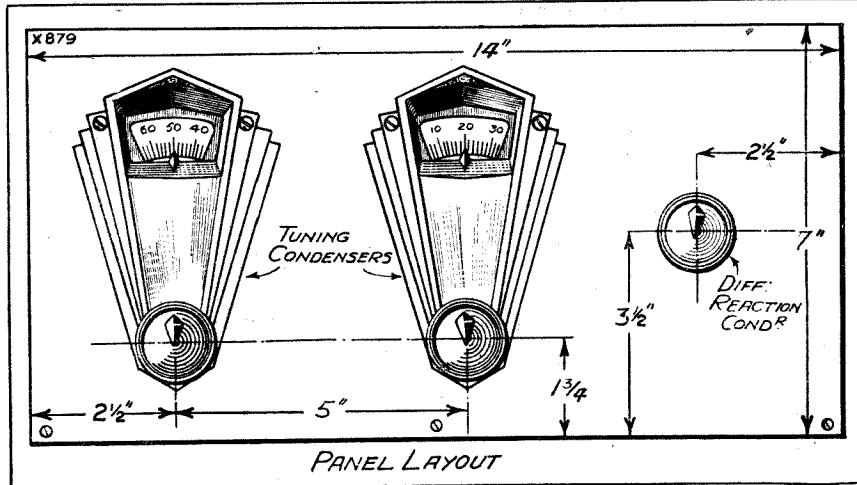
# The "Straight-Tune" Three—continued



WIRE IT UP THIS EVENING—LISTEN IN TO-NIGHT

# The "Straight-Tune" Three—continued

## THERE ARE THREE VALVES AND THREE CONTROLS



With the three knobs on the panel you have perfect control of all the stations as they come tumbling in one after the other. Simplicity of operation is one great feature of this receiver.

coils, are screened, thereby still further assisting in the construction of the set.

In the "Straight-Tune" Three the plain tuned-anode circuit is used without any H.F. choke shunting arrangements. It is, furthermore, devised so that the moving vanes of the Extenser are at earth potential, and the screen covering the Extenser is at the same potential.

To do this is quite simple, for it means only the use of a couple of large fixed condenser with a value of 1 mfd. each. One of these is placed in series with the tuned-anode coil and earth, and the other is used to block the switch path between the tuned-anode Extenser and the switch point on the anode coil (No. 7 terminal).

### Features of Design

But let us go through the various features of the circuit systematically, starting with the aerial input. This is carried out through a pre-set condenser with a maximum capacity of .0003 mfd. This allows a valuable control of selectivity.

A coil with separate aerial windings is used for the input tuning inductance, which is of the screened type. This is tuned by an Extenser of the screened variety which carries out the wave-changing automatically, as already indicated.

Following this tuned circuit, which has adjustable selectivity by taps as well as the series aerial condenser, is the screened-grid valve, with

another of the screened coils in its anode circuit.

In the tuned-anode circuit the full inductance of the secondary of the coil is used, the primary winding being unemployd. In this way the greatest possible amplification is obtained from the screened-grid valve, making the set particularly sensitive.

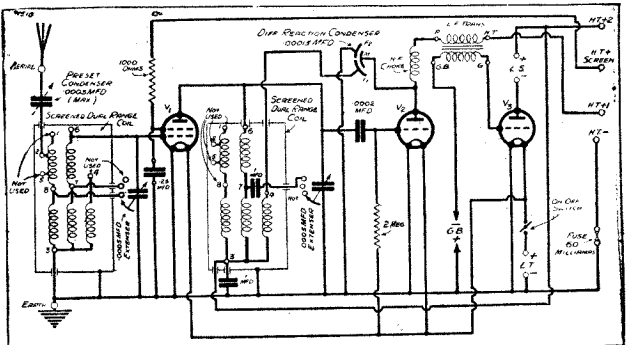
### Fullest Amplification

This sensitivity can be controlled by means of the input variations allowed by the series aerial condenser and the taps on the first coil, so that if the set owner lives some way from the "local" station, and there is no need to have very sharp tuning, he can arrange matters so that he gets the fullest amplification from the S.G. valve.

## WELL-CHOSEN COMPONENTS MEAN BETTER PERFORMANCE

- 1 Wood panel, 14 in. × 7 in.
- 1 Wood baseboard, 14 in. × 10 in.
- 2 .0005-mfd. Telexors (Telsen).
- 1 .00015-mfd. differential reaction condenser (Ready Radio, Lotus, J.B., Telsen, Peto-Scott, Graham Farish, Ormond, Cyldon, Polar).
- 2 Shielded dual-range coils (Sovereign).
- 1 Horizontal valve holder (Lissen L.N.739, W.B.).
- 2 4-pin valve holders (Lissen, Igranic, W.B., Bulgin, Telsen, Benjamin, Ready Radio, Lotus).
- 1 L.F. transformer, 1-3½ ratio (Lotus type No. 1, Atlas, Bulgin, Multitone, Lissen, Slektun, Ferranti, Graham Farish, Tunewell, Telsen, Lewcos).
- 1 H.F. choke (Ready Radio, Lewcos, Slektun, Peto-Scott, Telsen, Sovereign, Wearite, Tunewell, Goltone, R.I., Graham Farish, Lotus, Varley).
- 2 1-mfd. fixed condensers (Dubilier type B.B., Ferranti, Telsen, Igranic, Formo, Peto-Scott).
- 1 .25-mfd. fixed condenser (Dubilier type 9200, or see above).
- 1 .0002-mfd. fixed condenser (Graham Farish, or see above).
- 1 .0003-mfd. max. pre-set condenser (Goltone type J., Polar, Formo, Sovereign, Telsen).
- 1 2-meg. grid leak with wire ends or terminals, (Lissen, Dubilier, Ready Radio, Igranic, Graham Farish Ohmite, Goltone).
- 1 Push-pull on-off switch (Ready Radio, Telsen, Lissen, W.B., Tunewell, Goltone, Bulgin, Keystone, Ormond).
- 1 1,000-ohm resistance (Colvern Strip, Graham Farish, Dubilier).
- 1 Small right-angle bracket for on-off switch (Wearite).
- 1 Grid-bias battery clip (Bulgin).
- 1 Fuse holder (Bulgin F.5).
- 4 Terminals (Belling & Lee, Clix, Igranic, Eelex, Bulgin).
- 2 Terminal strips, 2½ in. × 1½ in.

## A WELL-TRIED CIRCUIT IN NEW GUISE



Tuned-anode coupling, Extenser tuning, transformer output stage, safety fuse—these are points to note in this theoretical circuit diagram.

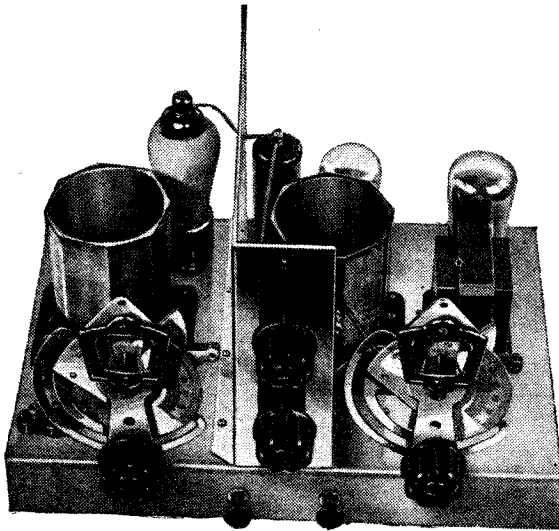
- 1 60-milliamp. fuse (Belling & Lee Serufuse).
- 5 Wander plugs: H.T.—, H.T.+1, H.T.+2, Screen, G.B.—, and G.B.— (Belling & Lee, Clix, Eelex, Igranic, Goltone).
- 2 Accumulator connectors (Belling & Lee).
- 6 Yards flex for battery cord.
- 5 Yards 18 S.W.G. tinned copper wire and 4 yards of Systoflex (Goltone).



# TWO FAMOUS SETS

## DESIGN BASED ON Mr SCOTT-TAGGART'S FAMOUS "S.T.300"

Build the "Meteor S.G.3"—the only set which combines all the features which made Mr. John Scott-Taggart's "S.T.300" famous, plus the added fascination of ultra-short-wave reception from all parts of the world.



### METEOR S.G.3

**MODEL A.** Complete Kit with set of three Mullard Valves and beautiful Walnut Cabinet fitted with Permanent Magnet Moving-Coil Speaker.

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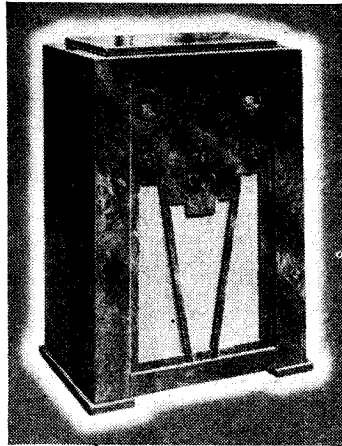
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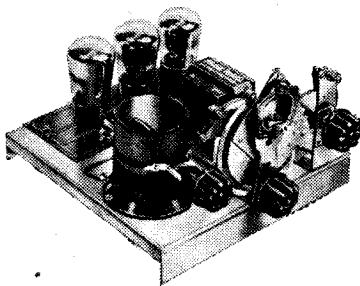


Super screened-grid selectivity; huge volume; moving-coil reproduction; very easy to build; a minimum of thirty stations guaranteed.

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### THREE-O-THREE

Built in twenty minutes. The most efficient type of Detector—2 L.F. Set. Remarkably selective and sensitive; moving-coil reproduction.

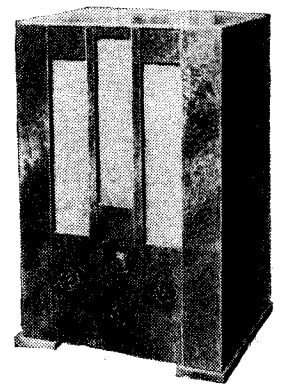
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No other condensers create the same feeling of confidence among set designers and constructors as Dubilier. The exhaustive tests to which they are subjected before dispatch accounts for their absolute dependability. Follow the choice of Mr. Scott-Taggart, he KNOWS, and incorporate Dubilier Condensers in the S.T. 400 you build.

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**TYPE 670**

Capacity  $006 \mu\text{F}$  -  $1/6$

(Tested 500 volts A.C., suitable for 250 volts D.C. Working.)

**TYPE 9200**

$1.0 \mu\text{F}$  -  $2/9$

Tested 500 volts D.C., suitable for 250 volts D.C. peak working.  
Size  $2\frac{1}{2}$ " high,  $1\frac{1}{2}$ " diameter.



X11

**DUBILIER CONDENSER CO. (1925) LIMITED**  
**DUCON WORKS, VICTORIA ROAD, NORTH ACTON, W.3.**

## The "Straight-Tune" Three—continued

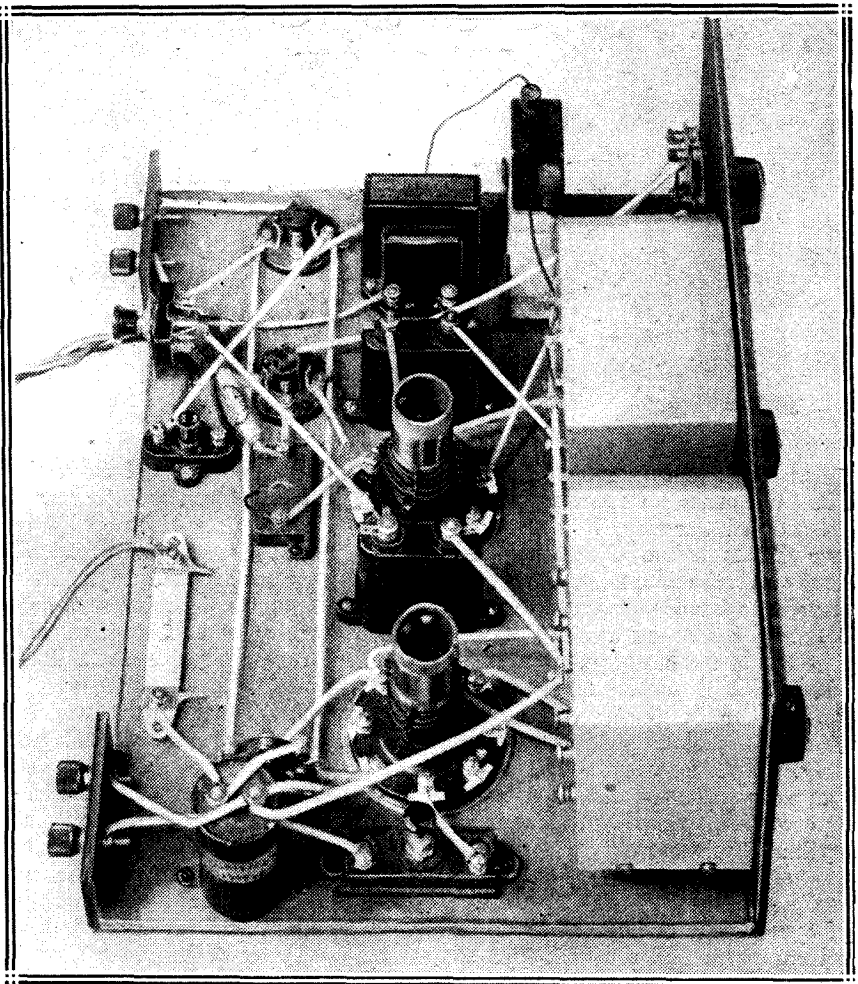
When the set is near to a station, and greater selectivity is required, the aerial series condenser is reduced in capacity, and this reduces the input to the S.G. valve. The result is that stations are more easily separated, and any decrease in sensitivity is made up on the reaction control.

From the anode coil we go to the detector, but first let us see how the Telexor (the commercial name for these screened Extensers) is arranged so that the moving vanes are at earth potential. The usual bottom of the coil (No. 3) has to be taken to H.T. as in the plain tuned-anode circuit, but in order to get the moving vanes at the L.T. potential, a series condenser of 1 mfd. is inserted between the terminal No. 3 and the Telexor, which goes to the L.T. circuit.

### Differential Reaction

There is the other precaution that has to be taken concerning the Telexor and the earth circuit in this set, and that is the switch connection between terminal No. 7 and the switch contact on the Telexor. In series with this connection we place another 1-mfd. condenser, to stop a further short circuit of the H.T. through the coil and the switch contact, which is internally connected in the Telexor to the moving vanes.

Reaction is carried out in the usual way by a differential condenser, while the coupling between the



### IT CHANGES ITS OWN WAVEBAND !

*The two Telexors on the right of this photograph provide the means by which this receiver changes automatically from the medium to the long waves by the mere action of turning the tuning controls! Note also the extreme clarity and simplicity of the wiring.*

#### OPERATING PANEL, "THE WIRELESS CONSTRUCTOR" "STRAIGHT-TUNE" THREE.

Circuit: Screened-grid, detector and transformer-coupled L.F. Automatic wave-changing.

#### VALVES.

- 1 Screened-grid (preferably metallised).
- 1 H.L. type (middle valve holder).
- 1 Output valve, small type for battery H.T., or larger if mains unit is used.

#### VOLTAGES.

- L.T., 2 volts for 2-volt valves.
- H.T. + 1, 60 to 80 volts.
- H.T. + 2, full voltage up to 150.
- "Screen," 75 to 80 volts.
- G.B. voltage depends on output valve used and the maximum H.T.

#### CONTROLS.

The two tuning knobs control the wavelength. The dial readings go from 0 to 200. While the readings are below 100 the set is being operated on the medium waveband, when the readings are above 100 the set is on the long waves.

The right-hand control is reaction, being turned to the right to increase. The on-off switch is at the back of the set.

#### ADJUSTMENTS.

These consist of the series aerial condenser (pre-set type) and the tap on the aerial coil. Both are for selectivity, and it is best to use the No. 2 tap on the coil (for aerial lead from the pre-set condenser) and adjust by varying the condenser, screwing the knob anti-clockwise to increase selectivity. The other tap on the coil, No. 5 terminal, is to be used only if the case is extreme, and the utmost selectivity is required. In this case the aerial condenser is used as before.

detector and the low-frequency valve is carried out by a transformer.

These are the main features of the set, which you will see is particularly simple in conception. The construction, too, is easy, as will be seen from the wiring diagram and the photographs.

The panel diagram gives the positions for the reaction condenser mounting and the holes for the Telexor escutcheons, and if it is followed carefully it is impossible to go wrong. There are only

the tuning and reaction controls on the panel; the on-off switch is fixed on a bracket at the back of the set, in a position that is convenient, but which does not spoil the look of the receiver.

When the panel parts have been fixed, it is advisable to mount the panel on the baseboard before undertaking the layout of the rest of the components. These are situated as shown on the wiring diagram, and they will be found to be very systematically placed.

### To Obtain Short Leads

The valves are in line, with the screened-grid valve lying horizontally at one end. This method of placing the screened-grid valve is in order to obtain short leads from both the

*(Please turn to page 252)*

# WITH PICK-UP AND SPEAKER

by  
A.  
JOHNSON-  
RANDALL

**A**LTHOUGH this number of THE WIRELESS CONSTRUCTOR is dated January, it will be in your hands before Christmas—and Christmas is the time for stunts. So I am going to devote my page this month to telling you about a stunt that is quite out of the ordinary.

It is not necessary for it to be Christmas, as a matter of fact, for the idea is just as good at any old party. And, anyway, quite apart from parties, it makes a most interesting experiment that is "as simple as anything" to carry out.

## An Output Filter

Beyond your radiogram amplifier and equipment, all that you want is a pair of ordinary high-resistance wireless telephones.

First of all, disconnect the leads that go to the loudspeaker terminals of the set. If your loudspeaker employs an output transformer, disconnect it at the primary.

Then connect up the telephones to the loudspeaker terminals instead. It is preferable that an output filter should be in use or be connected up with the telephones, because the heavy current from a large power valve might spoil the telephones or might prevent them working if they were of the non-adjustable type.

## Noise of Gaslight

Next you connect the two leads that were wired to the loudspeaker to the pick-up input, disconnecting the pick-up entirely.

What you now have is an amazingly sensitive "detectaphone." When you listen in the telephones you will be surprised how loudly the quietest whisper or noise in the vicinity of the loudspeaker is heard.

On a set using two valves in the amplifier I have been able to hear a paper-clip, or screwed-up piece of paper, fall on the floor at the side of the room opposite to the speaker. Also the noise of an incandescent gas-light, four or five feet from the speaker, came through as a loud rushing noise.

I have even heard a fly passing the speaker as a distinct buzzing, not unlike an aeroplane! You will immediately appreciate the possibilities of the idea when I mention that the scheme is to have the speaker arranged in one room and the set and 'phones in another, ordinary speaker extension leads being used.

All sorts of "thought-reading" schemes can be devised, such as telling which object the assembled

company has picked while you are out of the room, or you can even repeat a whole phrase that has been chosen. If you like you can have an accomplice in the room to ensure that the necessary information is repeated clearly.

The speaker can be used for ordinary reception or records with the set in another room, and then the connections changed over just prior to the "stunting."

You can go so far as to hide the speaker behind a curtain or other obscuring object. A few experiments beforehand will soon show the best position for it.

## Most Convincing

With a little showmanship you can produce the most puzzling effects. You can state that So-and-so is the person whose thoughts you are reading, and knowing the secret you can make a number of guesses or statements that gradually lead up to the correct thing in a most convincing manner.

When someone begins to think some sort of signs pass between you, you can come into the room blindfolded

## Final Triumph

They can even blindfold you before you go out of the room, so long as the 'phones are conveniently arranged in the next room! (The set need not be in the same room as the 'phones, for you can have leads to them as well as to the speaker.)

Your final triumph will come when you dispense altogether with your accomplice, whose thoughts you are "reading," and he goes out of the room with you, and does not come in again.

## "DETECTING PIRATES"



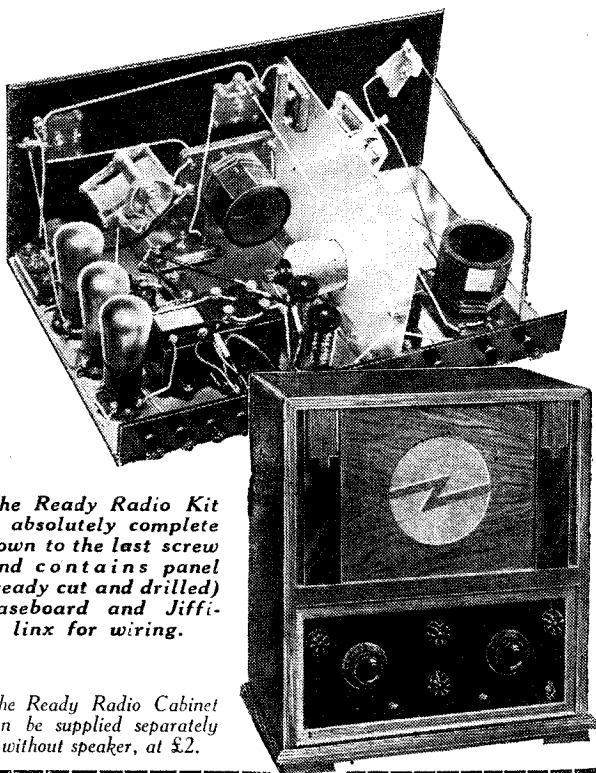
One of the G.P.O. detector vans—quite another kind of "detectaphone" is described on this page. But you can get "a whole heap" of fun from it.

# INSIST ON THE APPROVED READY RADIO S.T.400

Build your S.T.400 with the authorised Ready Radio Kit approved by Mr. John Scott-Taggart, A.M.I.E.E., F.Inst.P., who writes:—

“With reference to my S.T.400 Receiver, described in the current issue of ‘The Wireless Constructor,’ I have received for test from Messrs. Ready Radio Ltd. a kit of parts in accordance with the circuit. This kit has been tested and has proved entirely satisfactory.”

*Ready Radio S.T.400 Kits are packed in special dustproof covered cartons. Unless your kit is packed in this special carton it is not a genuine Ready Radio S.T.400 Kit.*



*The Ready Radio Kit is absolutely complete down to the last screw and contains panel (ready cut and drilled) baseboard and Jiffilix for wiring.*

*The Ready Radio Cabinet can be supplied separately without speaker, at £2.*

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Or by Easy Payments—deposit of 9/6 and 11 monthly payments of 9/9

**MODEL A**

Complete Kit as above, with four specified valves and handsome walnut cabinet fitted with Permanent Magnet Moving-Coil Speaker.

**£10 . 10 . 0**

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**FREE WITH EVERY KIT.** Full-size blueprint and full-size photoplan with Easy build wiring chart and copy of “Wireless Constructor” containing full instructions. **EVERY COMPONENT EXACTLY FITS THE BLUEPRINT.**

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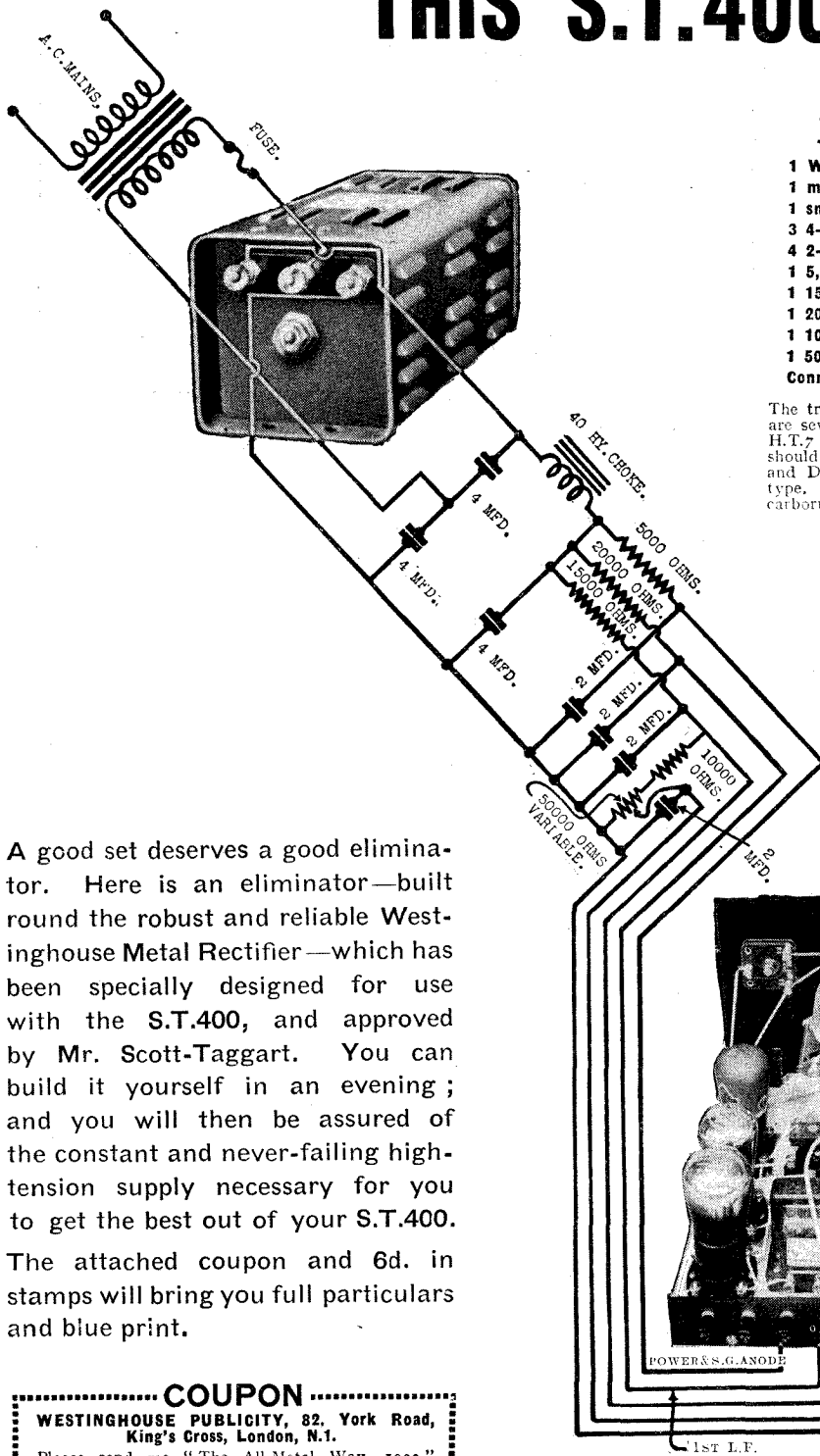
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S.T.400 REBUILDERS' KIT  
for all S.T.300 owners.**

**35/-**

Everything necessary to convert your S.T.300 to the correct S.T.400 with instructions and blueprint.

# BUILD

# THIS S.T.400 ELIMINATOR

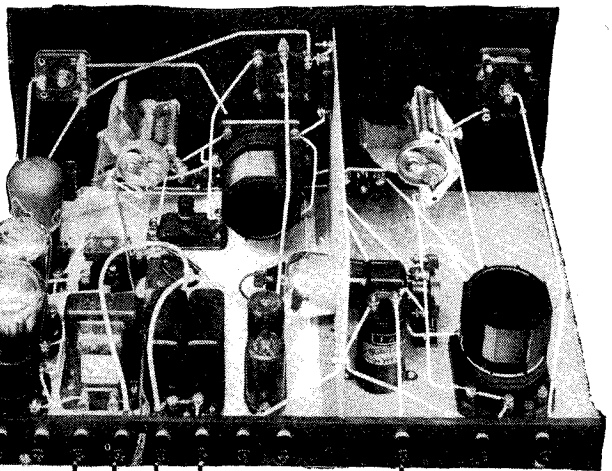


## COMPONENTS REQUIRED

- 1 WESTINGHOUSE METAL RECTIFIER STYLE H.T.7.
- 1 mains transformer.
- 1 smoothing choke (40 henry, 1,000-ohm resistance type).
- 3 4-mfd. condensers.
- 4 2-mfd. condensers.
- 1 5,000-ohm resistance.
- 1 15,000-ohm resistance.
- 1 20,000-ohm resistance.
- 1 10,000-ohm resistance.
- 1 50,000-ohm potentiometer.
- Connecting wire, fuse, etc.

The transformer must have an output of 135 volts, and there are several on the market designed specially for use with the H.T.7 Westinghouse Metal Rectifier. The Reservoir Condensers should be of the 200 D.C. Working Voltage type and the Filter and Decoupling Condensers of the 400 D.C. Working Voltage type. Resistances can be of the metallised 1-watt type, carborundum or spaghetti.

A good set deserves a good eliminator. Here is an eliminator—built round the robust and reliable Westinghouse Metal Rectifier—which has been specially designed for use with the S.T.400, and approved by Mr. Scott-Taggart. You can build it yourself in an evening; and you will then be assured of the constant and never-failing high-tension supply necessary for you to get the best out of your S.T.400. The attached coupon and 6d. in stamps will bring you full particulars and blue print.



### COUPON

WESTINGHOUSE PUBLICITY, 82, York Road, King's Cross, London, N.1.

Please send me "The All-Metal Way, 1933," containing full particulars of Westinghouse Metal Rectifiers, and telling me how to build an A.C. Eliminator, together with blue print of special unit for use with the S.T.400. I enclose 6d. in stamps.

Name .....

Address .....

W.C. 1.33.

THE WESTINGHOUSE BRAKE & SAXBY SIGNAL CO. LTD.,  
82, YORK ROAD, KING'S CROSS, LONDON, N.1.



# From My Armchair

by  
"S.T."

**H**ERE I am, once again in my armchair—and don't I relish it!

I see that the red corpuscles in the blood of Mr. Winston Churchill fell from a normal 5,000,000 to 3,200,000 after his accident, but have now returned to normality.

I haven't counted mine recently, but I should imagine they number about 173,000! A few evenings in this armchair (a reader wants to know where he can buy one like it) should, however, restore the figure to 5,000,000.

## Quite Decent, Really

A reader in the Channel Isles offered me a fortnight's rest in Guernsey. Unfortunately, he later wrote an abusive letter to the Editor saying I hadn't the common decency to reply. The explanation is simple. My whole mail has been disorganised through this tour.

My attentions have been concentrated on one thing only—the "S.T.400," and every day has seen me on the move. I am really a reasonably decent sort, and greatly appreciate the friendly feelings between readers and myself. Hence, my desire to avoid misunderstandings.

By the time you read this I shall be full of vigour again—and ready to tackle anything, including Monday morning's little collection of rude letters. (Why are people bad-tempered on Sundays?)

## Not a Dithery Spinster

I have received a Sunday letter (whether genuine or not, I cannot say) from someone who styles herself or himself "Indignant Spinster."

Dear Sir,

I have read your article on the "S.T.400" and am astonished at your narrow-minded attitude towards elderly spinsters. On a previous occasion you have given vent to ill-conditioned spite towards a much-maligned but useful section of the community, and it is indeed time that someone told you—to use an American vulgarity—where you get off.

In a note to the Editor, "S.T." writes: "I have cut down my notes this month because of the armchairish article dealing with my aerial tour. Next month, however, readers will have to put up with the full amount of Armchair Notes."

You will only get the real benefit out of this regular feature if you read it regularly, as references are often made to earlier incidents. Pull up your chair every month and meet "S.T." in his carpet slippers!

This month you talk of sets "designed for the most dithery of spinsters," and state that you do not think a home constructor's set should be "designed down to the lowest intelligence and the most wavering hand." Let me tell you, young man, that one can be a spinster without being dithery. I myself am a spinster, but do not dither.

My brother is building your "S.T.400," and I intend to work every knob there is on it and shall

ask him to write you an account of my success.

Meanwhile, I trust you will make a public apology.

Yours faithfully,

"INDIGNANT SPINSTER."

P.S.—I may say I am an organist.

P.P.S.—Have you ever thought of the thousands of your sneered-at spinsters who play the organ? They would find working the "S.T.400" as easy as Paderewski's playing of a tin whistle.

Well, you have certainly handed me a mouthful—or whatever the current American vulgarity may be. All I can say is that I was referring not to spinsters in general, but only to dithering spinsters with wavering hands and low intelligence. I gladly accept your word that you do not come into this category.

Will all dithery spinsters who are reading this, please note that my sneers are directed exclusively to them.

## Carlos At It Again

I knew I'd hear again from good old Carlos of Portugal. This time he has sent me four postcards by one mail—in parallel, so to speak.

He, at length, "asserts the mystification" of his remarkable gift. After saying, "I have enjoyed yours original chats about the inexhausted inkstrain," he adds a sort of rapid tuning guide to the reliquium.

All my guesses were correct, but he says nothing about the inkstrain having once been the property of Catherine of Braganza, or used to sign

## "Desolate Visions About An Enchanted Country"

the treaty of alliance between England and Portugal.

He does, however, hand a few bouquets. "You have a genial and funny form of wits." Thank you, Carlos. I'm not really a humorist, nor do I pretend to be one. I just ramble on in these pages devoted to my leisure moments.

### A Modest Reader

It is extremely unlikely that my "funny form of wits" should appeal to all. In fact, Percy V. Redcliffe, of Shoreham, writes: "I feel bored stiff when I read your armchair notes. All the people who write to you are half-wits." You are too modest, Mr. Redcliffe.

But to return to Carlos. He defends Setubal, his home-town, with which I expressed disappointment.

He says: "I am sorry you had desolate visions about an enchanted country surrounding a small nestling entangled on the Atlantic-embroiled coast." He adds: "We generally have permanent here the English summer."

That, of course, has torn it. Readers who booked their passages on the strength of the published postcard will cancel them, I am afraid.

Carlos may bring ruin to his town when the news gets round. Tourist traffic will cease. Just think!—an English summer all the year round!

He goes on: "You can assert Setubal more acutely in the four postcards I ask to forward enabling you to calibrate perhaps better sensitive sympathies for where I am risking the life."

### Like the Real Thing

I have asserted the four cards very acutely and have calibrated (a) what looks like a very fine public house, (b) a donkey drawing a cart of bananas, (c) what looks like the remains of the French fleet after Trafalgar, and (d) a really fine portrait of a nestling genuinely embroiled in a piece of Atlantic-entangled coast.

The latter tempts me enormously. I have got embroiled in many an Atlantic nestling, but this looks like the real thing! But, alas! Setubal is too far. I shall have to go some "helst."

Readers are amazingly kind people, really. Yes, you who are reading this probably have your tender

moments. But some of you get the most amazing sixpennyworth of radio literature, and then write as follows:

"May one congratulate you on the *nerve* you must possess as shown by the blarney in the current issue of the CONSTRUCTOR (he refers to the last issue but one). After having successfully shown up no fewer than eight 'S.T.300's,' I am now waiting to do likewise with the '400' when published."

This cheery ghoul calls himself "Ami du Cœur" and skulks in a place called Church, Lancs. I have never been to Church, but I feel it is

aroma, 15 per cent. fish aroma, and the rest the usual oxygen and nitrogen.

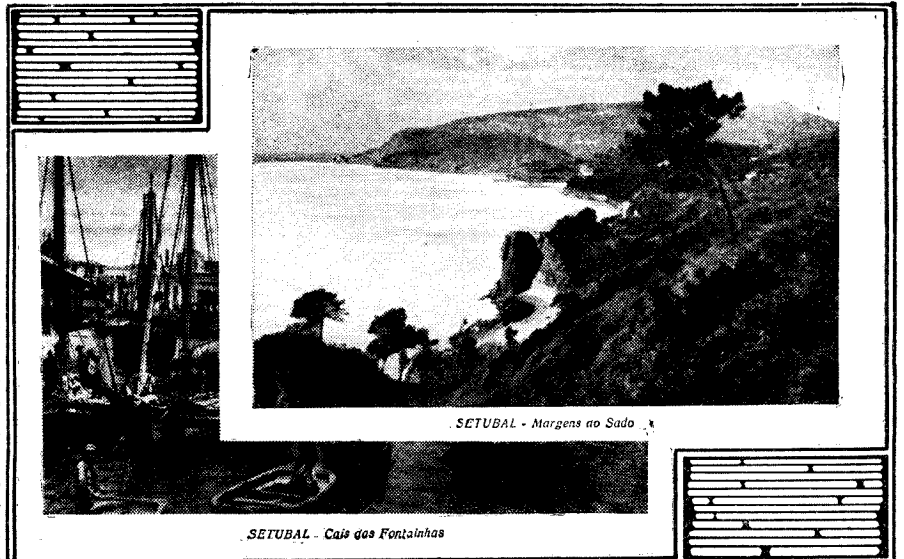
My correspondent adds: "I saw your machine twice on your aerial tour. Once at twelve o'clock on a Saturday at the beginning of August, flying over St. Helens. Then a week later. It was a beautiful, clear, sunny day; visibility perfect."

Well, I "give in." I withdraw all accusations against St. Helens. I have not a leg to stand on. Visibility must, indeed, have been perfect in St. Helens. Because on that day I was at Land's End.

\* \* \*

Well, I've been to Newcastle, 23

## "AN ATLANTIC-EMBROILED NESTLING"



Above is the description of the haunt of the wild inkstrain, as given by Carlos X of Portugal. Setubal would be a nice place for a holiday, only Carlos says: "We generally have permanent here the English summer." Too bad!

probably a suburb of Chorlton-cum-Hardy.

If living in Church makes one like that, give me St. Helens every time.

A reader, J. V., from the latter town, by the way, is indignant. He says:

"What a bloomer you made! The chemical works removed from the town years ago; the air is as pure and the sunshine as brilliant as it is on the banks of the Serpentine or the Welsh Harp."

### "Visibility Perfect"

Well, whenever I get off wireless technicalities I am invariably wrong. But chemical works or no chemical works, the air of St. Helens is 70 per cent. chlorine, 10 per cent. chips

you saw by the photograph of me at Cramlington aerodrome. Nice place. The wireless shops have notices:

### WIRELESS—TELEVISION.

I nearly went in to have a peep at the B.B.C. linoleum. Instead, I had my fortune told by a "television" machine. Next month, you will hear exactly what sort of a person I am.

\* \* \*

But I see I haven't given you Carlos' final message. After stretching out his hands to all readers he turns to me and concludes:

"I must bring you my humiliated thanks, as I wish to make great the flow of sympathetics on your already notorious reputation."

Thanks, Carlos, thanks!



# DIFFERENTIAL ANODE COUPLING

## -ITS SECRETS EXPLAINED



BY JOHN SCOTT-TAGGART A.M.I.E.E., F.INST.P.

IN setting out to design the "S.T.300," I desired to escape from the convention of obtaining selectivity control *solely* on the aerial circuit. I felt this latter to be a wrong and half-hearted policy.

There are two stages in inventing: the first is to be able to realise what is wrong with present systems, and the next is to find a better solution. The first attitude of mind is destructive; the second is constructive.

It may interest readers—who themselves may invent—to examine for a moment how one goes about developing a new circuit. One sets off with the idea—at least this is my attitude—that insufficient selectivity and sensitivity are obtained with ordinary arrangements.

### Examining Faults

It is no good being self-satisfied. Although an inventor who has to write an account of his work for a magazine such as this must necessarily talk about himself, yet there is no such thing as a self-complacent inventor. The whole driving force within him is a violent dissatisfaction with his own and other people's methods.

He must be scrupulously honest in examining the faults of his ideas and rigorously critical of those of his fellow workers.

### Facing the Problem

Having settled in my own mind that nearly all sets were insufficiently selective, the next step was to find out *why*. Excessive "damping" of the tuning circuits was the bugbear. How to reduce it without unduly sacrificing signal strength was the problem.

*"Having settled in my own mind that nearly all sets were insufficiently selective, the next step was to find out WHY. Excessive 'damping' of the tuning circuits was the bugbear. How to reduce it without unduly sacrificing signal strength was the problem."*

*Read below how it has been solved.*

The exceptionally small aerial coupler (·00004 mfd.) and the differential anode coupler were the two developments which have given the "S.T.300" its great selectivity, and both schemes are the subjects of patents either granted or provisional.

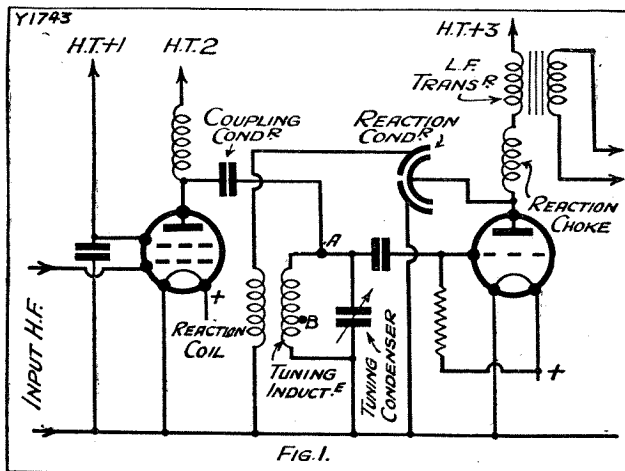
several whales of a difference as regards the signal strength and selectivity on different stations or in different localities.

### A Popular Number

Of the two features—small aerial coupler and differential anode coupler—the latter has, perhaps justifiably, captured the public imagination the most. It differs, as its name rather implies, in two ways from the condenser which feeds the tuned circuit (consisting of coil and ·0005-mfd. condenser) between H.F. amplifying valve and detector. The ordinary arrangement (shown in my first

### NO VARIABLE ANODE SELECTIVITY

*This shows part of a parallel-fed H.F. amplifier followed by a detector giving reaction. With this—the normal arrangement—the selectivity of the intervalve tuned circuit is not properly controllable.*



I may interpose here a mention of a "design" feature as distinguished from an "invention." I could have put both aerial and anode couplers *inside* the set; made them, for example, pre-set, i.e. only to be adjusted on rare occasions. Putting them on the panel is essentially a *design* feature, and yet it makes

(figure) consists of a fixed condenser, usually of ·0003 mfd. capacity.

The number 3 seems to have a special lure for radio people, usually with little technical justification for its popularity.

My differential anode coupling system is illustrated in use in Fig. 2. The anode of the S.G. valve is

# S.T. 400 →



**DONALD P. MARCUS, Managing Director, Direct Radio Ltd.**  
*"I want every British home to own a Direct Radio 'S.T. 400' Kit of approved, re-tested, and guaranteed components. The 'S.T. 400' is the only receiver which definitely copes with modern radio conditions. I know, because I have one myself."*

## WHAT MY TOUR OF THE COUNTRY REVEALED!

By **DONALD P. MARCUS**

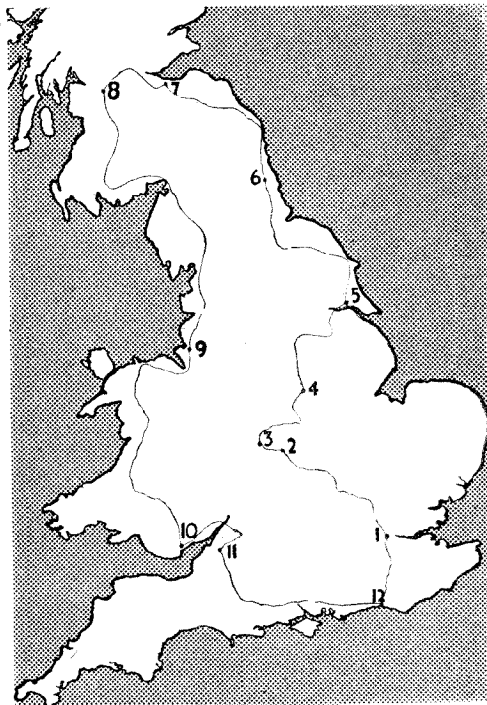
**THIS IS WHAT I WAS TOLD EVERYWHERE.**

**Practically no complete Scott-Taggart Kits in stock. Substitute kits available. Usual tale—deliveries Scott-Taggart specified and approved "S.T. 400" kits expected any time, but substitute kits available now.**

"Since the 'S.T. 400' was introduced to over 5,000,000 British Listeners by Mr. John Scott-Taggart, I have toured the Country so that I could convince people that the 'S.T. 400' really is a wonderful set, and also to obtain an accurate estimate at first hand to what extent approved kits were on the dealers' shelves. The accompanying map indicates my route, and indicates the position of 'S.T. 400' stocks. My tour has proved one thing conclusively—that if you want immediately of a guaranteed and specified 'S.T. 400' Kit, you must **buy it direct**. I would draw your attention to Mr. Scott-Taggart's warning on Page 127 of the December issue of 'Wireless Constructor.'"

*"Let me warn you that the great demand for 'S.T. 400' parts will give a glorious opportunity for unscrupulous dealers to fob off on you components 'just as good,' possibly on the grounds of being 'unable to get the recommended ones.' Well, I've warned you! Try somewhere else,"*

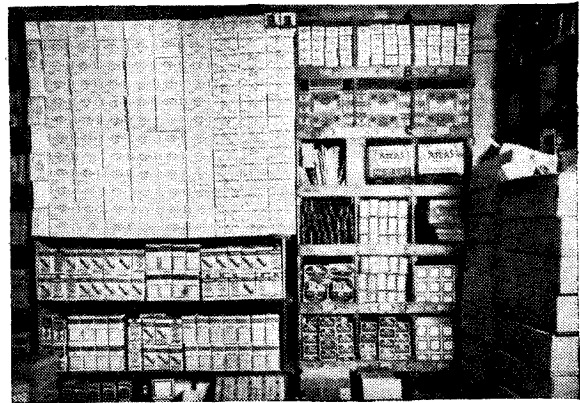
Take Mr. Scott-Taggart's advice and "try somewhere else" where you can get immediately a guaranteed Kit—Send to "Direct Radio," London Bridge.



*Direct Radio had the utmost confidence in Mr. Scott-Taggart's "S.T. 400" and foresaw the huge demand. There is absolutely no need for you to be put off with a substitute kit with unconvincing excuses or annoying delays.*

*Fill in the coupon now—order "Direct" and enjoy real radio with the "S.T. 400" whilst others are waiting.*

*Every "S.T. 400" Kit sold by Direct Radio is unconditionally guaranteed. Insist on having approved components in perfect condition and insist upon having them at once.*



### STOCKS! STOCKS! STOCKS!

*"My 'S.T. 400' arrived safely yesterday. I did not expect such early delivery. I am delighted with the results."—A. K., Birmingham.*  
*"Please accept my thanks for your prompt attention to my order. Everything arrived in perfect condition."—M. P., Edinburgh.*  
*"May I warmly compliment you on your originality in introducing the De Luxe Kit for the 'S.T. 400'! You have truly seen a demand by the wireless constructing Public for something better."—H. S., Carleton, near Blackpool.*  
*"I am very pleased indeed with the Kit, which arrived in perfect condition. Thanks to your wonderful packing."—M. W., Yorks.*  
*"What service! 2 days after order sent 'S.T. 400' De Luxe Kit received in perfect condition. Your assembling instructions were most helpful."—T. E., Brighton.*  
*(The original unsolicited testimonials may be inspected at our offices.)*

- |  |   |
|--|---|
| <p>1—<b>LONDON.</b> 50 calls. 7 held complete kits. 4 offered substitute kits. 39 had no stocks.</p> <p>2—<b>COVENTRY.</b> 21 calls. 3 held complete kits. 3 offered substitute kits. 15 had no stocks.</p> <p>3—<b>BIRMINGHAM.</b> 31 calls. 8 held complete kits. 3 offered substitute kits. 20 had no stocks.</p> <p>4—<b>NOTTINGHAM.</b> 10 calls. 1 held complete kits. 2 offered substitute kits. 7 had no stocks.</p> <p>5—<b>HULL.</b> 11 calls. 2 held complete kits. 2 offered substitute kits. 7 had no stocks.</p> <p>6—<b>NEWCASTLE.</b> 17 calls. 3 held complete kits. 4 offered substitute kits. 10 had no stocks.</p> | <p>7—<b>EDINBURGH.</b> 15 calls. 2 held complete kits. 3 offered substitute kits. 10 had no stocks.</p> <p>8—<b>GLASGOW.</b> 23 calls. 3 held complete kits. 4 offered substitute kits. 16 had no stocks.</p> <p>9—<b>LIVERPOOL.</b> 26 calls. 4 held complete kits. 6 offered substitute kits. 16 had no stocks.</p> <p>10—<b>CARDIFF.</b> 21 calls. 1 held complete kits. 3 offered substitute kits. 17 had no stocks.</p> <p>11—<b>BRISTOL.</b> 23 calls. 5 held complete kits. 2 offered substitute kits. 16 had no stocks.</p> <p>12—<b>BRIGHTON &amp; DISTRICT.</b> 10 calls. 1 held complete kits. 1 offered substitute kits. 8 had no stocks.</p> |
|--|---|

# Direct

**159 BORO HIGH ST**

# DIRECT RADIO HOLD STOCKS *for immediate delivery*

## "S.T.400" STANDARD MODEL

1 E.L. "Hypermite" L.F. transformer	£ 12 6
1 J.B. aerial coupler, -00004-mfd.	4 0
2 Colvern S.T.400 coils Ormond -0005-mfd. variable condensers, type R.493	15 0
1 Polar -0003-mfd. differential condenser	3 0
1 Leuco -00035 or Polar -0003-mfd. differential condenser	3 0
1 Ready Radio -0001-mfd. differential condenser	2 6
2 Telson -0003-mfd. pre-set condensers	3 0
3 Valve holders	1 6
1 W.B. Universal valve holder	1 0
2 Ready Radio 2-pt. switches	1 8
1 Telson binocular choke	5 0
1 Ready Radio Standard H.F. choke	1 6
1 T.C.C. -0003-mfd. fixed condenser, type "S"	1 3
1 T.C.C. -006-mfd. fixed condenser, type 670	2 0
1 Dubilier -006-mfd. fixed condenser, type 670	1 6
2 T.C.C. 2-mfd. fixed condensers, type 50	7 8
1 Dubilier -mfd. fixed condenser, type 9200	2 9
1 Dubilier 1-meg. grid leak with holder	1 4
1 Keramic 1,500-ohm spaghetti resistance	6
1 Leweos 50,000-ohm spaghetti resistance	1 6
1 Leweos 20,000-ohm spaghetti resistance	1 6
1 Leweos 60,000-ohm spaghetti resistance	1 6
1 Bulgin toggle switch, type S.80	1 6
11 Belling - Lee terminals: HT-, HT+1, HT+2, HT+3, HT+4, HT+, LT-, LS-, LS+, A., E., E.,	2 3
1 Screen and foil	3 0
1 Panel, drilled	4 6
1 Terminal strip, drilled	3 0
1 "Easy fix" baseboard	1 0
4 Valves to specification: Mullard PM12A or Cossor SG220; Mullard PM11H or Cossor 210 Det. Metal-Insul; Mullard PM2DX; Mullard PM2A	1 19 3
1 Special "159" cabinet	1 1 0
1 Calibrator, No charge	
	<b>£ 7 14 4</b>

### KIT Model 1

(less valves and cabinet) **£4:19:6**  
Or 12 equal monthly payments of **9s. 3d.**

### KIT Model 2

(with valves less cabinet) **£6:18:9**  
Or 12 equal monthly payments of **13s.**

### KIT Model 3

(with valves and cabinet) **£7:19:9**  
Or 12 equal monthly payments of **15s.**

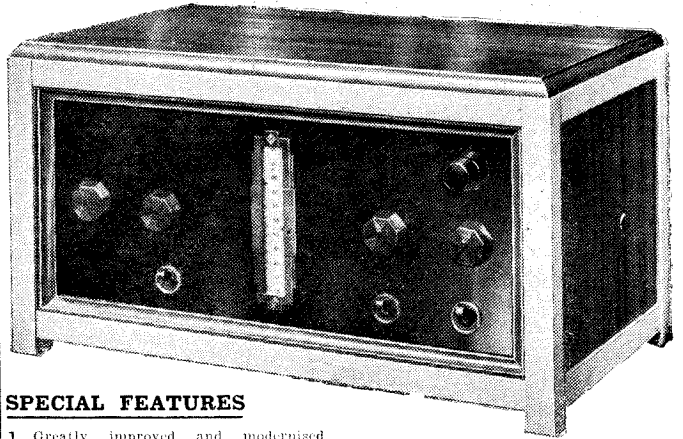
### S.T.400 ACCESSORIES

1 Siemens 120-volt H.T. battery	£ 13 6
1 Oldham 0-50 accumulator	1 0
1 Epoch Twentieth Century permanent magnet moving-coil speaker with input transformer	1 15 0
1 Blue Spot 44R magnetic type speaker in oak cabinet	2 12 6
1 Atlas A.C.244 mains unit	2 19 6
1 Atlas A.K.260 mains unit, with trickle charger	4 10 0
1 Atlas D.C. 15/25 for D.C. mains	1 19 6
1 Cop aerial lead-in and lightning arrester	2 6
1 Selectanet indoor aerial	2 6
1 Selectanet earth	1 6

**OFFICIAL DEMONSTRATION**  
*The "S.T. 400" will be demonstrated daily at 159, Borough High Street, London Bridge, S.E.1. Come and hear the amazing results for yourself.*

## "S.T.400" DE LUXE MODEL

Obtainable only from the official Distributors—**DIRECT RADIO, LONDON BRIDGE**



### SPECIAL FEATURES

1. Greatly improved and modernized panel layout.
2. Illuminated dials.
3. Side-by-side tuning dial indicators.
4. Slow-motion differential control.
5. Simplified tuning ensuring easy station searching and calibration.
6. Modern type walnut toggle switches throughout.
7. Modern design walnut cabinet with beautiful walnut grained chonite panel.
8. Super-power output giving maximum volume without distortion.
9. All components exhaustively tested and especially chosen to give record results.
10. NO complications in wiring involved.

### "S.T.400" DE LUXE SPECIFICATION

1 R.L. "Hypermite" transformer	£ 12 6	11 Belling & Lee walnut terminals	£ 2 3
1 J.B. -00004 aerial coupler	4 0	1 Screen and foil	3 0
2 Colvern S.T.400 coils	9 10	*1 Special walnut panel, drilled	5 0
*1 Simplicon slow-motion illuminated double full vision, scale type FVV	12 6	*1 Special walnut terminal strip, drilled	2 0
*2 Ormond No. 6 log condensers, -0005-mfd.	8 0	*1 Special "Easyfix" baseboard	9
1 Polar -0003-mfd. slow-motion differential condenser	6 6	*1 Ready Radio H.T. fuse and holder	1 0
1 Leuco -00035-mfd. differential condenser	3 0	*1 Dial light, low consumption type	6
1 Ready Radio -0001-mfd. differential condenser	2 6	2 Telson -0003-mfd. max. pre-set condensers	3 0
3 Valve holders	1 6	*1 Special S.T.400 De Luxe "159" walnut cabinet	1 5 0
1 S.T. type valve holder	1 0	4 Valves: PM12A, PM2DX, PM11H, PM202	2 2 0
*3 Becker walnut toggle type 2-pt. switches, No. 460	5 6	Flex. screws, battery plugs, etc.	2 0
1 Telson binocular S.T. choke	5 0	1 Calibrator station finder, No charge.	
1 Ready Radio Standard H.F. choke	1 6		
1 T.C.C. -0003-mfd. condenser, type "S"	1 3		
1 T.C.C. -006-mfd. condenser, type "S"	2 0		
1 Dubilier -006-mfd. condenser, type 670	1 6		
50 T.C.C. 2-mfd. condensers, type 50	7 8		
1 Dubilier 1-mfd. condenser, type 9200	2 9		
1 Dubilier 1-meg. grid leak and holder	1 6		
1 Leweos 1,500-ohm spaghetti resistance	1 0		
1 Leweos 50,000-ohm spaghetti resistance	1 6		
1 Leweos 20,000-ohm spaghetti resistance	1 6		
1 Leweos 60,000-ohm spaghetti resistance	1 6		

**£9 2 0**

\*Exclusive features which make your "S.T.400" De Luxe far superior to ordinary kits in appearance and performance.

### "S.T. 400" DE LUXE ACCESSORIES

Siemens 120-v. power H.T. Battery	£ 14 0
Oldham 0-75 accumulator	12 6
Epoch A2 dance orchestra permanent magnet moving-coil loud speaker with Multi-Ratio input transformer	3 3 0
Oldham 120-v. Wet H.T. accumulator, 5500 m/a hour capacity	4 1 0
Atlas A.C.300 super mains unit, giving H.T., L.F. and G.B.	10 0
Bowyer-Lowe A.L.D. Mark III. pick-up	1 10 0

## "S.T.400" DE LUXE KITS

<b>KIT No. 1</b> (less valves and cabinet) <b>£5:15:0</b> or 12 equal monthly payments of <b>10 9</b>	<b>KIT No. 2</b> (with valves, less cabinet) <b>£7:17:0</b> or 12 equal monthly payments of <b>14 6</b>	<b>KIT No. 3</b> (with valves and cabinet) <b>£9:2:0</b> or 12 equal monthly payments of <b>16 6</b>
<b>KIT No. 4</b> (with valves and special "159" S.T.400 De Luxe Console cabinet and Epoch A2 Dance Orchestra Speaker). <b>£12:15:0</b> or 12 equal monthly payments of <b>£1:4:0</b>		

# Radio

**LONDON BRIDGE S.E.1**

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

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

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

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

NAME.....

ADDRESS..... W. Cons. Jan. USE THIS COUPON FOR STANDARD OR DE LUXE KITS.

## Differential Anode Coupling—continued

connected to the moving vanes of the differential condenser, which is of .0001 mfd. capacity, i.e. the maximum capacity obtainable between the fixed and either set of moving vanes is .0001 mfd.

With the moving vanes X fully opposite the fixed vanes Y the arrangement is no different from Fig. 1, which represents the usual arrangement. With X opposite Z the H.F. currents go to earth and there is no coupling at all. As a matter of fact, on the "S.T.300" one can still hear signals—especially strong ones—with the anode coupler to the left, i.e. at zero. This is because even with X opposite Z there is still some capacity effect between X and Y, and no absolute zero is obtainable.

### Why Variable Selectivity?

Any intermediate position of X will give smoothly much the same effect as a very large number of tapings on the anode tuning inductance coil. Any combination of selectivity and signal strength is thus immediately obtainable.

The anode-to-filament path in the

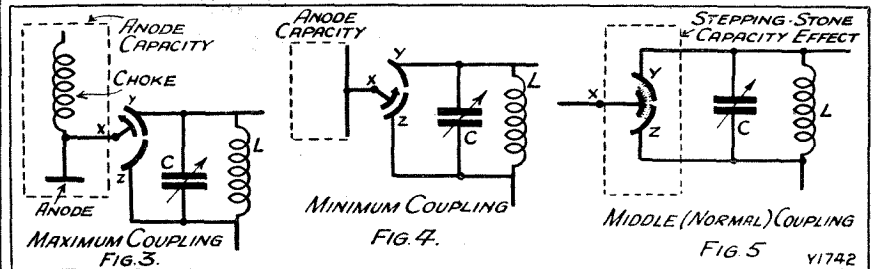
This is because a screen-grid valve needs a tuned output circuit of low H.F. resistance to give maximum signal strength.

Why should it be necessary to vary the selectivity of a set? Because

affairs. And so the anode coupler enables a nice balance to be obtained. But, remember, reaction must be used after reducing the anode coupling.

Two effects must here be noted.

### DIFFERENTIAL ANODE COUPLER POSITIONS



The above diagrams show the effect of anode damping and capacity at different adjustments of the differential condenser.

some districts need more. Those that need more must lose something in the number of stations they can get; this is common sense and common experience.

Experiments which resulted in the "S.T.400" have greatly minimised the trouble, but those living very close to a B.B.C. station will always have to pay

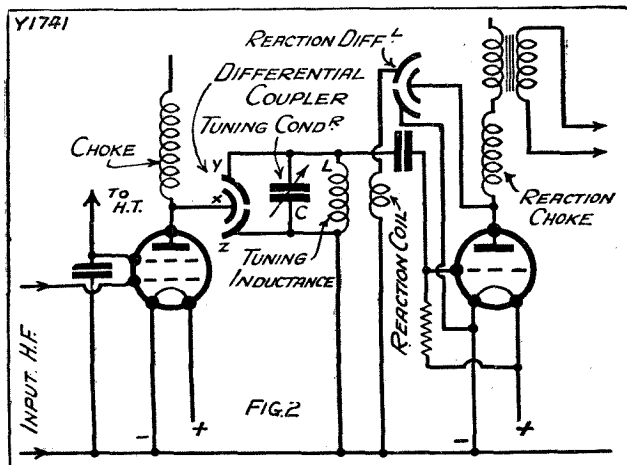
One is that altering the differential anode coupling means some readjustment of the anode tuning condenser (the right-hand one in the "S.T.300").

### An Explanation

My drawings, Fig. 3, Fig. 4 and Fig. 5, explain why this is necessary, and will interest the more experienced reader. With X opposite Y, as in Fig. 3, there is no extra capacity due to the coupler. Likewise, with X opposite Z (zero coupling, illustrated in Fig. 4) there is no extra capacity; in fact, you have even "disconnected" the extra capacity due to the anode of the valve and the things connected to it.

But in intermediate positions of the anode coupler there is what I

### THE "S.T." DIFFERENTIAL COUPLING



Here, in skeleton form, is shown the chief feature of the "S.T.300" set. Full-range selectivity is obtainable in the intermediate tuning circuit.

valve (and certain external apparatus) introduces a definite amount of "damping" or resistance into the anode oscillatory circuit. By lessening the capacity between X and Y, we leave the anode oscillatory circuit freer to oscillate and so get sharper tuning; it is like relieving a hiker of a heavy pack.

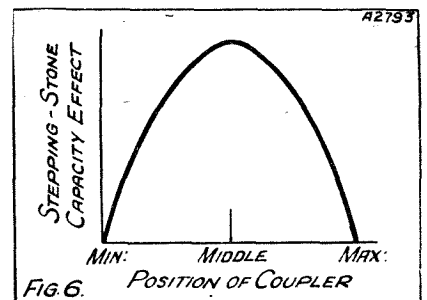
But bear this in mind: It is essential after reducing the differential coupling to bring up the reaction, otherwise signals will go weak.

substantially in money and complication if they demand an equal number of stations as constructors living farther away.

### A Nice Balance

The differential anode coupler enables the set to be adjusted to the district, and even to suit the amount of jamming any particular foreign station may be experiencing. But "selectivity up, signal strength down" has been the universal condition of

### EXTRA-CAPACITY CURVE

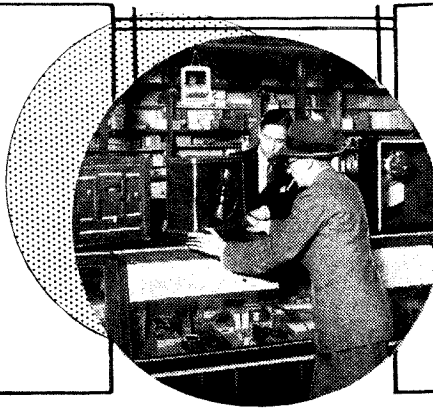


In practice the effect of the "stepping-stone" capacity is that if you move the anode coupler to either side of the middle position you will need to go up on the right-hand condenser a little.

am going to call a "stepping-stone" capacity. It consists of two condensers in series; one is formed by part of X being opposite Y, and the other results from part of X being opposite

(Please turn to page 255.)

# AS WE FIND THEM



# NEW APPARATUS TESTED

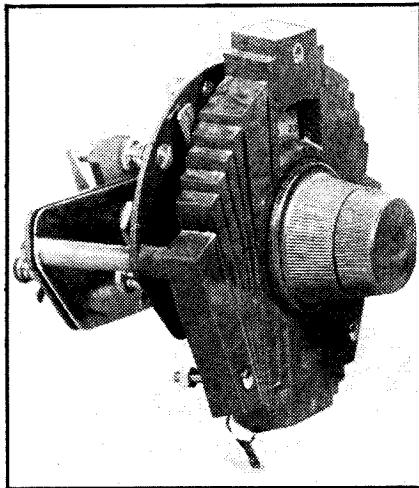
### Lissen Control Unit

**A**MONG the components Messrs. Lissen recently sent us for test was a novel control unit comprising a handsome escutcheon fitted with two .0005-mfd. miniature variable condensers.

These condensers can be operated either together or separately, so that the one unit has a variety of uses.

For example, by inserting a set-screw the knob drives both condensers

### SIMPLIFIED CONTROL



*The Lissen control unit consists of a handsome escutcheon upon which are mounted two miniature type variable condensers. These condensers can be ganged, or operated separately at will.*

simultaneously, and the unit functions as a "gang" assembly.

When the set-screw is removed the two condensers are independent, the larger knob operating the scale and the condenser nearer the escutcheon, and the smaller knob the rear condenser which can be employed for reaction control.

Also at the bottom of the escutcheon is a switch which is readily adaptable for wave-changing and filament control. As a means of simplifying reaction control and for

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

achieving compactness, this Lissen unit is to be commended. The makers are Messrs. Lissen, Ltd., Worpole Road, Isleworth, Middlesex, and the price 11s. 6d.

### Pick-Up Tone Control

Since we reviewed the "Multitone" transformer in the October issue we have received information from the makers as to its use in conjunction with gramophone pick-ups.

The "Multitone" can be employed with advantage between the pick-up and the set by those who wish to adjust the tone to suit their own particular requirements.

The transformer is used with a potentiometer of not less than 0.5 megohm, and the tone is dependent upon the position of the potentiometer knob.

One adjustment compensates for lack of bass on the record, another will correct any "booming" tendencies in the amplifier or speaker by emphasising the treble, and so on.

A tone compensator of this type is of the utmost value to those who desire to get the best from record reproduction.

The makers are The Multitone Electric Co., Ltd., 95-98, White Lion Street, London, N.1.

### All-Insulated Terminals

One would not imagine that there existed much scope for improvement in the design of terminals.

But evidently there is, judging by the different types sent in to us from time to time. The latest is the all-insulated terminal manufactured by

S. Lilley & Son, Ltd., of 80, Aleester Street, Birmingham. This is a neat bakelite terminal made with a variety of markings and having a non-rotating name.

The connections can be either spade or pin, and the terminals are good value at 2½d. each.

### Milnes H.T. Battery

Recently we have had on test, with highly satisfactory results, one of the H.T. supply units manufactured by the Milnes Radio Co., of Tanfield Works, Bingley, Yorks.

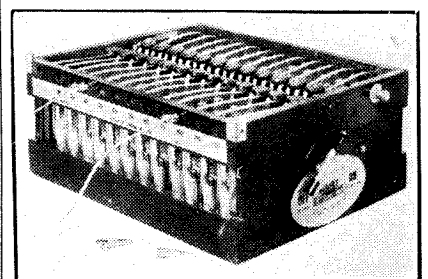
The unit consists of a battery of nickel-iron cells comprising "Alklum," nickel and steel plates immersed in an alkaline solution.

The makers claim that sulphation is an impossibility, and say that the cells may be "over-charged and discharged at practically any rate without fear of damage."

There is a series parallel switch on the case, and when the switch is placed in the parallel position the cells can be charged from a six-volt accumulator. When the unit is employed for supplying H.T. in the usual way the switch is pushed over to the series position.

The standard battery of 120 volts is capable of giving, economically, a current output of 20 milliamps.

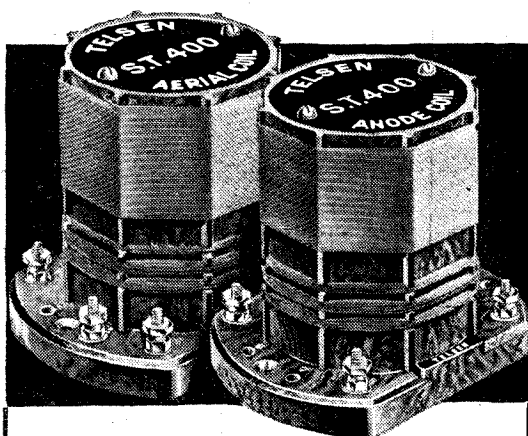
### CHARGED FROM THE L.T.



*The Milnes H.T. battery has a series-parallel switch by which the cells may be connected in parallel for charging, or in series when used for supplying H.T. in the usual way.*

# YOUR SHOPPING

*For the finest results at the lowest cost consistent with quality, build your S.T.400 exclusively of TELSEN Matched Components*



## TELSEN S.T. 400 COILS

These coils have been specially designed for use in the S.T. 400 circuit, but are equally suitable for dual range tuning coils where tapings are not required.

The aerial coil consists of plain long and medium wave windings connected in series. It has in addition a reaction winding which is separate from the above windings. The Anode Coil is similar to the Aerial Coil as regards the long and medium wave windings but has a larger reaction winding connected to the earth end of the main winding.

The terminal numbers on the formers are the same as those on the blue print issued by the "Wireless Constructor."

The anode coil is supplied complete with two brackets and the necessary screws for mounting in a horizontal position.

PRICE  
**9'6**  
PER PAIR

**H**OWEVER good a circuit design itself may be the finished receiver is only as good as the actual components with which it is built. This applies with particular force to the S.T.400. Its 100% perfect design demands 100% perfect components, if the finished receiver which you build is to have that 100% perfect performance which you know it can and should have. To help you achieve this quality at the minimum of expense, Telsens, the world's largest manufacturers of radio components, offer you this ALL-TELSEN Shopping List for the S.T.400. Go to your dealers with it now. Not only has it been specially prepared for you by Telsens technicians — not only has every component been individually tested for immaculate performance and enduring efficiency — but the complete ALL-TELSEN S.T.400 has itself been subjected to prolonged testing to ensure that every component recommended is perfect for its purpose.

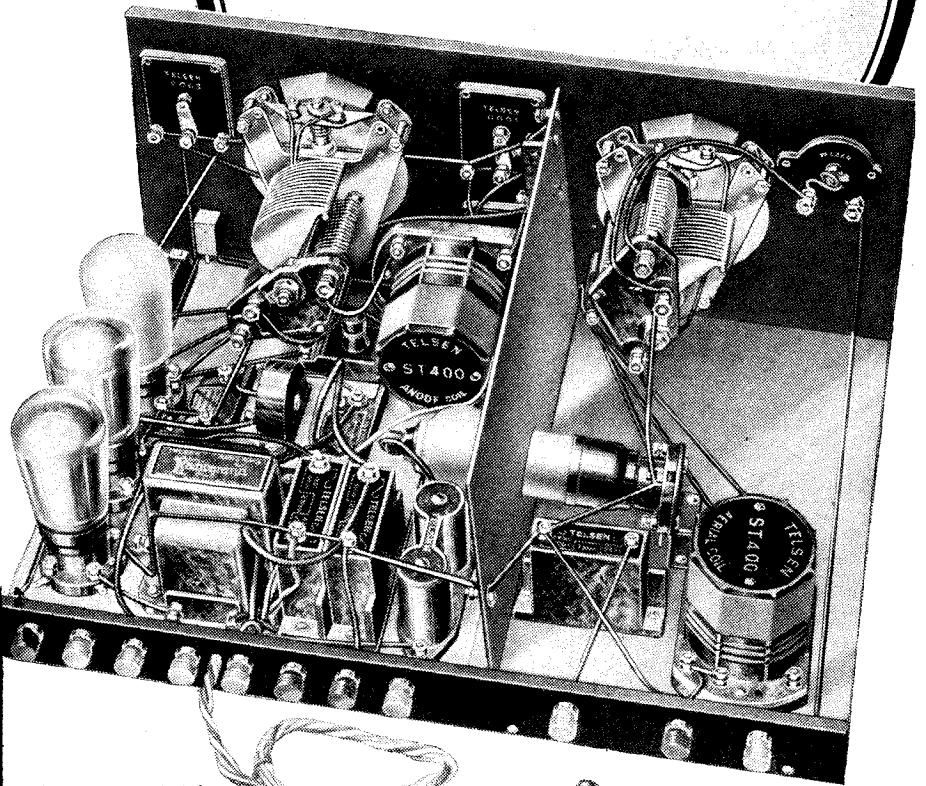
# TELSEN

RADIO COMPONENTS

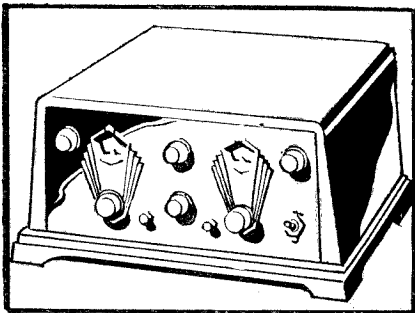
# LIST for the S.T. 400

Total cost of Telsens Matched Components for building the S.T. 400.

## 77'9



View of front panel of the ALL-TELSEN S.T. 400, showing the handsome silver oxidized escutcheons of the Telsens Disc Drives.



## Here is the complete list of components

1 TELSEN "Radiogrand" Transformer, ratio 5-1	s. d.	7 6	1 TELSEN Binocular H.F. Choke	s. d.	5 0
1 TELSEN Aerial Coupling Condenser, .00004	-	2 0	1 TELSEN Standard H.F. Choke	-	2 0
1 Pair TELSEN S.T. 400 Coils	-	9 6	1 TELSEN .0003 Fixed Condenser	-	1 0
2 TELSEN .0005 Variable Logarithmic Condensers	-	9 0	2 TELSEN .006 Fixed Condensers	-	2 6
2 TELSEN Disc Drives	-	7 0	2 TELSEN 2 mfd. Self-Sealing Condensers	-	6 0
1 TELSEN .0003 Differential Condenser	-	2 6	1 TELSEN 1 mfd. Self-Sealing Condenser	-	2 3
1 TELSEN .00035 Differential Condenser	-	2 6	1 TELSEN Grid Leak, 1 meg.	-	1 0
1 TELSEN .0001 Differential Condenser	-	2 6	1 TELSEN 1,500 ohms. Spaghetti Resistance	-	9
3 TELSEN Valve Holders	-	2 3	1 TELSEN 50,000 ohms. " "	-	1 6
1 TELSEN Universal Valve Holder	-	1 0	1 TELSEN 20,000 ohms. " "	-	1 0
2 TELSEN 2 point Switches	-	2 0	1 TELSEN 60,000 ohms. " "	-	1 6
			2 TELSEN .0003 Preset Condensers	-	3 0
			1 TELSEN Universal Screen	-	2 6

Obtainable from all dealers everywhere

## As We Find Them—continued

### MACNAMARA

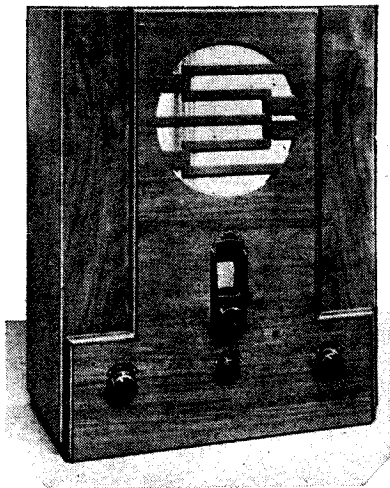
#### The "Golden Voice" Receiver

The Telsen Macnamara "Golden Voice" is an outstanding example of British receiver design.

Value for money is what the listening public demands in these days of high taxation and depleted finance, and there is nobody who realises it more than this great firm of Telsen.

The most cursory inspection of the

#### A FINE SET



Handsome and distinctive cabinet work is but one of the many attractions of this noteworthy design.

"Golden Voice" receiver at once reveals abundant evidence of the highest grade workmanship, and it is obviously a design that has been built up to a standard, and not down to a price.

And yet the figure at which the receiver sells is so moderate that one marvels at the production methods that make such a combination possible.

The Macnamara "Golden Voice" is an all-electric receiver for A.C. mains of from 200/250 volts, 50/60 cycles. It makes use of that popular and tried-out circuit arrangement, the screened-grid, detector and pentode, which has proved itself unsurpassed for efficient all-round results.

The policy of the makers in taking such a circuit as a basis, and of perfecting it by the careful and clever blending of component values, is, in our opinion, a very sound one.

Full-wave valve rectification is employed on the high-tension side, and we found the model sent us for test singularly hum-free. There is a hum adjuster on the set, and, although we had no occasion to use it, it does provide a safety margin with which to contend with abnormally bad mains.

#### Illuminated Scale

As is usual with the most modern designs, the tuning scale is calibrated directly in wavelengths, and the "ganged" condenser is operated by a single knob having a concentric trimmer.

Needless to say, the scale is illuminated. The controls are arranged on the front of the receiver below the speaker fret with a nice regard to appearance, as well as to ease of operation.

On the left will be found the selectivity control, which takes the form of an aerial series condenser of the self-shorting type, so that maximum volume can be obtained when necessary.

A two-way ganged wave-change switch occupies the centre position, and we found it particularly smooth and silent in operation. The reaction control is on the right, and this is also remarkably smooth and gradual

—that is, on the few occasions on which it is necessary to use it.

At the back of the chassis are the mains on-and-off switch, sockets for connecting pick-up leads, and also

#### CLEVERLY PLANNED



By the detailed perfection of a fundamentally sound circuit arrangement, the makers of the Macnamara receiver have enabled the last ounce of performance to be obtained from three valves.

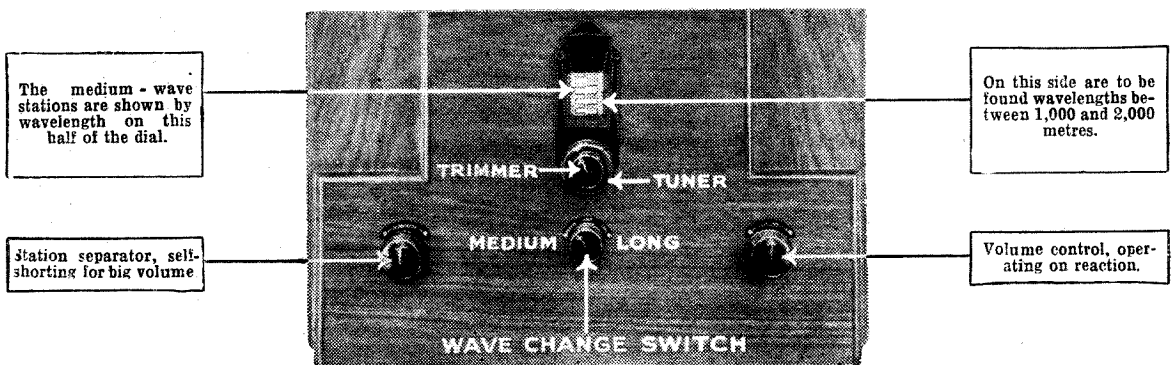
for the use of an additional loud-speaker.

The chassis design everywhere bears evidence of careful planning, and such features as detail work and accessibility are excellent.

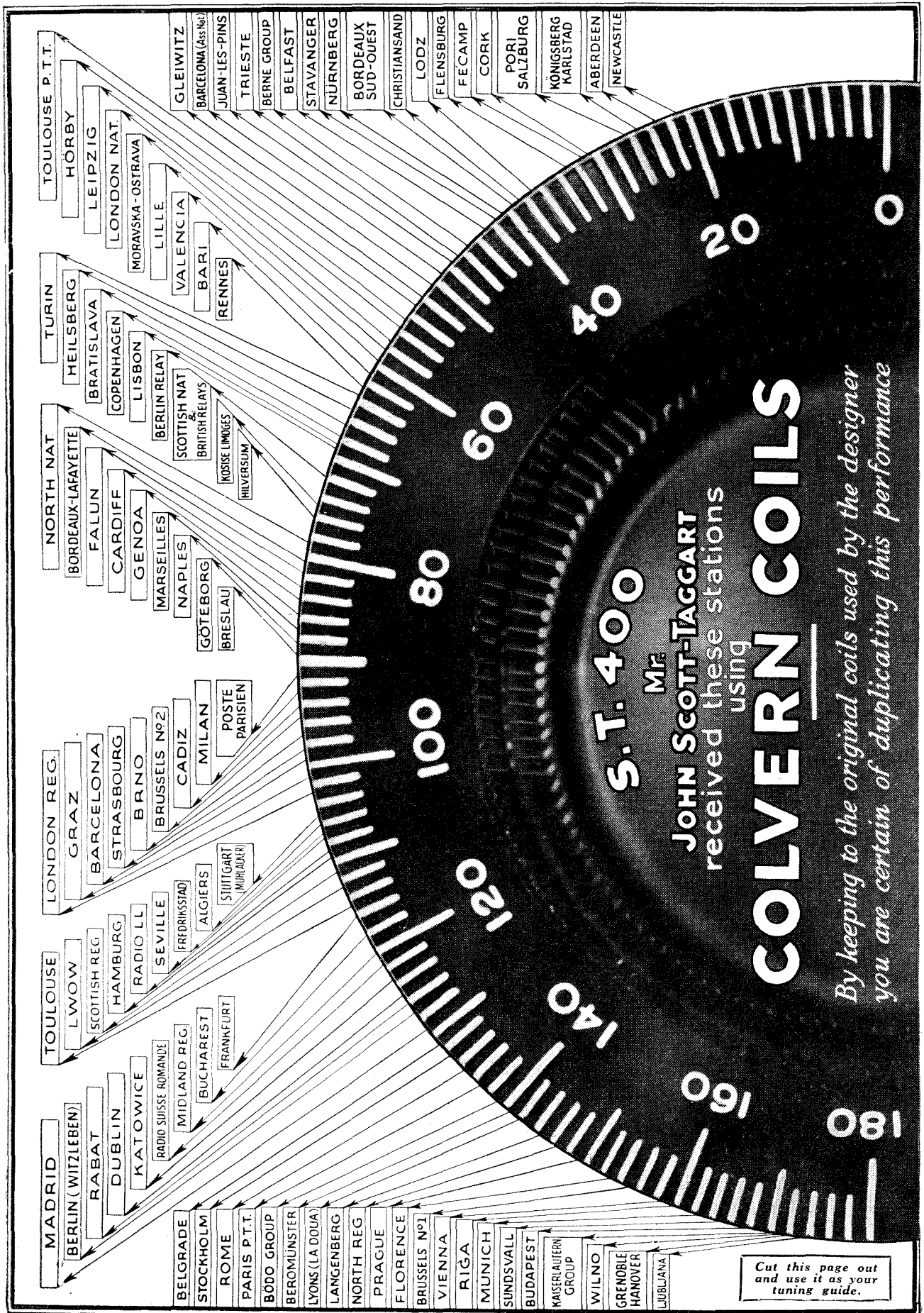
#### Best Results

The "Golden Voice" is, of course, mainly intended for use in conjunction with a conventional aerial, and it is with such aerials that it will give its best results. But there are occasions when it is not possible

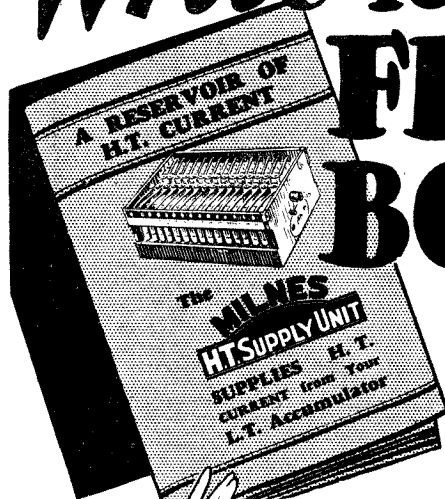
(Please turn to page 256)







# Write for this FREE BOOK



## The MILNES H.T. SUPPLY UNIT

THE CHEAPEST MEANS OF H.T. CURRENT

... and the Best

IN the Milnes Unit you have a new way of supplying your H.T. needs—a way that is undoubtedly superior to any other method. Its performance will amaze you—it supplies a smooth, steady current at a cost which is absolutely negligible. There is no hum, no corrosion, no dirt and no trouble.

Fed by your Low Tension Accumulator, the Milnes Unit consumes only the amount of H.T. energy drawn by your valves, and this is unnoticeable. The output is ample for the largest sets. The Milnes Unit is automatically recharged when the set is off, by the simple movement of a switch.

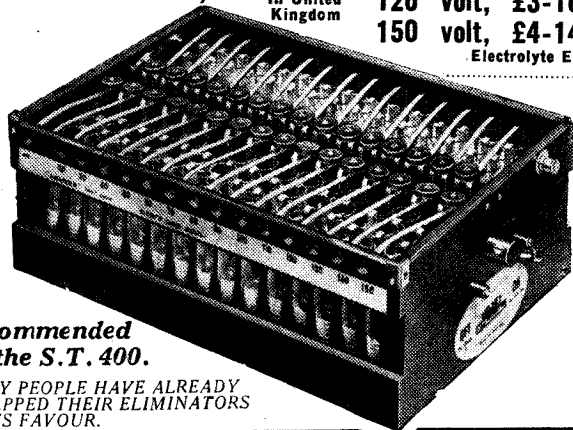
Write to-day for this Booklet which tells all about the Milnes Unit—the way to save pounds on H.T. Current.

Write for your copy to-day

**MILNES RADIO Co.**  
VICTORIA WORKS,  
CHURCH ST.,  
BINGLEY, YORKS.

Phone: Bingley 500.

PRICES	90 volt,	£2-18-0
In United Kingdom	120 volt,	£3-16-0
	150 volt,	£4-14-0
		Electrolyte Extra.



Recommended for the S.T. 400.

MANY PEOPLE HAVE ALREADY SCRAPPED THEIR ELIMINATORS IN ITS FAVOUR.

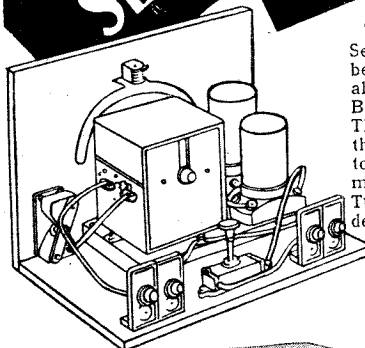
Stowe & Bowdon

MAKE YOUR SET SELECTIVE

EFFICIENT BAND-PASS FILTER

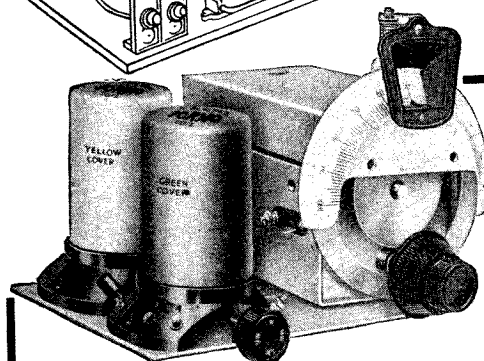


Band-Pass Unit



Sets that are a year or so old can be made finely selective without any alteration by the addition of the Band-Pass Filter shown on the left. This highly selective unit provides the requisite selectivity and improves tonal quality. It requires little more than a Formo Band-Pass Tuning Assembly and has been designed by a well-known expert as a simple and inexpensive way to bring any set up to date.

Write for a copy of the designer's Article describing the Filter in detail.



Formo Dual Gang Band-Pass Unit Complete

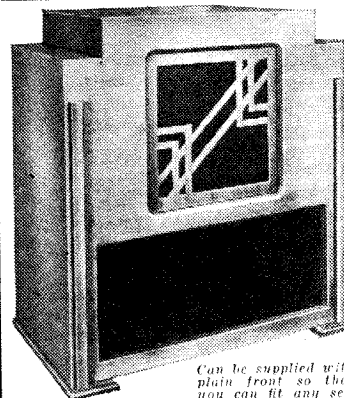
33/6

Triple Gang Band-Pass Unit

46/6

If you have any difficulty in obtaining, write for latest Formo Catalogue.

**FORMO** London Showrooms: 23, Golden Sq., Piccadilly Circus, W.1  
Head Office: Crown Works, Regent's Park, Southampton



THE CABINET for the S.T. 400

30/- Cash or C.O.D. Carriage Paid.

The "Whitehall de Luxe" is a fine solid piece of furniture, and is available in three finishes: natural, golden, lacbean. The use of solid wood does away with any troublesome boom effect, plywood only being used for decorative purposes, namely, the fret, and detachable back.

Make certain that your "S.T. 400" is housed in a worthy cabinet—the "Whitehall de Luxe," price 30s. cash or C.O.D. Carriage Paid. Obtainable at all good-class Radio Dealers, or direct from the sole manufacturers. State style of finish required when ordering. Money refunded if not completely satisfied.

The Myers-Hunt Cabinet Co., 7, Austin St., Shoreditch, London, E.2.  
Telephone: Bishopsgate 3037 & 4928.

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1. Only 2 1/2 in. deep.
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The most remarkable gramophone invention of the age—a gramophone turntable that "goes by itself." In a few minutes you can convert an ordinary gramophone into an automatic electric one. It takes little longer, following the simple instructions supplied, to convert your present Radio Set into a Super Radio-gram. The total cost is only...

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It lasts a lifetime with no additional cost. Ask your Dealer for illustrated leaflet and demonstration.

**SIMPSON'S ELECTRICALS LTD.,**  
GRANGE ROAD - LEYTON - E.10.



# A PRACTICAL MAN'S CORNER

By R. W. HALLOWS, M.A.

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

## A G.B. Battery Switch

WHEN the variable-mu valve is controlled by means of a potentiometer wired across a grid-biasing battery it is important that a switch should be provided which will throw the resistance out of action when it is in the "off" position.

A moment's thought will show why it is essential to have such a switch. The average potentiometer used for the purpose has a resistance of about 50,000 ohms. If this is connected across a 9-volt grid battery the current passed is only a little more than a fifth of a milliampere, but it forms a continuous drain upon the battery, whose life must therefore be shorter than it ought to be.

Such a resistance placed across an 18-volt grid battery will result in a steady current of about one-third of a milliampere. In either case the voltage of the biasing battery will be continually falling, with the result that the amount of possible diminution in the volume by rotating the knob of the potentiometer is reduced.

### Automatic or Not?

It is possible, of course, to provide a simple on-and-off switch connected between one end of the potentiometer resistance and one pole of the battery. This is completely effective—if you can be sure of always remembering to operate this switch besides the filament switch when closing down for the evening. But can you be sure? Certainly I can't!

Fig. 1 gives a skeleton diagram showing the way in which automatic switching of a potentiometer resistance

can be obtained by the use of a double-throw switch.

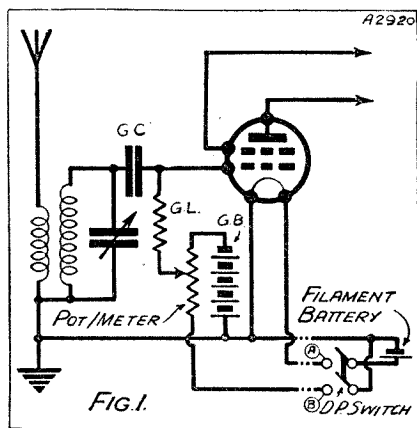
When this is closed, contact A makes the filament circuits of all the valves in the set. Contact B at the

same time connects the "lower" end of the potentiometer resistance to low-tension negative.

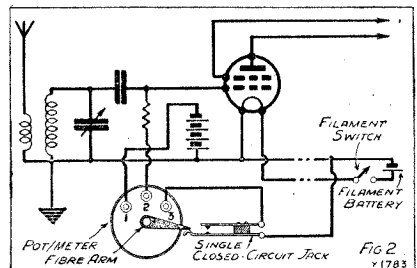
Since the positive pole of the grid-biasing battery is permanently connected to low-tension negative and the negative pole of the battery to the other end of the potentiometer resistance, this means that the control potentiometer is automatically connected across the grid-biasing battery when the set is switched on.

When the set is switched off the "lower" end of the resistance is disconnected from the positive pole of the grid-biasing battery and no current passes.

## POTENTIOMETER SWITCHING



*When variable-mu valves are controlled by a potentiometer across the G.B. battery, it is necessary for the potentiometer circuit to be broken when the set is not in use. This can be done by a double-pole switch as shown above, or by a switch operated by the potentiometer slider, as below. It is necessary to see that the contact spring is not strong enough to move the slider.*



## Worth Noting

Readers may notice that in the skeleton circuit I show a grid condenser and grid leak used with a variable-mu valve. This is, I believe, by far the most satisfactory way of dealing with these valves, since it enables the moving vanes of the variable condenser tuning the grid coil, as well as the low potential end of the windings of both this coil and the aerial coil, to be connected directly to earth.

It is also the simplest method of converting a set designed for ordinary screen-grid valves for use with variable-mus since the alterations required in the wiring are so few.

The grid condenser, which may have a value between .0001 and .0003 mfd., is connected between the grid terminal of the coil and the same terminal of the first valve holder. The grid leak, with a resistance of 2 megohms, lies between the same terminal of the valve holder and the sliding contact of the potentiometer.

## A Practical Man's Corner—continued

### A Different Kind of Switch

Potentiometers, nowadays, are obtainable which incorporate a switch for connecting or disconnecting one end of the windings to and from one pole of the grid-biasing battery. If you don't happen to possess one of these, but do possess a potentiometer with a threaded spindle which protrudes from the rear, you can very easily make a switching arrangement in the way shown in Fig. 2.

Fix up the parts of a single closed circuit jack (the junk boxes of most old hands will contain these), as shown in the drawing; provide your potentiometer with an arm made of fibre or some other suitable insulating material, and connect it to its spindle by means of a couple of nuts.

Then, as you will see by studying the drawing, the fibre arm automatically disconnects the grid battery when it reaches one end of its travel—you can arrange this to be the maximum or minimum end just as you like.

### The Spindle is Alive

But why should the arm be of insulating material? Would it not be much simpler to make it from a piece

of sheet brass, German silver or some other metal to be found in the stock of most constructors? From an actual workshop point of view it might, but don't forget that the spindle of a potentiometer is generally "alive," being connected directly to the sliding contact arm.

A metal arm is therefore undesirable, for if one were used its contact with the switch would be likely to result in a particularly hearty and un-

### Don't Forget

This point, by the way, about the "aliveness" of the potentiometer spindle is one that should never be lost sight of when making use of these components in the wireless receiving set. The earthed metal or metal-lined panel is largely used nowadays, and so is the one-hole fixing potentiometer, whose bush is just as much alive as its spindle.

I have come across one or two cases in which the control potentiometer of a tone-regulating transformer was fixed up on such a panel, in blissful forgetfulness of the fact that the moving contact was thereby earthed.

Several of those who made this slip have told me that they considered the claims of the tone-control transformer to be grossly exaggerated, since nothing in particular seemed to happen when the knob was moved.

They were lucky, for quite a few unpleasant things can happen in

We wind our coils nowadays on formers of very small diameter; we don't bother (except when short waves are in question) about spacing the turns, and we use wire so fine that but a few years ago the very mention of its gauge would have caused low-loss enthusiasts to raise aloft despairing hands eloquent of pious horror.

The truth is that nowadays the high power of transmitting stations, and the wonderful efficiency of modern valves and circuits, render the low-loss coil almost, if not quite, unnecessary. Excellent results may, in fact, be obtained with the pre-(wireless)historic hank-wound coil, of which, personally, I make considerable use.

### Mathematical Mysteries

And talking about hank-wound coils, one of the curiosities of wireless is that, though you can demonstrate mathematically that these must be inefficient, you can often obtain even better results with them than you can with coils whose windings have been worked out with the aid of logarithms and cosines and all kinds of other mathematical mysteries.

Here is a tip for making hank-wound coils that readers of an experimental turn of mind may find useful. What is wanted is a suitable former consisting of a very short barrel and nice, deep cheeks. You can, of course, make it, given a piece of cardboard tubing, a supply of flat millboard, unlimited patience, and an adhesive that really will stick.

But a far, far better way is to go to a fishing tackle shop and to ask if they happen to have one or two of the neat wooden reels that are used for holding 25 yards of undressed fishing line.

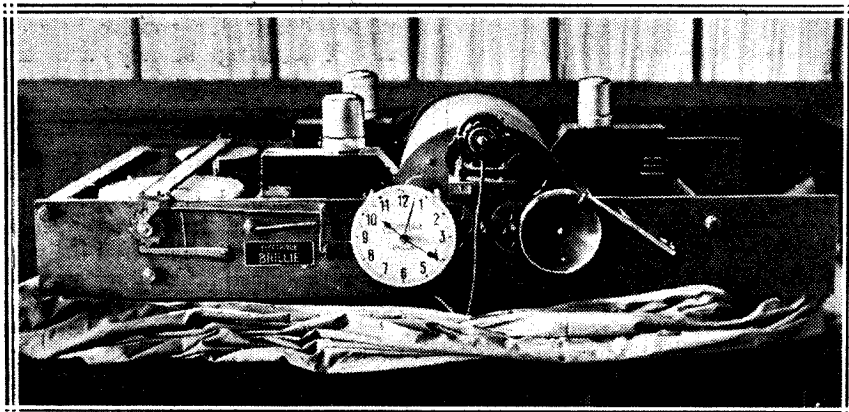
### Most Useful

If you are lucky in your tackle shop, you will find that the salesman is only too glad to get rid of them.

They vary to some extent in size, but on the average they are about  $\frac{3}{8}$  in. wide between cheeks, whilst the central part has a diameter of approximately 1 in., with cheeks of about  $1\frac{1}{8}$  in. in diameter.

These reels are thus exactly what you require for winding either medium- or long-wave coils with wire of a gauge suitable for the purpose.

## NOT A JOB FOR THE HOME CONSTRUCTOR!



Three hundred and sixty times an hour this French clock speaks the time—but one is not obliged to hear it. It is necessary merely to ring up a certain number on the telephone to hear the correct time spoken by this robot time-keeper.

certain tone-control arrangements if you do earth the sliding contact of your potentiometer!

### A Coil Tip

An inspection of the interior arrangements of any of the small screened coils in use in receiving sets to-day will show that we have travelled a long way since the days when low-loss was the slogan of every keen wireless man.

*Santa says:—*

# “Go on, Graham Farish Xmas is just your season”

Xmas, the season of jollification, parties, dancing, high jinks. Overtime for the Wireless or the Radiogram. Your set has got to surpass itself this Xmas. No crackling or fading—just fine, clear, strong, constant tone and volume.

Guarantee your guests and yourselves the last word in perfect reception. Half-a-crown spent on a Filt Percolative Earth will do it. Ten minutes will fix it.

Remember, your Earth connection is your only direct contact with the transmitting station. Unless that is the best you can make it, your reception will be far from perfect—not only at Xmas but now and always.

**GRAHAM FARISH**  
**FILT**  
**PERCOLATIVE EARTH**  
**2/6**

Simply bury the copper receptacle containing the wonderful FILT chemical which spreads through the earth, attracting moisture and making a highly conductive area several feet deep. FILT keeps moist and highly conductive, earthing your set perfectly and giving you every ounce of power, range and purity.

*Get a Filt and Gard Lightning Arrester from your nearest Radio Dealer or direct (post free) from the Sole Manufacturers*

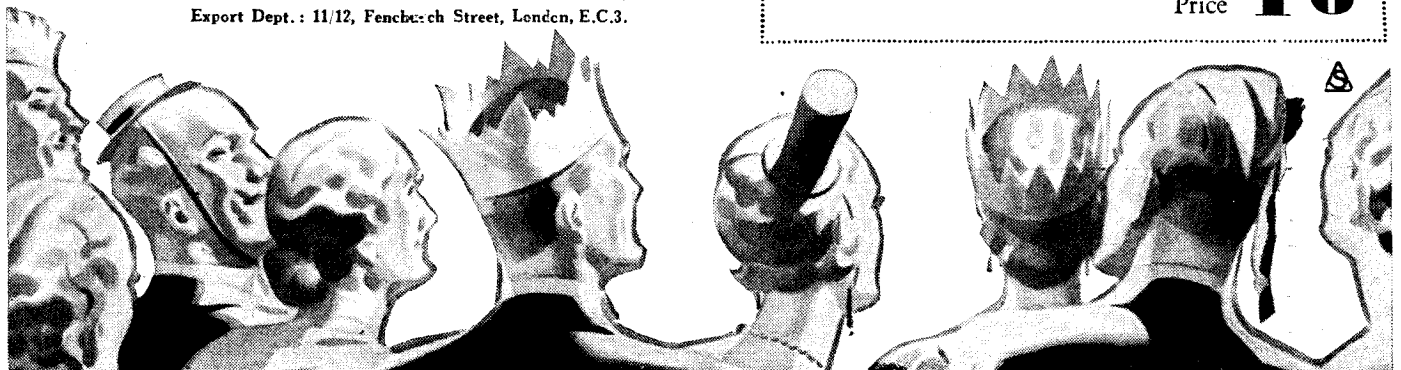
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**GARD YOUR SET AGAINST LIGHTNING**

Cut out the risk of damage by electrical or lightning storms by fitting a GARD lightning arrester. This little protector makes your set so safe from outside interference that you need not even switch off your set before going to bed.

Price **1/6**



# Recommended and approved by Mr. John Scott-Taggart for the S.T.400

Only by using components of unquestioned reliability can you get the best from your S.T.400—every component has got to pull its weight. That is why Mr. John Scott-Taggart has approved and recommended the use of T.C.C. Condensers. With a backing of 25 years' specialised research—with a reputation for downright reliability—you can put T.C.C. into your set in the assurance that they will do their job efficiently and continuously—you know that they are working as the designer intended. Insist on the "condenser in the green case" and get results "as per specification."

### THE CORRECT T.C.C. CONDENSERS

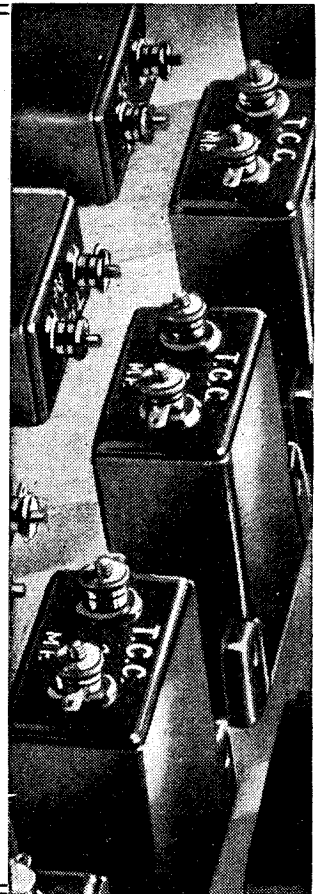
Here are the correct T.C.C. Condensers for the S.T.400. Make a note for your shopping list. If you are buying a complete Ready Radio Kit you will find T.C.C. used throughout—all approved by Mr. John Scott-Taggart.

2 — 2 mfd.	Type 50	3/10 each
1 — 1 mfd.	Type 50	2/10
2 — .006 mfd.	Type S	2/- each
1 — .003 mfd.	Type M	1/-

# T.C.C.

ALL-BRITISH  
CONDENSERS

THE TELEGRAPH CONDENSER COMPANY, LIMITED  
WALES FARM ROAD ————— N. ACTON, W.3



2000

# S.T.400

THE Belling-Lee components specified by Mr. John Scott-Taggart for the S.T.400 can be obtained in a kit as follows:—

11 Type "R" terminals, lettered	s. d.	2 3½
5 Bowspring Wander Plugs— H.T.—, H.T.+1, H.T.+2, H.T.+3, H.T.+4		7½
4 ditto— G.B.+ , G.B.—1, G.B.—2, G.B.—3, with Twintap plug to enable two plugs to be inserted in one socket as required by Mr. John Scott- Taggart		7
1 Screen Grid Anode safety con- nector		4
2 Spade terminals— L.T.+ , L.T.—		4
		<u>4 2</u>

## BELLING-LEE

FOR EVERY RADIO CONNECTION

JOHN SCOTT-TAGGART  
AMIEE. PART 2  
Consulting Engineer

10th October, 1932.

Messrs. Belling & Lee, Ltd.,  
Queensway Works,  
Ponders End, Mdx.

Dear Sirs,

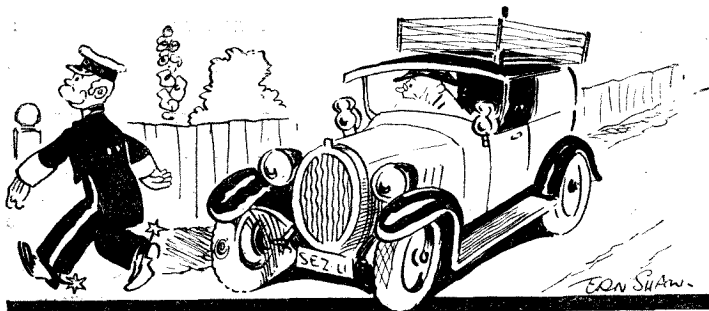
This is officially to inform you that I have selected for use in my S.T.400 Receiver, November 15th:

11 Belling-~~and~~ Lee terminals - 2 3½ type  
H.T. minus,  
H.T. plus 1,  
H.T. plus 2,  
H.T. plus 3,  
L.T. plus 4,  
L.T. minus,  
L.S. plus,  
L.S. minus,  
A,  
E.

Also H.T. & G.B. plugs.

Yours faithfully,  
John Scott Taggart

Advr. of Belling & Lee, Ltd. Cambridge Arterial Road Enfield Mdx



# In Lighter Vein

By Wireless Wayfarer.

LIKE many great men, the Professor is not at his best on the telephone. I don't think that he will ever get used to the automatic dial, for instance. Suffering as he does from absent-mindedness, he can seldom remember that he is not tuning in a wireless station when it comes to dialling.

Sometimes again he imagines that the dial is the steering wheel of his car. All sorts of queer things happen, and distracted operators generally apply for a transfer to some other place within a week or so of their appointment to the Mudbury Wallow exchange.

### Important Conversation

The other evening, when I entered his den at the "Microfarads," the Professor was in the middle of what appeared to be a most important conversation.

"The discharge is, of course, oscillatory," he bellowed into the microphone. "No, you idiot—I said oscillatory."

### "C" FOR CICELY



"No, six—SIX: S for six, I for Irma, X for xylophone."

"Spell it," I suggested.  
 "O-s-c-i—" began the Professor.  
 "No, no," I said. "That's not the way you spell on the telephone. Don't you know—A for Arthur and so on?"  
 The Professor leapt at the idea.

"O for Ouse, S for Sicily, C for Cicely—"

"My dear good man," I protested. "What is the good of saying S for Sicily and C for Cicely?"

"Well, one's an island and the other's a girl's name."

"But can't you see that they both sound alike? Try something else."

The Professor turned to the microphone again.

"O for Ouida, S for Sicily, C for Czar, I for Ina, L for Llanfairfechan, another L for Llanfairfechan, A for always, T for thrombosis, O for outside, R for rhomboidal and Y for Ypres. There now, I hope you've got it at last."

The man at the other end of the line was still puzzled, I gathered from the Professor's remarks into the microphone, but my old friend went gaily on.

"I expect you will want six turns," he roared. "No, six—SIX: S for six,

**Professor Goop and Wayfarer get a great idea for "raising the wind" with an imitation detector van. All goes well until Prof. Goop calls on Captain Bucket, and then—!**

I for Irma, X for xylophone. That should be about right for the primary coil—no, no, primary, primary, PRIMARY; P for Ptolemy, R for rhododendron, I for Ivy, M for Mnemonic— What, you can't get it? Well, I can't be bothered spelling any more of it. Why can't you use your sense. I am making each letter clear by giving you a name that begins with it!"

The Professor wiped his fevered brow, listening intently to what the receiver was telling him.

"Is it a battery set?" he inquired.  
 "I said battery; B for bdellium, A for Aileen, double T for double titillation, E for entrée—well, really, if you won't try to understand me I can't go on with it. Ring off, please."

The Professor slammed the receiver on to the hook thing with considerable violence and flung himself exhausted into an armchair.

### Brothers in Misfortune

"That," he said, "is that. Now I can see that you are burning to consult me upon some subject. Unburden yourself, my dear fellow; in other words, get it off your chest."

I sighed. Then with a little tired smile I slowly turned my pockets, one after the other, inside out.

"We are brothers in misfortune," murmured the Professor. "Have you any means to suggest for what I believe is termed raising the wind?"

"It is about that," I said, "that I came to commune with you. I have the germ of an idea and if we co-operate closely I think that the scheme may prove lucrative."

### Wonderful Vans

The Professor's face lit up.

"Go on," he urged. "Your tale interests me strangely."

"Do you think," I queried, "that there are many wireless pirates in Mudbury Wallow?"

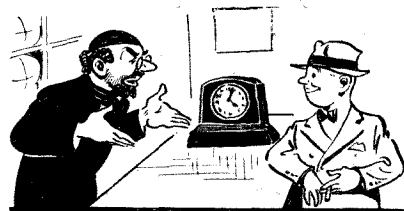
"Wireless pirates?"

"Yes. W.P. for short. W for whoever, P for psychology—"

I dodged neatly the three-gang condenser that the Professor flung and proceeded to elaborate my idea.

"Doubtless," I continued, "you have observed that the G.P.O. is conducting one of its smelling-out campaigns with those wonderful vans which can detect at a range of three miles an unlicensed crystal set even if it isn't working. It is most unlikely

### AN UNCLE OF MINE



"—with whom I left Miss Worples' drawing-room clock."

that one of these vehicles, which are, by the way, cunningly disguised to look exactly like Post Office detector vans, will come to Mudbury Wallow; but why should not you and I conduct a little anti-pirate campaign of our own?"

The idea made an instant appeal to the Professor. We spent the rest of the evening discussing details and

## In Lighter Vein—continued

devoted the next day to transforming the Professor's ancient car into a most realistic detector van, complete with large frame aerial on the roof.

All that remained was to provide ourselves with suitably impressive uniforms. For this purpose I made a hasty journey to a fancy dress specialist in London and returned with two very natty creations. Mine was a symphony in blue with brass buttons and large clanking spurs.

For the Professor I was able to acquire a most impressive undress uniform of a vice-admiral in the Swiss Navy, complete with cocked hat and sword. I bought also an assortment of readily-attachable face fungus.

### The Drawing-Room Clock

The reader may wonder how I acquired sufficient funds to pay for my railway fare, the excellent lunch of which I partook in London, and the hire of the costumes and appurtenances. This was easy. Having seen Miss Worples leaving her house to take darling little Tiddlyums for a morning exercise, I paid a short call upon her. This was followed by another call upon an uncle of mine with whom I left her drawing-room clock. You cannot keep a good man down.

When the day chosen for the inauguration of our campaign arrived, the Professor and I donned our

### CAN'T WE TALK IT OVER?



"—such was the ferocity of my glare that he hastily added a second fiver."

uniforms in his potting shed. I fitted him with a noble beard, whilst he applied side-whiskers and a fierce moustache to my countenance.

We drove first to Sir K. N. Pepper's house. Approaching at a crawl along the street, we stopped in front of the gate. The Professor slowly rotated the frame from inside the van, whilst I kept an eye on the house through a cunningly devised peep-hole.

Presently I saw Sir K.N., looking rather worried, watching us from

behind the curtain. We drove on a little way and then came back.

Making a majestic exit from the van, I strode up the drive. It was, perhaps, unfortunate that those outsize spurs became entangled and caused me to go head first into a bed of dahlias; but with great presence of mind I crawled about on my hands and knees, obviously in search of an earth connection.

### White About the Gills

Then rising, I proceeded to the front door. Having torn the bell out by the roots, I raised pandemonium with the knocker.

Sir K.N., looking a little white about the gills, came to the door himself.

"Wh-wh-wh-what?" he stammered.

With an imperious gesture I cut him short.

"I have called," I said coldly, "to examine your wireless licence. Kindly produce it for my inspection."

Terribly flustered, Sir K.N. assured me that he had taken out a wireless licence and was sure that he had it somewhere, but just where it was he simply couldn't think. Would I come back on the following morning?

My piercing glance froze him to silence.

"A clear case of piracy," I barked. "I'm afraid, my man, that this means serious trouble for you."

"Couldn't we go inside and talk it over?"

Looking my fiercest, I strode into the house, though once more those infernal spurs nearly tore it. To be quite exact they did tear it, or rather them. I caught the right one in the hem of Sir K.N.'s Oxford bags, and—well, he had to wear a mackintosh during the rest of the interview.

### Gradually Mollified

"Couldn't we possibly settle this without going any further," he said timidly, drawing a fiver from his inside pocket.

Such was the ferocity of my glare that he hastily added a second fiver, after which I allowed myself to be gradually mollified.

We got thirty bob from Tootle and confiscated Primpleson's ten-valve super-het., which was given up without a murmur.

When we got to Captain Buckett's

house I told the Professor that it was his turn to get out and do things.

The Professor got into the house all right, but from the uproar that soon arose from within I gathered that the old sea-dog was not inclined to take things lying down.

Making my way hastily into the Captain's den, I found that I had come just in the nick of time, for Captain Buckett had the Professor

### "BEAT IT!" I YELLED



"I can testify that Capt. Buckett is a good man with the flat of a sword."

over his knee in a position that brought back memories of childhood days, and was laying into him good and hearty with the flat of the sword which, as I learnt afterwards, he had wrenched from the Professor.

"This," I roared, "is a most serious case. Having been caught red-handed, you now commit an assault upon the person of a highly-placed official."

### This Tomfoolery

As the Professor was at the moment sitting upon the floor, this might have been better expressed, but nothing daunted, I went on.

"You will certainly hear more of this, sir. Precisely what the outcome will be I am unable at the moment to state. But you may take it from me, sir—"

"And you may take it from me, sir," bellowed the Captain. "I won't stand any more of this tomfoolery. Get out both of you!" He aimed another blow at the Professor, who sprang nimbly to his feet and seized him by the beard.

"Beat it!" I yelled to the Professor, myself making a dash for the french window. We got a pretty good start, and if it hadn't been for my spurs and the Professor's sword scabbard all might have been well. But both of us were brought low in our flight by these absurd accessories.

I can testify that Captain Buckett is a good man with the flat of a sword.



Every year my set gives me a 50% ★ Christmas Box



Prices from

**39/6**

or by Easy Payments

All models are similar in external appearance. Size, 9 in. by 5 in. by 3 1/4 in.



**RADIO POWER UNITS**

★ "I've saved over two pounds ten on the running costs of my three-valve set this year. It used to need four batteries a year, costing over fifty shillings. Nowadays I use an EKCO Power Unit—and the cost is one shilling a year."

Whatever your set, providing you have electric light, there is a suitable EKCO Unit. All you have to do is to connect the Unit in the place of your H.T. Battery, plug into the electric light or power supply, and switch on—that's all! No alterations to set, valves, or wiring. Ask your dealer or post coupon now for full details!

★ Based on three hours' daily use of an average three-valve set.

To E. K. Cole, Ltd., Dept. D1,  
EKCO Works, Southend-on-Sea.

Please send me illustrated FREE literature of EKCO All-Electric Radio.

Name .....

Address .....

.....



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

**H**AVE you ever tried for American stations on the medium waves? Conditions have been so good for real long-distance work that quite a number of U.S.A., and even South American, broadcasting programmes have been coming over, some of them at wake-the-baby strength. And all this on ordinary wavelengths without any change-over of coils or plug-in adaptors, or anything of that kind.

**Getting America**

Even a one-valve set can sometimes get America direct after Europe's medium stations have closed down, but success with only one valve is very unusual. A far more likely combination is a good three- or four-valver, and the best time to try is from about 1 a.m. onwards.

No doubt there are already enthusiasts who frequently set their alarms for that ungodly hour, and, fortified by cocoa, twist the dials till 4 or 5 a.m., and think nothing of it.

But I am not thinking of them so much as of the rest of us who value our "fresh awakenings," but who nevertheless occasionally sit up late over a book, or get home from a dance about 1.30 a.m. That is the time to try your luck.

**Genuine U.S.A.**

Just walk over to the set, switch on, and go round the dials as usual. If you hear nothing, or only very weak stuff, don't bother any more, but go to bed. It is not a good night.

But if instead you pick up quite a strong station and wait a bit, hardly believing your ears, it is quite likely he will earnestly implore you, on behalf of the Blue Gum Company of Peoria, or somewhere, to brush your teeth night and morning with Blue Gum! Genuine U.S.A. publicity.

Such advice, at such an hour, and over such a distance, is distinctly bracing.

Try on your set before the Spring comes and spoils your chances. You may be lucky any night between now and March, and there is a real thrill in it.

**Wonderfully Good**

As for the European stations, they seem to be getting louder than ever, don't they? Trieste, Heilsberg, Turin, and Horby have all been wonderfully good towards the bottom of the dial, the first two especially.

There is a very fine group round Breslau's wave, 325 metres. Immediately below him is Goteborg, often good and strong, while above, on 328.2 and 331.5 metres respectively, are those two excellent stations Poste Parisien and Milan. Both have been wonderfully consistent of late.

Frankfurt seems to be doing well on 259 metres, but he is really too close to the National to be comfortably picked up by most of us.

**On Long Waves**

As for long waves, one can only say that considering their comparatively small number of stations they have behaved magnificently as good programme providers. Some of the Morse people appear to have decided to sharpen their tuning, or else transmit on less power, and the interference from this source with long-wave stations has generally not been too bad—at least, in comparison with conditions of only a year or so ago.

**A**N attractive list sent out by Lectro Linx, Ltd., of 254, Vauxhall Bridge Road, London, S.W.1, emphasises once again not only the importance of good contact, but also the ease with which it may be ensured.

"Clix for Perfect Contact" is the firm's slogan, and evidently it receives enormous public support, for only on the basis of big sales could such efficient components be marketed at such low prices.

As an instance, take the Clix panel terminal, "with 4 B.A. stem, two lock-nuts and soldering hole, for use with Clix spade, hook, and ring terminals and other standard fittings, supplied in black with white engravings"—all for 2½d. No wonder "Clix" are popular.

**For Radio or Gramophone Work**

Always on the look-out for something that will make for further realism in reproduction, set-builders seem to have taken to the Rectatone

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

L.F. transformer with enthusiasm. There has been a big demand at "Varleys," of Kingsway House, 103, Kingsway, W.C.2, for "The Book of the Rectatone," which is supplied free to WIRELESS CONSTRUCTOR readers. In it will be found full details of the transformer, with suggestions for installation and operation.

**Buying Batteries**

The wise H.T. battery buyer always knows about how much anode current his set takes, and buys accordingly. He appreciates the fact that trying to take more milliamps. out of it than a battery can give is folly—and so he likes to know, before buying a battery, what it is rated to supply. "Ediswans" will tell you that

where the anode current required is 10 milliamps. or less, their "Standard" type is recommended; but if super-power valves are used, super-capacity-type batteries should be employed for economical running.

A free book on "Your H.T. Battery," with useful date, hints and tips, will be supplied by the firm on application to Edison Swan Electric Co., 155, Charing Cross Road, W.C.2.

**All-Electric Set**

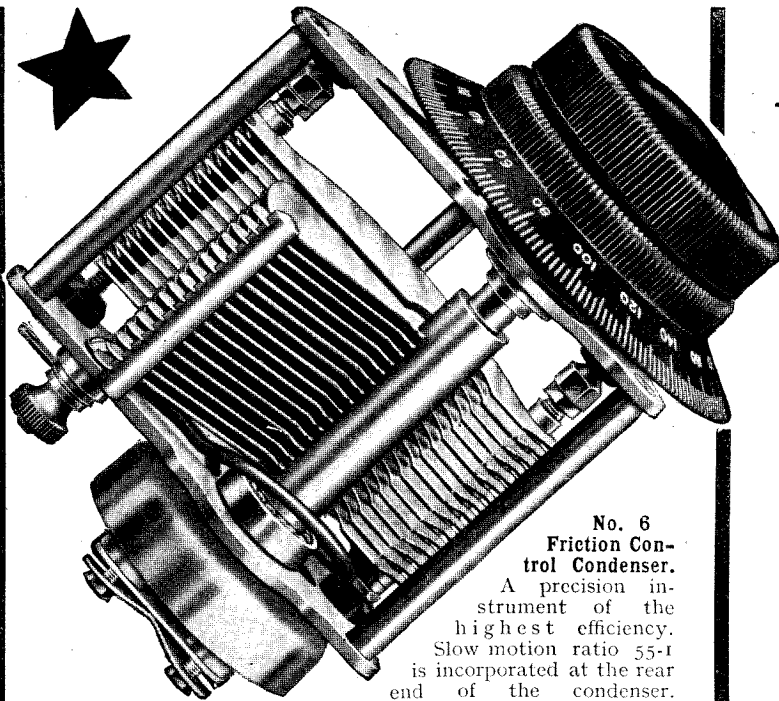
Would-be purchasers of an All-Electric A.C. receiver will be interested in the attractive broadsheet issued by A. C. Cossor, Ltd., in connection with their Model 533 A. The salient points of this popular design are clearly shown by large photographs and as it incorporates moving-coil speaker and two variable-mu S.G. stages, the proposition at £17 17s. is unusually attractive.

Details from the above-named firm at Cossor House, Highbury Grove, London, N.5.

# Ensure the Success of your S.T. 400

... use these ORMOND Quality Components!

Naturally you want to make a first-rate job of your S.T. 400. And, just as naturally, you want to do it as economically as possible. Purchase Ormond components, and save money without sacrificing anything of Quality, Performance, or Dependability. Every Ormond component shown here exemplifies the Ormond policy of "High Quality—Low Price—Unbeatable Value."

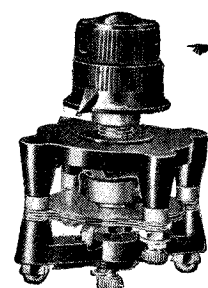


No. 6 Friction Control Condenser.

A precision instrument of the highest efficiency. Slow motion ratio 55-1 is incorporated at the rear end of the condenser.

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

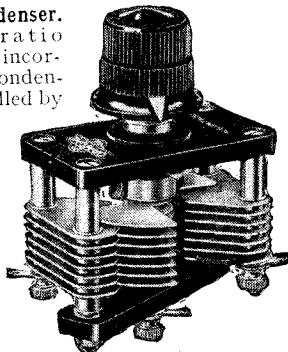
Cat. No.	R/491	Capacity	00025	Price	7/6
"	R/492	"	00035	"	7/6
"	R/493	"	0005	"	7/6



Differential Condenser.

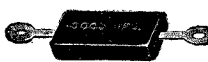
Slow-motion ratio approx. 9-1 is incorporated in the condenser and is controlled by the upper knob, direct drive being obtained on the lower knob.

Cat. No.	R/190.	Capacity	0003
each half.			
Price	3/-.		
Cat. No.	R/195.	Capacity	0001
each half.			
Price	3/-.		



Midget Condenser.

For use as aerial coupler may be connected in series or use one half only. Incorporating a slow motion movement similar to R/190. Cat. No. R/149. Price 3/-.



Fixed Condensers.

Designed for extreme accuracy and ease of mounting.

Capacity 0003. Cat. No. R/439. Price 7d.

Capacity 0006. Cat. No. R/443. Price 1/6.

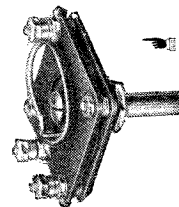
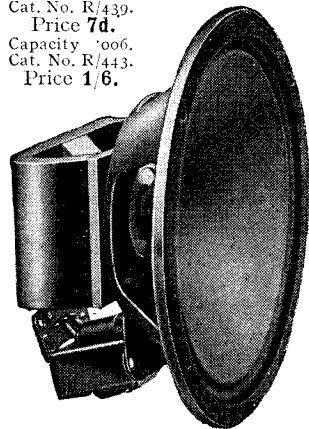


Vary Condenser (pre-set).

Unique locking device enables capacity to be fixed as desired. Cat. No. R/193. Capacity 0003. Price 2/-.

P.M. Moving Coil Chassis.

Gives an excellent response throughout the frequency range and is supplied complete with input transformer. Cat. No. R/475. Price 38/6.

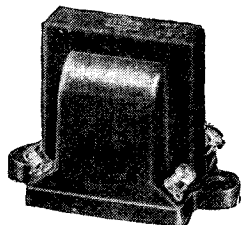


No. 8 Differential Reaction Condenser (Distributor).

Capacity 0003 each half. Cat. No. R/510. Price 2/6.

L.F. Transformer.

A highly efficient Transformer. Walnut Bakelite finish with connections clearly indicated. Cat. No. R/531. Price 7/6.



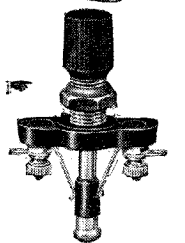
Toggle Switch.

A perfectly insulated quick make-and-break switch. Cat. No. R/330. Price 1/3.



Push Pull Switch.

Moulded bakelite former. Complete with terminals and soldering tags. Cat. No. R/323. Price 1/3.



for Efficiency & Reliability



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Telephone: CLERKENWELL 5334-5-6 & 9344-5-6. Telegrams: "ORMONDENGI, ISLING."



*Assistance from Television—  
That "sum" beat—A Turn-  
table Bureau—Calibrating  
Tip.*

**D**o you realise that the ear is much more obliging than the eye? Yes, it's all right—this does concern radio!

What I have in mind is that one can put up with a certain amount of distortion of various kinds where aural reproduction is concerned, with perfect tranquillity. But when television is in question, straight-line output assumes a new importance, and distortion becomes apparent with much more emphasis.

Quite likely this will be made use of in the future for the investigation of night distortion, fading, and other little-understood phenomena. Television may yet "open our eyes" to quite a lot.

### Heterodyne Problems

Writing of phenomena reminds me that I have been asked why we never

hear anything about the "sum" beat where heterodyning is concerned. My inquirer points out that "a beat is produced at the difference and the sum of two frequencies," and yet, where both super-hets. and interference whistles are concerned, we only seem to consider the difference frequency.

I assure you all that if a difference-frequency beat *must* also exist. But remember it will be the dickens of a high frequency!

### Radiogram Conversion

And it is there that the reason for our not hearing it as a heterodyne whistle comes in. It's much too high a note for anybody to hear.

So far as the super-het. part is concerned—well, there is a form of this circuit which does work on the "sum" frequency, but due to its high

value, the "intermediate" frequencies work on ultra-short waves.

Have you seen those new turntable bureaux (or "bureaux" if you are French) that are getting about in the radio stores? I think they are rather cute.

They are very reminiscent of a "pukka" writing bureau—a bit smaller though—and when opened reveal an electric turntable and pick-up, and their flat top is ample to accommodate most console type mains receivers.

On one model the space between the legs is utilised for a neat cupboard for the records. This is just the thing for converting an ordinary set into a "pedestal" radiogram, providing, of course, the receiver has provision for pick-up connections.

### A Plotting Hint

When you next come to draw up a calibration chart for a powerful set—that is, one that will bring in most British stations, remember this: that nearly all these stations take the same dance music programme at the end of the evening.

It is thus an easy matter to place all the British stations by comparing the tunes being played with those from the local. Quick identification of these stations is thus made, and with them plotted, the intervening stations can quickly be filled in. A. S. C.

**F**ROM the point of view of distant reception, the past month on short waves has not exactly been brilliant. I have managed to rake up one or two new additions to the log, but I haven't been able to do anything at all worth speaking about below 25 metres.

Whenever I find that my old friend W 2 X A D is taking a holiday, so far as this country is concerned, for days on end, I am always inclined to regard it as a fairly certain indication that there will not be much else doing below 25 metres.

### Marked Tendency

That is exactly what has happened so far as I am concerned during the past month. Just as a matter of interest I had a glance through my log for the last few years before I sat down to write these notes, and the tendency for stations below about 25 metres to become weaker about this time of year is most marked.

With the advent of the dark evenings, I suppose one must expect it to a certain extent, but I hate to have to record that 1932 is going the right way

\*\*\*\*\*  
\* **THE MONTH ON** \*  
\* **SHORT WAVES** \*  
\* *All the latest news about this in-* \*  
\* *teresting waveband.* \*  
\*\*\*\*\*

to break the "nothing doing" record! Still, there is plenty of time yet, and perhaps readers in other parts of the country are having better luck. Reports would be appreciated.

Having had my monthly moan, so to speak, I want now to try and strike a more cheerful note.

### The Maiden Trip

First of all, then, I wonder how many of you heard the transmissions from Italy's fastest ship when she made her maiden trip to New York recently?

The transmissions from the "Rex," as she is called, were sent out under the call letters of I C E J, and I heard her testing on several occasions on a wavelength of about 34 metres. So far as I could gather, the tests were being made with stations on the East coast of America.

Talking of America, by the way, I am reminded to give you one or two alterations to time schedules which have just come to hand. W 9 X F at Chicago is now working daily except Saturday on 49.18 metres from 9.30 until 1 a.m. G.M.T. Our old friend W 3 X A L, also on 49.18 metres, can be heard on Saturdays from 9.30 p.m. until 6 in the morning.

### Other Changes

Personally, I prefer bed after about 1 a.m. these days, but it is nice to know that he is there (or should be!) if you want him!

Pittsburgh (W 8 X K) has also made some changes. He can now be heard on 25.25 metres (perhaps!) from 9 p.m. until 3 a.m., and on 48.86 metres (which is much more likely) from 9 p.m. until the end of the programme.

Incidentally, you might be interested in the schedule of one of the Canadian stations that is often heard in this country. I refer to V E 9 G W at Bowmanville, who transmits on 49.2 metres from 10 p.m. until 4 a.m. daily. (All times are G.M.T.)

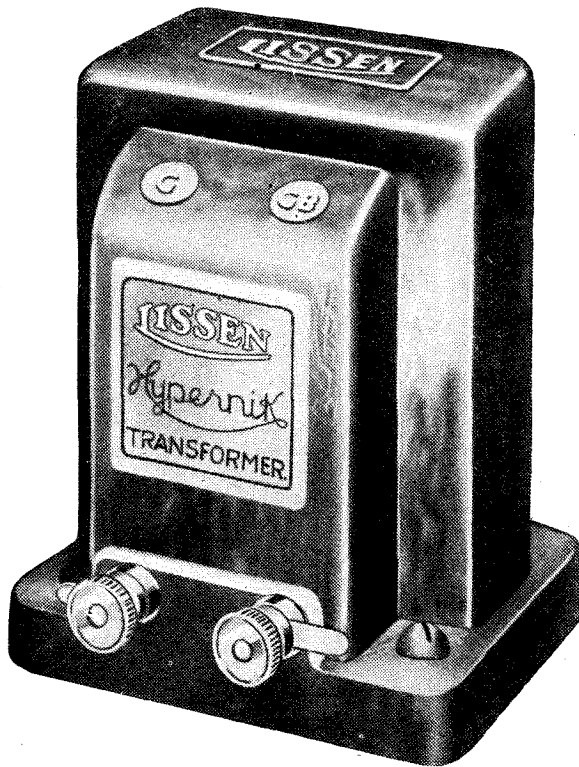
# Mr. Scott-Taggart's

## DEFINITE CHOICE

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## HYPERNIK TRANSFORMER



You CANNOT build the S.T.400 exactly as the ORIGINAL unless you *do* use a Lissen Hypernik Transformer. If substitutes are offered you, ask yourself this question: "Why did Mr. Scott-Taggart choose Lissen Hypernik for his own S.T.400?" The answer, of course, is that to get the fine results for which he was planning, a REALLY GOOD TRANSFORMER WAS NECESSARY—and you will be wise to let his FIRST CHOICE be yours!

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*John Scott Taggart*

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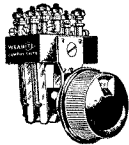
**RECOMMENDS**

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for the

**S.T.400**

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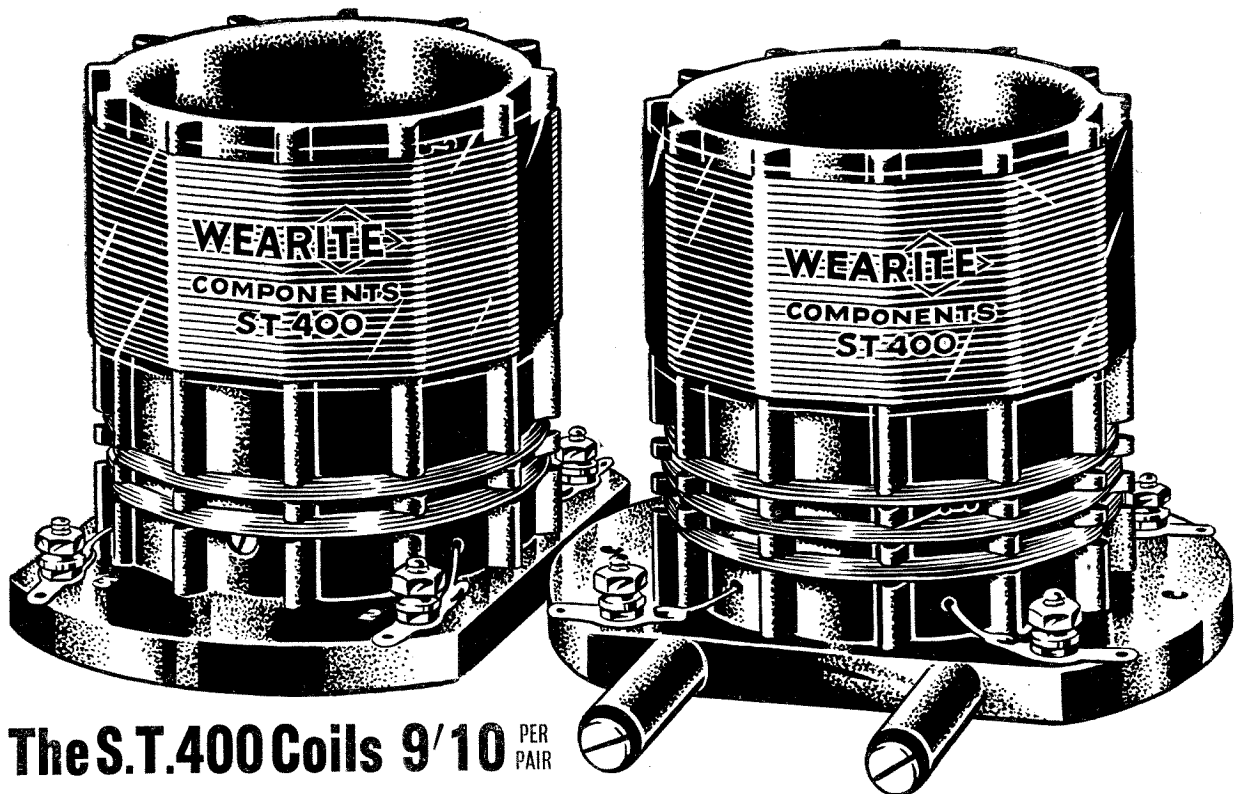


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# THE TRUTH ABOUT TONE CONTROL

*by Victor King.*



I do not think it is generally realised how closely tone is bound up with volume. That is probably because, in this hurrying age, many of us do not pause awhile and reflect on things as much as, perhaps, we should.

We tend to speak of tone or volume control as though they were things apart, although it demands only a little reflection to show that they are intimately related. With a given degree of amplification, it is impossible to affect tone without affecting the "quantity" of sound ultimately heard.

## What Really Happens

But what exactly is "tone control"? There is much glib talk these days about "bass lift" and "rising characteristics," though, as a matter of fact, these terms are most misleading; or, rather, their application is usually far from being strictly accurate.

### A LOSS—NOT A LIFT

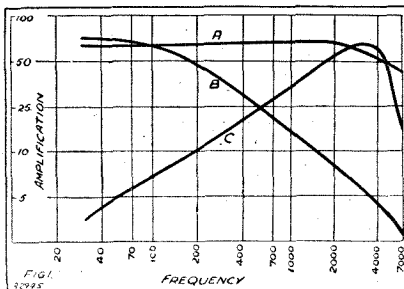


FIG. 1  
12925  
Curve A is before tone control is applied. When a bass loss is introduced as at C, the effect is as though the treble had been "lifted." The converse also applies to curve B.

My first diagram, Fig. 1, shows the curves obtained by a popular form of transformer-potentiometer tone control. With the arrangement set at "normal," a fairly straight line results (A). This indicates that all frequencies from about 30 to over 4,000 are given substantially equal amplification.

A low double bass or piano note is magnified just as much as a "middle C" or a high violin or trumpet note, in so far as their fundamentals are concerned.

Now it is said that when a certain adjustment is made to the apparatus a marked "bass lift" is given,

*Volume control and tone control are not the two entirely unrelated "commodities" that they are often supposed to be. Nor are "bass lift" and "treble lift" just what these terms convey. These two items form the theme of this outspoken article by a writer who always explains his opinions on radio matters in no uncertain manner.*

and a curve such as B is provided as a graphic illustration. But it takes no scientist to see that what exactly has happened is that the high notes have been considerably reduced. The low frequencies are receiving approximately the same treatment as hitherto, but there is an increasing drop of amplification on the high notes.

## Important Duty

Similarly, when a further adjustment is made, it is claimed that a "treble lift" follows. I am sure every reader of THE WIRELESS CONSTRUCTOR will be able to see at once from the C curve of Fig. 1 that, in reality, the low notes have been reduced.

You could truthfully speak of "bass lift" or "treble lift" only if the opposite end of the scale remained unaffected while there was an actual rise of amplification at the bass or treble end. However, that does not happen with tone control as such.

Instead of "bass lift," we ought to say "high note cut off," and in place of "high note or treble lift,"

we ought to refer to "bass reduction," and then we should be more clearly able to visualise the effects.

This should not be construed as an argument against tone control, or any of the proprietary devices which enable it to be carried out so effectively. Indeed, I am of the opinion that these latter will have an increasingly important duty to play as the technique of radio reception expands.

## Regaining Lost Volume

But you must not expect to be able to control tone without affecting volume. In order to obtain the greatest benefits from the various schemes, you should apply discriminate volume control coincidentally, unless in special cases this is done for you.

A straightforward tone control should never be operated independently of volume adjustments, and failing proper controls for these,

## AN INEXPENSIVE METHOD

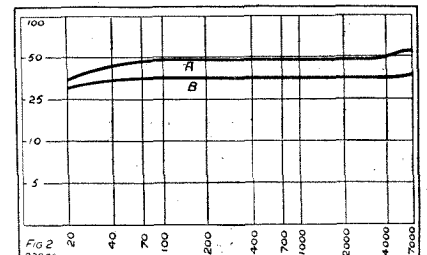


FIG. 2  
12926  
The almost straight characteristic curve shown at B is obtained by parallel feeding an inexpensive and small transformer. It is even better than curve A, obtained with a comparatively expensive transformer directly connected.

tuning and de-tuning is, at least, better than nothing.

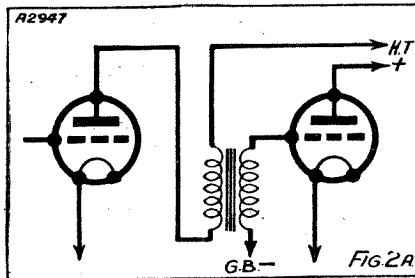
I have actually witnessed a constructor handling a tone control as though it were a volume control, which is, of course, about as wrong as anything could well be.

When it is necessary to pay toll in volume for a satisfactory tone

# The Truth About Tone Control—continued

adjustment, that is a straightforward transaction and reflects no discredit on tone controls in general. As I have said, the factors are intimately related, and you may often be presented with the two alternatives of "plenty of punch—bad quality," or "not so loud, but very pure," and you are quite free to make your choice.

## THE ORDINARY METHOD



Connected, as shown here, in the conventional straightforward manner, a transformer has to be very good to approach the quality given by parallel feeding.

Generally speaking, you lose most volume when you go for a "treble lift"; and I make no apologies for employing this term, for I am sure I shall not be able to suppress it or replace it for another, as it is too well implanted! And I suppose, after all, it does convey a pretty clear meaning!

However, you won't lose as much as the curves Fig. 1 might appear to suggest, for those are voltage amplification curves. You have to make fairly hefty variations in voltage amplification before they are noticeable in the resultant loudspeaker volume.

## Volume Visualised

The bass loss shown in curve C, for instance, does not mean you will hear only high notes, although this is the extreme of adjustment of the one particular tone control, and the effect will be pretty considerable.

You will get some idea of how volume varies with such tone adjustments if you can visualise volume as being represented by the space in the whole of such a diagram enclosed within the actual curve and the bass line. I say "some idea," because it is, indeed, only a very crude measure. Among other things, the ears do not react equally to different frequencies.

Well, I hope I have made my

first point. A "bass lift" in the literal meaning of the term could result only if the whole of the curve C in Fig. 1 were pushed up so that its bottom (left-hand) end rested on curve A. (Its "peak" would then soar right over the top of the present drawing!)

## Straight Characteristic

And my point is that for this to be done the amplification must be increased, and that is just what the average tone control does not do. Nevertheless, as I have intimated, a modern set works, or should work, with a margin, so that volume can be raised if necessary to compensate for tone-control losses.

There is another tone-volume tie-up which I must bring to your notice, although in this case it is not, perhaps, quite as drastic a link. I refer to the two methods of connecting L.F. transformers into circuit known as direct and parallel-fed.

These are shown diagrammatically in Figs. 2a and 2b.

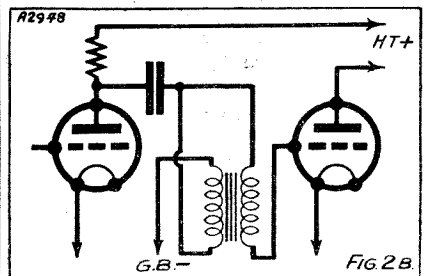
I think it is now generally conceded that it is not possible to obtain so inexpensively as with a parallel-fed transformer a wonderfully straight

characteristic such as is given at B in Fig. 2.

As a matter of fact, this actual curve was taken with a tiny little transformer having a core no bigger than half a dozen pennies laid on top of each other.

The other curve is not quite so good, but it took a comparatively expensive transformer to give that in a direct coupling.

## FOR LEVEL AMPLIFICATION



The parallel-fed method of transformer coupling is a most effective way of getting even frequency response from an inter-valve transformer.

But here is the vital point. The curves were taken in identically similar conditions, and even the ratios of step-up were exactly the same. But as the curves plainly show, the parallel-fed transformer only achieved its wonderful straightness at the expense of some drop in amplification.

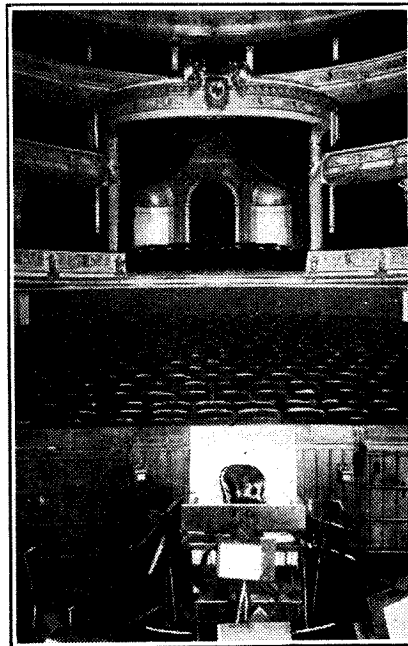
This drop is not such that there would be a very appreciable loss of volume, but, nevertheless, it is there. And I do not remember ever having seen it remarked upon before in print that it is inevitable that there should be a loss of this kind.

## Negligible Losses

If you work out the effective loss in terms of voltage amplification, you may tend to consider that the loss is more serious than in fact is the case. It all depends upon the margins of amplification to which you are working.

With our modern, very effective valves and high efficiency components it more often than not happens that a set cannot be extended to its limits, on at least the more powerful stations, without overloading occurring. So I, for one, can regard such losses as are encountered in tone controlling, and the use of the parallel-fed method of transformer coupling, with equanimity.

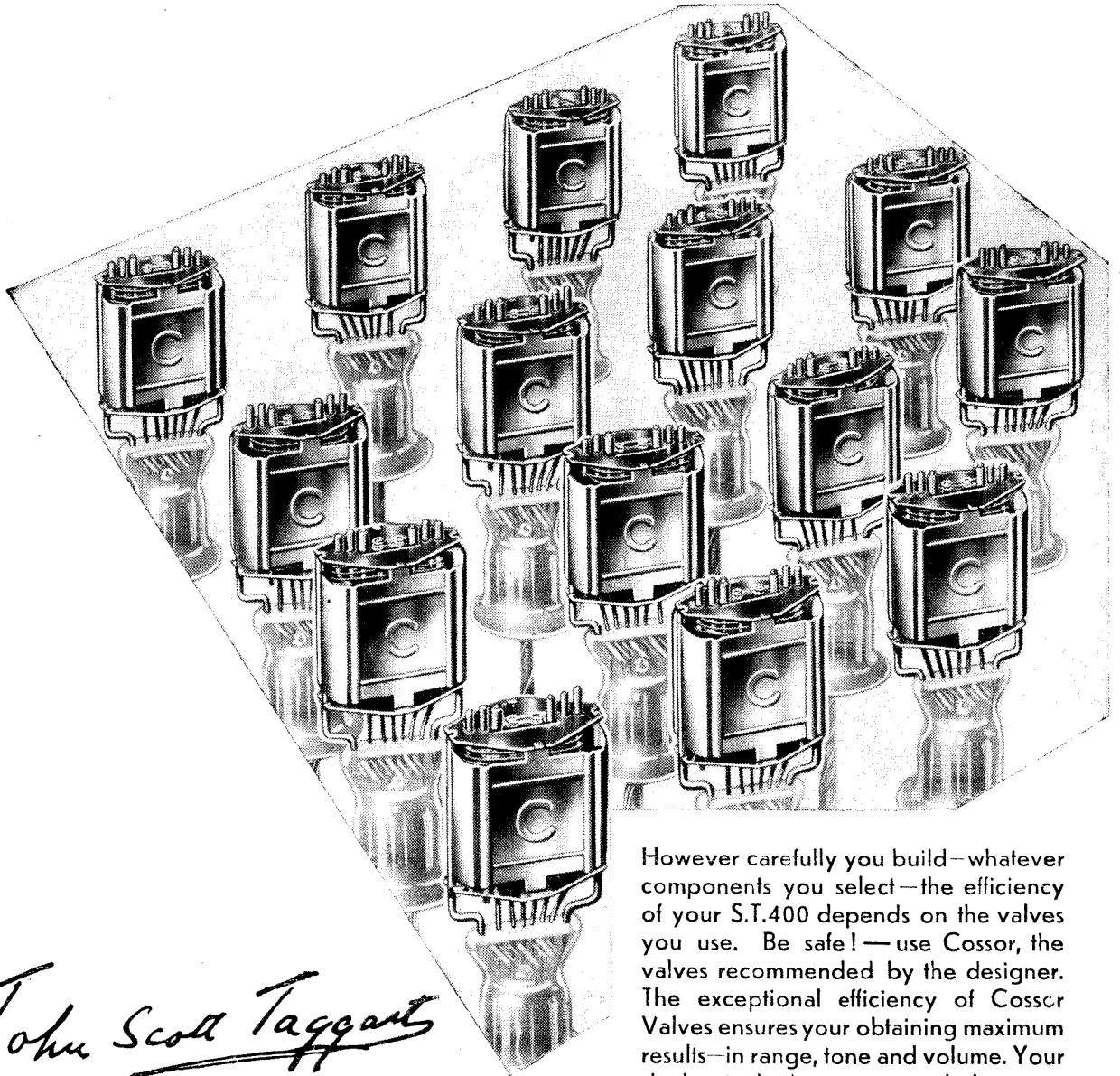
## WHERE TONE COUNTS



The Berlin State Opera House, from which relays are frequently made. The microphones are hung beside the conductor's chair. It is on such items as opera that the benefits of tone control are most appreciated.



# -for the S.T.400



*John Scott Taggart*

RECOMMENDS

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However carefully you build—whatever components you select—the efficiency of your S.T.400 depends on the valves you use. Be safe!—use Cossor, the valves recommended by the designer. The exceptional efficiency of Cossor Valves ensures your obtaining maximum results—in range, tone and volume. Your dealer stocks the recommended types:—

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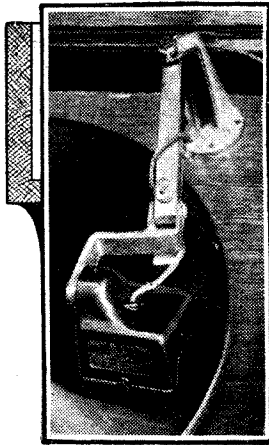
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W.C. 1/33 .....



# PICK-UP HINTS AND TIPS

*Some interesting notes on various practical aspects of radiogram reproduction.*

By A. BOSWELL

I MENTIONED last month in my notes that it is the easiest of matters for one to get so used to a record as it wears that one is entirely unable to appreciate that it is anywhere near so badly worn as it is. This can be the cause of one getting a very misleading idea of a new amplifier or radiogram when it is tried for the first time.

## Showing Signs of Wear

The frequency response range of the new apparatus may be so much better than the old one that it shows up the wear on the record in a way that the old instrument was unable to do. And not realising the extent to which the record is worn, it is easy to get an erroneous impression of the capabilities of the new outfit.

For this reason it is as well to have brand-new records with which to try out a new amplifier or radiogram. Particularly when one is considering its purchase and a fair amount of money is at stake.

Similarly, if it is battery operated, for goodness' sake don't starve it of high-tension. In this connection, I think advice along the lines of that given by the Shavex people is appropriate.

They say: "Give Shavex a fair chance, start with a sharp razor." So give the amplifier a fair chance, start with a new battery.

## Surprising Difference

As a matter of fact, the voltage of the high-tension where the electrical reproduction of records is concerned, is so vital that it simply cannot be over-emphasised. The amount of volume you can have is dependent upon the amount of H.T. you can supply, and where small battery power valves are concerned that extra 10 volts or so can make a surprising difference.

It may mean that another volt added to the grid swing can be tolerated before overloading takes place. And mentioning overloading—few people seem to realise how easily it is done and the great bearing it has on quality.

No matter what volume a valve seems to be capable of handling, many users seem to want to get just that little bit more.

## SOME RECORDS TO HEAR

.....	.....	.....
.....	The Blue Danube.	Broadcast
.....	Famous Choir of Canaries ..	Broadcast
.....	Round the Bend of the Road.	
.....	Singin' Sam ..	Broadcast
.....	Let's Put Out The Light.	
.....	The Blue Mountaineers ..	Broadcast
.....	The Old Brigade.	
.....	Debroy Somer's Band ..	Columbia
.....	Daly's Theatre Waltz Memories.	
.....	Charles Prentice and His Orchestra	Columbia
.....	She Was Only Somebody's Daughter.	
.....	Norman Long ..	Columbia
.....	I Beg Your Pardon, Mademoiselle.	
.....	B.B.C. Dance Orchestra ..	Columbia
.....	Otello Suite.	
.....	New Symphony Orchestra ..	H.M.V.
.....	Hallelujah Chorus.	
.....	Massed Bands at Crystal Palace	H.M.V.
.....	John Willie's Farm.	
.....	Gracie Fields ..	H.M.V.
.....	Love is the Sweetest Thing.	
.....	Ray Noble and His Orchestra	H.M.V.
.....	He's in the Infirmary Now.	
.....	The Blue Lyres ..	Zonophone
.....	.....	.....

Perhaps it is bound up with the fact that one never gets "shoutingly" loud effects until overloading takes place.

Big volume is not overbearing if overloading is not taking place. As a matter of fact, a small valve badly overloaded may sound horridly loud, whereas a larger valve not overloaded may be quite pleasant to listen to and yet be giving a considerably larger output than the smaller one.

## Noisy Effect

If more milliammeters were used people would soon appreciate how easily overloading can be indulged in

and the noisy effect that it produces. They would also soon learn to appreciate a small volume well within the capabilities of the valve in use, in preference to greater volume with the consequent distortion that is bound to occur with it.

## The Finest Method

We all agree that it is a little difficult to keep an eye on two things at the same time. And so for dead accurate timing of the turntable a small piece of paper tucked under the edge of a record and used in conjunction with a watch can be improved upon.

Of course, a stroboscope is the finest method and probably the quickest ever devised. One of its advantages being that the speed can be checked up in a second or two if one is suspicious that it may have altered.

But the stroboscope is of no use to those who have not A.C. mains in the house. And radiogram enthusiasts who have such mains are by no means in the majority.

## A Slight Scratch

A good alternative for them is to get an old record—it must be a really old one, because after the necessary treatment it will no longer be of use as a "tune"—and make a slight scratch across it in a straight line from the centre out to the edge of the recording. A heavy mark is not necessary and might possibly have a detrimental shaking effect upon the pick-up.

When the record is turning with the pick-up in place, a definite tap will be heard at every revolution of the record, thus enabling full concentration upon the watch while checking up the number of revolutions per second that the turntable is making.

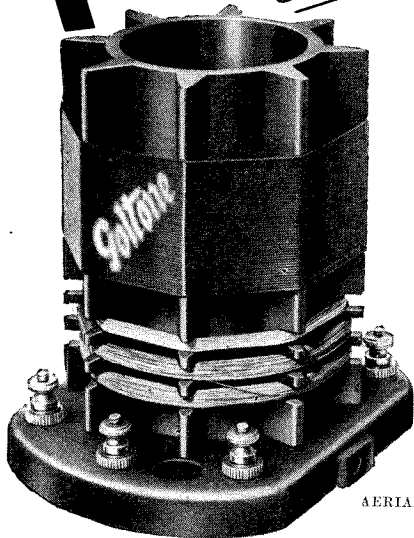
## Eminently Suitable

I seldom make comment upon the records that are listed from month to month upon this page, so would remind you that they are specially selected as being pre-eminently suitable for pick-up work. There are naturally some records that please to a greater extent than others where electrical reproduction is concerned, and which bring out the latent possibilities of the amplifier to the full, and it is with this in mind that the titles are selected.

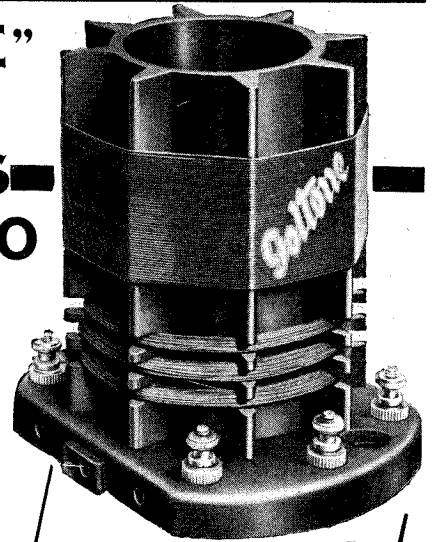
They are chosen from those recently issued and you will not go far wrong if you use them as a guide.

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- 1 1,500-ohms Spaghetti Resistance.
- 1 50,000-ohms Spaghetti Resistance.
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- 11 Terminals.
- 1 Panel, 16" x 7" x 3/16".
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Because the head is fixed at the correct angle, record wear is minimised, and light damping and good tracking is ensured. Full fitting instructions included.



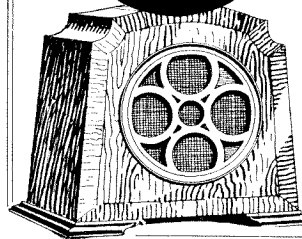
A "rest" for the British Radiophone Pick-Up can be supplied. Price 1/6 each.

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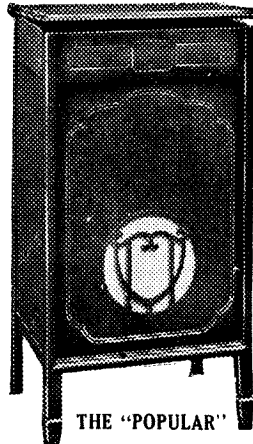
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THE "POPULAR"

# The READY RADIO

## S.T.400 KIT

SOME people are very keen on shopping, but there are many more who don't like it a bit. I once heard of a man who did not build a set in which he was particularly interested, simply and solely because it was too much fag to collect the necessary parts together.

### A Little Embittered

He complained that one might go into a radio shop and get some of the parts O.K. right away. But in respect of quite a lot more the salesman would offer him something different with the assurance that "it was just as good."

Even then there would still be a number of components to get. Some of these the salesman might offer to put on order, and the rest would have to be sent for by post. And by the time he had everything he was sure he would have lost interest in the receiver!

Well, I reckon he was a little embittered for some reason or other; but nevertheless there is a certain amount of truth in his grouse. Some people do experience a bit of bother in getting together just the right parts for a receiver, and perhaps the set gets held up for just one part. Then comes the temptation to substitute something else for it, which may lead to no end of bother in getting good results.

### Many Advantages

There's no doubt that it's as well to gather together all the parts before you start on a set, and what better way is there than buying them as a kit? There will then be no bother in collecting the parts, and no delay. You can start building while your enthusiasm is at its height.

We have recently had one of the Ready Radio "S.T.400" kits of parts in for inspection, and can say right away that it has many advantages to offer to the builder of this receiver. Take the insignificant fixing screws for holding down the components. What a lot of bother they

*Every item needed for constructing the set is supplied with the Ready Radio Kit, from the drilled panel down to the wire for connecting up and the screws for holding down the components. Here are some notes about it which will interest you.*

By a

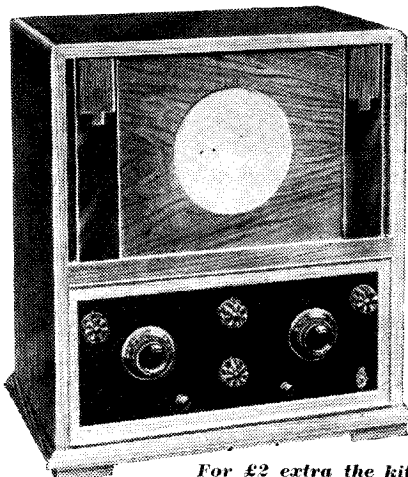
'Wireless Constructor' Technician

occasion in the building of a set in the ordinary way.

But not so with the Ready Radio kit. There is no searching for a screw just the right length; all the screws you will want are supplied with the kit.

Then, again, there is the question of wiring. Jiffilix are supplied for this, and they have an eyelet attached to each end ready for slipping over the terminals. These cannot open out

### IN WALNUT CABINET



*For £2 extra the kit includes a handsome cabinet of walnut which is designed to house all the batteries and the loudspeaker.*

like badly made loops in the ends of wires will, and they save no end of time.

Then there is the panel. It doesn't cost you any more, but it is supplied ready drilled for the components to be mounted.

Naturally, when buying a kit of parts, the constructor is anxious to know that it will prove quite satisfac-

tory. In this connection it is interesting to note that the Ready Radio kit of parts meets with the entire approval of Mr. Scott-Taggart himself.

Writing last month to the Editor, he said: "With reference to my 'S.T.400' Receiver described in the December issue of THE WIRELESS CONSTRUCTOR, I have received for test from Messrs. Ready Radio, Ltd., a kit of parts in accordance with the circuit. This kit has been tested, and has proved entirely satisfactory."

### Careful Tests

There can be no doubt in the mind of the purchaser of the Ready Radio "S.T.400" kit as to how to proceed, for the instructions include a full-size blue print of the receiver, and also a copy of the December THE WIRELESS CONSTRUCTOR in which the set is fully described by Mr. Scott-Taggart. There is also a chart of the wires which enables a correct length jiffilix to be chosen for every connection.

Every item which the constructor will need is included in the kit, except, of course, the pliers and screwdriver. But no one expects a set of tools to be included with a kit of parts!

Careful tests are given to all the components before they are sent out to ensure that nothing faulty can fall into the constructor's hands. So comprehensive is this test that every component carries a two years' guarantee.

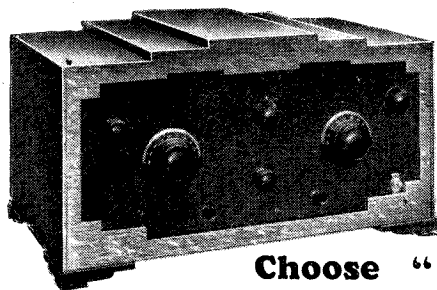
### After-Sales Service

Messrs. Ready Radio, Ltd., do not lose interest in their customers as soon as the transaction is completed. Every purchaser of a kit is entered as a Ready Radio registered user, and is thus assured of a useful after-sales service.

He will be informed from time to time of any new developments, and at the same time is entitled to take advantage of a query service and may write on any technical question.

And now for some details about the cost of the Ready Radio "S.T.400"

**IT'S ON THE FRONT COVER—**



It costs only  
**19'6**  
Carriage Paid.

Choose **"CLARION"**—  
**Mr. SCOTT-TAGGART did**

WHY construct a receiver which performs excellently and then fit it into a box of crude design and worse finish, stamping it as an amateur production?

The Clarion "1933" Radio Furniture Catalogue will open your eyes to the possibilities of the home constructed set, listing as it does a variety of cabinets to suit all tastes and pockets.

Before deciding on your new cabinet, get our "1933" Illustrated Catalogue "T.C."

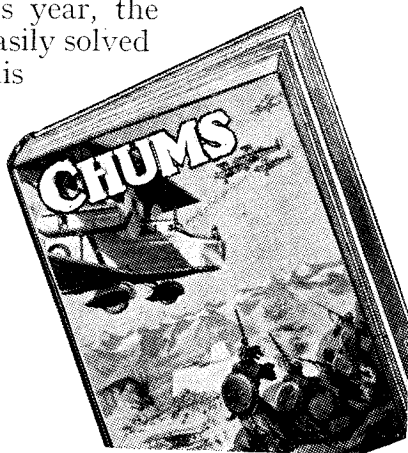


**CLARION**  
Radio Furniture

28-38 MANSFORD STREET, LONDON, E.2.  
Telephone: Bishopsgate 6371.

**A REGULAR BOOK FOR A REGULAR FELLOW**

CHUMS ANNUAL is a regular book for a regular fellow. It contains 832 pages of gripping fiction and articles. And its pictures—there are hundreds of them, and all first-class—so are its beautiful coloured plates. CHUMS ANNUAL is good—boys will never tire of reading it. If you're in doubt what to give this year, the problem is easily solved if you get this splendid gift book.

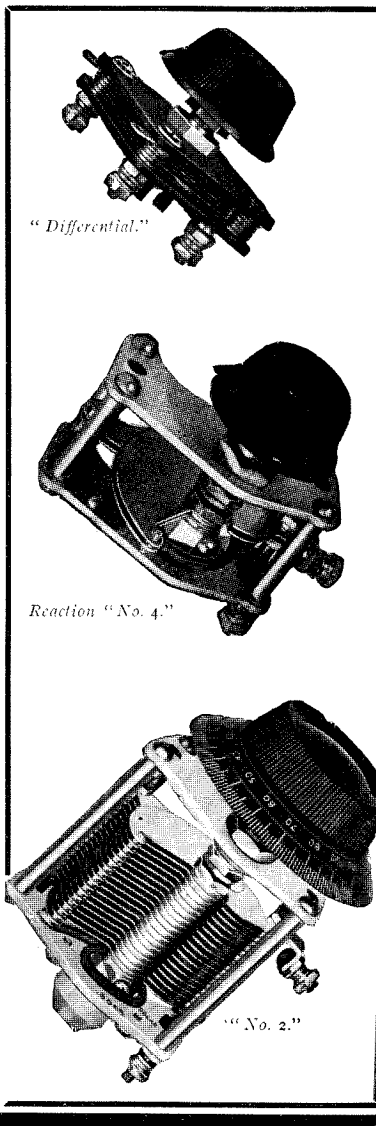


On sale at all Book-sellers and News-agents.

**12'6**

**Here are your Condensers for the S.T.400**

When making his choice of components for incorporation in the "S.T.400," Mr. John Scott-Taggart knew from experience that Polar would contribute largely to its success.



"Differential."

Reaction "No. 4."

"No. 2."

**POLAR "DIFFERENTIAL"**  
Capacity '0003 each side, Specified. Constructed of highest quality materials throughout. Smooth action. Very accurate control. '0001, '00015 '0003. **3/-**

**POLAR REACTION "No. 4"**  
A small air-dielectric reaction condenser. Made in aluminium with brass pillars. Robust construction. Bonded rotor vanes. Ball bearings give smooth, easy control. Supplied with pointer knob as illustrated. '0001, '00015, '00025, '00004. **3/9**

**POLAR "No. 2"**  
A condenser which, although amazingly low in price embodies the finest and most modern constructional points. Fast and slow motion with ball-bearing spindle positive pig-tail connection, one-hole fixing. Made in hard aluminium with brass pillars for rigidity. These features, with its precise workmanship, make the "No. 2" the most outstanding condenser of its type. '0005, '00035, '0003. **6'6**

**POLAR PRE-SET**  
'0003 - **1'6**

Polar Condensers are obtainable from all Dealers. Write for complete Catalogue "C."

**POLAR CONDENSERS**

**WINGROVE & ROGERS LTD.**  
188-9, STRAND, W.C.2. Polar Works, Liverpool.



## The Ready Radio "S.T.400" Kit—continued

kit. The price is £4 17s. 6d., or with the four specified valves £6 16s. 9d.

Those who also want a cabinet for the set have one available at £2. It is made of walnut and has accommodation for batteries and loudspeaker, being of the console type. This cabinet is illustrated on the first page of this article.

### Just the Right Kind

Messrs. Ready Radio have specialised in kits of parts for home constructors, and therefore know all about the little points that are likely to crop up, and are thus able to guard against them well in producing their "S.T.400" kit of parts. As I have indicated, the kit method of construction is undoubtedly the most straightforward way of setting to work on the construction of a new set—you save time, you save bother,

"S.T.300." For their benefit, a kit of specially selected components is available which makes the conversion as simple and straightforward as possible.

### A Reduction

This complete conversion kit, with instructions for turning your "S.T.300" into an "S.T.400," costs £1 15s. And, moreover, any "S.T.300" purchaser of this kit may obtain a reduction of 2s. if he sends the original aerial coil out of his "S.T.300" when ordering.

There is one final point that merits mention in connection with the Ready Radio "S.T.400" Kit, but which is by no means the least important; these kits are distributed in the same way as any ordinary radio component is distributed throughout the country. That is to say, the radio wholesalers

store and buy a Ready Radio Kit just as one would purchase an ordinary '0005 variable condenser.

The producers of this excellent kit have made a speciality of this method of distribution for kits of parts, and from the constructor's point of view it has everything to recommend it and nothing against it. A. S. C.

\*\*\*\*\*  
**CELLS FOR CHARGING**  
 \* *Two months constant work and* \*  
 \* *still at it is the record of the* \*  
 \* *Daniell cells described here.* \*  
 \*\*\*\*\*

The four cells have now been in continuous service for two months, charging all sorts and conditions of accumulators, with scarcely a breather, and are as lively as ever.

I hate to confess it, but the name of the cells is "Daniell." In case, as I strongly suspect, I have previously said some nasty things about these cells, I take it all back unreservedly.

They are perfect little gentlemen. And as they have been so successful, perhaps some readers may be interested in the running cost. Over a period of two months they have used 2 lb. of copper sulphate at 1s. 6d.

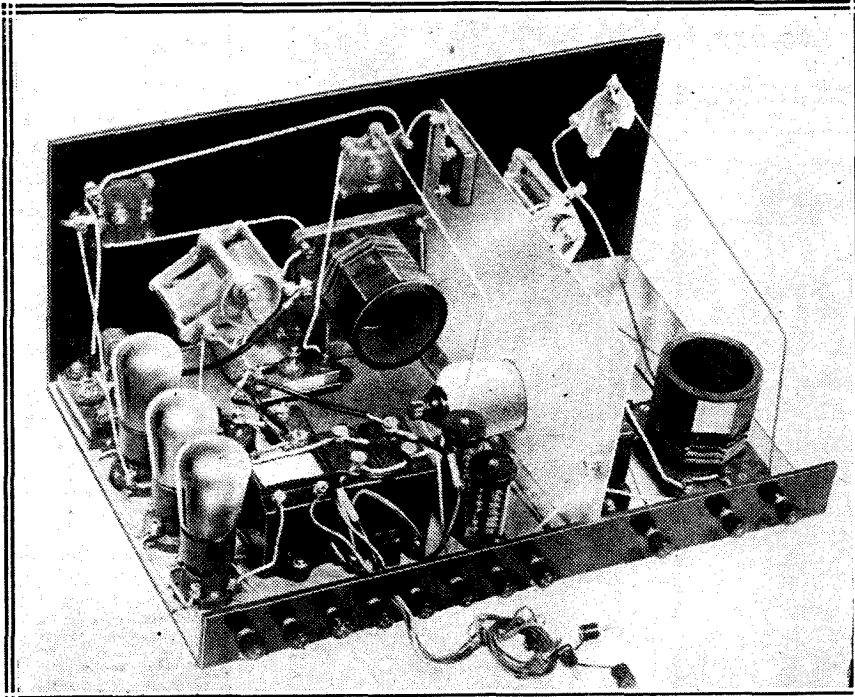
The four large zincs, costing 1s. 6d. each, have still a third of their life to run, at a cost to date of 4s. Zinc sulphate, which we used in preference to sulphuric acid, as it avoids wasteful consumption of zinc, is negligible, a teaspoonful or two in each of the porous pots apparently keeping things going indefinitely, but one may call it 6d. A total cost of 6s.

### Compares Favourably

To bring a 2-volt 30-amp. hour Exide from scratch, specific gravity 1,050, up to its maximum of 1,250, took the cells four days and nights of constant work. Allowing seven weeks of continuous use (and this is well below the mark) the cost of a four days' charge comes out at 6d., which compares favourably with standard charging rates.

As a means of obtaining a small but steady and continuous current, one can recommend these cells to anybody who is in difficulties. They need little attention; except for an occasional rub of mercury on the zincs to ensure the minimum of wear and tear, you can safely leave them to work continuously without supervision. P. L. A.

YOU WILL FIND IT VERY SIMPLE TO ASSEMBLE



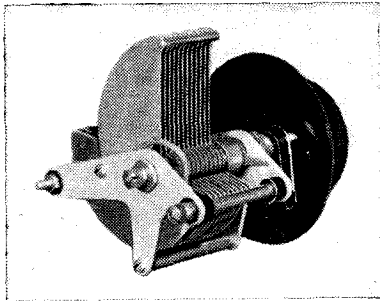
With every kit of parts, Messrs. Ready Radio, Ltd., supply a full-size blue print and a copy of "The Wireless Constructor," which contains full details for building the "S.T.400." Incidentally, every purchaser is entitled to take advantage of the Ready Radio Query Service for Registered Purchasers.

and you know that all the parts are of just the right kind. Furthermore, with the Ready Radio kit you know that every part is in perfect working order, having been thoroughly tested before dispatch.

Before closing these notes, mention may well be made of the Ready Radio conversion kit for owners of the

hold stocks of them which they distribute to the retail stores and shops.

It is thus not necessary for the purchaser to deal direct with the producers. Time in ordering is thus saved and the bother of sending away by post obviated. As a matter of fact, it is possible in a very large number of cases to walk into a good radio



## ALL VARIABLE CONDENSERS for the S.T.400 for only £1-1-3

- 2 Slow Motion Condensers (all brass) Type 27. Cap. .0005 .. 10/6
- 1\* Differential Condenser, Type 60. .0001 2/3
- 1 Differential Condenser, Type 60. .0003 2/3
- 1 Differential Condenser, Type 60. .00035 2/3
- 1\* Aerial Coupling Condenser, Type 80. .00004 .. 4/-

\*Specified by the designer.

WRITE FOR ILLUSTRATED CATALOGUE

## WAVEMASTER

The Webb Condenser Co., Ltd., 42, Hatton Garden, E.C.1

# SPECIFIED

and recommended by  
**Mr. Scott-Taggart**  
for the

# "S.T.400"

The Varley NICLET was specified in the original "S.T.300," and Mr. G. P. Kendall, B.Sc., Chief Engineer of Ready Radio, has chosen it in preference to all alternatives for inclusion in the Ready Radio "S.T.400" Kit. See that you get THE S.T.400 NICLET—specially designed and labelled for this great set by Varley.

The S.T.400 NICLET **READY NOW** 7/6

# Varley

Props.: Oliver Pell Control Ltd.  
Advt. of Oliver Pell Control Ltd., 103, Kingsway, W.C.2. Tel.: Holborn 5303.

## CONNECTING THIN WIRES

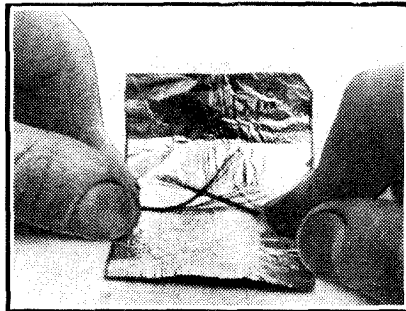
*A Useful Method.*

It is often a difficult task to connect thin wires, flexes, and so forth, particularly if you only want to make a temporary, yet electrically efficient, connection, and at the same time do not wish to go to the trouble of soldering the wires together.

The best way of tackling such a job is outlined below.

Bare and clean the thin wire or wires which you require to be electrically joined together. Then take a piece of silver paper from a cigarette packet, and spread the wires on it, as shown. Roll the silver paper

### IT'S VERY EASY



Silver paper from a packet of cigarettes enables you to make an excellent join as explained.

up tightly over the wires, and then, over the resulting join, roll a small piece of copper foil or thick lead foil, squeezing the parts together by means of a pair of pliers.

## AS WE FIND THEM

### A NEW WANDER-PLUG

For the "S.T.400" it was desired to incorporate G.B. plugs which allowed for double tappings, and as a result Messrs. Lectro Linx, Ltd., produced their dual wander-plug, which was fully approved by Mr. Scott-Taggart and specified by him for this receiver.

We have had the opportunity of testing a sample of this new addition to the Clix range, and can testify as to its efficiency.

It is an ingenious and well-constructed plug, which is fully up to the high standard which one associates with Clix fittings.

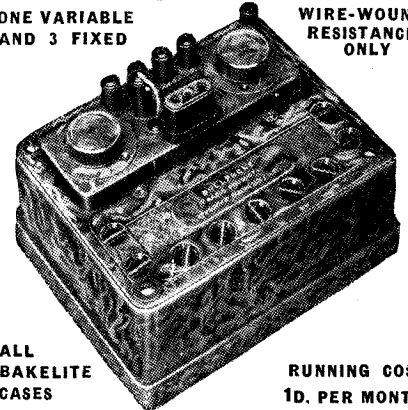
The contact with this type of plug is extremely good, and we have no hesitation in recommending it.

## THE WORLD'S BEST

20 M.A. AT 20v AC MAINS 200-250v 45'

50% CHEAPER 25% BETTER than any other make.

ONE VARIABLE AND 3 FIXED WIRE-WOUND RESISTANCES ONLY



ALL BAKELITE CASES

RUNNING COST 1D. PER MONTH

### OTHER MODELS

- A.C.2 Same as A.C.1, but with Trickle Charger. 60/-
- A.C.3 150v. 30mA. 4v. Raw A.C. 60/-
- A.C.4 Same as A.C.3, but with Trickle Charger. 75/-
- A.C.5 200v. 50mA. 4v. Raw A.C. 70/-
- D.C.2 140v. 35mA. One Variable, three Fixed. 35/-

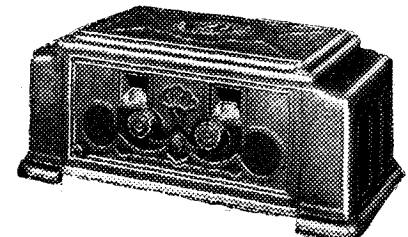
### WESTINGHOUSE

### METAL RECTIFIERS

- D.C.1 25mA. OUTPUT For 22/6 150v. or 230v. Mains.
- 10/- Deposit and balance monthly, will secure any Bullphone Eliminator. Ask your local dealer for particulars, or write direct to address below.

### NIGHTINGALE 3-VALVE RECEIVER

We have only a limited number of these famous receivers for disposal at this price. All bakelite base, size 18 x 9 x 9. Make sure of being one of the lucky owners of this receiver—TO CLEAR undoubtedly the greatest prize at our price ever offered in radio. Ask your dealer or send cash direct—but don't miss it. Usual Price 80/- To clear—45/- Cash refunded if not satisfied.



The Technical Staff of "Wireless Constructor" highly recommend Bullphone Eliminators and components for all their circuits. Don't be put off with any other make. There is no other as good, not at double the price. If your dealer cannot supply, send direct.

# BULLPHONE RADIO

NEW NORTH RD. BARKINGSIDE, ESSEX  
PHONE CHIGWELL 162



# OUR NEWS BULLETIN

## Cause and Effect

THE Post Office campaign against wireless pirates, which began on October 10th, resulted in the record number of 784,000 licences being taken out by the end of the month. Of course, this figure includes renewals of licences, but, nevertheless, it is 144,000 more than in any other month.

More than 900 prosecutions were initiated against pirates during October.

## A Change of Face

A subtle change is coming over the Press as regards its attitude to the B.B.C. The other day the "Daily

Mail" had a leader on the B.B.C.'s ten years of activity, and pointed out that "no other country in the world can boast of so vast an army of paying listeners, nor has any other country that diversity of entertainment and learning. The B.B.C. is readily recognised as a model for the rest of the world; thus from whatever standpoint we view this wonderful organisation, the British Nation has just reason to be proud of it."

## From the Year Book

After reading the "Daily Mail" leader, it was interesting to note in the B.B.C.'s Year Book for 1933 that the attitude of the Press towards broadcasting was characterised in the 1930 Year Book as follows: "It cannot be described as ever having been cordial, although it has fluctuated between definite hostility and mere watchfulness."

mere watchfulness."

"This will suffice," states the Year Book, "as a summary of affairs up to that date, and might, with modifications, hold good to-day."

## "The Recent Tendency"

There is another little paragraph in the Year Book dealing with the relations of the B.B.C. to the Press, which some of our self-appointed B.B.C. advisers might take to heart:

"The recent tendency," states the Year Book, "therefore, is for hostility of the Press on its own behalf to give way to active but by no means invariably informed and responsible criticism on behalf of the listeners' interests as it sees them."

## Contradictory Criticism

In another section of the Year Book—which, by the way, is a very fine production at the reasonable price of 2/-, and full of facts of interests to all listeners—there is reference to the occasional unnecessary extreme and hopelessly contradictory criticism (published in the Press) which is of so little help to the B.B.C.

The following examples are given: The B.B.C.'s broadcast, "The

(Continued on page 248)

# ADAPT YOUR S.T.400 TO SHORT WAVES . . . !

*Mr. Scott-Taggart says: "The set is particularly suitable for giving LOUDSPEAKER results when used in conjunction with a Short-Wave Adaptor."*

The Magnum Short-Wave Adaptor is specially recommended for use with the famous S.T.400. It will bring within the range of this popular receiver a whole host of short-wave stations from all over the world at good loudspeaker strength. It can be fitted in a few seconds, and the price is only 39/6 complete, including one coil 40/80 metres, cord and plug. Extra coil 18/40 metres - - 3/-

## SPECIFIED FOR THE S.T.400

### MAGNUM

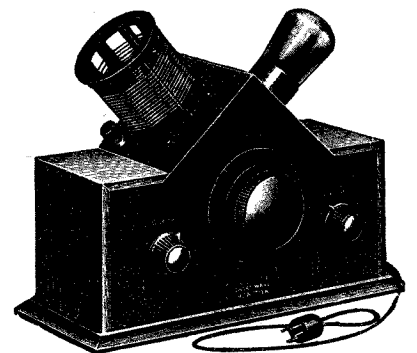
Aluminium Sandblast Screen- - 1/9  
Baseboard Foil - - - 9d.

## OTHER RECOMMENDED MAGNUM COMPONENTS

Aerial Coupler, .00004 - - - 1/6  
S.G. Binocular Choke - - - 3/6  
Reaction Choke - - - 1/6  
Spaghetti Resistance - - - 1/6

The S.T.400 is available ready wired and tested.

This adaptor is equally suitable for use with other sets, whether A.C. Mains or Battery operated, provided a S.G. Valve is not used as detector.



**MAGNUM SHORT-WAVE ADAPTOR . . . . 39/6**

## FREE TRIAL OFFER

To enable you to test our claims for yourself, a Magnum Short-Wave Adaptor will be sent on ten days' free trial against cash. Send at once for lists including the latest Short-Wave Stations, and "Stenode" Brochure.

# BURNE-JONES & CO., LTD.,

"Magnum" House, 296, Borough High Street, LONDON, S.E.1.

Telephones: HOP 6257, 6258.

Scottish Agent: Mr. ROSS WALLACE, 54, Gordon Street, Glasgow, C.1.



# JOHN SCOTT-TAGGART SPECIFIES



## IN THE S.T. 400

This famous designer trusts Igranitic tested Components in his wonderful new set, the S.T. 400, and specifically recommends the following:—

- \* 1 2-mfd. Fixed Condenser - - Price 2/9
- 1 1-mfd. Fixed Condenser - - " 2/3
- \* 1 1,500 Spaghetti wire - wound Resistance - - " 6d.
- \* 1 20,000 Spaghetti wire - wound Resistance - - " 9d.
- \* 1 50,000 Spaghetti wire - wound Resistance - - " 1/-
- 1 'Midget' L.F. Transformer - - " 10/6
- 2 Push-Pull Switches - - " 9d.
- 1 'Midget' Switch - - " 1/6
- 1 'Midget' Switch, With Terminals " 1/8
- 11 Terminals

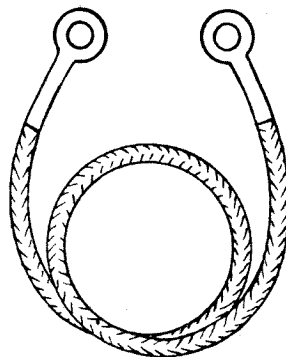
\* Incorporated in the model set.

### Also the IGRANIC D.9 SPEAKER

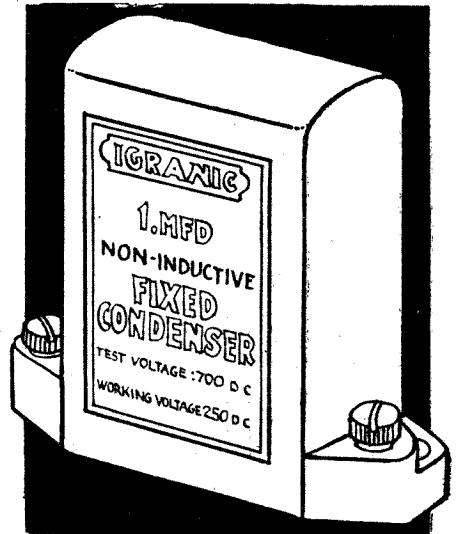
This NEW type Permanent Moving Coil Speaker, since its introduction at Radiolympia, has achieved an amazing popularity.

PRICE **32/6**

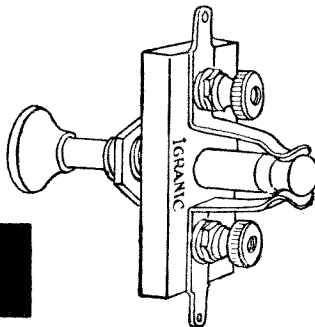
Mr. Scott-Taggart uses Igranitic Components because he has tested them and proved their superiority—due to the fact that all Igranitic Components are built of the finest materials.



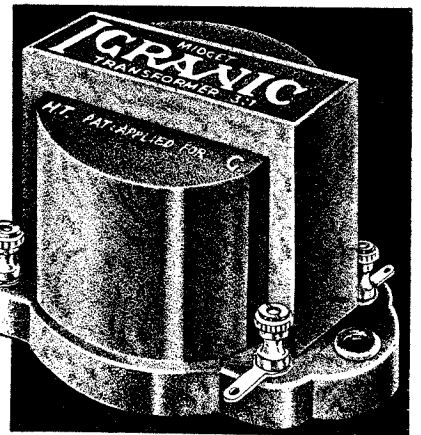
Igranitic Spaghetti Resistance



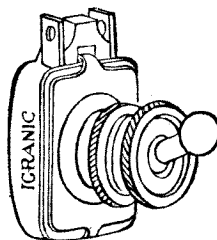
Igranitic Fixed Condenser



Igranitic Push-Pull Switch



Igranitic Midget L.F. Transformer



Igranitic Midget Switch

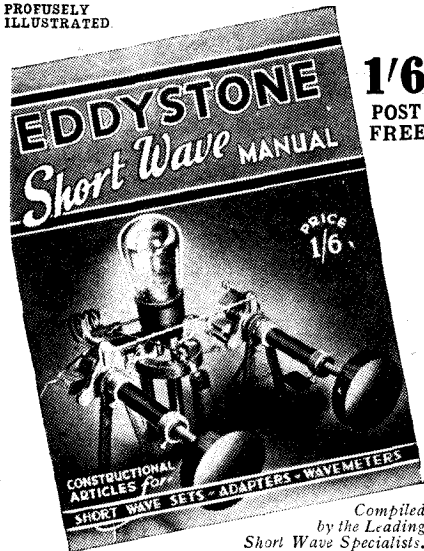
**IGRANIC**  
**COMPONENTS WILL**  
**BE THE MAKING**  
**OF YOUR SET.**

Write to-day for fully Illustrated Catalogue No. J1211 of complete new range of Igranitic Components.

IGRANIC ELECTRIC CO. LTD., 149, Queen Victoria Street, London, E.C.4  
CVS—38

**• EVERYONE—**  
**INTERESTED IN SHORT WAVES**  
**SHOULD READ THIS BOOK!**

CLEARLY WRITTEN.  
 PROFUSELY  
 ILLUSTRATED



● "The EddyStone Short Wave Manual" includes fully illustrated constructional articles for building 2-, 3-, and 4-valve short-wave receivers, a 1-valve super-het. S.W. converter, a 1-valve S.W. adapter, a dynatron and heterodyne wavemeter, and a 7-metre ultra S.W. converter. Articles on short waves, short-wave tuning, S.W. condensers, trouble locating, etc.

List and cost of parts given in detail for each set.  
 Ask your Radio Dealer for this splendid book.  
**EDDYSTONE**  
**SHORT WAVE**  
**MANUAL**  
 STRATTON & Co. Ltd. (D) BROMSGROVE STREET, BIRMINGHAM.  
 LONDON Service Depot: WEBB'S RADIO STORES, 164, Charing Cross Rd., W.C.2

**SCREEN AND FOIL.** For "S.T.400" as specified. Aluminium Screen, Silver-frosted finish, 10" x 6" with S.G. Hole and Notched. 1/9. Foil, 10" x 7", Copper 9d. Aluminium 6d. Special Post Free Offer: Screen and Copper Foil, 2/6. Screen and Aluminium Foil, 2/3. "Rex" Patents Co., "Rex" Works, Park Rd., Kingston-on-Thames

Famous Makers Offer! **£5** Radio-Gram CABINET for **65/-**  
**7 DAYS' FREE TRIAL** (OR 10/- MONTHLY.)  
 Polished Oak! and Piano built! the acoustic Tone brings a fine thrill. Makers to (Radio Press, B.B.C., 5,000 clientele).  
 Other Models 35/- to £15.  
**PICKETTS** Piano-Tone Cabinets. (O.W.) Albion Road, Bexleyheath

**FOR "S.T.400"**  
**PICKETTS CABINETS**  
 As Recommended by John Scott-Taggart.

**TAYLEX WET H.T. BATTERIES.**  
 Give long service, improved volume and tone; very economical.  
 Replacements for Taylex or Standard batteries at low prices; details post free; also Bargain List, Radio Kits and parts at lowest prices.  
**C. TAYLOR, 57, Studley Rd., Stockwell, London.**

**WIRELESS IS THE WORLD'S**  
**FINEST HOBBY,**  
**MAKE IT A PROFITABLE ONE.**  
**SAVE MONEY,**  
**MAKE MONEY,**  
**NO OUTLAY.**  
**JOIN THE ELECTRO CET CLUB**  
 Every Wireless Salesman, Experimenter, Constructor  
 should write his name and address in the margin, and post in 1d. unsealed envelope for particulars, and FREE 1,000 illustration catalogue of all makes, components, kits, and sets.  
**ELECTRO CET 3, SOLIHULL, BIRMINGHAM,**

PLEASE be sure to mention "Wireless Constructor" when communicating with advertisers. THANKS!

**OUR NEWS BULLETIN**

—continued from page 246

Testament of François Villon," provoked the following from the "Sunday Referee": "Of all the clotted nonsense . . ."; while the "Manchester Guardian" stated: "One of the best plays the B.B.C. has given us." The "Daily Herald" found horror in the play, "The Forsaken City," but the "Manchester Guardian" said there was nothing in it which could support the assertion of horror-mongering by the B.B.C.

The "News Chronicle" said of "Oxford Blazers": "Capital entertainment it was"; while the "Saturday Review's" opinion was: "The year's worst broadcast up to date."

There is no doubt people at Broadcasting House must chuckle up their sleeves quite a lot when they see radio criticism of this kind in the newspapers.

**A Waste of Time**

By the time this issue of THE WIRELESS CONSTRUCTOR is on sale the International Wireless Conference at Madrid will have broken up.

There is no doubt this Conference, from the listeners' point of view, has been a failure. After a waste of time and money, various delegates from Austria, Portugal, Greece, Hungary, etc., started to make protests because of the lack of results, and several representatives of various countries announced that their Governments had told them they had been wasting their time too long in Madrid and had better come home.

**Worse to Come**

Anyway, the fact remains that nothing of any importance has been decided upon which will put into effect new methods for controlling the congestion of the ether and the indiscriminate building of high-power stations. So, despite all the chatter at Madrid, listeners may as well be prepared for an even more intensive period of interference in the ether.

**The Truth—**

Sir John Reith doesn't often write articles in the newspapers, but a little while ago he contributed an interesting article on the future of British broadcasting to the "Daily Telegraph."

In concluding his article, Sir John wrote:

"The B.B.C. has, in fact, little—if any—hesitation in claiming to have aimed high and to have endeavoured

in every phase of its activity and with every concentration of brain and will, to have deserved well of the community; to merit, if not to receive, the goodwill, encouragement and even the gratitude of the community; and if perchance not even to merit, then this at least through no lack of effort."

We think even the most bitter critic of the B.B.C. will have to admit that the truth in the above extract cannot be denied.

**Political Broadcasts**

Even the "Daily Herald" the other day had a little article which contained the following:

"Whatever critics of this or that aspect of the programmes may say, there is little doubt that the B.B.C. provides the public with better fare than any broadcasting corporation in the world. . . . But there is—and until there is an alteration for the better there will continue to be—grave dissatisfaction with the political broadcasts.

**Too Much Bias**

"This," continued the "Herald," "was the subject of complaint by Mr. Ramsay MacDonald during the 1929 Election campaign when he noted the Conservatives having 'two kicks at the football' to Labour's one. . . . A further outcrop of bias was displayed over the broadcast speeches in connection with the resignation of Viscount Snowden and the Samuel Liberals from the Cabinet.

**Fairness, Please**

"No Labour spokesman was permitted to state the Opposition view of the situation thus created. Yet Labour represents nearly one-third of the electors.

"Those who remember Mr. Whitley's admirable impartiality and his jealous ward of the rights of the Opposition when he was Speaker of the House of Commons look to him to insist upon the same fairness from the B.B.C."

**"Empire" Call-Signs**

It is understood that the British Empire Short-Wave Station at Daventry will be given eight different call-signs representing the eight different wave channels to be used.

The call-signs are as follows:

- G S A—49-58 metres.
- G S B—31-54 "
- G S C—31-29 "
- G S D—25-53 "
- G S E—25-28 "
- G S F—19-81 "
- G S G—16-88 "
- G S H—13-97 "

(Continued on page 249)

**OUR NEWS BULLETIN**

—continued from page 248

**B.B.C.'s Music**

The B.B.C.'s music library is one of the wonders of Broadcasting House. The collection includes to-day, among other music, complete scores and parts of some 11,000 musical items, and the whole collection is valued for insurance purposes at £30,000.

**Rather Costly**

According to statistics just published in Italy, there are in that country 239,000 wireless licences for a total population of 42,000,000. Milan tops the list with 31,157, while Rome has 19,362. The cost of a licence per year is approximately 25s.

**The Scapegoat**

Do you know why schoolgirls have weary eyes? Well, according to the Medical Officer of Health who recently examined several hundred schoolgirls in Beckenham, he found that all but two were seriously in need of more sleep.

To a meeting of parents, the headmistress said: "I think noisy homes are largely responsible. It is impossible for your girls to get good sleep when you have the wireless on." What will wireless be blamed for next?

**Radio in Prince's Car**

The Prince of Wales has had one of his motor-cars equipped with a wireless set, so that he can listen-in while travelling along the road. It is understood that the set is built into the car in a box installed under the foot-rests for the rear seat passengers. An automatic device controls the volume from the loudspeaker as the car passes in and out of screened areas. A second loudspeaker has been placed in the driver's compartment.

**The B.B.C.'s New Organ**

The new organ which is expected to be working in the Concert Hall of Broadcasting House early in 1933 has been designed and built by the British firm John Compton, of cinema organ fame.

Many people imagine that "Wurlitzer"—the name of an American firm—suffices to describe any cinema organ, but actually there are nearly 200 British Compton organs installed throughout the country. One of the most interesting of these is at the Shepherd's Bush Pavilion. Incidentally Mr. Reginald New, a most successful broadcaster, is a fine exponent of Compton organ technique.

# S.T.400

## Easibilt Constructor Kit

*Efficiency with Economy*

As pioneers of Radio on Easy Terms, we have created this wonderful opportunity. In order that you can enjoy the amazing performance of Mr. John Scott-Taggart's latest set, the "S.T.400," we have produced the **EASIBILT "S.T.400" KIT**, available **CASH, C.O.D., or H.P.** direct from us, **GUARANTEED EFFICIENCY WITH ECONOMY IS OUR SLOGAN**

YOURS FOR  
FIRST PAYMENT OF

# 7/-

CARRIAGE PAID  
Balance in 11 monthly payments of 7/-

**EASIBILT "S.T.400" KIT**

Contains these fully Guaranteed Parts

	s.	d.
1 Peto-Scott aerial coupler, -00004 ...	3	6
1 Slektun super transformer, ratio 4-1 ...	3	6
2 Sovereign S.T.400 coils ...	3	6
2 Keystone -0005 variable condensers ...	12	0
2 Sovereign -0005 preset condensers ...	2	6
1 Keystone -0001 differential condenser ...	2	6
3 Valve holders ...	1	0
1 W.B. universal valve holder ...	1	0
2 Peto-Scott 2-point switches ...	1	3
1 Peto-Scott binocular choke ...	3	0
1 Lewcos reaction choke ...	2	6
1 Goltone -0003 fixed condenser ...	2	0
2 Graham-Farish -006 fixed condensers ...	2	0
2 C.E.C. 2-mid. fixed condensers ...	4	0
1 Dubilier 1-mid. fixed condenser, type 9209 ...	2	9
1 Keystone -0003 differential condenser ...	2	6
1 Keystone -00035 differential condenser ...	2	6
1 Sovereign 1-wg. grid leak with holder ...	1	3
1 Sovereign 1,500-ohm spaghetti resistance ...	1	10
1 Sovereign 50,000-ohm spaghetti resistance ...	1	1
1 Sovereign 20,000-ohm spaghetti resistance ...	1	10
1 Sovereign 60,000-ohm spaghetti resistance ...	1	1
1 Bulgin toggle switch ...	1	6
1 Keystone marked terminals ...	1	10
1 Aluminium Screen, 10" x 6", ready drilled ...	1	0
1 Red Triangle baseboard, 16" x 10", with 10" x 7" screening foil ready mounted ...	1	6
1 Red Triangle black ebonite panel, 16" x 7" x 3/16", ready drilled ...	3	3
1 Red Triangle ready drilled black ebonite terminal strip, 16" x 1 1/2" ...	1	8
1 Wire, screws, flex, etc. ...		
<b>FREE FULL-SIZE BLUEPRINT, LARGE ACTUAL ASSEMBLY PHOTOGRAPH, and copy of "Wireless Constructor," S.T.400 issue</b> ...		<b>GRATIS</b>

Complete Kit, Cash or C.O.D. **£3 15 0**

Separate items in this Kit sent Cash or C.O.D. Part Kits value over 40/- on Easy Terms. Orders over 10/- sent Carriage and C.O.D. Charges Paid. Send for latest lists.

**FREE FULL SIZE BLUE PRINT WITH EVERY KIT**

and copy of "Wireless Constructor," S.T.400 (December) issue.

Comprises Kit of Parts as listed, with Ready Drilled Panel and Terminal Strip; Drilled Screen, and foil-mounted ply Baseboard, less Valves and Cabinet.

# 7/-

with order Balance in 11 monthly payments of 7/-

Cash or C.O.D. **£3 15 0**

Carriage Paid. Complete Kit as above with Valves, Cash or C.O.D. or 12 monthly payments of **10/6** **£5 14 3**

Complete Kit as above with Valves and Handsome Oak Table Cabinet, Cash or C.O.D. or 12 monthly payments of **11/9** **£6 9 6**

**FINISHED INSTRUMENT**

Assembled with EASIBILT "S.T.400" Kit, exactly as listed and Aerial Tested, Complete with Valves and Table Cabinet.

# £8.8.0

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You may have absolute confidence in the EASIBILT "S.T.400" KIT. Every component included is guaranteed for 12 months. SEND THIS COUPON NOW FOR PROMPT SERVICE.

MAIL ORDER ONLY. NO CALLERS.

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Please send me EASIBILT "S.T.400" KIT for which I enclose £ s. d. Cash/Deposit

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W.C.1/33

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STRICT PRIVACY GUARANTEED

**BRITISH**  
**RADIOGRAM**

THE  
"KIT FACTORS"

*Largest Wholesale Suppliers for the*

**S.T. 400**

**FIRST SPECIFIED COMPONENTS**

**IMMEDIATE DELIVERY**

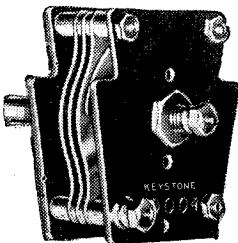
*Cash with Order or C.O.D. at full recognised Discounts (bona fide Dealers only). Enclose Trade Card when ordering or send at once for fuller details of our splendid service.*

**S.T.400 Structakit**  
CONTAINS 'Red Triangle' Black Panel 16"x7"x $\frac{3}{8}$ ", ready drilled; 'Red Triangle' Terminal Strip 16"x1 $\frac{1}{2}$ "x $\frac{3}{8}$ ", ready drilled; Peto-Scott non-warping Laminated Base-board 16"x10", with Aluminium Foil ready mounted. Ready Drilled Aluminium Screen 10"x6" all necessary screws, wires and nuts to build complete PANEL ASSEMBLY for S.T. 400. **10/6**

**S.T. 400 CONVERSION KIT**  
FOR CONVERTING THE S.T.300 TO MR. JOHN SCOTT-TAGGART'S AMAZING S.T.400. CONTAINS only Zone-Tested Parts exactly as First Specified by Mr. John Scott-Taggart. Complete with FREE FULL SIZE BLUE-PRINT and copy of "Wireless Constructor" S.T.400 issue. **31/-**

**B.R.G. S.T.400 KIT**  
Complete with FREE FULL SIZE BLUE-PRINT and copy "Wireless Constructor," S.T.400 issue. **£4-5-0**

**KEYSTONE**  
**LOW MINIMUM AERIAL COUPLER**  
**FIRST SPECIFIED**



by Mr. John Scott-Taggart for the S.T.400 because of its exceptionally low minimum and ideal construction for the important functions it has to perform. Supplied with knob.

There's no substitute.

**3/6**

Registered Design.

**YOUR DEALER HAS STOCKS**  
IN CASES OF DIFFICULTY SEND DIRECT WITH NAME AND ADDRESS OF YOUR USUAL SUPPLIER.

**BRITISH RADIOGRAM Co. Ltd.**  
Pilot House, Church Street,  
Stoke Newington, LONDON, N.16

Clissold 6287/8.

**MY SET ON YOUR AERIAL**

—continued from page 192

a very stringent test of the set. At one home, a grandmother was enthusiastic about a superb reception from America. Her eyes lighted up as she told me how Henry had tuned it in and explained to her what was happening. She told me the story: "There was a terrible storm in America. It came in wonderfully. You could hear the terrific crashes of thunder . . ."

**He Had His Twiddle**

I nodded sympathetically. My eyes avoided Henry's. I've heard those storms myself, even from Daventry—with a wobbly grid-bias plug.

What shall I say about a keen reader at Bristol who woke me up in the morning (I slept the night at his house) and popping his head round

"There's no need for you to come here; we've got our licence." I had a second and better look at the number on the door.

At another house the lady thought I had come to demonstrate a vacuum-cleaner.

As a matter of fact, everyone has been extraordinarily nice to an absolute stranger. The tests have been invaluable—and, I hope, of interest to those in whose homes I have been.

After my experiences, the thing that amazes me is how people find their way home! "Number three hundred and fifty, did you say? That'll be the Dugdale Road end. You go down Springlawn Road and take the fifth or sixth turning off to the left—or is it the right?—no, the left, and then you take the right fork until you come to a house with a heap of stones in front of it; then go straight on till you come to the roberts—yes, 'roberts'—where the lights go in and out. Follow the tram-lines till you get to the first

**"THE SECRETS OF THE AUTOMATIC REACTION EQUALISER"**

In next month's "Wireless Constructor"—on sale January 14th—Mr. John Scott-Taggart will discuss a fascinating feature of the "S.T.400." His article will interest not only the thousands who have built and are building the "S.T.400," but all home constructors.

the door said confidentially: "Do you mind if I just switch on and have a twiddle?"

I let him have his "twiddle."

At one house there was a twenty minutes' hitch. A pork-pie, specially obtained for my refreshment, had been mislaid. Sisters, brothers, a grandmother were all interrogated and the test was held up while cries echoed up the stairs: "Have you seen Mr. Scott-Taggart's pork-pie?"

It was a jolly good pork-pie, and I'm glad they found it.

Oh, yes, I've been in your homes all right. I only hope my account does not sound "superior"; but there were bound to be some "human interest" episodes, and on this occasion I am not discussing the serious and very solid results of my tour (that sounds like a reference to the pork-pie again). As for myself, I felt anything but superior as I knocked at No. 6, No. 48, or No. 351. I felt highly nervous.

At one door I did not seem at all welcome. I muttered something about a wireless set and the lady promptly retorted:

traffic policeman, turn right, and the second on the left is Acacia Road. Anyone will tell you—Arcadia Road? I thought you said Acacia Road. No, never heard of the place."

Points of reference vary with towns. Some, like Rochdale, swear by their picture theatres. "It's the second road past the Rialto. You can't go wrong."

**A Sad Relapse**

Others believe in public-houses. "You go on till you come to 'The Duck and Green Peas,' and then follow the tram-lines till you come to 'The Fatted Calf' then ask somebody else. You can't go wrong."

Other towns prefer churches. "You take the third on the left—no, not counting this one—then the first on the right, till you come to St. Peter's. Bear right and follow the tram-lines till you come to St. Luke's. Then look for the trams marked Bradshawgate and follow down that road till you get to St. Barnabas."

One source of information began in this strain, but had a sad relapse by

(Continued on page 251)

**MY SET ON YOUR AERIAL**

—continued from page 250

ending: "And stop when you get to 'The Jolly Ploughman.'"

Much as I regret to record the fact, I found the public-house system the more reliable. One had only to call out the words "Cow and Calves"? and half a dozen willing and knowing arms would shoot out in the direction of the hostelry named.

And once outside the inn, one was always sure of finding a group of half a dozen men from whom it was possible to obtain a majority verdict as to the direction of Stanley Road South.

**An Old Glasgow Custom**

Aerial tour? The next time I shall buy a tram! I have followed more tram-lines, seen more public-houses, scrutinised more street name-plates than the average man does in years.

In Manchester they say: "Follow the tram-lines; it's about a two-penny ride up." Not knowing the price per mile in Manchester one is rather at sea. Especially if one has been to Glasgow, where you can go for leagues for twopence!

A Glasgow reader took me on the trams for a ride. "Two ha'pennies!" he told the conductor. I looked suspiciously at him. Was he pretending we were under twelve—an old Glasgow custom, perhaps? He reassured me, however, by the information that Glasgow was unique in issuing halfpenny fares. Great place, Glasgow.

**Over-estimation!**

But I've also been in country districts. Same old reassurance: "You can't go wrong." This flattering remark has ended practically every string of instructions. I'm afraid the public over-estimates my abilities. Experience compels me to decline the compliment.

At the end of the "S.T.400" Rapid Construction Guide, it's a wonder I didn't finish with the words: "You can't go wrong."

I should have been right.

J. S.T.

**Switching to Long Waves on the "S.T.400"**

For long-wave reception the wave-change switches should be pushed in, and not pulled out, as stated on page 132 last month, in the article on Covering Europe on the "S.T.400."

**And Now Specified AND RECOMMENDED by Mr. John Scott-Taggart**

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

**for the S.T.400**



**Ensures Better Reception**

You cannot hope to get the best results from this marvellous receiver unless you include the "Slektun" 4-1 Super Transformer. Mr. John Scott-Taggart specifies and recommends it—and it is guaranteed for a minimum period of 3 YEARS. The official guarantee and a copy of the N.P.L. frequency response curve is supplied with every transformer.

**SLEKTUN**

**8/6**

**SUPER TRANSFORMER**

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If you have any difficulty in obtaining from your usual dealer, please write us direct.

**Guaranteed 3 Years**

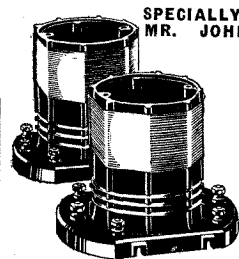
SLEKTUN PRODUCTS LTD., 21, DOUGLAS ST., WESTMINSTER, S.W.1.

Telephone: Victoria 3405-6-7.

# A FINE START FOR 1933

## SOVEREIGN COILS SCORE DOUBLE TRIUMPH

### "S.T.400"



SPECIALLY RECOMMENDED BY  
MR. JOHN SCOTT-TAGGART.

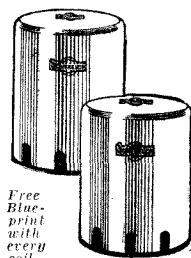
Made with microscopic care to Mr. Scott-Taggart's exact specifications—tested and approved by the designer himself! Sovereign "S.T.400" coils are securely wound on strong walnut-toned moulded bakelite formers with correctly numbered terminals at base. You can be sure of results by using Sovereign in your "S.T.400."

### "S.T.400" 8/6 PER PAIR COILS

Nine other Sovereign Components are officially approved for "S.T.400." Use Sovereign as much as you can—it saves you money.

### "STRAIGHT-TUNE 3"

SOLE SPECIFICATION FOR SOVEREIGN'S NEW COILS.



Two of Sovereign's latest Coils (universal screened type) are specified solely for this simple but highly efficient 3-valve receiver described this month. These Coils are accurately made of highest-grade materials, and their design ensures good performance that can be definitely relied on to bring the best out of your set. Complete with spun aluminium cans.

UNIVERSAL SCREENED COIL Each 6/6

## IT'S THE COILS THAT COUNT

In cases of difficulty, send direct, also for free components catalogue



SOVEREIGN PRODUCTS, LIMITED,  
SOVEREIGN HOUSE, Rosebery Avenue,  
London, E.C.1

## THE "STRAIGHT-TUNE" THREE

—continued from page 209

grid and the anode of the valve to obviate the need for any extra screening in the set to that supplied by the coils and the Telexors.

The result of this, and the situation of the other parts on the baseboard, is that very short wiring is obtained throughout the set, and the results show a corresponding benefit in efficiency.

The lining up of the components is not done for mere appearance. It is essential for the sake of efficiency, for, as we have indicated, the shorter the leads the better the results.

As the coils are close to the Telexors, it is a good plan to get the part of the wiring connecting these together done before the coils are finally screwed down, so that they can be moved about slightly, and so make it easier for the connections to be made.

### NEXT MONTH

## "S.T.400"

Questions Answered

Out on Jan. 14th - 6d.

Order Now

When the coil connections to the Telexors have been completed, the coils can be screwed down tight and the rest of the set attended to.

It is important to notice that the earthing arrangements for the coil cans are made by means of the terminals on the sides of the cans. The coils themselves are not earthed to the can, nor to the base, as is the case in some instances, and so it is necessary to take a lead from each can terminal to the earth circuit of the set—that is, to the filament terminals of the valve holders as shown in the wiring diagram.

### Grid-Leak Connections

Note, too, how the grid condenser and grid leak of the detector valve are fixed. The condenser goes between the tramway lines formed by the filament leads to the three valve holders, and the grid leak is fixed by its wire, to the grid and the filament

positive terminals of the detector valve holders. A grid leak needing a holder could be used if desired, but it is more convenient to employ the type that has wire tags at the ends and will fix direct on to the terminals of the other components.

### The Safety Fuse

A fuse is inserted between the L.T. negative wire that runs from the accumulator and the H.T. negative lead, so that there is no possibility of blowing the valves or otherwise damaging the set if you make a wrong connection.

When the wiring has been completed the set should be carefully looked over to see that no mistakes have been made. Then the valves can be inserted in their places, a screened-grid valve of the metallised type being most suitable for the S.G. stage, followed by an H.L. type of detector, and the output valve of either the small type (when battery H.T. is used), or of the larger type (when mains H.T. is available). The recommended valves are given in a separate list in these pages.

As regards the H.T. tapplings, these should be the full maximum of 120 or 150 for H.T. + 2, a matter of 60 or so for H.T. + 1, and 80 volts for the H.T. tap marked "screen."

The grid bias for the output valve will depend upon the valve employed and the H.T. voltage applied to it. The correct bias will be stated by the makers of the valve.

The operation of the set is very easy. With the pre-set condenser screwed right down and the coil tap of the first coil on terminal No. 2, turn the two tuning dials slowly round in step between 0 and 100. You will then pick up your local station, and probably several others, on the medium waveband.

### Selectivity Adjustments

If you are too near the station, or want more selectivity for other reasons, the pre-set condenser should be unscrewed until sufficient selectivity is obtained. It may be advantageous in some cases to alter the tap on the coil to No. 5, but as a rule the pre-set condenser will give all the variation required.

Naturally, with increased selectivity it will be necessary to use more reaction when listening to distant stations, but this in itself will still further increase the selectivity and is thus more of a boon than a disadvantage, as some might think.

(Continued on page 253)

**THE "STRAIGHT-TUNE" THREE**

—continued from page 252

Reaction is a wonderful ally in the search for selectivity, and its importance cannot be over-estimated when it comes to tuning-in distant transmissions, especially if they are inclined to be spoiled by some neighbouring station heterodyning them.

**Set for the Long**

On the long waves the procedure is the same, but having adjusted the selectivity for the medium waveband, it will not likely have to be altered for the long. All you have to do on the

**THE A.C. "S.T.400"**

Following the Conversion of "S.T.300" into "S.T.400"—which is to be described next month—an "S.T.400" for A.C. Mains will be given in our number on sale Feb. 15th, 1933.

**Make sure of your WIRELESS CONSTRUCTOR**

**ORDER NOW**

long waves, therefore, is to tune the Telexors between 100 and 200, keeping them fairly well in step. And it will be found that they do keep in step to a remarkable extent.

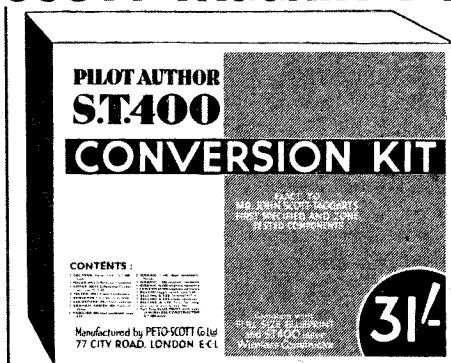
**Mains Units**

There is nothing more to add, except that if you do decide to use a mains H.T. unit instead of a dry battery, do not omit to get a unit that has the necessary tappings, and which will easily supply the required current for the output valve you choose, plus about 5 milliamps. or so for the detector and screened-grid valves in the set. It is important that this point be very carefully considered, as you will not get satisfactory results if you use a unit that is not quite large enough for the set.

The H.T. and L.T. flex leads can be plaited together to form a "battery cord," or you can merely twist them together and secure by binding with thin wire or cotton. You can arrange the "cord's" length to suit your own purposes.

**S.T.400**

**CONVERT YOUR S.T.300 TO JOHN SCOTT-TAGGART'S LATEST RECEIVER**



In Sealed Carton containing only ZONE-TESTED PARTS exactly as First Specified by Mr. John Scott-Taggart. Complete with FREE FULL-SIZE BLUEPRINT and copy of "Wireless Constructor" S.T.400 Issue.

**WE ALLOW YOU 2/- ON YOUR OLD S.T. 300 COLVERN AERIAL COIL**

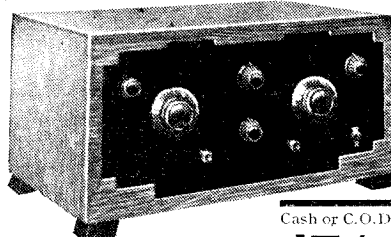
**CONTENTS**

- 1 COLVERN S.T.400 Aerial Coil .. s. d. 5 0
- 1 POLAR -0003 Differential Condenser .. 3 0
- 1 LOTUS -00035 Differential Condenser, type M.D.35 .. 3 0
- 2 TELSEN -0003 Pre-set Condensers .. 3 0
- 1 BENJAMIN Vibroder Valve Holder .. 10 5
- 1 GOLTONE -0003 Fixed Condenser .. 5 1
- 1 GRAHAM FARISH -006 Fixed Condenser .. 1 6
- 1 DUBILIER -006 Fixed Condenser, type 670 .. 1 6
- 2 IGRANIC 2-infd. Fixed Condensers .. 5 6
- 1 IGRANIC 1,500 Spaghetti Resistor .. 6
- 1 IGRANIC 50,000 Spaghetti Resistor .. 6
- 1 LEWCOS 60,000 Spaghetti Resistor .. 1 0
- 1 BULGIN Toggle Switch, type S.80 .. 1 6
- 1 BELLING & LEE Terminal H.T.4 .. 2 3
- 1 BELLING & LEE Anode Connector .. 6
- 1 BELLING & LEE Twin Tap Plug .. 1 1
- Quantity of Wires, Screws, Flex .. 1 6
- 1 FULL-SIZE BLUE PRINT WITH COPY OF "WIRELESS CONSTRUCTOR" S.T.400 Issue .. .. .Gratis

**CASH or C.O.D. 31/- Carriage Paid**

Or Send 29 - only with old COLVERN S.T.300 Aerial Coil

**S.T.400 CABINETS OAK TABLE MODEL**



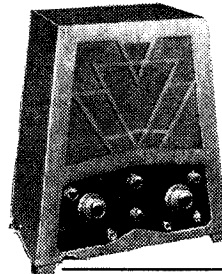
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**17/-**

Carriage Paid

Figured hand French-polished oak Table Cabinet designed especially to make an attractive housing for the S.T.400.

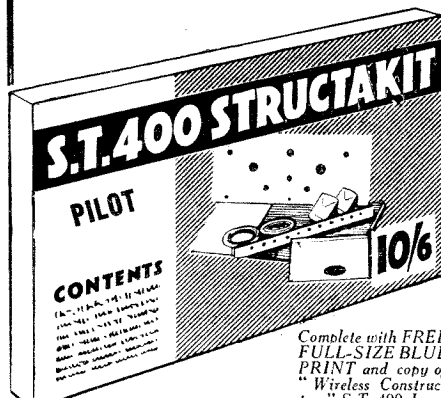
**OAK CONSOLETTA MODEL**



Specially designed for the S.T.400. Constructed of hand French-polished oak with attractive silk covered vignette complete with battery shelf and speaker compartments.

**CASH or C.O.D. 25/- Carriage Paid.**

**S.T.400 PANEL ASSEMBLY**



Complete with FREE FULL-SIZE BLUE PRINT and copy of "Wireless Constructor" S.T.400 Issue.

**CONTENTS** 'Red Triangle' Black Panel 16" x 7" x 3/16", ready drilled; 'Red Triangle' Terminal Strip 16" x 1 1/2" x 3/16", ready drilled; Peto-Scott non-warping laminated Base-board 16" x 10", with Aluminium Foil ready mounted. Ready Drilled Aluminium Screen 10" x 6" and all necessary screws, wires and nuts to build complete PANEL ASSEMBLY for S.T.400.

**10/6**

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

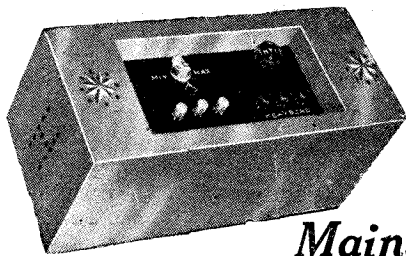
Dear Sirs,—Please send me CASH/C.O.D.

**PILOT AUTHOR S.T.400 CONVERSION KIT 31s. 0d.      PILOT S.T.400 STRUCTAKIT 10s. 6d.**  
**S.T. 400 TABLE CABINET - - - - 17s. 0d.      S.T.400 CONSOLETTA CABINET 25s. 0d.**

for which I enclose £.....s.....d. CASH

NAME.....

ADDRESS.....W.C.1/33.



## Mains POWER for S.T.400

Here is a Mains Unit suitable for both Battery and A.C. Mains versions of the S.T.400. It was chosen by Mr. Scott-Taggart for the S.T.300, and now he recommends it for the S.T.400. Remember—the Heayberd MW.1 Mains Unit is individually built by specialists—not mass produced. Incorporating Heayberd Transformer, Double Chokes, 16mf. Block Condensers (800v. Test), Westinghouse Metal Rectifier, Safety Fuse, etc. Provides for future as well as the present.

**MODEL MW.1 Alternative H.T. Outputs:**  
 30 ma. at 150v. or 50 ma. at 200v.  
 L.T. A.C. 4v. 5 amp.  
 Tappings: 40/120v. Var. S.G., 175v. and 200v. Fixed (Max.)  
 Price . . . . . 127/6

GUARANTEED THREE YEARS

This model can be supplied in assembled Kit form for £1 less. Suitable D.C. Mains Unit is HDC.150 at 55/-



**Post Coupon**  
 for Heayberd handbook on Mains Working

I enclose 3d. stamps for New Handbook of Mains Equipment. Packed with Technical Tips, Service Hints and diagrams

Mr. \_\_\_\_\_  
 Address \_\_\_\_\_

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**F.C. HEAYBERD & Co.,**  
 10 FINSBURY STREET, LONDON, E.C.2  
 One minute from Moorgate Stn.

**RADIO SUPPLIES**  
 Send your list of Radio needs for our quotation—Kits, Parts, Sets, etc. Everything in Radio stocked; prompt delivery. 7 days' approval. Catalogue free. Taylex and standard Wet H.T. replacements stocked.  
**C. TAYLOR, 57, Studley Rd., Stockwell, London.**

**STENIBAC RADIO CABINET**  
 Model No. A2  
 for the "WIRELESS CONSTRUCTOR" "S.T.400"

Model No. A2

OAK	12/-
MAHOGANY	13/-
WALNUT	14/-

Carriage 2/- extra. Inclusive of baseboard and front panel.  
**STENIBAC LTD. DEPT. C.**  
 303, ESSEX ROAD, ISLINGTON, LONDON, N.1. Phone: Clissold 8056.

## ABOUT ACCESSORIES FOR THE "S.T.400"

—continued from page 194—

high tension, a mains unit can be utilised and, as already mentioned, with perfect satisfaction. There are just two points to watch when choosing your mains unit.

First, there is the number of positive tappings and their voltage ratings; and, secondly, the maximum current which the unit is rated to give. The makers' advice on rating for the "S.T.400" should be sought.

There is no objection when a mains unit is to be used, in joining + 3 and + 4 together by a short piece of wire, and thus taking both to the intermediate voltage tap. This makes it possible for a mains unit with only three taps to be employed, so long as they give the right voltages.

Suitable mains units are obtainable in these makes: Atlas, Regentone, Ekco, Heayberd, Formo, R.I., Ferranti, Lissen. And full details for constructing a suitable unit employing a Westinghouse metal rectifier may be obtained from the makers of these rectifiers. Incidentally, their advertisement last month was incorrect as regards the leads to the set. But in the instructions they sent to readers this is put right.

### Valves to Use

The last item for our consideration is the question of valves. These are vital items, and as such it is very desirable that they should be of the types and makes which have actually been proved ideal for the set.

It is possible that untried valves would work, and in some cases work quite well, but you are running a risk with them of not getting anything like the best from your set. Makes which you can rely upon, and which will enable your "S.T.400" to give its best, are Mullard, Cossor, Mazda, Osram and Marconi. Some of the suitable valves made by each of these firms are illustrated with this article. And with these illustrations you will find details of the full range of five suitable valves in that make.

Five are mentioned in each case, because both small and larger power valves are given. So that you will know in which positions each of the valves should go, they are mentioned in this order: S.G., det., first L.F., and output valve of the small or larger power valve type.

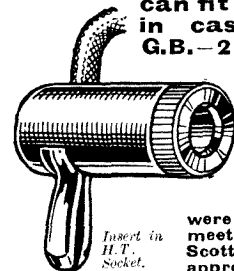
By the way, in the list of components last month the name "Glosite" was incorrect. It should have been "Glazite."



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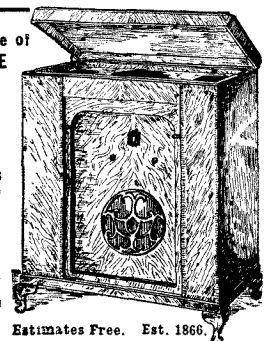
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**DIFFERENTIAL ANODE COUPLING**

—continued from page 218

Z. This "stepping-stone" capacity (which is in parallel with C) is at a maximum when the anode coupler is half-way. The curve of the effect is given in Fig. 6.

In practice, all this means that, in the "S.T.300," if you move the anode coupler to either side of the middle position you will need to go up on the right-hand condenser a little. The left-hand condenser is unaffected.

A slightly useful effect of adjusting the coupler is to "get down" to some of those rather insignificant stations which work on very low wavelengths, and which are not "on the dial." If, with the coupler at "normal," a station is very low on the right-hand condenser, turn the anode coupler either way and re-tune higher up.

**NEXT MONTH**

**Full and detailed RAPID CONVERSION GUIDE**

enabling all "S.T. 300" builders, past or future, to convert the set into the "S.T.400."

The remarkably helpful features of the "S.T." Rapid Construction Guides are here applied to conversion.

Even if you have already converted you will want to see if you have carried out the process in the same way as "S.T."

**NEXT MONTH'S WIRELESS CONSTRUCTOR**  
Out on January 14th.

You will notice that, in practice, you can tune down to a lower wavelength by moving the coupler towards the left. This is because you are "disconnecting" the "anode capacity."

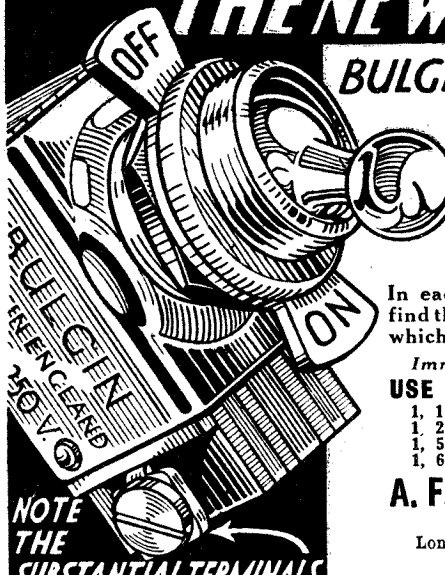
The above are refinements of little practical importance to the average user. In fact, I have always tried to make a point of designing sets that require no technical understanding. But there is a fact about differential anode coupling which may become of importance.

It is this:

If for any reason with reaction at zero the set tends to oscillate, the anode coupler should be turned to the left (i.e. the coupling reduced) until the oscillation stops. The "S.T.300," as designed, is fully stable at all adjustments, but differences in sample

(Continued on page 256)

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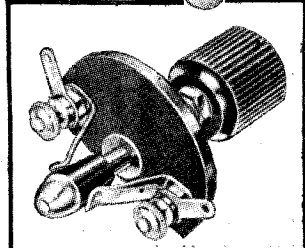
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- TUNEWELL TENTACLE EARTH (chemically-aided) 2/6



**TUNEWELL Super-Radio Components**

## DIFFERENTIAL ANODE COUPLING

—continued from page 255

of valves, layout, components, use of wrong wave-change switches, etc., may increase a little the "inherent reaction" of the set.

This reaction is between S.G. anode circuit and the aerial circuit and is *not* similar to normal reaction. It is accidental reaction in the *first* valve, and not the wanted and intentional reaction given by the *second* valve.

Any strong "inherent reaction" will always tend to make for unreliable proper reaction. If normal reaction is increased up to oscillation point, and you have to go a longer way back to stop the oscillation, you are getting "overlap" ("reaction hysteresis"), and it is ten to one that your *first* valve is oscillating.

### Disclosed for the First Time

The absolute cure for excessive "inherent reaction" (i.e. instability) and "overlap" is a slight reduction in anode coupling obtained by turning the coupler a little to the left. Any loss of signal strength is insignificant. Prior to differential anode coupling it was quite customary to use inefficient H.F. transformers or relatively low tapping points on the anode coil to ensure stability under all conditions; the result was a substantial loss in signal strength.

The information in this article was largely discovered during work on the experimental models of the "S.T.300" and is disclosed here for the first time. The particular cause

of "overlap" given above is, however, of universal interest and may occur (although usually without a remedy) on different types of sets using H.F. amplification.

The information contained in this article should be equally useful to "S.T.400" builders, who, however, have at their command the additional feature of the double channel reaction distributor and selectivity range adjuster.

brought in by a slight movement of the tuning control.

There is no doubt whatever that this set will receive every programme in the European ether worth listening to at good loudspeaker volume.

As regards selectivity, this is fully in keeping with the high sensitivity, and such powerful Regional transmissions as the Brookmans twins could be separated and cut out with the greatest of ease.

## NEXT MONTH

### "THE CIRCUIT THAT WAS TOO GOOD TO PUBLISH"

By JOHN SCOTT-TAGGART

Some months ago Mr. John Scott-Taggart announced in his "Armchair" columns that he had evolved a circuit that was "too good to be published." Although he has indicated and still believes that the circuit is too "tricky" to embody in a set design for general use, readers have shown the liveliest interest in this "mystery circuit."

Next month Mr. Scott-Taggart will reveal it.

## AS WE FIND THEM

—continued from page 222

to erect an aerial of this type, and therefore provision is also made for plugging in at a moment's notice the mains aerial incorporated in the set. This will appeal to those who live in flats, or who may wish to work the receiver in different rooms.

Now for the performance of the receiver. We can only say that we were amazed at the very high measure of sensitivity; and the way that station after station could be

The undistorted output from the pentode valve is more than ample for normal domestic requirements, since the Mazda pentode is capable of supplying just over 2 watts to the built-in moving-coil loudspeaker.

This large safety factor means that when the volume is cut down to a pleasant listening strength, reproduction is exceptionally fine, and we will say, here and now, that the tonal balance on music will satisfy the most critical listener, while speech is crisp and natural.

One of the first questions that a prospective buyer usually asks is: "How much will the set cost to run?" Well, the running costs of the "Golden Voice" are definitely low, and as much as seventeen hours of entertainment are available for the expenditure of one unit of electricity.

The price of the receiver is correspondingly low—12 gns. in Whitewood Cabinet, or 15 gns. for the De Luxe model.

Summing up, we would say that this new Telsen design is a receiver which, for efficiency and ease of control, is right in the top flight, and must necessarily be considered as among the very best receivers of the day. As sheer tip-top value for money it is unsurpassed, and the makers are to be congratulated on their enterprise and skill in producing a receiver which we are confident represents one of the most important contributions that has yet been made towards the popularisation of all-electric radio.

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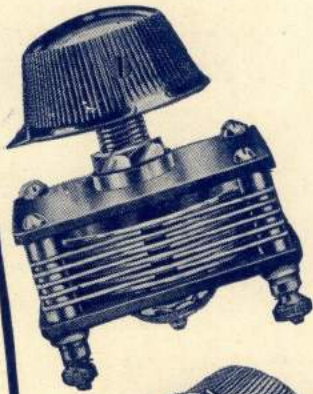
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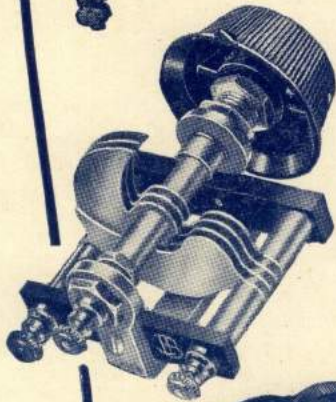
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