THE AUSTRALASIAN

Radio World

VOL. 7 . . . . . NO. 5 OCTOBER 15 1942

- **"Amplifier Circle" formed to gain practical ideas for enthusiasts**
- **Mantel version of "Victory Set" uses parts readily available**
- **Details of latest American power-line transmitter-receiver outfits**
- **Up-to-the-minute list of short-wave station loggings**

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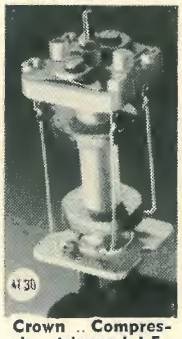

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ALL-WAVE ALL-WORLD DX NEWS

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A. G. HULL

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CONTENTS

EDITORIAL

It is only to be expected that war-time trading conditions are difficult, but it has come as rather a surprise to many that the difficulty takes the form of too much business, too much profit and the greatest difficulty of all—the payment of a huge income tax.

At the moment the services of radio technicians are at an extraordinary premium, and those who accepted Mr. Graham's suggestion from the back cover and trained for a radio career must all have attained more than their fondest hopes.

Notwithstanding the efforts to control prices the actual value of radio and electrical appliances is mounting every day. It is reported that a second-hand refrigerator which originally cost £57/10/— was sold recently for £137. Similarly with radio set and components there is a danger of a false value being given to goods which are scarce, especially when the seekers are earning big wages and have little to spend them on.

Such trading, however, is most dangerous, as the authorities cannot be expected to show the slightest mercy to anyone who is found to be making an excessive profit.

In the matter of the repair and adjustment of sets the practice of taking advantage of the present conditions seems to be prevalent and we have heard of several cases which would appear to indicate that exorbitant charges are being made for unsatisfactory work.

Looking to the future, at first glance it might be thought that that the large number of men being trained in radio technique will eventually mean a saturation of the trade, but on further investigation it is very evident that the development of radio is wide enough to absorb all the men who are likely to be trained for many years to come.

For the VICTORY Set . . .

For the VICTORY set featured in this issue — in in fact for **any** set you might plan to build — safeguard yourself against disappointment by using only R.C.S. Components. Used by radio engineers and amateurs alike for their accuracy, dependability and inbuilt quality, they guarantee the constructor perfect results every time. And now that replacement parts are so hard to get, it **pays** to buy the best while you can.

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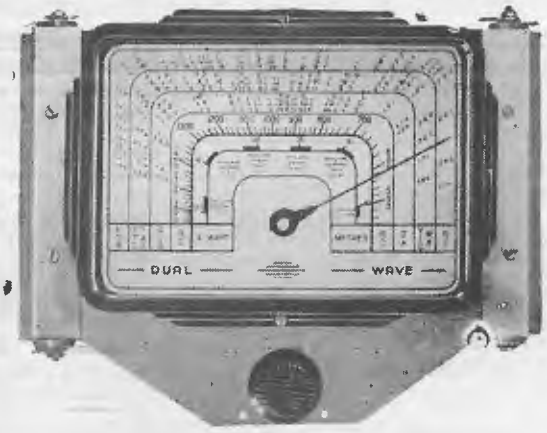

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Types DA1 and DA2 are single glass dual-wave, the type DA2 having been designed especially for use with the Five-Band Communications Coil Kit and "H" type condenser. Type DA1 is a standard dual-wave dial for use with R.C.S. coils and "F" type condenser. The DA-5 dial is for use on the 1600 to 550 k.c. and 13.7 to 40 metre bands, with "H" type condenser. All this series is edge-lit and wedge-driven. Aperture for the escutcheon is approximately 7" x 4-7/8."

DA1—Standard D/W Dial, "F" condenser	22/6
DA2—Communications Dial	22/6
DA-5—13.7 to 40 metres D/W condenser	22/6
DA-6 Mantel Set Dial, D/W "H" gang	18/9
DA-7 Portable Kit Dial D/W "H" gang	9/-
DA-8 Same as DA-7 but ready assembled	13/6

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The new R.C.S. permeability tuned I.F.'s are wound on special Trolitul formers into which are inserted the adjustable iron cores. These R.C.S. permeability-tuned I.F.'s are the most dependable and efficient I.F.'s it is possible to produce. They should be used whenever the optimum in results is required.

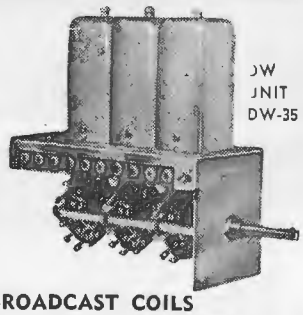
When three I.F.'s are used:
IF164 1st .. 13/9
IF164 2nd 13/9
IF163 3rd .. 13/9
465 K.C. I.F.'s
IF166 1st 7/6
IF167 2nd .. 7/6
Air Core 175 K.C.
1E68 1st 7/6
1E69 2nd 7/6
IF162
465 K.C. I.F.'s

When two I.F.'s are used:
IF162 1st .. 13/9
IF163 2nd 13/9

R.C.S. D.W. UNIT DW35

Type DW35, as illustrated, consists of Aerial, R.F. and Oscillator Coils, Wave Change Switch, the necessary B/C and S/W Trimmers and Padder mounted on a rigid steel base, wired up ready to assemble in a set utilising 465 k.c. and R.F. stage. The bands are S/W 13.7 to 40 metres, and B/C 1600 to 550 k.c.

Code DW35. Price £3/7/6



R.C.S. TROLITUL BROADCAST COILS

These coils are available in both Air Core and Permeability tuned types. The latter are adjusted to ensure maximum efficiency in our laboratories.

AIR CORE "H" GANG

E342	Aerial	6/6
E343	R.F.	6/6
E344	Osc.	6/6

PERM. TUNED "H" GANG

E345	Aerial	8/6
E346	R.F.	8/6
E347	Osc.	8/6

T.R.F. TYPE-AIR CORE

T88	Aerial	6/6
T89	R.F.	6/6
T87	R.F. with reaction	6/6
T81	Reinartz	6/6

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Cat. No.		Retail Price
TA1	Audio Choke, bakelite case	18/6
TM1	Modulation Transformer — Power	3/-
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TB6	Input "B" Class, bakelite case	18/6
TB35	"A" Class High Fidelity, steel case	67/7
TB36	"B" Class Input High Fidelity, steel case	67/6
TB37	"AB" Class, bakelite	28/6

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SYDNEY: Bloch & Gerber — Martin de Launay — Fox & MacGillycuddy — Lawrence & Hanson Electrical — John Martin — Radio Equipment — Radio House — United Radio Distributors — Homecrafts Ltd.
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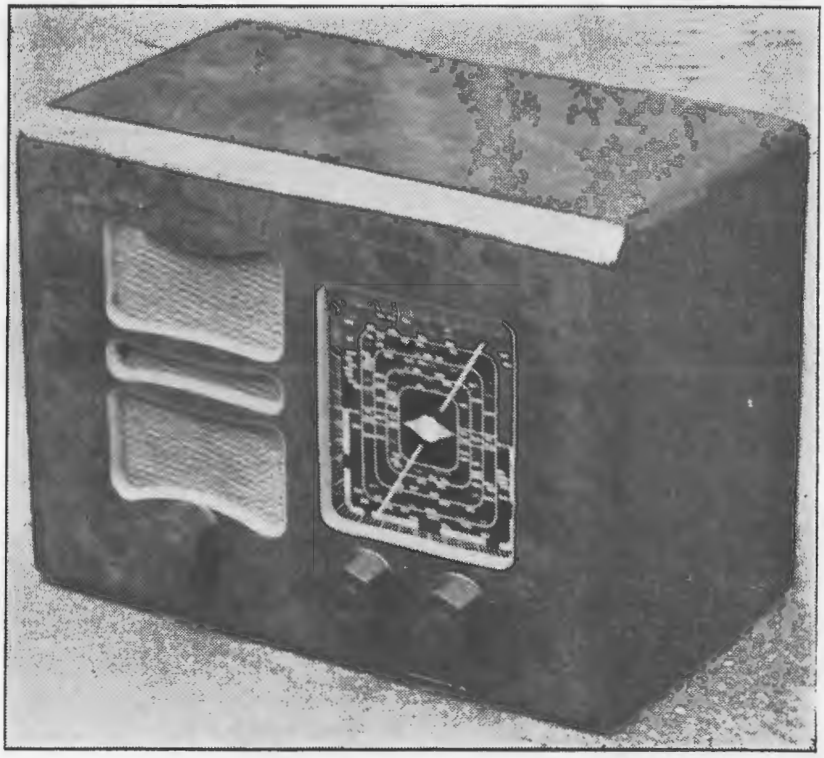
VICTORY MANTEL MODEL

IN last month's issue we gave constructional details of a radio set designed to embody only those valves and components which we found readily available in spite of war time conditions. The article proved immensely popular, but we have had a number of requests from readers who wish to build a set, but in keeping with the austerity campaign, they want an even cheaper and simpler set, a mantel model which will bring in only the local stations. In accordance with these wishes we set to work to find out just what performance could be expected from a t.r.f. set of similar design to the original "Victory Set", but with only one stage of radio frequency amplification.

By

A. G. HULL



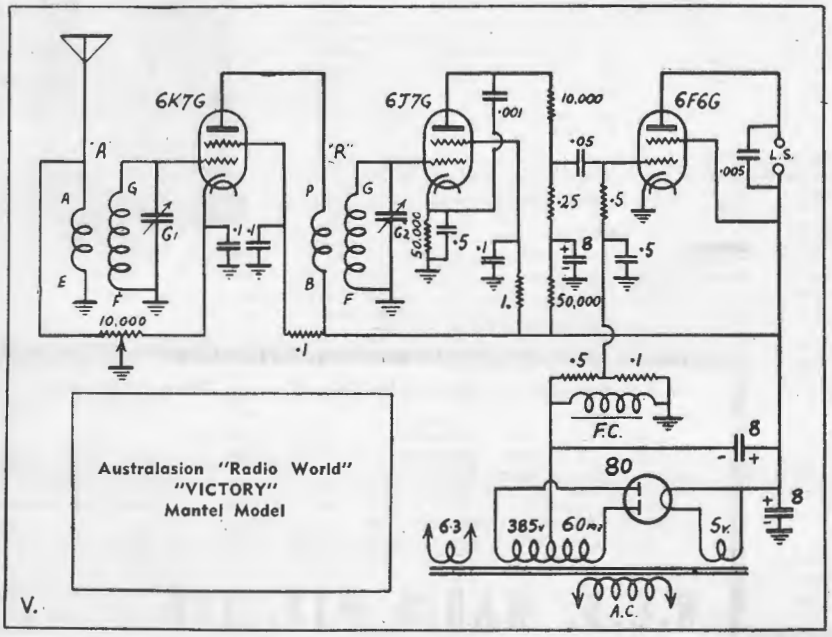
The 'Victory" mantel model can be built into any suitable cabinet, such as the "Little Companion" pictured here.

Modification

Working on the original chassis we removed the second r.f. stage, made the necessary wiring alterations, and in a short time had it working as a four-valver. Results were still quite O.K. and we found that the modern coils displayed their improved efficiency in no uncertain way. In the old days a t.r.f. set with a single r.f. stage would need careful adjustment in order to separate the local stations and just the right length of aerial to bring all of them in at reasonable volume level. But this little set left nothing in doubt and with about fifteen feet of aerial wire the local stations all came up to full strength with a little volume control in reverse, yet there was no trace of overlapping.

Time being so precious, we have not actually built this set on a small base, but past experience leads us to say that there should be no reason why this circuit should not make an admirable little mantel model, and we have no hesitation in recommending it as such. Our experience with the adapted chassis of the original "Victory Set" has proved to us quite

(Continued on next page)



A DECIMAL POINT

Obsessed with the idea of spring-cleaning, the process engraver cleaned up the block of the circuit of the "Victory Set" in last month's issue, removing several quite important decimal points from in front of the capacity and resistance figures. Fortunately, the parts list showed the decimal points correctly and made the omissions fairly obvious.

VICTORY MANTEL MODEL

(Continued from page 5)

conclusively that one r.f. stage is ample for local reception if modern coils are used.

The Parts Required

Anyone building this set is advised to first read through the article on the "Victory Set" in last month's issue, in which we outlined the circuit and explained the reasons behind the design. For example, the main reason for swinging back to the t.r.f. type of set is the scarcity of converter valves. A few of these converter valves are released from time to time. but not where near enough to fulfil all demands. According to a Melbourne wholesaler, a recent release to him consisted of only half a dozen converter valves, whereas his normal requirements would run into hundreds.

INTERSTATE ORDERS

As the result of the article in last month's issue, a heavy demand for kits of parts has been made on the Melbourne warehouse of J. H. Magrath Pty. Ltd. Quite a few of these orders have come from others States, especially Queensland and New South Wales. Owing to transportation difficulties, and the already overloaded postal facilities, it is not in the best interests that orders should be handled over such distances. Therefore, J. H. Magrath Pty. Ltd., have announced that for the present they are only able to handle trade orders from Victoria.

Readers living in other States are advised to deal through local traders, such as Martin DeLaunay Pty. Ltd., of Sydney, and Denham's Radio Service, of Maryborough, Queensland.

Difficulty in obtaining suitable wirewound resistors led to the bias arrangement, which picks off the required negative potential from a pair of resistors forming a voltage divider across the field coil, which is placed in the negative return of the power transformer secondary. In this position the field coil is still effective as a filter choke and the arrangement have everything to recommend it, giving a semi-fixed bias for the output valve which allows maximum power output and minimum distortion.

The Base

The selection of a suitable base should present no difficulty, as although it is not now so easy to get a special base cut to order, there are dozens of different types of mantel model chassis about, all of them designed to accommodate four valves and a two-gang condenser. A point to watch is in connection with the length of grid leads, i.e., the leads which run from the gang condenser sections to the caps of the valves. These should be about the same length for both the r.f. and detector stages, although it is by no means essential that they should be parallel or even running in the same direction.

With regard to the power transformer, it is desirable to obtain one of the small 340 volt transformers which are designed to mount on the small base, but if this type of transformer is not available it is a simple matter to fit a pair of brackets so that the ordinary type of flush-mounting transformer can be mounted up on its side, with the terminal strip facing inwards.

The Speaker

The speaker can have a field coil winding of almost anything between 1,000 and 2,500 ohms, although if it is to be a small speaker, such as a five-inch model, then it will be advisable to keep the field coil resistance down to 1,000 or 1,500 ohms, as otherwise the field may get too much excitation current and over-heat. The value of field coil resistance used will have some bearing on the effective bias voltage applied to the output valve, but as this valve is a 6F6 the bias is not so critical as with the later types of beam power valves such as the 6V6G.

PARTS LIST

"VICTORY" MANTEL MODEL

1—Base, size to suit cabinet.
1—Power transformer 60 ma. at 340-v, with 6.3 filament..
1—2-gang tuning condenser.
1—Dial to suit (Radiokes, R.C.S., Crown).
2—Coils (1 aerial, 1 r.f. — R.C.S., Crown, Radiokes).
1—10,000 ohm potentiometer (R.C.S., Radiokes).

Resistors.

1—10,000 ohm 1-watt (I.R.C.).
2—50,000 ohm 1-watt (I.R.C.).
2—100,00 ohm 1-watt (I.R.C.).
1—250,000 ohm 1-watt (I.R.C.).
2—500,000 ohm 1-watt (I.R.C.).
1—1 megohm (I.R.C.).

Condensers

2—8 mfd. 500v electrolytics, can type (T.C.C.).
1—8 mfd. 500v or 600v tubular type (T.C.C.).
3—.5 mfd. tubular 400v (T.C.C.).
3—.1 mfd. tubular 400v (T.C.C.).
1—.05 mfd. tubular 400v (T.C.C.).
1—.005 mfd. mica condenser (T.C.C.).
1—.001 mfd. mica condenser

Sundries

5 sockets (3-octal, 2-UX), 2 valve cans, hook-up wire, screws and nuts, power flex, solder lugs, 3-bank terminal strip, etc., etc.

Valves

1—6K7G or 6U7G (Mullard, Radiotron).
1—6J7G (Mullard, Radiotron).
1—6F6G (Mullard, Radiotron).
1—80 (Mullard, Radiotron).

Speaker

Suitable size, with field coil of 2,000 ohms and input load of 7,000 ohms.

FORMING THE AMPLIFIER CIRCLE

AS announced in last month's issue, a scheme has been suggested for the formation of an "Amplifier Circle," with the object of obtaining first-hand information about the practical aspects of high-quality amplifier design and operation and making it available to all readers.

As outlined in last month's issue, the "Inner Circle" in Melbourne is to consist of ten or a dozen keen enthusiasts, each the owner of an exceptional outfit. These enthusiasts will take it in turn to play host to the remaining members, demonsrating their amplifier to the visitors.

Then a description of this amplifier, together with details of the equipment will be published in "Radio World", together with expressions of opinion and suggestions from the visiting members.

Owing to delays in the post, also the transportation problems in connection with the distribution of the "Radio World," at the moment of writing there has not been time for the applications for membership to be in hand in full, but already it is evident that a number of enthusiasts in both Sydney and Melbourne are prepared to devote at least one evening per fortnight to visit other members, and also to demonstrate their own amplifiers.

How to Join

If you live in either Sydney or Melbourne you can join the "Inner Circle" by filling in the application form on this page and posting it immediately to A. G. Hull, at 117 Reservoir St., if you live in Sydney, or to 187 Berkeley Street, Carlton, if you live in Melbourne. It is hoped by this means to have two amplifier descriptions in each issue, or even more if sufficiently interesting amplifiers are unearthed.

A Typical Example

Some idea of the value of the scheme can be gained from the following interesting points which were unearthed in a short interview with Mr. H. W. L. Hunt, of Mont Albert, one of the originators of the scheme and a foundation members of the Melbourne "Inner Circle."

Mr. Hunt is a dentist by profession, and a keen amplifier man in his leisure hours. Strangely, perhaps, Mr. Hunt takes a deep academic interest in amplifier design, and derives just as much pleasure from working out equations in connection with his inverse feedback circuits as he does in listening to the flawless reproduction he achieves. Every alteration or adjustment which he attempts is first calculated in algebraic formula, and then the practical results compared with the theoretical expectations.

Mr. H. W. L. Hunt, keen amplifier enthusiast, with his high-fidelity speaker in which he has built a special base to accommodate an elaborate power supply to ensure adequate energising.

Some Experiences

Mr. Hunt has not had a great deal of experience with amplifiers and their associated equipment, compared to some of our readers. Yet he has tried out a number of different pick-ups, speakers and amplifier circuits. Keeping right up-to-date in his ideas, Mr. Hunt has already proved to himself beyond all doubt that triodes are to be preferred to beam power valves and pentodes, when quality is the primary aim, and he agrees with recent suggestion published in "Radio World" which claim that even with triodes the use of inverse feedback has much to recommend it.

The Pick-up

For the pick-up Mr. Hunt has tried various magnetic types, but feels that only the crystal type can do justice to modern recordings. He uses a Tru-tan crystal cartridge, with a home-made tone-arm which ensures correct tracking and needle pressure. This cartridge has been loaded with various capacity and resistance networks, but so far Mr. Hunt has not satisfied himself as to the best all-round combination and so is not prepared to commit himself on this point.

Baffling

To obtain best response from his speaker, Mr. Hunt has done the usual rounds of square and irregular-shaped baffle boards, but has always come back to the old radio cabinet which, as Mr. Hunt describes it, "bulges like a Walt Disney Silly Symphony" when handling power, yet gives a resonance which fits in with the characteristics of the speaker so that it is not unpleasant, However, Mr. Hunt has now designed a new type of combined

(Continued on next page)

THE AMPLIFIER CIRCLE

Application for Membership to the Inner Circle

I operate an amplifier which I would be pleased to demonstrate to others who are interested. I would also like to hear other amplifiers which are considered by their owners to be good.

My most suitable evening for visiting would be .....

Name .....

Address .....

State .....

AMPLIFIER CIRCLE

(Continued from page 7)

baffle and cabinet, which he is constructing with the aid of a carpenter friend in his spare time. The new cabinet is to be built of three-quarter inch thick timber over formers of three inches by one and a half, the whole being built of kiln dried ash.

The Speaker

The speaker used by Mr. Hunt is a twelve-inch high fidelity job, with a base built on to it to accommodate an entirely separate energising transformer, rectifier, chokes and filters and a huge input transformer with many impedance-matching tappings.

The Circuit

It is hoped to give a full description of the amplifier in next month's issue, but in the meantime a few details may be of interest. It might be said that the circuit is based on the Roadiotron circuit No. A503, although many modifications have been made, including the addition of inverse feedback from the plate of one of the push-pull triodes to the screen of the first audio valve. The phase-splitter is a 6V6G. Back bias for the output valves is obtained from a resistor in the negative high tension return, with a potentiometer fitted as a bias balancing device, so that the plate current of the two output valves can be equalised by this adjustment. The current is checked by measuring the voltage drop across two 100 ohm stopper resistances fitted in the plate circuits.

Personal Points

Getting down to personal details, we found that Mr. Hunt has the usual domestic problems associated with high-level reproduction, his young children not appreciating music of this kind as a lullaby. Mrs. Hunt is not appreciative of more than half a watt of audio power. All of which leads to the plans which Mr. Hunt has well in hand for the conversion of a shed to make it into a radio shack with ideal acoustic properties.

PREFERRED RECORDINGS, by H. W. L. Hunt

DOX368, Introduction and Finale, on organ, by G. D. Cunningham.

DOX515, Torchlight Music, by Sydney Torch, on organ.

C1996, Boutique Fantasque, Royal Opera Orchestra, Covent Garden.

D1293, Orpheus in the Underworld, by State Opera Orchestra, Berlin.

SIMPLE HI-FI CIRCUIT

And Other Interesting Suggestions

By —

JOHN W. STRAEDE

B.Sc., A.M.I.R.E.

7 Adeline Street, Preston, Victoria

RECENTLY the writer had to build a "reasonably small, tone as good as possible," mantel receiver. Only local stations were required, but the tone had to be just so.

In working out the design the following features were considered first:

1. A large speaker, 8 inches at least, with plenty of field excitation.
2. T.R.F. circuit, with diode detector, but not diode biassed
3. Triode output.
4. At least 3 watts.
5. Full low frequency response.

No attempt was made to get the set down to "midget" proportions. A chassis about the size of the Trade Builder was used. To get full field excitation a 60 m.a. power transformer and a 5V4G rectifier allowed plenty of current plus a large voltage drop. Only one T.R.F. stage was used, but high-gain iron-core coils and careful alignment partly made up for that.

IDEAS IN CIRCUITS

In This Article:

- **(a) Tone-Gain Control.**
- **(b) I.F. Selectivity Control.**
- **(c) Permag. Microphone.**
- **(d) Inverse Feed-back Circuit.**
- **(e) Reflex Volume Control.**
- **(f) Hi-tone Control.**

The Detector Circuit

The diodes used for rectification are isolated from the control grid of the "detector" valve by a condenser. A.C. shunting of the diode load is negligible due to the large value of grid resistor. This large value of grid resistor, together with the large condenser between the second and third valves, gives a really good bass response. The output valve is a 6B5 (octal equivalent is 6N6, actually two triodes directly coupled internally, and gives a maximum output of over 6 watts. The R.F. stage and power supply are quite conventional, the latter containing plenty of filtering.

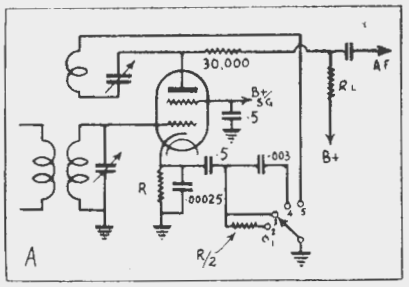
Even without a baffle, the bass response is noticeably better than from an ordinary "midget" set, while in a thick wooden mantel cabinet ,with half the back covered in, the tone and volume are amazing.

Should it be found that the 6B5 valve is not readily obtainable, it is possible to use a 2A3, or 6A3, type triode by arranging suitable bias by means of the conventional bias resistor and by-pass condenser.

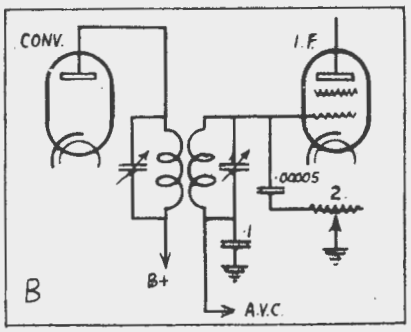
Tone-Gain Control

One type of high-fidelity detector is the "infinite-impedance" type — actually an anode detector with inverse feedback. Unfortunately, this type of detector gives very little gain and so an extra valve is required if distant stations are to be received, Instead of the extra valve, a switching device can be used to "rewire" the circuit to a conventional anode detector for DX work. The same switch can include positions for semi-DX high-boost and bass-boost. In the circuit shown, a simple 5-way switch with an earthed moving arm is used. This type of switch is not at all expensive owing to its simplicity. One tap is not connected to anything, that tap being for "high fidelity". For DX reception, the bias resistor of the anode detector is shunted, not only by the small mica condenser necessary for detection, but also by a large-capacity electrolytic to prevent degeneration. To obtain a high-boost effect, a smaller condenser is used, whilst to obtain a bass-boost, the selectivity of the receiver is increased by adding some fixed reaction, the actual amount of reaction being controlled by an adjustable condenser of the trimmer type. The 6J7G (or 6C6) and 57 type valves are particularly suited for anode detection (or biassed detection, as it is sometimes called). The bias resistor should be about 15,000 ohms.

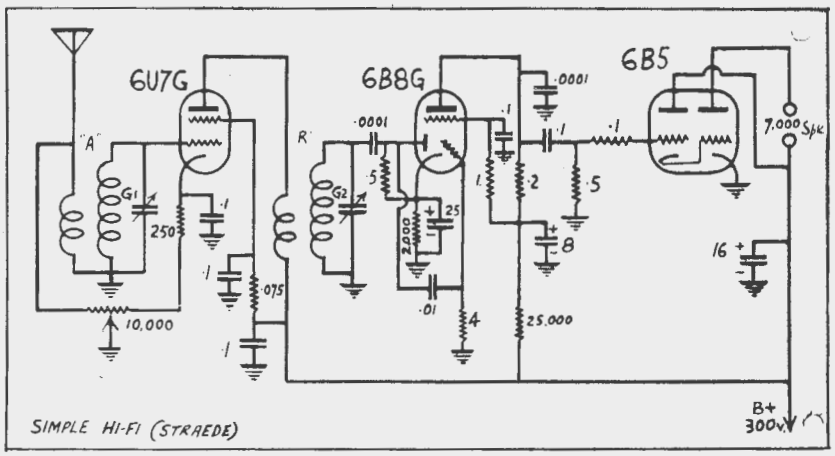
(Continued on page 11)



A versatile detector arrangement provided by simple switching.



Selectivity control for the intermediate stage can be had in this neat way.



Suggested circuit for a mantel model to possess outstanding quality of reproduction.

Near technical perfection is achieved through use of scientific instruments but the trained eyes of skilled workmen inspect completed units before they are passed along to the pumps

An important reason why Eimac valves set the modern pace in communications

In the fabrication of plates, sealing of stems and leads, winding of grids...every tiny part must pass the rigid inspection of trained individuals, precision testing devices. At the end of each production line sits a group of hardboiled inspectors. All this checking and testing takes place before Eimac valves reach the vacuum pumps. That's one of many reasons why Eimac valves possess such uniformity of characteristics . . . why their performance records have made them first choice among world's leading engineers.

Follow the leaders to

Eimac VALVES

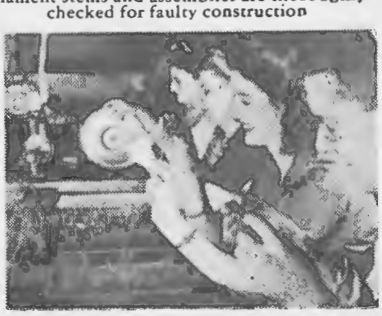
Manufactured by **EITEL-McCULLOUGH, INC., SAN BRUNO, CALIFORNIA, U. S. A.**

Export Agents: Frazar & Co., 301 Clay St., San Francisco, California, U. S. A.

Bead tester utilizes polarized light in search for stress points in glass beads which seal leads to bulbs

Polariscope is here used to inspect glass bulbs for flaws or strain which may occur during the shaping operations

General inspection bench where completed filament stems and assemblies are thoroughly checked for faulty construction

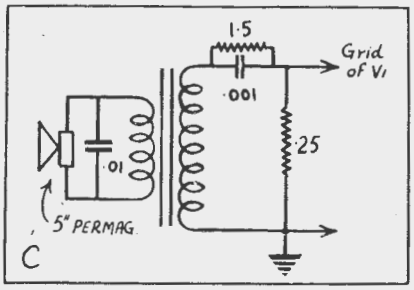


IDEAS IN CIRCUITS

(Continued from page 9)

I.F. Selectivity Control

Selectivity is desirable when receiving a distant station for two reasons. It enables the reception to be free from a background of an interfering local station, and high selectivity causes a decrease in the response of the receiver to the upper audio frequencies, thus making static noises less noticeable (a famous American set uses a selectivity control as a tone control). Elaborate systems of movable-coil transformers, variable band-pass coupling condensers, etc., have been used, but the simple system shown is qnite an efficient one, though rather limited in its scope. The secondary of the first I.F. trans-



Circuit for using small permog. speaker as a microphone.

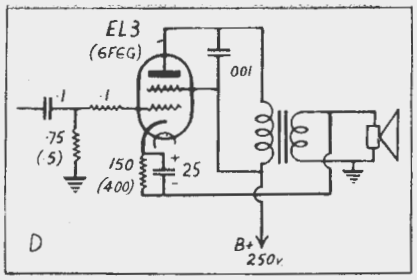
former is shunted by a small condenser in series with a variable resistor of large maximum value, at least 1 megohm.

When the resistance is a maximum, normal DX reception is obtained, any damping due to the resistor being balanced by a slight amount of reaction

CROSSWORD SOLUTION

1 C	2 O	3 N	4 E	■	5 T	6 A	7 P	■	8 B	A	9 N	10 D
11 O	V	E	N	■	12 A	T	E	■	I	■	13 H	Y
14 N	O	T	E	■	15 R	O	D	16 M	A	N	■	N
17 D	L	■	■	18 G	E	M	■	19 E	S	■	20 P	A
21 E	O	22 N	■	A	■	23 I	24 C	W	■	25 P	O	T
N	■	26 O	27 F	■	28 R	S	T	■	29 E	A	S	R
30 S	E	N	O	31 R	■	M	■	32 R	A	D	I	O
E	■	33 A	N	A	34 M	■	35 W	O	O	■	36 O	N
37 R	38 E	G	E	N	E	R	A	T	I	O	N	■
■	39 R	O	■	40 G	D	■	I	■	■	■	■	41 O
42 A	G	N	■	43 E	I	44 N	S	T	45 E	46 I	47 N	S
48 H	O	■	49 D	■	50 A	R	T	■	51 R	O	T	C
52 A	N	T	E	N	N	A	■	53 F	I	N	A	L

Solution of the Radio Crossword Puzzle which was published in a recent issue.



A simple way of arranging an effective inverse feedback to prevent distortion.

(if necessary). When the resistor is reduced to a low value, the primary and secondary circuits are highly damped, decreasing the selectivity (and sensitivity) so that the upper audio frequencies are not attenuated. When the resistor is at its minimum value (usually several ohms), the circuits are not so damped, but the secondary is actually detuned. Some experimenters connect a fixed resistor of about 5,000 ohms in the series circuits, between the condenser and the variable resistor.

Permag. Microphone

Small 4-in. or 5-in. permagnetic speakers make excellent microphones, especially for choral work. For more ordinary work such as public address, when the speaker is within fifteen inches, a filter network is necessary to eliminate blasting (see diagram). By removing the speaker transformer (now used as a microphone transformer) and placing it near (but not on) the amplifier into which the microphone is feeding, lines of ordinary twin-twisted flex may be used, in place of expensive shielded microphone cable. The filter circuit shown, not only prevents blasting and allows close speaking, but also reduces the low-frequency response somewhat, thus reducing hum pick-up. The transformer should be one designed to mach the speaker to a high impedance valve load, say, 25,000 ohms.

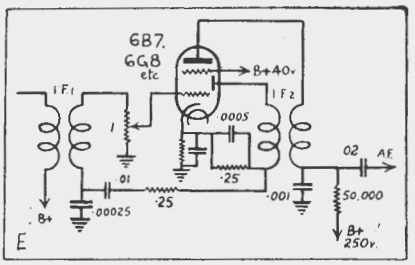
The permag. microphone has quite a high output, much higher than medium-level crystal mikes. It can usually be fed into one valve preceding the output valve. For best reproduction music, the microphone can be mounted in a wooden box baffle, approximately 5-in. x 5-in. x 2½-in. Several ¼-in. diameter holes should be drilled in the box. Alternatively, the pot cover from some types of speaker can be used as a microphone case, providing half-a-dozen ¼-in. holes are drilled in it. A plated wire grille over the front improves the appearance.

Cathode Inverse Feedback

The fourth circuit idea for this month shows a method of inverse feedback, the feedback voltage being taken from the voice coil of the speaker and applied to the cathode of the output valve. This feedback system is voltage feedback and is positive or negative according to the polarity of the voice coil connections. If positive feedback is obtained, due to incorrect connections, the sensitivity of the output stage is increased—it may even cause oscillation such as howling, or motorboating—but the tone is entirely spoilt.

Any inverse feedback system taking the voltage from the voice coil, compensates to a certain extent from distortion produced by the output transformer.

The gain-reduction ratio (and that



Reflex detector circuit with effective volume control.

is practically equal to the distortion-reduction-ratio) produced by the circuit shown depends on the type of output valve and the voice coil impedance.

(Continued on next page)

IDEAS IN CIRCUITS

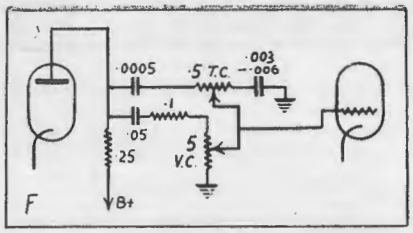
(Continued from page 11)

The effect is greatest for steep-slope valves such as the 6V6 and the EL3.

If the feedback by this system makes the response too level*, then the cathode bypass condenser can be omitted, giving more feedback, but of a different type, so that the bass and treble humps are partly restored.

Reflex Volume Control

Most Reflex circuits in which the volume control is in the A.F. section, suffer from a minimum volume effect due to the reflex valve acting as a biassed detector. This occurs most when the I.F. signal is greatest and is overcome in the circuit shown by having the I.F. controlled as well as the A.F. The volume control should be of a high resistance to avoid excessive loading of the I.F. tuned circuit (a little loading is desirable as it reduces sideband cutting and thereby improving the high-note response) it also reduces the chances of instability which is always likely to occur in a reflex circuit. A 6B8G valve is shown in the diagram, but a 6G8G can be used. The latter seems to be less critical as regards voltages, but produces more distortion when operating at full volume.



Circuit for the Hi-tone Control.

Hi-Tone Control

Most tone controls act by cutting off more or less of the "highs" so that at one end "normal" reception is obtained, whilst at the other the "highs" are reduced and the bass predominates. Unfortunately, the highs are already reduced in most receivers, so such a tone control can only make things worse. The type of tone control shown here acts in the usual way over half its range, but for the other half it actually boosts the highs by a small condenser connected from the "hot" end of the volume control. At a midway position, normal reception is obtained. The values given for the condensers are not critical—the larger the value the more pronounced the effect, but if they are too large, the lows are also affected and the tone control is no longer of use.

Note

Enquiries by letter will be answered if a stamped addressed envelope is enclosed. No enquiries will be answered by phone. Where particular interest is shown in a circuit idea, it will be described in "Radio World" in greater detail.

* See earlier article, "The Reduction of Harmonic Distortion", in February, 1942, issue of "Radio World."

UNITED NATIONS NEED HAM EQUIPMENT

Radio hams are being asked to sell their transmitters and receivers for use by the armed forces of the United Nations, according to an announcement by the American Radio Relay League, which is centralising information on available apparatus on behalf of the government agencies concerned.

Only commercially-manufactured communications-type receivers, and transmitters for which standard instruction manuals are available are required at present. Such equipment is more readily used and understood by military operators than home-made units, even though the latter may be of comparable quality, it was explained.

CARRIER-CURRENT EXPERIMENTS

By

JOHN F. THURLOW, M.D.

Reprinted from "Radio," (U.S.A.)

CARRIER - CURRENT telephone telegraph systems have been in use many years, yet very little is written about them. Utility and power concerns have made substantial use of them, with complete privacy, since radio's earliest days. Considering this fact, it is surprising that the technic of transmitting radio-frequency signals over wires has been known only to those who built and maintained the equipment for these companies. However, now that the amateurs not already in government services are concerned about "what to do for the duration," an opportunity is presented to learn about what carrier-current systems can be made to do over ordinary house lighting circuits.

NOTE

This article is reprinted from the greatly improved "Radio" from U.S.A. We feel sure that it will be found full of interest but we want it clearly understood that this outfit is entirely unsuitable for Australian conditions.

Wired wireless systems have the peculiar advantage of being non radiating. present-day warfare forbids the use of radiated signals when there is danger of air attack, which is precisely the time that flexible communication systems are most needed. While the apparatus described here does not solve any of the perplexing problems of civilian defence, at least it is useable for short-distance communication without endangering the community in which it is used. In this connection, however, wired wireless is being studied for what usefulness it might be expected to yield in civilian defence, and development may be forthcoming in the near future.

Advantages of System

Communication by means of carrier current has, in addition to being nonradiating, a number of other advantages. Distances up to several thousand feet can be covered with an input power of less than two watts with the intervening lines above ground. The transmitters and receivers necessary are entirely conventional and very simple to build and operate. With carrier-current equipment antennas are not necessary, which of course makes it much more convenient to move from place to place than radiating equipment. In fact, if the transmitter and receiver are built into one physical unit, only one piece of apparatus, save for the telephone handset, need be carried about. To set it into operation the line cord is plugged into the nearest socket. Such simplicity of operation will be found a restful change by those who dislike encumbrances and fussing.

The unit to be described in this article resulted from a long standing curiosity as to how carrier-current systems performed, and was built to serve a need for house-to-shack communication. The equipment was worked out by trial and error methods which finally brought results, although not until much effort had been expended winding large coils with various amounts of very fine wire. Spare parts were used when available. It will be noticed in referring to the circuit diagrams that r-f chokes are omitted; no use was found for any. We used variable condensers from old battery operated receivers for our receiving section.

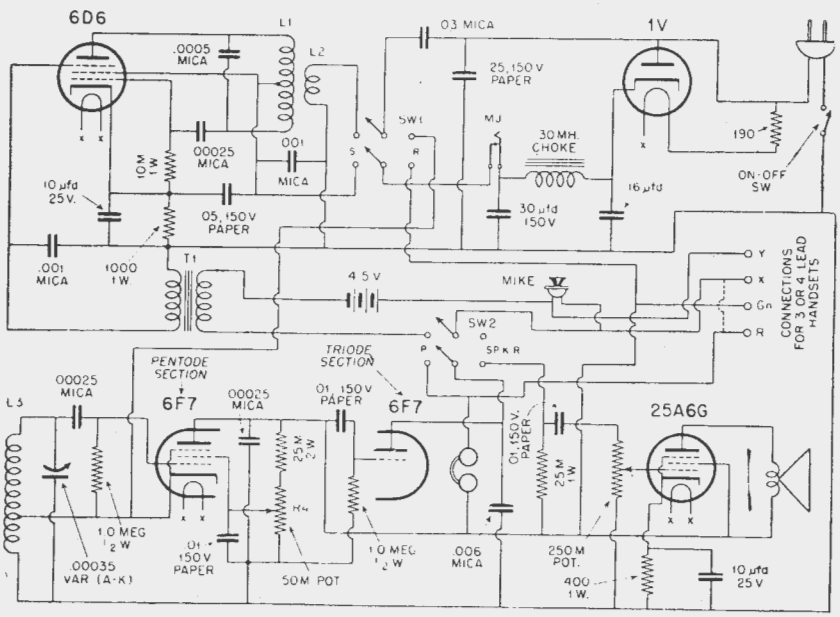
In designing the transmitter-receiver unit it was decided to use 185 kc so as not to interfere with other services. After considerable listening on this and neighbouring frequencies there did not seem to be any possibility that interference would be created, nor were any other carrier-current signals heard in our locality at any time during several months of almost daily operation. There is, however, a possibility that signals lower or higher in frequency might conceivably give trouble, so it is suggested that the neighbourhood of 185 kc be used.

When development of the unit had progressed to the point where signals could be transmitted through the power lines, it became apparent that operation of the equipment could be made very simple. The transmitter, it was found, would work nicely without frequency or other tuning adjustment; the receiver required a tuning adjustment, and regeneration and volume controls. This made it possible to construct apparatus which anyone of ordinary ability could operate, and gave a minimum of opportunity for failure when operation was carried on by anyone unfamiliar with transmitting equipment.

Description of Equipment

As finally worked out, the carrier-current apparatus took the form of a "talk-back". To call the other party, a small permanent magnet speaker is

(Continued on next page)



Circuit of the carrier-current transmitter-receiver, which can be used for communication over the power supply wires. It should be noted that the circuit is NOT suitable for Australian conditions.

CARRIER-CURRENT

(Continued from page 13)

used, which in conversation is switched off, putting the telephone handset and its microphone in operation. To transmit, a "push-to-talk" switch, SW1, is depressed, which puts the transmitter into operation as long as it is held down. On letting the switch up the receiver again operates. The "transmit-receive," or push-to-talk switch is so arranged that the antenna condenser shifts from one part of the unit to the other in switching, along with the plate voltage supply. This helps to prevent trapping the transmitter signal in the receiver circuits. The receiver can be left alone once it has been adjusted. As a result, no adjustments are necessary except for occasionally reversing the line plug for best signals if the unit is carried from one place to another.

Four tubes are used. The ac-dc power supply employs a 1-V rectifier which supplies both the transmitter and receiver. The transmitter consists of one tube only—a 6D6—which is suppressor-modulated by a carbon microphone through an ordinary microphone transformer, T1. The receiver uses a 6F7 and a 25A6G, the former tube functioning as two separate tubes. The receiver circuit is the familiar "detector and two-step" arrangement.

The transmitter section uses a modified Colpitts circuit, and its efficiency was found to be of high order if the L/C ratio was kept high. When we tried lowering the oscillator frequency by adding capacity across the tank, the output fell off rapidly. The output of the 6D6 is very effectively modulated through the suppressor grid if a microphone battery of 4½ volts is used. A dry-cell "C" battery fills the bill. Less than this is not recommended. The frequency of the transmitter is fixed, and can only be changed by the substitution of another value of fixed condenser, which we did not find to be necessary. However, it is worthwhile to determine the frequency. This we accomplished by borrowing the use of a Chanalyst. It was found to be 185 kc with the values of inductance and capacity given.

The pentode section of the 6F7 serves as a regenerative detector, while its triode section supplies audio for the handset and the output 25A6G. In our equipment the triode section of the 6F7 worked into a low-impedance handset much better than into a good quality high-impedance telephone receiver. For this reason, provision was made for the use of a three terminal handset, which is the most readily available low-impedance equipment for the average amateur. However, a four terminal handset can also be used. If the handset has three terminals, connect X and R together as indicated by the dotted line in the schematic.

The power supply furnishes about 110 volts for the plates of the oscillator and output tubes if the line voltage is about 120 volts. The amount of resistance used to drop the line voltage to the 43-volts necessary for the tube heaters is dependent on the prevailing line voltage in a given location. As ours averaged 128 volts, we used 210 ohms at R10 to prevent heater voltages from getting too high. In other locations it is possible that as little as 190 ohms will be required. Considerable filtering was necessary, and blocking condensers across the line were put in which effectively reduced line noises from electrical devices.

NOTE

These remarks apply only in the United States.
In Australia, experimenting with apparatus of this kind should not be carried out without authority from the Radio Inspector.

Constructional Notes

Construction offered no problems once the manifold terminals of the 6F7 were firmly in mind. Nothing was

grounded to the chassis, so as to reduce the likelihood of receiving shocks. To reduce chances of radiation, the oscillator tube and inductances, and as much of the r-f circuits as possible were covered by a shield can which also served to protect the fine No. 32 wire used in the inductances from damage. The inductances were wound on cardboard cylinders and painted with coil dope. The fine leads from these were brought to the terminal strips bolted to the chassis in order to make the necessary connections with fixed condensers, etc., and to give the r-f section physical stability.

The mechanical layout used can be that which seems most practical. Breadboard construction was found to be just as satisfactory in performance as the metal chassis arrangement which we eventually used. A panel of insulating material, such as Presdwood or Masonite, is suggested with a view to making it possible to mount panel circuit components so that they will be isolated from the chassis. If every effort is made to prevent the chassis from being "ground," there is little likelihood of shocks being felt, which could easily happen if the polarity was such that the chassis was "hot." Even so, operation in the bathtub, or from wet cement flooring is not recommended.

Operation

To operate the equipment, the line cord is plugged in and reversed if necessary so that a singing line hum, instead of a low 60-cycle buzz, is heard. The regeneration control R4 is advanced until it just goes into the fringe of oscillation, as in any regenerative receiver. When two of these units are plugged in, the push-to-talk switch of one is held down until its signal can be tuned in by the other. The tuning adjustment of the receiver need not be changed once it has been made at a sufficient distance to tune it accurately. With the microphone connected (handset in operation, the speaker inoperative), the push-to-talk switch is depressed and the other unit called. This other unit then responds with it's switches in the same position, while the first listens by simply letting the push-to-talk switch return to the receive position. With a little practice conversation is effected quite smoothly.

CW operation, of course, is simply a matter of plugging a key into the meter jack MJ and keying the plate lead of the oscillator, with the other unit in oscillating condition to heterodyne the signal. With the receiver in this condition, radiated long-wave signals will often be heard across the receiver dial.

Within one building the signals received from the other unit are broad, and so strong that the plate current flunctuates in the receiver. With the units farther apart, tuning becomes sharper and more normal. It is recommended that they first be tried between buildings several hundred feet apart once "percolation" has been achieved.

Long, uninterrupted power lines strung above ground provide the best medium for distance operation, and when circumstances are favourable good signals are heard at about 3,000 feet. When the intervening lines are unfavourable, which seems to be the case with underground conduits, or when tranformers provided with baffles intervene, the dx possiblities are much less. It is well to remember also, that two locations only a block apart may have a separation of a mile or more from the standpoint of the power lines supplying them, so that a study of power routing may prevent disappointment by indicating that what seems a short distance is really dx.

Our limited experience with this form of communication has seemed to indicate that low power offers results comparable to what a similarly-powered trans-receiver would provide under somewhat unfavourable conditions. The outstanding feature, however, is the convenience of the equipment from the standpoint of operation and portability. A single piece of equipment which may be easily carried about can be made to yield many useful functions about the house, or from building to building,

(**Continued on poge 24**)


Wireless alone can meet the exacting needs of communication for Mobile Units...
INSTANT ★ CONSTANT CERTAIN
AUSTRALIAN-MADE
RADIOTRON
RADIO VALVES

ABOUT THE TUNED CIRCUIT

This month the way a simple oscillatory circuit works is explained, together with the meaning of resonance.

WHEN an inductance and capacitance, represented by a coil and condensers, are connected as shown in fig. 1, what is technically known as an oscillatory circuit is formed.

If a battery, with a resistance in series to limit the current, is connected across the coil as shown in fig. 2, and the switch closed, the resultant current in passing through the coil will set up a magnetic field around the latter. The action will not be instantaneous, due to the inductive reactance of the coil impeding the current flow.

As long as the key remains closed, the magnetic field surrounding the winding will remain constant. At the instant it is opened, however, the field will commence to collapse, thus returning the energy stored in it back to the circuit.

The field, in collapsing back on the coil, tends to maintain through "L" a current in the same direction as that originally applied (see article 4 of this series). Thus current flows into the condenser "C," which then becomes charged as shown in fig. 3. At this stage there is no magnetic field, energy that was entirely stored by the latter being transferred in the form of charge to the plates of the condenser "C".

This is obviously not a stable condition, and the condenser discharges through "L," the resultant current through the winding again setting up the magnetic field as before. But because the current is now in the opposite direction, the original north pole of the winding now becomes the south, and the original south pole the north (see fig. 4.).

Entire Process Repeated

When the condenser is completely discharged, thus fully establishing the field, the latter again commences to collapse, until it disappears altogether, leaving "C" charged once again, but in opposite polarity to that shown in fig. 3.

If it were not for the fact that a circuit always contains resistance in one form or another, this process would continue for ever. The current would never cease surging in and out of the condenser, travelling backwards and forwards through the coil all the time. As it is, the resistance present dissipates as heat, some of the energy transferred during each cycle, and the process finally stops as there is no longer energy to sustain it. In practical circuits, energy to overcome this damping, as it is called, is supplied, in a manner to be explained later.

It follows logically that the larger the coil (the greater its inductance) the longer time it will take for the condenser to discharge through it. Similarly, the larger the condenser, the longer it takes to charge and discharge. Hence, the smaller the coil and condenser, the higher will be the frequency of oscillation.

The Meaning of Resonance

The resonant frequency is the natural frequency of oscillation of any oscillatory system. An excellent mechanical analogy to illustrate this point is afforded by the tuning fork. If this is struck and then held near

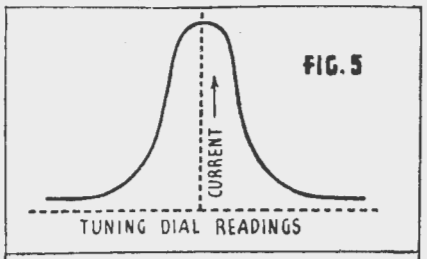


FIG. 5

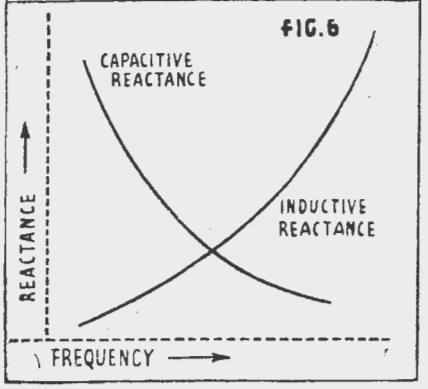


FIG. 6

a piano, the string in the piano which is tuned to the same frequency as that of the fork will vibrate in sympathy with the latter, obtaining the energy to do so from the air waves set up by the vibration of the fork.

A similar effect occurs in the tuning circuits of a receiver when the dial is rotated to bring in a particular programme, Every radio station operates on a different frequency, and this frequency is picked out from all the rest by adjusting the variable tuning circuits in the receiver until their natural frequency of oscillation coincides with the frequency on which the wanted transmission is being made. When the tuning adjustment is correct, the

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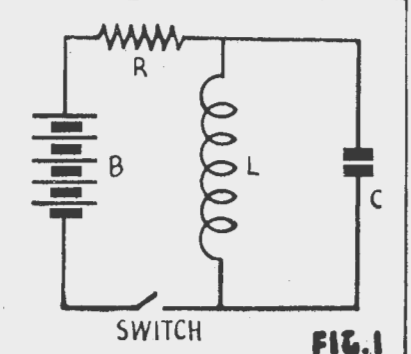

FIG. 1

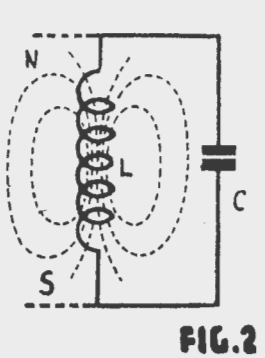

FIG. 2

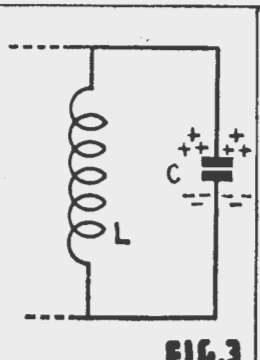

FIG. 3

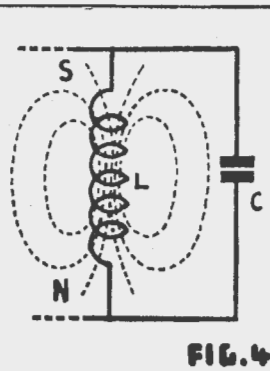

FIG. 4

RADIO STEP BY STEP

(Continued from page 17)

voltages across each tuning circuit reach their maximum values for the particular programme being received.

Fig. 5 illustrates the process graphically. As the natural frequency of the tuned circuit approaches that of the wanted transmissions, the current in the circuit increases as shown, reaching a maximum when resonance is obtained. If the tuning dial is rotated still further, the current decreases rapidly as illustrated.

Inductive and Capacitive Reactance

Earlier in the series it was mentioned that the formula for inductive reactance is $2\pi fL$, while that for capacitive reactance is $\frac{1}{2\pi fC}$ (where $\pi = 3.1416$, f is the frequency in cycles per second, L the inductance in henries, and C the condenser capacity in farads).

From these formulae it can be seen that the impedance offered by a coil (i.e., inductive reactance) to an alternating current, increases with the frequency of oscillation. For a condenser the opposite holds, or in other words, capacitive reactance decreases as the frequency of the oscillatory current increases.

It is thus apparent from the above that in any coil and condenser combination there must be a point at which the inductive and capacitive reactances are equal. Since they oppose each other, they cancel, leaving only the resistance in the circuit to impede the flow of current. (See Fig. 6).

At the resonant frequency, then, $2\pi fL$, the inductive reactance, must equal $\frac{1}{2\pi fC}$, the capacitive reactance.

Hence:—

$$f = \frac{1}{2\pi \sqrt{LC}}$$

and so if L and C are known, the frequency at which they will resonate can be calculated.

Thus another way of explaining what happens when a receiving circuit is tuned is this. By varying the capacity in the circuit by means of the variable condenser, the circuit is adjusted so that its total reactance is at a minimum for the incoming frequency. In this way, the natural frequency of oscillation of the receiving circuit is made to coincide with the frequency of the wanted signal, and there is resonance.

COLOUR CODES

I have never been able to discern the reason for the complicated cabalistic signs which are used to mark resistances and condensers. It is advantageous to mark multi leads for identification, but surely the value of a resistance or a condensers could be stamped on them, using the usual digits. Why should the body of a resistance be marked with one colour, the tip with another, and a dot or band on the body to indicate its resistance? To read the value one has to take the body colour first, then the tip colour, and then the dot. For example, a 25,000-ohm resistance would have a red body, a green tip, and an orange dot. It is stupid and unnecessary; the values could be stencilled on so that they could be read direct. I know that the Radio Component Federation some years ago approved this code, which must not only be costly to carry out in manufacture, but gives rise to serious mistakes. A number of firms tell me that few manufacturers have been able to train girls to identify colour codes, and resistances are dispatched of wrong values. It ought to be abolished, for it is a relic of the early days of radio, and the type of mentality which was in radio in those days. There is no point in trying to make the identification of a resistance value mysterious or clever.

—By "Thermion," in Practical Wireless (England).

IT TOOK HIM WAY UP

'Calling British Forces in India'—a weekly BBC programme from London—has a request tune feature on the last Thursday of each month. Requests from servicemen in India or from their families in Britain—who ask for the men's favourite tunes to be broadcast to them—are included. Christopher Stone is the popular compere.

After one broadcast he received an airgraph saying:

"Millions and millions of thanks for sending my wife's and my two small daughters' messages over the air last Thursday. It was one of those moments in my life, when I really was way up somewhere, I don't know where, but the world just didn't seem big enough to contain me. I forgot the heat, the flies that were making my knees a skaeing rink, the dust, and the smell from the little cluster of mud huts—which is 200 yards or so in front of my bungalow — where the families of the men who built the bungalow were cooking their evening meal. I even forgot the shortage of beer, which is a thing that takes some forgetting.

"I've been out here for fourteen months now, and have often listened to your programme and hoped for a message from there."

Origin of the Oscillograph

IT is highly probable that the world's present knowledge of electrical phenomena, especially that of alternating currents, would not be nearly as complete without the results obtained by the use of a highly important instrument, the oscillograph. This instrument was the first and most notable invention of William Duddell.

William Duddell was born in England in 1872, but because of delicate health, he was educated in Cannes, France. As a child he showed great mechanical ingenuity, and, after his schooling, he served any apprenticeship as an engineer at Colchester. In 1893 he went to the City and Guilds Institute where he stayed for several years because of the excellent facilities for experimental work. Later he opened an office of his own in Victoria Street, London.

The present day recording oscillographs of the galvanometer type all utilise the same basic principles incorporated in the first recording oscillograph developed by Duddell in 1894. The device consists of a modified moving coil galvanometer combined with a rotating or vibrating mirror and a moving photographic film or plate. Briefly described, the galvanometer or vibrator portion consists of two parallel conductors made of thin phosphor bronze looped over a pulley. A very small mirror is attached to both strips of phosphor bronze. The assembly is mounted between the poles of a powerful magnet. A guide block placed at the top of the pole pieces limits the vibration of the conductors to the portion directly in the magnetic field. When a current is passed through the strips, one strip advances while the other recedes, thus causing the mirror to rotate about a vertical axis.

The entire vibrator is immersed in oil, the purpose being to damp its movement. A source of light is arranged so that the beam is reflected by the mirror to a photographic film or plate. When an alterating current passes through the strips, the mirror, and therefore the spot of light from the reflected beam, oscillates back and forth as the current varies. When the photographic film is moved at right angles to the direction of motion of the spot of light, an image of the alternating current wave form results.

In 1904 Duddell saw the need for a sensitive alternating current galvanometer for current measurements at radio frequencies and adapted the Boys' radio-micrometer for this purpose. The moving system of the Boys' instrument consisted of a single turn of silver wire at the bottom of which was a tiny thermocouple of bismuth and antimony. This unit was suspended between the poles of a strong magnet by means of a fine quartz fibre, to which was attached a small mirror. Deflections were read with a lamp and a scale. Duddell's contribution to this instrument was the addition of a heating unit mounted just under the thermocouple. The current to be measured passes through the heating resistor and the heat developed is carried to to the thermocouple by convection and radiation. The current generated by the thermocouple flows through the silver loop which is deflected by electrodynamic action. The modern thermo-galvanometer is more stable in operation because the heating unit is in direct contact with the thermocouple. The indications of the instrument are proportional to the square of the current, and, because it is practically free of inductance, it may be used to measure current at high frequencies.

Duddell's contributions to electrical science were widely recognised and he held office in several learned societies, besides being a Fellow of the Royal Society. He died on November 4, 1917.

—The N.Z. Radiogram."

RADIO QUIZ

1. What is a Billi?
2. If you connect a condenser with a capacity of .0001 in parallel with a .001 condenser what is the resultant combined capacity?
3. What does D.C. stand for?
4. What is the speed of light?
5. In morse code what is "A"?
6. What is a tetrode?
7. An element in the valve is called aa "plate." What is another term for this element (English)?
8. A "Watt-hour"—What is it?

Answers on page 24.

A WALKING AUTOGRAPH BOOK

In a recent BBC 'Anzacs Calling Home' programme, Sergeant Pilot 'Cliff' Richards, who received an injury to his foot while flying over Germany, was one of the 'Aussies' who sent a message—to his wife and relatives in Orange and Bellevue Hill, Sydney N.S.W.

After Richards had broadcast his greetings, H. H. Stewart, who looks after these Anzac message programmes, added a postscript: "I must tell you, Mrs. Richards, about Cliff's new autograph book. He's got signatures all over the plaster of paris covering his foot—the only catch is that the famous have to kneel on the floor to do the signing."

THE ORIGIN OF WIRELESS AS TOLD IN A BOOK DATED 1899

Wireless telegraphy came into actual practical working in the Bristol Channel. Towards the close of March, 1898, after many experiments had been conducted, a system of communication was set up between the fort on Lavernock Point and the fort on the rock in the Channel called the Flat Holm. The system is electromagnetic rather than by Marconi's method, and forty words a minute were signalled across the distance of three miles without cables in the sea. Large gauge copper wires were erected parallel with each other on the sea front at Lavernock and near the lighthouse at Flat Holm; and very distinct Morse code signals were transmitted; the vibration sent through space from the electric motor producing a pleasing tone on the telephone receivers and the dots and dashes being easily read. Signor Marconi had previously introduced an electric telegraph working without wires. It had been observed that a message sent on one wire could sometimes be perceived on another very near it, though a space existed between them. This is due to what is called "induction," and Mr. Preece, C.B., chief engineer of the post office, succeeded in sending telegrams in this way. The message is conveyed through space by "waves" set up in the ether by the electricity in one of the wires and is caught by the other wires. There have been other workers in the same field, and Heinrich Herx discovered that electric sparks set up "waves" in the ether of space several years ago. Marconi sends his messages by an induction coil and several sparking balls of brass, which produce and transmit the electric sparks. These sparks produce waves in the ether, and thus in telegraphing by the Marconi system we have groups of waves proceeding from the sparking balls to make signals, instead of long and short currents passing through a wire. The waves are received on a Branly "coherer," which a compound of silver and nickel dust mixed with a little quicksilver, and is joined to a battery and a Morse telegrapher. Marconi's telegraph has been used in various countries over a space of ten miles and more; the electricity set up in the induction coil and sparking balls acting on the prepared metal dust of the "coherer" which caused the Morse instrument to record the message.

—The N.Z. Radiogram.

Shortwave Review

CONDUCTED BY
L. J. KEAST

NOTES FROM MY DIARY—

The vernal equinox has once more brought its accompanying gales, those nasty little gusts that have a habit of finding out all those unsoldered joins we meant to fix. But our chief concern is that it signals a change in schedules and, of course, wave-lengths. This time we have been thrown a little off our balance by the introduction of Daylight Saving Time, but it has its compensations and we get an opportunity of hearing some of the morning stations. I have found the 41 and 49 metre bands quite good. However, we can say goodbye to daylight reception and can spend those long summer evenings now with a greater choice than that which has been offering over the past few months.

Evidently taking a leaf from the "V" for Victory campaign of some time ago, the Sudeten German Transmitter on 25.14 metres from 10.25 p.m. till closing at 10.50 p.m., is reading, in German, of course, letters from listeners who are experts in different trades, telling their friends how to sabotage machinery and methods of short circuiting electrical equipment.

HER-2, Schwarzenburg, 11,865 kc., 25.28 metres, has been heard the last few nights from 11 to 11.30 p.m. giving news in German and French.

Elsewhere will be found a nice list of New Stations, a number that any club paper can be proud of, and we are.

This list is made possible by the members passing on their finds to me for the benefit of others following this grand hobby. I appreciate it very much and take this opportunity of thanking them.

That reminds me, Dakar, the fortified naval station in Senegal, French West Africa, is in the limelight and the first to log FGA, 9.41 m.c., 31.88 metres, was our old friend Sam Nelson of Cairns. Long time since we heard from Mr. Nelson.

Sgt. Clack with the Home Forces somewhere in Australia, forwards a copy of the Free French Paper, "France D'Aboard," which he received from Radio Brazzaville. In addition to FZI, 11,965 kc., 25.06 metres, they refer to Radio-Cameroun. This will be R1A6 Douala, Cameroons, 8 m.c. 37.50 metres. News is given from 3.15 to 3.30 a.m., and this should be audible in Sydney; but on the other occasion they give news, 7.45 p.m., I doubt if we would hear it.

The same paper makes mention of ZOY, Accra, Gold Coast, 6002 kc., 49.98 metres, as relaying Emissions de la France Libre at 9 p.m. and 4 a.m.

Sgt. Clack also sends along details of KWU, Dixon, California, 15,355 kc., 19.53 metres.

He says their usual closing time is 9.15 a.m., but on Sundays they continue until later. He is not sure of closing time, but thinks it is about 1 p.m.

Here are the details from his own observation:

10.45 a.m. Programme schedule announced. 10.50 News in English. 11 a.m. "Victory for China" in Chinese. 11.15 Talk in French: "Japan the Peril of Asia." 11.30 a.m. "Japan Against Japan," in Japanese. 11.45 "Freedom for the Philippines," in English and Tagalog. Noon. News in English. 12.15 p.m. Session in Philippino dialect.

Sgt. Clack closes his letter by mentioning with justifiable pride his verification from Emmissora Nacional in Ponta Delgrada, Axores Is., which he used to hear last summer on 7330 kc., 40.93 metres. His report, which was apparently the first from Australia, was printed on the front page of "Correio dos Azores."

For quite a while I have been hearing a most peculiar type of interference on the 41 and 49 metre bands. It is certainly very annoying and is not a sharp signal, appearing to spread over.

I understand from Mr. Cushen the BBC are concerned as regards its effect and figure it is of enemy origin. The main frequencies used are 6190, 6180 and 6050 kc., according to the BBC, but I have heard them around 7220 kc.

Mr. Roy Hallett, of Enfield, tells me he has heard what sounded like XGAW, Shanghai, on approximately 49.25 metres, at 11.55 p.m. Japanese National Anthem followed and station went off the air.

He also refers to "Radio Metropole"

NEW STATIONS

KES-2 Bolinas, 8930 kc, 33.59m.: A further outlet for "The Voice of America." Heard in parallel with KWID from 9 p.m. Only a fair signal. This is also the opinion of Sgt. Clack and Mr. Du Faur, but Mr. Gillett of Adelaide finds the signal good, but not to be compared with KWV. I think this is one of the R.C.A. Communications Inc. Point-to-Point Service Stations.

KES-3, Bolinas, 10,620kc, 28.25m.: Still another transmitter used in parallel with KWID Heard from about 6 p.m. Uses Asiatic langouge quite a lot. First reported by Mr. Du Faur. Another R.C.A. Point-to-Point.

WGL, New York, 9750 kc., 30.76m.: Reported to be operating from 6.45 p.m. till 9 p.m. News in English at 8 p.m. Several foreign languages are also used. Mr. Perkins heard them at 8.30 p.m. but interference bad.

KGEI, San Francisco, 11,730kc, 25.58m.; Another transmitter from the Fairmount Hotel. This General Electric International Station is heard from 3.15 p.m. to 6 p.m. News at 3.20 and 5 p.m.

WJT, New York, 8810kc, 34.05m.: Another "Voice of America" owned and operated by Press Wireless Association. Heard at 10.45 a.m. First reported by Mr. Condon, South Australia.

Thailand Radio, Bangkok, 6044kc, 49.63m.: Here is another new outlet from this Eastern country. Mr. Condon also reports this and says signal good at 1 a.m.

Radio Tananarive, Tananarive, 6162kc., 48.68m. Another one forwarded by Mr. Condon of Lauro, South Australia. Good signal at 1.30 a.m. Male and female announcers. Good musical programme. News in French at 2 a.m.

Radio Debunk,(?) Berlin, 10,340kc, 29.01m.: Here is a new one reported by Mr. Cushen of New Zealand. It is a German operated station directed to U.S.A. Signal is good when opening at 11.30 a.m. with announcement "This is Voice of America Radio Debunk bringing you the news from inside America." Then follows "The Star Spangled Banner" on piano. Male vocalist "Carry Me Back to Old Virginia." They sign with anthem at 11.58 a.m. First heard August 29. (This station has been mentioned in U.S.A. magazines far quite a while as operating on 7,200kc, 41.67m., but Mr. Cushen's catch is certainly a good one.—Ed.)

XGAW, Shanghai 6090kc, 49.25m.: Mr. Cushen also sends this one. Here is what he says: "Heard a Yank voice on 6.09mc., the other night with news at 10.45 p.m. Took it to be CBFW, but was surprised at the announcement, "This is ? XGAW, Shanghai, next news at 9.30."

HCJB, Quito, 10,000kc., 30m.: Another one from New Zealand and forwarded by Mr. Cushen, "Voice of the Andes." Heard from September 5 on 10,000kc., also on 12,460 kc., 24.09m. English session from 1 p.m. to 2 p.m. Very good strength. Mr. Perkins, of Queensland, heard them at 10.15 p.m. which, of course, now would be 11.15 p.m.

CR7??, Lourenco Marques, 51m.: Mr. Condon of South Australia says, "Heard weakly at 7 a.m. on September 9 with same programme as CR7BE (30.48m.) (This is a new one for this country. The latest list I have from the Radio Clube de Mocambique, sent to me by Dr. Gaden, shows them on 49.71m., although latest American magazines show wave length as 49.21m. (6097kc).—Ed.)

"Radio Metropole," Locatian unknown, 9475 kc., 31.66m.: This is a new transmitter for this station, suspected of being operated by the Japs. Mr. Perkins, of Malanda, Q., heard a female announcer at 8.10 a.m. giving titles of records which were mainly American jazz. At 8.15 a.m. a man read anti-British news. This was followed by jitterbug tunes.

WOK, New York, 10,555kc., 28.42m.: Mr. Perkins submits this one as giving Spanish at 10.27 a.m.

SHORT-WAVE REVIEW

(Continued)

on 31.6 metres, with a good signal closing about 9.05 a.m. Lady announcer.

Mr. Hallet says the Italian Broadcasting Service now opens at 6 p.m. with music, news in Italian at 6.10, news in English at 6.20. Prisoners of war at 6.28. These items are on 2RO-3 31.15 metres and 2RO-6, 19.61 metres.

Roy says he had a letter from a pal saying he heard WJB, New York on approximately 34 metres at 9.30 a.m. on one Sunday morning.

(Radio Hobbies announce a WJT on 34.09 metres at 10.30 a.m.—Ed.)

EXCERPTS FROM LETTERS

Mr. Condon, of Laura, S.A., in an interesting letter, amongst other things, mentions hearing Lourenco Marques on 51 metres, carrying same programme as CR7BE, 30.48 metres, at 7 a.m. with news in English. He also mentions he heard CR7BE on September 13, at 10.15 p.m., with fair signal, English was spoken and station closed with "Dolores" at 10.30.

Mr. Condon has also heard WOK, New York, 28.42m., the first new station mentioned by Mr. Perkins. He also says TGWB, Guatemala, according to a friend of his, has been transmitting on 46m., 46.12m., and 46.22m.

(Perhaps there was a little trouble with their crystal as latest American reports label them as on 6490kc., 46.22m., but label them as "hopping about."—Ed.)

Mr. Condon sends in a most comprehensive report, but owing to our enforced sectional Loggings, we are unable to print a lot of it.

Mr. Arthur Cushen, of N.Z., as usual sends over the unusual. His particular avocation keeps him at the controls more often than a lot of us and possessed of unbounded energy, together with limitless enthusiasm, he seems to be there when the changes in skeds and wave-lengths take place.

Arthur draws my attention to India now being on summer time, the 41 metre band stations, VUC VUD and VUB all give news at 11 p.m. instead of 11.30 p.m. Incidentally, for those who try BC-DX, Patna is heard on 630 kc., at 2.50 a.m.

Mr. Cushen says "Indian Freedom" station is now on 15,180 kc., 19.76m., and English is heard at 2.40 a.m. He believes the transmitter to be in Shonan and is the new 100 k.w. station partly completed before Japanese invasion.

(Shonan is the Japanese name for Singapore.—Ed.)

He says WDI, New York, was withdrawn on August 2 and replaced by WGL.

Several new stations reported by Mr. Cushen are shown in the appropriate section of this issue.

Mr. Hugh Perkins, of Malanda, is naturally proud of hearing "Radio Metropole" on 31.66m., in the mornings and receiving a verification from Metropole" on 31.66m. in the mornings Radio Addis Ababa and FZI Brazzaville. The former give their exact frequency as 9620kc. Well, we were only five kilocycles out, so that is not too bad.

Mr. Perkins says he hears a station on approximately 16.83m., with an R6 signal at 9.15 p.m. which is not DJH. In other words, he maintains

RE VERIFICATIONS

AW763DX asks "What is the position regarding sending Loggings to Allied countries for veries during the present time?"

I understand mail is received for all Allied countries, but with the exception of America, replies are unlikely.

I have not heard from Moscow since hostilities began and this is understandable.

But to have a report to New York returned with a stamp "Not in Directory" is just too annoying for anything.

I think I was one of the first to log WJO, New York, and I despatched a full report on May 8. Imagine my chagrin when it arrived back at Carlingford unopened (except for Censor in Sydney).

Surely the postal clerk handling same in New York could have shown a little gumption and 'phoned Radio City.

there are three Berlin stations in parallel.

One U.S.A. station he heard on 10.62m. at 8.30 p.m. relaying KWID, would be KES-3, 28.25m., mentioned under "New Stations."

Dr. Gaden of Quilpie, Queensland, probably the most prolific writer of all short-wave listeners, forwards some interesting observations. Dr. Gaden, like a good many of us, finds the BBC holding his attention for considerable periods, and I gather the Eastern service is one of his favourites.

Best reception at Quilpie is through GRD, 19.42m., he has not heard the 13 metre band yet (a few more days like Sunday, October 4, and we would consider summer here and fully expect results around 21,470 k.c.).

Dr. Gaden was the first to tell me of Singapore (25 metres) being heard till closing at 11.30 a.m., and a very nice signal, too. Morning signals are free from morse interference, which is the reverse at night, but at 11.15 a.m. XIRS, on 25.02m. are badly affected by morse. As Dr. Gaden says, the Jap speaking from XIRS is very precise, never fails to say comma, full-stop, etc.

They close at 11.30 a.m., give wave length as 25.02m., and state next news at 11 a.m. Shanghai daylight saving time.

Our friend considers the interference on VLQ2 at 9.40 p.m. is deliberate. Always an erratic signal at Quilpie.

Dr. Gaden, in an air mail letter, tells me of a new one—WGO, New York, 20.7 metres, giving news in English at midnight, commentary at 12.10 a.m. Spanish at 12.15 a.m. Very poor signal.

Mr. Du Faur, of Melbourne, forwards a fine bunch of Loggings, and with commendable decency hastens to advise he has fathomed his own query of last month re HTOA (see Help Wanted, September issue). He finds he misread his dial—was actually on 30.86 metres and station is, of course, XGOA.

This is another ardent listener who has noticed how night reception has improved, being able to log 8 stations on the 16 metre band between 10.25 and 11.15 p.m. This, of course, was exceptional as the next night the customary 3 or 4 were only available.

While on 16 metres, Mr. Du Faur has also heard PMC, Batavia, 16.54 metres at 10.20 p.m. in addition to 1.15 p.m. when they give list of prisoners of war in Java.

This Jap controlled station reminds me these copyists must have been listening to William Winter, as the other night JZL, 16.87 metres at 7 p.m. announced, "Ladies and gentlemen, how do you do. This is the Japan Broadcasting Corporation."

Mr. Rex Gillett, of Adelaide, although unable to spend as much time as usual at his receiver, nevertheless sends in a mighty fine list of Loggings. He, like myself, finds daylight reception very poor, night signals improving but no sign of the 13 metre band being active yet.

Mr. Gillett says he hard TAP, Ankara, on 31.7 metres calling WEL, WCG and WES, New York at 9 a.m. This was in reference to Facsimile Transmissions. He also has been listening to the new Bolinas transmitter, KES-2, 33.59 metres and KES-3, 28.25m.

Like several other reporters quite a number of the Loggings cannot be shown, as they are not covered in this issue.

The MONTH'S LOGGINGS

ALL TIMES ARE AUSTRALIAN DAYLIGHT SAVING TIME

Pressure on space only permits of sectional Loggings. (See August issue for Australia, Africa, Central and North America and Mexico. September issue for further North American stations, South America, the East and Great Britain.)

Please have reports sent to L. J. Keast, 23 Honiton Avenue West, Carlingford, to arrive by 27th of month,

North America: Further American stations to be added to list.

KGEI, San Francisco .... 11,730kc, 25.57m. 3.15 p.m. till 6 p.m.
News 3.20 and 5 p.m. Religious service at 5.45 p.m. (Du Faur). Only a fair signal (Clack) (Perkins).

KWU, Dixon 15,355kc, 19.53m
This is the announced frequency (Du Faur) (Clack)—See "Diary".—Ed.

KES-3, Bolinas .... 10,620kc, 28.25m.
Heard from about 6 p.m. In parallel with KWID, (Du Faur).

WGL, New York ....9750kc, 30.76m.
From 6.45 p.m. till 9 p.m. News at 8 p.m.

KES-2, Bolinas 8930kc, 33.59m
Heard from 9 p.m. in parallel with KWID (Clack, Du Faur, Perkins).

WJT, New York 8810kc, 34.05m
Around 10.45 a.m. (Condon).

WOK, New York 10,555kc, 28.42m
Heord in Spanish at 10.27 a.m. (Perkins).

Great Britain:
Further seasonal alterations to the BBC Pacific Service.

GSV 17,810kc, 16.84m
From 6 p.m. till closing at 8.45 p.m. getting better nightly (Gaden).

GRD 15,440kc, 19.42m
From 6 p.m. till closing at 8.45 p.m. I like this best of all (Gaden).

GSF 15,140kc, 19.82m
From 6 p.m. till closing at 8.45 p.m.

GRV 12,040kc, 24.92m
From 4.45 p.m. till 8.45 p.m. announcements at 4.50 p.m. News 5.15 p.m.

GSD 11,750kc, 25.53m
4.45 p.m. to 8.45 p.m.

GSB 9510kc, 31.55m
Also used in Pacific Service. Best transmitter in afternoon.

GRS 7065kc, 42.46m
Another good transmitter in Pacific Service.

EUROPE

Bohemia:

DHE4A, Prague 11,840kc, 25.34m
Heard at 7.30a.m. Can be identified by old Czechoslovakian nine-note signal. No English.

France:

Radio Vichy, Vichy 15,245kc, 19.69m
12.30 a.m. to 3.45 a.m.

Radio Vichy, Vichy 11,845kc, 25.33m
4 a.m. to 9.50 a.m.

Radio Vichy, Vichy 9520kc, 31.51m
10 a.m. to 6.30 p.m. News 2.15 p.m.

Germany: Only the principal transmitters are listed:

DJR, Berlin 15,340kc, 19.56m
4 p.m. to 3 a.m. News 6 and 11 p.m.

DJQ, Berlin 15,280kc, 19.63m
4 p.m. to 3 a.m. News, 6 p.m., 11 p.m. and 1 a.m.

DJB, Berlin 15,200kc, 19.74m
8.50 a.m. till 3 p.m. News 10, 11 a.m., noon and 2 p.m.

DJL, Berlin 15,11kc, 19.85m
2.40 a.m. to 8.25 a.m. News 3.15, 6.15 and 8.15 a.m. Lord Haw Haw at 11.30 p.m. (Du Faur, Gillette.)

DZH, Berlin 14,460kc, 20.75m
R5 at 9 p.m. (Perkins).

DZE, Berlin 12,130kc, 24.73m
Used for Latin America from 8.50 a.m. ta 3.15 p.m.

DJP, Berlin 11,855kc, 25.31m
8.50 a.m. to 3.15 p.m. Used for Latin America. 7.15 p.m. to 3 a.m. Wonderful signal at midnight (Du Faur).

DJD, Berlin 11,770kc, 25.49m
8.50 a.m. to 3 p.m. News 10, 11 a.m., 1 p.m. and 2 p.m.

DXR, Berlin 11,760kc, 25.51m
3.15 a.m. to 8.25 a.m., 4 p.m. to 6.15 p.m. News at 4.30 and 6 p.m.

DZD, Berlin 10,543kc, 28.45m
3.30 a.m. to 8.45 a.m. News at half past the hour. Also at 6 a.m. and 7.45 a.m.
8.50 a.m. to 3 p.m. News for North America 10, 11 a.m. noon and 2 p.m.

DZC, Berlin 10,290kc, 29.15m
7 a.m. to 8.45 a.m., 8.50 a.m. to 3.15 p.m.

DJW, Berlin 9650kc, 31.09m
8.50 a.m. to 3.15 p.m. for Latin America. 4 p.m. to 3 a.m. News 6 p.m., 11 p.m. and 1 a.m. R5 at 11 p.m. (Perkins).
News at 5 p.m. Talk, 5.45 p.m.

DXL-24, Berlin 9620kc, 31.18m
8.50 a.m. to 3 p.m. Australian prisoners of war at 4.30 p.m. (Du Faur).

DXZ, Berlin 9570kc, 31.35m
3.30 a.m. to 8.45 a.m.

DJA, Berlin 9560kc, 31.38m
8.50 a.m. to 3.15 p.m.

DJH, Berlin 17,845kc, 16.81m
5.30 p.m. to 3 a.m. News 6 and 11 p.m. (Heard very well at 8.30 p.m.—Ed.)

DJE, Berlin 17,760kc, 16.89m
5.30 p.m. to 3 a.m. News 6 and 11 p.m. Signal getting better nightly.

DJX, Berlin 9675kc, 31.01m
2.40 a.m. to 8.25 a.m. News 3.15, 6.15, 8.15 a.m. R6 at 8 a.m. (Perkins).

DXM, Berlin 7270kc, 41.27m
News at 3.30 a.m., 4.30 a.m., 6 a.m. and 7.45 a.m

DXJ, Berlin 7240kc, 41.44m
3.30 a.m. to 8.45 a.m.; 2 p.m. to 4.35 p.m. News at 3 and 4 p.m. Good music at 6.40 a.m. (Du Faur).

DJC, Berlin 6020kc, 49.83m
4.40 a.m. to 8.25 a.m. News 6.15 and 8.15 a.m. Prisoners of War at 6.28 a.m. (Du Faur).

Holland:

PCJ-2, Huizen 15,220kc, 19.71m
This German-controlled station announces at 10.30 p.m., "Here is Holland calling." News 10.45, 11.45 p.m. and 1.30 and 2.30 a.m. Closes 2.45 a.m.

Italy.
Rome:

2RO-17, ... 19,590kc 15.37m
Russian at 11.30 p.m.

2RO-6 .. .. 15,300kc, 19.61m
1.30 a.m. to 4.30 p.m. (excepting for breaks of a few minutes) 6 p.m. to 6.30 p.m. News 6.20 p.m. Very clear at 6.15 p.m. (Du Faur).

2RO-4 .. .. 11,810kc 25.40m
Some schedule as 19.61m. But on air from 7.15 p.m. to 7.30 p.m. in addition. (News for Great Britain). Good (Gandy).

2RO-? 10,330kc, 29.04m
3.30 a.m. to 9.15 a.m. 9.30 a.m. to 12.30 p.m. (for Latin America) 11th edition of News at 8.13 a.m. (Du Faur).

2RO-3 .... 9630kc, 31.15m
3.30 a.m. to 9.15 a.m. News 6.30 a.m., 11.30 a.m. to 3 p.m. News 11.30 a.m. and 1.30 p.m., 3.30 p.m. to 4.30 p.m. News 4 p.m, 6 p.m. to 6.30 p.m. News 6.20 p.m. Good at 7.30 o.m. and 4 p.m. (Condon, Gandy).

2RO-11, Rome 7220kc, 41.55m
3.30 a.m. to 9.15 a.m. News 8.12 a.m. Fair signal at 7.30 a.m. (Du Faur, Condon).

2RO—, Rome 6300kc, 47.60m
3.30 a.m. to 9.15 a.m. News 8.12 a.m. Good signal at 7.45 a.m. (Condon, Du Faur).

2RO-, ... 11,950kc, 25.1m

3.30 a.m. to 9.15 a.m., 11.30 a.m. to 3 p.m.

2RO-, ... 11,740kc, 25.55m 3.30 a.m. to 7 a.m., News 4.30 a.m.

2RO-, ... 9695kc, 30.63m Used in Latin America session from 9.30 a.m. to 12.30 p.m.

2RO-, ... 15,060kc, 19.92m This Italian is heard well at 11 p.m. (Gillett).

Vatican City:

HVJ .... 15,120kc, 19.84m 2 a.m. to 2.20 a.m. on Wednesdays.

HVJ, ... 5969kc, 50.26m 5 a.m. to 6.30 a.m. Talk 6.15 a.m. except Mondays. Good signal but morse interference bad (Gillett, Du Faur).

Portugal:

CSW-6, Lisbon .... 11,040kc, 27.17m 3 a.m. to 9 a.m.

CSW-7, Lisbon .... 9740kc, 30.8m 9.15 a.m. to 10 a.m.

RADIO WORLD—FOUR

Roumania:

Radio Bucharesti, ... 9255kc, 32.41m 3 a.m. to 9 a.m. News 7.50 a.m. Good musical programme at 8.45 a.m. (Condon). Not too clear at 7.52 (Du Faur).

Russia:

Transmission from either Mascow or Kuibyshev. Schedules are liable to change daily.

——, Moscow .... 15,265kc, 19.65m 10.40 p.m. to 11.15 p.m. News and talks. 12.15 p.m. to 12.25 p.m news and talks.

——, Moscow .... 15,230kc, 19.7m 8.15 a.m. to 8.40 a.m. News 8.25 a.m. 9.48 a.m. to 10.25 a.m. (will fade as summer approaches) 12.15 p.m. to 12.40 p.m. (English). 2.15 p.m. to 2.40 p.m. (English).

——, Moscow .... 15,115kc,19.85m 8.15 a.m. to 8.40 a.m. News 8.25 a.m. 9.48 a.m. to 10.25 a.m. Talks. 12.15 p.m. to 12.40 p.m. News and talks. 2.15 p.m. to 2.40 p.m. news and talks. Good signal (Perkins).

——, Kuibyshev .... 13,010kc, 23.06m 11.50 p.m. to 12.10 a.m. Talks. Very good (Du Faur). 12.45 a.m. to 1.15 a.m. Talks.

——, Moscow .... 9545kc, 31.43m 10.40 p.m. to 11.15 p.m. Talks. 12.15 a.m. to 12.25 a.m. Talks. Heard them close at 11.20 p.m. in fine style (Gillett).

——,Sverdlovsk .... 12,225kc, 24.54m Heard opening at 10.40 p.m. in English talk. 10 chimes are heard for some time before announcement on opening (Gillett).

——, Kuibyshev .... 8050kc, 37.27m English from 6.30 to 7 a.m.

——, Kuibyshev .... 6130kc, 48.94m English from 6.30 to 7 a.m.

Siberia:

——, Khabarovsk .... 9566kc, 31.36m 6.50 a.m. to 8.30 a.m. 8 p.m. to 1 a.m.

Spain:

EAQ, Madrid ... . 9860kc, 30.43m Heard at 610 a.m. with fair signal (Condon). Suffers from bad interference at times.

Radio Malaga, Malaga .... 7210kc, 41.61m Good signal at 8 a.m. (Condon).

EAJ-9, Malaga .... 7140kc, 42.02m "Radio Silva" relays Malaga at 8 a.m. suffers from interference (Condon).

Radio Mediterrania, Valencia, 70.35kc, 42.66m Opens at 7 a.m. with march. Slogan, "Voz Espana." Signs off with "Valencia." Good when relaying Malaga (Condon).

Switzerland:

HER-5, Schwarzenburg .. .. 11,865kc, 25.28m Saturdays, 4.45 p.m. to 6.15 p.m. in national languages and on Tuesdays in English.

HER-3, Schwarzenburg ... . 6165kc, 48.66m 4 am. to 8.05 a.m. Good signal. Programme consists mostly of music. French and German spoken (Du Faur, Condon, Gillett).

Yugoslavia:

YUB, Belgrade .... 6100kc, 49.18m 5 a.m. to 9 a.m. Musical programme. Fair signal at 7.50 a.m. (Du Faur).

(Continued on page 24)

SCANDANAVIA

Sweden:

SBT, Stockholm 15,155kc, 19.8m
2 a.m. to 3 a.m. News at 2 a.m.

SBr, Stockholm 11,710kc, 25.63m
4.56 a.m. to 5.15 a.m.; 7.56 a.m. to 8.30 a.m.; 5.40 p.m. to 6.30 p.m.

SBU, Motala 9530kc, 31.46m
8.15 a.m. to 9 a.m. News 8.20 a.m. Fair Signal when giving news (Condon).

Finland:

OIX-3, Helsinki 11,785kc, 25.46m
Schedule 2 a.m. to 10 a.m. News 3.45 a.m. and 9.15 a.m.; 11.20 to 5.45 p.m. News 11.25 a.m. and 2.10 p.m.

OIX-2 Helsinki 9500kc, 31.58m
Schedule: 2 a.m. to 10 a.m. News 3.45 and 9.15 a.m.
News at 3.45 am. and 4.15 a.m.

MISCELLANEOUS

Arabia:

ZNR, Aden 12,110kc, 24.76m
Heard around 4 to 5.45 a.m.

Canada:

CBFY, Montreal 11,705kc, 25.63m
10.30 p.m. till 12.30 a.m.; News 10.30, 11 and midnight. (Signal now only fair.—Ed.)

CFRX, Toronto 6070kc, 49.42m
Heard just after midnight.

Iceland:

TFJ, Reykjavik 12,235kc, 24.52m
Doubtful if audible here, but said to be on air at 8 am.

Iran:

EQB, Teheran 6155kc, 48.74m
5 a.m. to 6.30 a.m. News 5.50 a.m.

Turkey:

TAP, Ankara 9465kc, 31.70m
1.15 a.m. to 7 a.m. News 5.15 a.m. (Condon).
Heard one Saturday morning at 9 a.m. calling WCG, WES and WEL, New York. Very loud signal (Gillett).

Location Unknown:

"Radio Metropole,".... .... 11,735kc, 25.56m
This pro-Fascist station talking in Ukranian and Russian is heard from 2.15 to 2.25 a.m.

"Radio Metropole," 9475kc, 31.66m
Heard at 8.10 a.m. by Mr. Perkins of Malanda, Q. See "New Stations."

European Revolutionary Station
9640kc, 31.12m
Invariably announce they are on 31.20m. Heard from 4 p.m. to 4.12 p.m. Closing announcement in German is "Finish the War; Down with Hitler; Down with Fascism; Long live the German and European Revolution."

Syria:

Radio, Levant, Beirut 8035kc, 37.37m
Heard around 4.15 a.m. News in French.

Cuba:

COCY, Havana 11,740kc, 25.55m
Around 10.15 p.m.

COK, Havana 11,620kc, 25.82m
Good, morning, afternoon and night. English spoken frequently. R6 at 4 p.m. and 1.30 a.m. (Gandy).

COCH, Havana 9435kc, 31.80m
Heard at 10.45 p.m. on some nights (Condon, Gandy).

CUBC, Havana 9365kc, 32.05m
Good signal at 9 a.m. (Condon).
Improved a lot lately.

COCX, Havana 9270kc, 32.36m
Usually good at 9.30 a.m. (Condon, Gandy).

COCQ, Havana 8850kc, 33.9m
9.40 p.m. to 12.30 a.m.; English at 9.45 p.m. Fair signal at 10.30 p.m. and 9 a.m. (Du Faur, Condon). Best Cuban at night (Gillett).
Can be heard morning, afternoon and night.

COCO, Havana 8700kc, 34.48m
Heard nightly from 11 p.m.

COHI, Havana 6455kc, 46.48m
Heard around 11 p.m. (Gandy).

COCQ, Havana 6375kc, 47.06m
Fair from 10.40 p.m.

Haiti:

HH3W,Port au Prince 10,130kc, 29.62m
Good in morning around 7 a.m. Gives call in French and Spanish.

Dominican Republic:

HI2G, Cuidad Trujillo 32.28m
Heard opening around 8.45 a.m., strength varies quite a lot. Plays Blue Danube Waltz on opening.

CARRIER-CURRENT

(Continued from page page 15)

and its usefulness is not decreased by the need for adjustment or special installation. For example, one of our relatives has called her OM from a neighbour's house to remind him to feed the baby.

Legality

The Federal Communications Commission took cognizance off the use of wired wireless systems by unlicensed persons when the matter of collegiate "broadcasting" between university buildings was brought to its attention. It was decided by the Commission that the "Provisions Governing the Operation of Low Power Radio Frequency Devices" was applicable. In other words, the rules laid down for wireless record players and the "Mystery Control," which permit operation if the field strength of the device does not exceed 15 microvolts per metre at a distance of alpha/2π from the transmitter, were allowed to apply in the case of wired wireless telephony.

The University students in question were stated to have used an input power of 2 watts. The FCC not only allowed the inter-dormitory systems to continue in operation, but those who developed them are now aiding the OCD in its attempts to find a way to utilise wired wireless for air-raid warning purposes. It is strongly urged, therefore, that the precedent of using inputs of 2 watts or less be rigidly adhered to in order to prevent the enactment of prohibitive legislation. This will surely follow any excesses of power or frequency deviation, especially those which cause interference with other services. It is also essential that the equipment be checked for radiation with a long-wave receiver before being put into use. If care is exercised, the amateur will have a new instrument to use "for the duration" and after.

—"Radio," U.S.A.

RADIO QUIZ ANSWERS

From Page 19

1. A synonymous term for millimicro (one billionth).

2. Condensers connected in parallel increase the capacity. The total capacity is obtained by adding the values together, therefore .0001 + .001 = .0011 mfd.

3. Direct current.

4. 186,000 miles, or 300,000,000 metres per second.

5. Dit dah.

6. A 4 Electrode valve. The screen grid valve is a tetrode, has a filament, screening grid, control grid, and plate.

7. Anode.

8. A commercial unit of electrical work. It is the work done in one hour by the current of 1 amp. flowing between two points having a difference of potential of 1 volt.

—N.Z. Radiogram.

ERROR-PROOF RADIOTELEGRAPH PRINTER

All possibility of error from defective signals in radio telegraph transmission is eliminated by a new error-proof radio printer put into operation in the international communications field on the direct radio circuit of R.C.A. Communications, Inc., between New York and Buenos Aires.

Product of R.C.A. Laboratories, the new printer automatically rejects false signals and prints an asterisk in place of an incorrect letter.

Present secrecy restrictions necessitated by the war, prevent a full description of the printer. It may be revealed, however, that the device operates with a special code so constructed that a defective character is immediately recognised as such by the printer.

The printer may operate alone or with others over the same radio transmitter. In sending messages, the outis used, they are operated in conjunction with RCAC's "time-division" multiplex system, which provides two, three or four simultaneous message channels over a single radio transmitter. In sending messages, tse output of the several transmitter-perforators is brought together in the multiplex equipment, scrambled, and delivered to a transmitter, which beams the aggregate radio signal to its destination. At the receiving end, the multiplex equipment unscrambles the signal and delivers the components to the several separate error-proof printers. The aggregate speed of the four-channel system is 248 words a minute.

With ordinary telegraph printers as used on the radio, errors may be caused by spurious signals. The appearance of an extraneous signal, or the absence of part of the correct one, will cause printing of an incorrect letter on the ordinary instrument. Unless the error is obvious, it may go undetected.

SPEEDY QUERY SERVICE

Conducted under the personal supervision of A. G. HULL

W.E. (Prestan, Vic.) is having trouble with an electric motor.

A.—The subject happens to be a bit wide of the scope of this journal, which is essentially radio, but from what you say we would imagine that you are dealing with a single-phase, 240-volt motor which has the starting winding burnt out or disconnected. If this is so, a heavy pull on the pulley should make it run, the "tightening up" effect and the heavy current drawn being a sure indication that the main running winding is still in continuity. The idea of the governor device is not to regulate the speed, but merely to cut out the starter winding as soon as the motor gain its revs. Failure of this automatic switch would account for the burning out of the starter winding.

* * *

G.E. (Melbourne, Vic.) camplains about late delivery of his "Radio World," which is ordered through a local newsagent.

A.—Sorry, but distribution is a bit of a problem in these difficult times. Supplies for Interstate usually have to go by boat, and only when space is available, Copies for direct subscribers are always posted out on or before the fifteenth of each month, but some delay is unavoidable in general distribution, We appreciate the problem, however, and steps are being taken to try and speed things up a bit.

* * *

H.A.C. (Cowra), asks whether we have had any success with a patent electrolyte, which is claimed to revive old accumulators when poured into thm.

A.—No, we have never had any happy experience with patent battery medicines of this type and we doubt if there is any sound theory behind the idea. Once an accumulator becomes thoroughly run down and then left in this condition for a few months it is almost certain to be sulphated beyond all redemption. So far as we know, there is no shortage of accumulators yet, and so we strongly advise you to replace with a really first-class battery, such as the Clyde, and then look after it properly so that it will give you years of service.

* * *

P.S.V. (Wagga) wants to know if he can builo up a "B" battery from torch cells.

A.—Yes, now that torch cells are fairly readily obtainable, you could build up a heavy duty "B" battery from torch batteries, but the cost would be fairly high. At one and a half volts per cell you would need sixty cells to give you 90 volts, which is the lowest voltage likely to prove satisfactory with your set. At 9d. each cell this would work out at £3/7/6. Smaller cells would be cheaper and really more suitable, but the U2 is the only cell readily available at the moment.

Connecting up would be a simple matter. Simply join up the centre electrode of one cell to the outside can of the next, with particular care to insulate the can of every cell from the can of the others alongside of it.

Service from such a battery should be excellent as the cells have a heavy copacity, and it would be possible to replace any cell which might happen to run down quicker than the rest.

* * *

R.F.T. (Cremarne) sends some further information about the conditions of the radio trade in England, and mentions that it is estimated that at least a million sets are silent on account of the shortage of valves and other component parts.

A,—Many thanks for the interesting letter and the cuttings. The difficulties are fully appreciated by the trade here, we hope. Steps are being taken to keep the authorities fully aware of the danger of too much control of the raw materials necessary for component part manufacture.

* * *

G.L.M. (Perth, W.A.) wants to knaw the correct method of using acid to etch figures and letters on to steel plates.

A.—Usually it is nitric acid which is used. The surface is covered with a thin coating of beeswax, wax polish, or candlegrease, and the lettering is then scratched through this protecting surface. Table salt is then spread in the scratchings and a drop or so of the acid applied. When the salt turns a deep brown colour and the acid and salt can be woshed awoy and the wax covering wiped off. Needless to add, the nitric acid is highly corrosive and should not be applied to the fingers or to clothing.

If you don't want to handle such highly corrosive chemical as the nitric acid, you can do a fair job with even vinegar or salt water, allowing the solution same haurs to act on the exposed metal. A good job can be done with copper sulphate, which is nat difficult to handle, but takes several hours to take effect.

* * *

W.M.S. (New Farm, Q.) wants to know what gauge wire would have a diameter of about a thirty-secondth of an inch.

A.—This would be about 21 gauge S.W.G., which is .032-in., 20 S.W.G. would be .036 and 22 gauge would be .028.

* * *

R.T.M., (Lindfield), is traubled with noise in his set, which has been back for service, but returned as O.K.

A.—It certainly seems as though the trouble is in the house wiring or somewhere else, but not in the set itself. From your remarks we wouldn't be at all surprised if the trouble is due to a faulty lamp. There are plenty of them about these days, with slightly loose internal connections. If the trouble only occurs at night you may be able to trace it down by doing a little detective work, switching off lights in turn until the trouble stops. If you can't find the fault this way you may try to tighten up all switch contact screws, doing this in the day-time so that you can pull the main switch to make sure you don't get a shock. If the little screws are loose inside any switch, the wire may make intermittent contact and spark across, causing an interference noise in the speaker.

* * *

M.J.K. (Wollongong) wants design data for a pair of infinite baffle boxes for an Amplion di-phonic speaker set.

A—.Sorry, but we have no data available on this paint. It wauld not appear necessary, however, to have two boxes. It should be sufficient to have the low note speaker in the box and use a small flat baffle for the high-note speaker. To be correctly suited the box should be designed in accordance with the resonance frequency of the cone. Hit and try methods are seldom successful with infinite baffles.

* * *

J.J.K., (Narmanton) wants details af the method of rewinding a car generator to make it suitable for use with a propellor to make a wind-charger.

A.—The car generator should not require rewinding if it is in serviceable condition. It is merely a matter of turning it over at 1500 revolutions per minute and it should then charge as it would normally charge on a car. With regard to your other queries, we suggest that you get the recent issue of "Radio and Hobbies," which covered the subject of wind-chargers in a most comprehensive way. With regard to results, our experiences have nat been too happy, and we find from reports received that it is not by any means common to have a consistent twenty-mile-an-hour wind blowing for three or four days per week, as is desirable if you hope to do the work with the charger which you hope will be possible.

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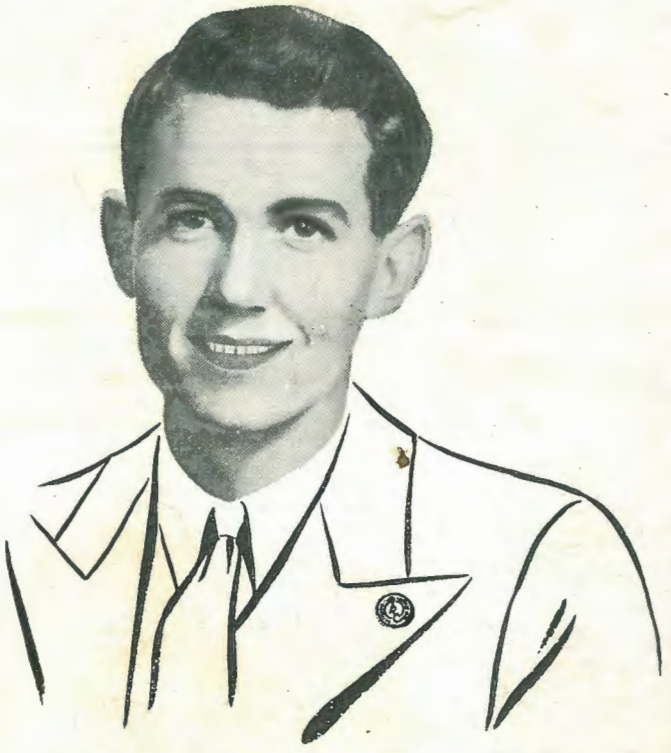

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