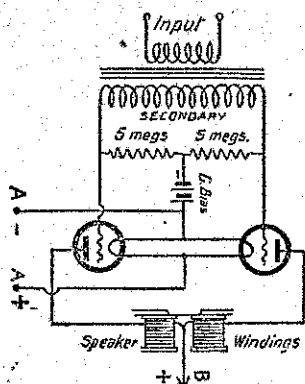


Construction Continued

EXPERIMENTAL PUSH-PULL AMPLIFICATION THE LISTENERS' GUIDE

EXPERIMENTERS have been inquiring for a method of testing push-pull amplification without employing special transformers. The following method was published recently in a London radio journal, and is reproduced here for the benefit of those who are interested and care to try it out. Although this arrangement has not all the advantages derived from the use of a pair of push-pull transformers, the use of the two valves in one stage will certainly allow considerably more volume to be handled. The increase in actual amplification is very small when a push-pull stage is substituted for the single valve arrangement, but increased volume is gained because it is handled without distortion, and this gives the same effect as greater amplification. It is also necessary for the speaker to be capable of carrying the increased volume without overloading.

THE method employed is to use an ordinary audio transformer as the input transformer of the push-pull stage, and as this is not provided with a centre-tapped secondary winding, the



equivalent is provided by shunting the secondary with two high value resistances and making the grid-bias connection at the junction of the two.

IT is not possible, however, to perform this operation on the primary of an output transformer owing to the large D.C. voltage drop which would be caused across them, with the result that the voltage on the plates of the valves would be absurdly low.

AS is well known, the windings of a 2000 ohm loudspeaker, for instance, are wound on two bobbins, each bobbin having a D.C. resistance of 1000 ohms. These bobbins are connected in series, and it is obvious that the plates of the two output valves could be connected to the ordinary terminals of the loudspeaker, the H.T. plus connecting via a third terminal (which could be fitted in a convenient position) to the junction between the two bobbin windings where they are connected in series; care must be taken in the soldering operation. This can be done even in the case of a super-power valve, for no risk of magnetic saturation of the loudspeaker core will take place, as the magnetising current in each bobbin will cancel out just as is the case with the two halves of the primary of an output push-pull transformer.

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SPECIAL INTEREST TO CONSTRUCTORS

CONSTRUCTORS and experimenters will find the "Listeners' Guide" extremely handy for general reference for lists of New Zealand, Australian, American and Canadian stations, with power and wave-lengths, short-wave stations, and a wide range of other information.

Of special interest to constructors there is a list of practically all valves on the New Zealand market, showing at a glance their main characteristics and the positions in the set for which each valve is best suited. There is also a table giving the necessary grid-bias for any valve likely to be used in audio stages.

ANOTHER useful list is that of rectifying valves that are sold without the stipulation that the purchaser must be in possession of the charger for which they are designed. Valves for B battery eliminators and A battery charging are also included, full particulars of all the rectifiers being given.

OTHER tables include winding of solenoids for given wave-length; turns for spider-web coils to tune with condensers of different capacities; turns for secondary coils tuned with condensers of various capacities; tables for making fixed mica condensers of capacities from .5 mfd. down to .00015; wire tables; list of amateur transmitters, etc.

CONSTRUCTIVE articles include crystal receivers, with the "R.R." Selective Crystal Receiver, which so many constructors have found highly successful, and which makes a highly effective wave-trap. Then there are two amplifiers for the crystal, a one- and a two-valve.

The ever-popular four-valve Brown-Drake is fully dealt with, including the amplifying for which inquiries are coming to hand in connection with the two R.F. tuning unit. The "Record" short-wave receiver is fully described, both as a complete shielded three-valve receiver, and as a one-valve "converter" or "adapter," which can be plugged into the detector socket of any broadcast receiver and thus use the audio amplifier to increase the volume of the short-wave reception.

Other information includes the Government regulations relating to wireless listeners, a handy glossary of radio terms, etc.

The "Guide" can be obtained from your dealer for 2s. 6d., or 2s. 9d. posted from the "Record" office.

AN EXPONENTIAL HORN SPEAKER

A FINE example of exponential horn of the folded type is now on the market in New Zealand. This pattern, which is fitted with a speaker unit of high quality, is capable of very fine quality reproduction, and when housed in a suitable cabinet, forms a useful and attractive piece of furniture. A number of these have been landed by Messrs. Thos. Ballinger and Co., Victoria Street, Wellington, where a demonstration will be given.

Browning-Drake Connections.

IN the Browning-Drake circuit as originally published, B negative lead was connected to A positive. It has been found advisable to connect B negative to A negative, and thus keep both negatives at earth potential. Such change would be necessary in the case of adding a potentiometer across the filament of last valve to cut out A.C. hum as mentioned in another column.

Position of Loud Speaker.

THERE are various kinds of "howling" which can be set up in a receiving set, and which are frequently dealt with in relation to the circuit arrangements and to the set itself, but a low-frequency howl sometimes arises owing to purely acoustical reaction between the loud speaker and the valves, especially if the latter are inclined to be microphonic. Sometimes this effect is very troublesome, and I have known cases of amateurs seeking for a remedy for this trouble with no idea of the true cause. The action in cases of the type referred to is similar to that which occurs if you place the ear-piece or receiver of an ordinary line telephone against the transmitter. If the loud speaker is facing the set and

in close proximity to it, a loud note from the speaker, if it happens to be of about the right pitch, may produce considerable vibrations in the valves, and thereby in the filaments, this having the effect of increasing the note in the loud speaker, and so on. The remedy is simply to turn the loud speaker in a different direction and also, if necessary, to remove it further away from the set.

PROTECT YOUR FILAMENT

AN EASILY-MADE FUSE

ANY listener running a valve set should insert a delicate fuse of some kind in the B battery circuit in order to protect valve filaments in case of an accidental wrong connection or short-circuit. By placing one such fuse in the negative lead of the B battery, close to the battery terminal, all valve filaments in the set will be protected, as the fine fuse will "blow" before the high voltage has time to damage the filament.

SUCH fuses have been frequently described in this column in connection with eliminators and other apparatus. Over three years ago the writer accidentally dropped a wire and "blew" three valves costing about £2 each, and the tinfoil fuse was devised in order to prevent the recurrence of such a calamity.

THE construction of these fuses is an extremely simple matter, and it is a far better proposition to construct one and place it in position than to bemoan the loss of one or more valves and purchase others for their replacement.

CIGARETTE tinfoil is the only essential material required, and from this are to be cut the finest possible shreds about an inch long, a sharp pair of scissors being used. To make the cutting easier, the tinfoil may first be pasted to a sheet of paper.

THE next requirement is a slip of ebonite about 1 1/2 in. long and 3-8 or 1/2 in. wide. Two 1/8 in. holes are drilled in this about an inch apart, and into each hole a brass bolt and washer are placed. A piece of fuse is then put into place with an end under each washer, the connecting wires to battery and set being placed over the back of the bolts and the whole secured by a nut on each. An active length of fuse of 1/2 to 1 in. is quite sufficient, and uneven cutting does not matter, as if there is a weak (narrow) place in the fuse, so much the better, as it will be more delicate and fuse more readily.

For those who do not care to construct, there is now on the market a Philips H.T. fuse of the "wander-plug" type which answers the purpose mentioned above.

(End of construction)

RADIO IN ARCTIC

ESKIMOS LISTEN IN.

How Eskimos in the vicinity of Anaktok Bay, Labrador, were able to listen in on one of their own race broadcasting from New York on a recent night, was described in radio messages received by the National Broadcasting Company from Donald MacMillan, leader of the Rawson-MacMillan field expedition, now in the Arctic.

The messages were picked up by A. V. Giamatteo, of the National Broadcasting Company's staff at Bellmore, L.I., who operates amateur station 2VI, and who has been in daily communication since last November with Clifford Himoe, the radio operator on MacMillan's schooner Bowdoin.

Teddy Kirogluk, an Alaskan Eskimo, took part in the programme, announcing the musical selections in Eskimo language, and making a short speech on his experiences in New York since his arrival last December. The principal message of the three received from the Arctic exploration ship Bowdoin, said:

"Thank you for musical programme last night. With the exception of fading now and then everything came in beautifully. The Eskimos listening—Simeon, his wife Miriam, and Panigamiak—were greatly interested, and could understand about one-quarter of what your Eskimo said."

VOICE FROM THE WILDS

AFRICAN TRADER BROADCASTS.

A trader from the wilds of Africa, Trader Horn (Alfred Aloysius Smith) is being taught how to broadcast. He has been introduced to the microphone in the studio of the National Broadcasting Company, and on March 27 at 9 o'clock he went on the air over WEAF, New York, and nineteen associated broadcast stations. The first audition is said to have revealed that Trader Horn's "whiskers and lack of teeth" are the only factors which prevent him from being a perfect broadcaster. He is now being coached to overcome these difficulties.

The adventurer from the Dark Continent was the main attraction on the Eveready hour during which he was on the air for about twenty minutes to tell of his life among the cannibals and wild beasts of Africa.

It was pointed out that Trader Horn's narrative would have a good chance of reaching Africa because the short-wave transmitters of WGY at Schenectady sent out the programme simultaneously with the regular broadcast on 380 metres.

RADIO DIRECTORY

What to Buy and Where

ATWATER-KENT RADIO	Frank Wiseman, Ltd. 170-172 Queen Street.
ALTONA & HAMMARLUND-ROBERTS SETS.	Johns, Ltd. Chancery Street.
AMPLION LOUDSPEAKERS	All Radio Dealers.
BREMER-TULLY RADIO	Superadio, Ltd., 147, Queen Street.
BURGESS RADIO BATTERIES,	All Radio Dealers.
CE-CO VALVES	All Radio Dealers.
CROSLY ELECTRICAL AND BATTERY MODELS	The Forrest-Crosley Radio Co., Ltd. Cuba Street, Palmerston North.
FADA RADIO	Radio Supplies, 251 Symonds Street.
FEDERAL, MOHAWK, GLOBE	Federal Radio House, 8 Darby Street.
GAROD, CROSLY, RADIO AND ACCESSORIES	The Hector Jones Electrical Co. King and Queen Streets, Hastings.
GILFILLAN AND KELLOGG	Harrington's, Ltd., 138-140 Queen Street.
GREBE RADIO	Howie's, Dunworth Building, Custom St. N.
MARCONI ECONOMY VALVES	All Radio Dealers.
MULLARD VALVES	All Radio Dealers.
RADIOLA RECEIVERS	Farmers' Trading Co., Ltd., Hobson Street.
RADIOTRON VALVES	All Radio Dealers.
RELIANCE BATTERIES	Reliance Battery Mfg. Co., Ltd., 98 Albert Street.
PHILIPS VALVES AND APPARATUS	All Good Radio Dealers.

THE PERFECT LOUD-SPEAKER

EFFORTS FOR IMPROVEMENT.

The reproduction by your radio set of original sound in the broadcasting studio is no better than the amplifying element, which finally transmits the electrical waves into sound waves, and projects them into the air, can make it. Very often a beautiful receiving set is handicapped by the necessity of expressing itself through the medium of a poor loudspeaker. The loudspeaker is the last link in the chain from the microphone to the ear of the listener, and as such should be as perfect as human ingenuity can make it. With this in mind, the most recent efforts of radio engineers have been directed toward the improvement of loudspeakers now on the market.

UNEQUAL AMPLIFICATION.

The perfect loudspeaker will reproduce every vibration that originally strikes the microphone, or at least every one that reaches its diaphragm in the form of electrical waves. If these vibrations are amplified in their original proportions, the reception is remarkably true and clear. If, however, the horn which projects them is of a substance prone to vibrate in the same period, certain of these vibrations are amplified a great deal, while others not in that period are actually subdued. The result, of course, is positive distortion.

Likewise, if the horn be made of a composition which does not vibrate at all, it has the effect of muffling all the sounds. The happy medium is a material which will vibrate in tune or in harmony with all notes, and consequently amplify all vibrations in their proper proportions, resulting in high sweet notes, and low notes full of resonance.

QUESTION OF TERMS

VARIABLE OR ADJUSTABLE?

Claiming that the term "variable resistor," which is now so widely associated with current and voltage-control devices for radio, is inaccurate and misleading, Leonard Kebler, president of Ward Leonard Electric Co., in a recent letter to the Radio Manufacturers Association, asks that the use of the word "variable" as applied to resistors should be abandoned by the radio trade.

In his letter of protest, Mr. Kebler points out that "variable" carries with it several meanings which are inexact and which tend to create in the mind of the buying public faults and shortcomings which are not common to properly-constructed resistors of this type.

Dictionary Definition.

The term "adjustable resistor," according to Mr. Kebler, can be employed more exactly and effectively by the radio trade as a whole in merchandising this kind of resistances. The adjective "variable" carries with it the idea of

possible fluctuation and undesirable change once the control resistor is set at a definite point. A comparative definition of "adjustable" and "variable" from Webster's New International Dictionary makes clear the distinction. "Variable: liable to vary; too susceptible to change; unsteady, inconstant."

"Adjustable: made exact; free from discrepancies; brought into proper relation."

Interpreting the two terms in even a loose sense, Mr. Kebler concludes, one gathers that a variable resistor is one which is constantly changing in itself. An adjustable resistor is one in which the resistance value can be changed, but in which voltage and current characteristics remain constant for a given setting of resistance.

Yet the "variable" condenser has remained free of such imputations, and the "adjustable" condenser has failed to take. If we were to coin a word, "setable" might do.

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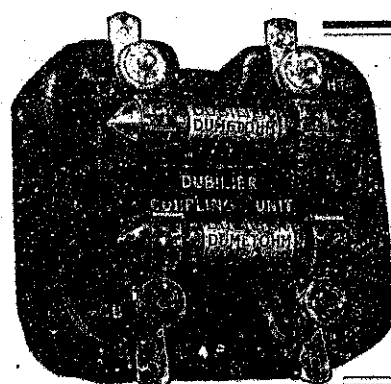
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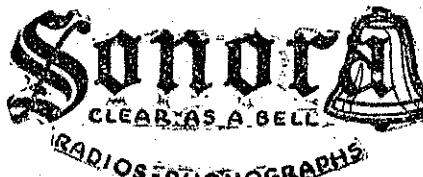
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