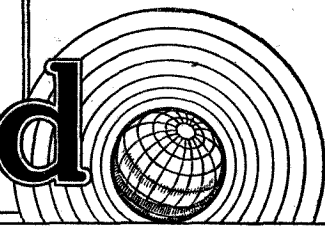
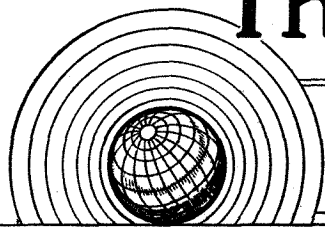


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*As many of the circuits and apparatus described in these
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EDITORIAL COMMENT

American Set Design

*New Models Show
Interesting Trends*

A RECENT survey of new developments in American receiver design, prepared at our request by our American representative, reveals some interesting trends although comparatively little of outstanding novelty.

American designers are paying far more attention to frequency response, even with the cheaper sets, than has been the case hitherto, and quite a large number of new receivers boast of a response more or less flat up to 4,000 cycles per second. This is a very marked advance, since in the past the majority of popular receivers were content to include frequencies up to about 2,500.

It seems that the American public, being far less ready than our own listeners to be content with a powerful local station, resent the additional interference which comes in when the response of receivers is carried to a much higher figure. There is in America a definite demand for better bass reproduction, and this is probably a reaction from midget sets which were formerly so popular and where the bass register is so poorly reproduced. Bass compensation which could be operated manually has been popular for some time, and now a number of manufacturers are introducing bass compensation which is automatic.

Cabinet Resonances

The question of cabinet resonances is receiving more attention and is being tackled scientifically, some manufacturers, whose ideals in regard to quality are higher than the average, resorting to the introduction of a

speaker mounted separately from the set. Other loud speaker manufacturers, instead of leaving their speakers to the tender mercies of the set manufacturer to mount them as he pleases, are adopting their own baffle construction suited to the speaker and employing acoustic filters.

Because of the objections to noise, tweeters and other additional speakers for high-note response are less in favour than formerly, whilst single speakers have improved in the reproduction of top.

More Valve Stages

There is a noticeable increase in the average number of valves in receivers. This is due partly to additional circuits for such purposes as automatic frequency control, volume expansion, and automatic selectivity control, the latter requiring the addition of five or six valves to the receiver. Another reason for the average increase in the number of valves is that designers are favouring the use of single-purpose valves, rather than multiple types.

A great deal of attention is being paid to tuning dials, and since nearly all receivers include short-wave ranges, all sorts of dial devices have been resorted to for indicating to which band a set is tuned. These requirements have resulted in a big increase in the general size of dials. One very large manufacturer has sponsored the idea of push-button operation with circuits tuned to a number of selected popular stations already tried out here but on a small production scale.

A very noticeable tendency which is rather difficult to account for is towards very generous output stages, especially in the more expensive designs. Outputs of from 10 to 35 watts for ordinary domestic receivers are now quite common.

Variable-Selectivity

I.—OBTAINING A FLAT-TOPPED RESONANCE CURVE

By W. T. COCKING

FROM the standpoint of the quality enthusiast one of the most important developments of recent years has been variable selectivity, for it permits one and the same receiver to be as good for local as for distant reception. Before its introduction, if a receiver were made highly selective in order to give interference-free reception of distant stations it was too selective for high-quality reproduction from the locals; if it were made unselective so that the full range of modulation frequencies was obtained, then it was of little use for distant reception on account of the interference experienced; if, as was usually the case, a compromise were adopted, the set could not be entirely satisfactory, for it could meet neither requirements fully. On the average, however, the results of such a compromise proved generally better than the adoption of either extreme.

The use of variable selectivity does not remove the necessity for a compromise between selectivity and quality, but it takes it out of the hands of the designer and puts it into those of the user. Even if this were all, it would be a distinct advantage, for everyone has a different idea about the optimum compromise. It is not all, however, for the optimum actually depends upon the strength of the

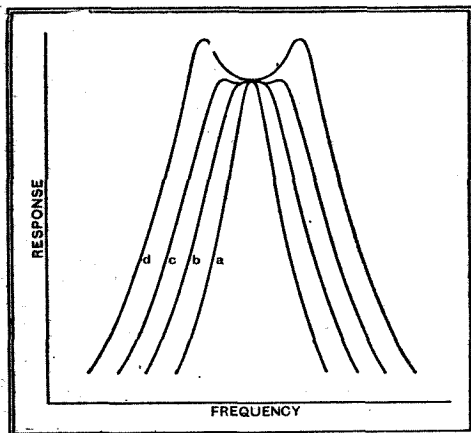


Fig. 1.—The effect of varying the coupling between a pair of tuned circuits is shown here. Curve (a) is for loose and (b) for optimum coupling, while curve (c) shows the flattish top produced by slight over-coupling. At (d) the double-humped curve obtained with tight coupling can be seen.

received station, the relative strength of its immediate neighbours in the frequency spectrum, and even the volume level at which the loud speaker is operated. The optimum compromise consequently varies

ALTHOUGH variable-selectivity can readily be achieved by the simple expedient of adopting a variable coupling between the coils of an IF transformer, careful attention to detail is necessary if satisfactory results are to be secured. It is shown in this article that the efficiency of the coils and the manner in which they are connected in circuit are all important

from station to station, and it is only possible to obtain it under all circumstances if the receiver is fitted with variable selectivity. That these facts are generally realised is evidenced by the gradual inclusion of this refinement in receivers produced within the last year or so. *The Wireless World* 1936 Monodial AC Super¹ was among the first sets to have this fitting, and since then details have appeared of many other sets including it.

Resonance Curves

There are several different methods of obtaining variable selectivity, but only one which seems simple enough for general use. This method consists simply in varying mechanically the coupling between the pair of coils forming an IF transformer. It is an arrangement which seems simple enough, but in practice all sorts of unexpected difficulties crop up, and unless the transformers are correctly designed in the first place and used properly in the second, the results may not be very satisfactory.

When two tuned circuits are coupled together by mutual inductance between the coils the resonance curve exhibits a single fairly sharp peak at the resonance frequency when the coupling is sub-optimum. The curve still has only a single peak when the coupling is increased to the optimum value, but the peak is now much flatter. The difference is readily seen from the curves of Fig. 1, in which (a) and (b) refer to the sub-optimum and optimum conditions respectively. An increase in the coupling beyond the optimum value produces at first a curve with a top which is nearly flat (c) and later a double-humped curve (d) with two prominent peaks and a marked trough at the resonance frequency.

Now the maximum selectivity obtainable with such a pair of coupled circuits depends on the operating frequency, the $Q (= \omega L/R)$ of the circuits and upon the degree of coupling. The selectivity increases with a decrease in frequency and coupling and with an increase in Q . The amplification obtained when the circuits are connected to a valve depends, apart from the characteristics of the valve, upon the coupling and upon the dynamic re-

sistance of the circuits; it is greatest with optimum coupling and increases with an increase of the dynamic resistance. The greatest efficiency and selectivity will consequently be secured by using circuits of high Q and dynamic resistance and by operating them at a low frequency.

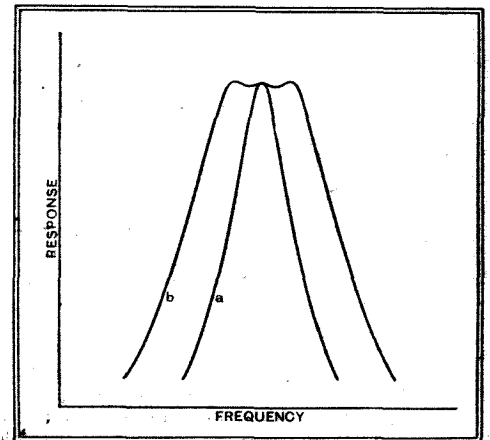


Fig. 2.—With three tuned circuits having adjustable coupling between two only, a single-peaked curve (a) is obtained with loose coupling, and a nearly flat-topped curve (b) with tighter coupling.

In the position of minimum selectivity it is desirable that the resonance curve should have a close approximation to a flat top over the whole range of modulation frequencies. The curve should not have two prominent peaks, for these will not only tend to accentuate the higher audible frequencies but may lead to amplitude distortion in the detector. It is not difficult to show that the required condition can only be realised for the audible range of frequencies by using circuits having a low value of L/R , which means a low Q at a low frequency or a high Q at a high frequency.

Whatever operating frequency be used, it is found that if Q is chosen to give the same flatness of top to the resonance curve over the normal sideband range of frequencies in the "low-selectivity" position of the control, the selectivity is the same at "high-selectivity." The necessity for maintaining a flat top to the resonance curve and avoiding marked peaks sets a limit to the selectivity obtainable with loose coupling and prevents the operating frequency from having any effect upon the selectivity. There is consequently no

¹ *The Wireless World*, July 26th, and August 2nd, 1935.

Developments

advantage in using a low frequency. The Q required for given results will depend on the frequency, and, in general, it is not possible to build coils of high enough Q for the best results at very high frequencies, while it is very easy to do so at low frequencies. In general, a high intermediate frequency is advantageous in a superheterodyne, but the frequency cannot normally lie within the tuning range of the receiver. We are consequently limited to frequencies lower than 150 kc/s, between 350 kc/s and 550 kc/s, and higher than 1,500 kc/s. It is very difficult to secure a high enough Q at frequencies higher than 1,500 kc/s, but it is readily possible to do so between 350 and 550 kc/s. The commonly used frequency of 465 kc/s is thus quite suitable, and we need not further consider the operating frequency.

Three-circuit Couplings

Even at this frequency the Q must be of quite a moderate value if the flat top of the resonance curve is to have a maximum width of 20 kc/s. Consequently, only moderate selectivity is obtainable when the coupling is loosened, and for good results many pairs of coupled circuits would be needed. There is no electrical objection to this, of course, but it is by no means economical.

Much more satisfactory results can be secured by using not two circuits, but three.² If a pair of variably coupled circuits be used and followed by a third circuit of one-half the Q , the single-peaked response curve of the single circuit tends to fill up the trough in the curve for the coupled pair. By correct design it is possible to obtain with three circuits a curve like (a) of Fig. 2 at "high selectivity" and one similar to (b) at "low selectivity." The curve exhibits

three peaks of equal height, and there are two troughs between them. The greater the band-width and the higher the Q , the greater will be the difference between the heights of the peaks and troughs, so that for an even response there is a limit to the Q . If we permit 1 db. variation between the peaks and troughs and make

the width of the curve such that the response at 10,000 c/s different from resonance is 1db. below that at resonance, the Q of the two variably coupled circuits must be 93.5 and that of the third circuit one-half this figure. With three circuits capable of passing modulation frequencies up to 10,000 c/s, the response will then vary not more than ± 0.5 db. up to this frequency.

At 465 kc/s it is by no means difficult to build coils of this value of Q . It is, in fact, quite possible to obtain circuits of much higher Q . A Q of 93.5 at this frequency can be called moderate, and is quite readily obtainable without undue precautions; it does, however, necessitate the use of Litz wire, and, if the coils are of high inductance, air-dielectric trimmers. It may be obtained with either air- or iron-cored coils, so that which are used will depend upon the manufacturer's preference and will not affect the electrical performance.

For the most satisfactory performance, therefore, the tuned circuits should be arranged in threes, which means that the number included in a receiver should be three, six or nine, according to the degree of maximum selectivity required. In every three circuits the coupling between two only need be variable, so that the arrangement leads to no special complication. There are many possible ways of

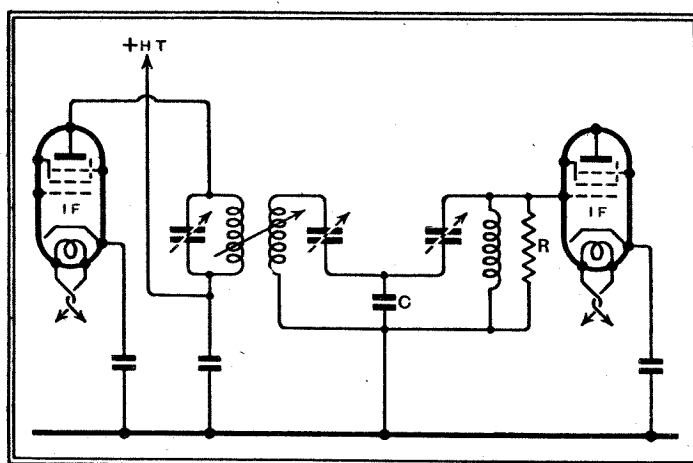
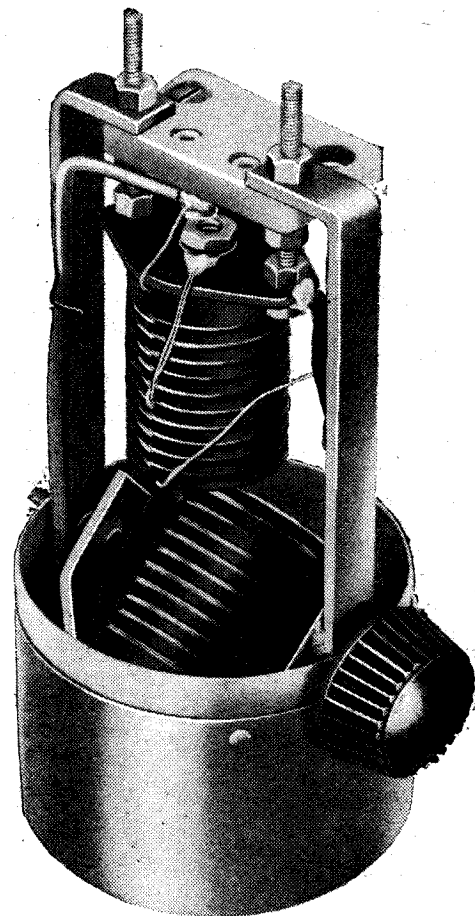


Fig. 3.—One method of connecting three circuits for variable selectivity. If all three circuits are alike, R must be equal to the dynamic resistance.

arranging the circuits in a receiver, and some appear no different from conventional methods. Before discussing this, however, let us consider the question of amplification.

When the Q of the tuned circuits and their coupling have been settled on considerations of the selectivity and band-width required, the amplification depends only on the characteristics of the valve



A typical variable-selectivity IF transformer of the kind having a rotatable lower coil.

and the dynamic resistance of the tuned circuits. Now, the dynamic resistance is $\omega^2 L^2 / R = \omega L Q$, so that at a given frequency it is proportional to the inductance when Q is fixed. The inductance which can be used is limited primarily by the stray circuit capacities, and cannot normally be higher than some 2,000 μH .; in practice, however, the possibility of obtaining the requisite Q must also be considered, and a reasonable figure is then an inductance of about 1,500 μH . With this inductance and a Q of 93.5 a dynamic resistance of 0.41 megohm is secured at 465 kc/s.

Amplification

With a valve of suitably high internal resistance and a normal figure for mutual conductance, stage gains of 800 times could be secured with a single tuned circuit, or about 400 times with a coupled pair. Amplification of this order is actually obtainable from a single stage when the grid circuit is untuned, but considerations of stability prevent it from being a practical proposition in a receiver.

In order to maintain stability and for other reasons to be discussed later, we must be content with a lower degree of amplification. At first it would consequently appear that there is no justification for the use of circuits of high dynamic resistance, and that we should employ a lower value of inductance so that the dynamic resistance is the right value for the amplification which we can use. This

² *The Wireless Engineer*, March, April, May, 1936.

Variable-Selectivity Developments—

is not so, however, for the stage gain is proportional to both mutual conductance and dynamic resistance. Consequently, we can control it by varying either.

It is much easier to vary mutual conductance than dynamic resistance, for it may be done merely by selecting the grid bias of the valve appropriately, whereas to change the dynamic resistance of a circuit without affecting its Q means a complete redesign of the IF transformer. By employing the highest practicable value of dynamic resistance, therefore, the application of the transformer is greatly widened, and it becomes suitable for very varied conditions.

Turning now to the uses of the circuits, there are many possibilities. The circuits must be in threes, but they need not all be together. Fig. 3 illustrates one method of connecting three circuits between a pair of valves; the first pair are variably coupled and contained in one screening can, while the third circuit, which must be separately screened, is coupled to the second by the "bottom-end" capacity C . If this third circuit is built to have the same Q as

the others, as will usually be the case for convenience, it must be damped by an external resistance R equal in value to the dynamic resistance.

In general, however, two IF stages with six tuned circuits are used, and it is then possible to adopt a more conventional arrangement, for one variably coupled pair can be used between the frequency-changer and the first IF valve, another between the two IF valves, and a fixed-coupled pair of $Q/2$ between the second IF valve and the detector, as shown in Fig. 4. This appears a very ordinary arrangement, and so the circuit actually is; provided that the transformers are correctly designed and used, however, it will give the three-humped curve of Fig. 2. If the coils in T_3 have, when connected in circuit, one-half the Q of those used in T_1 and T_2 , and if they are quite loosely coupled, they may be regarded as approximately the equivalent of two single circuits, so that in effect each variably coupled pair has a single circuit associated with it.

The Coupling to the Detector

In considering the design of this transformer T_3 the input resistance of the detector must be taken into account; furthermore, the gain from the grid of the last IF valve to the detector must be as high as possible in order to reduce to a minimum the risk of amplitude dis-

tortion in this stage. These conditions are best met by making the coils in this transformer of the same Q as those in the others, and arranging the external circuits to provide the requisite damping to reduce it to one-half. In the case of the detector, the input resistance is commonly about 0.125 megohm, and there are two ways of making this value of resistance reduce the Q of the secondary of T_3 appropriately. If this coil is the same as the other it has a dynamic resistance of 0.41 megohm, so that we can obtain the correct conditions by tapping the coil for the connection to the diode anode so that the diode is fed through a step-down ratio of 1.81-1. Alternatively,

ance of 0.41 megohm. The VMP4G, with 250 volts anode, 100 volts screen-grid, and -2.1 volts grid, potentials, has this value of resistance, with a mutual conductance of 2.65 mA/V. With a suitable degree of coupling between the coils of T_3 a gain of 120 times can be obtained from this stage.

The AVC System

It should be noted that it is not permissible to control the last IF stage from the AVC system, for a change in the grid bias will alter the AC resistance of the valve and so upset the frequency characteristic of the band-pass filters. Further-

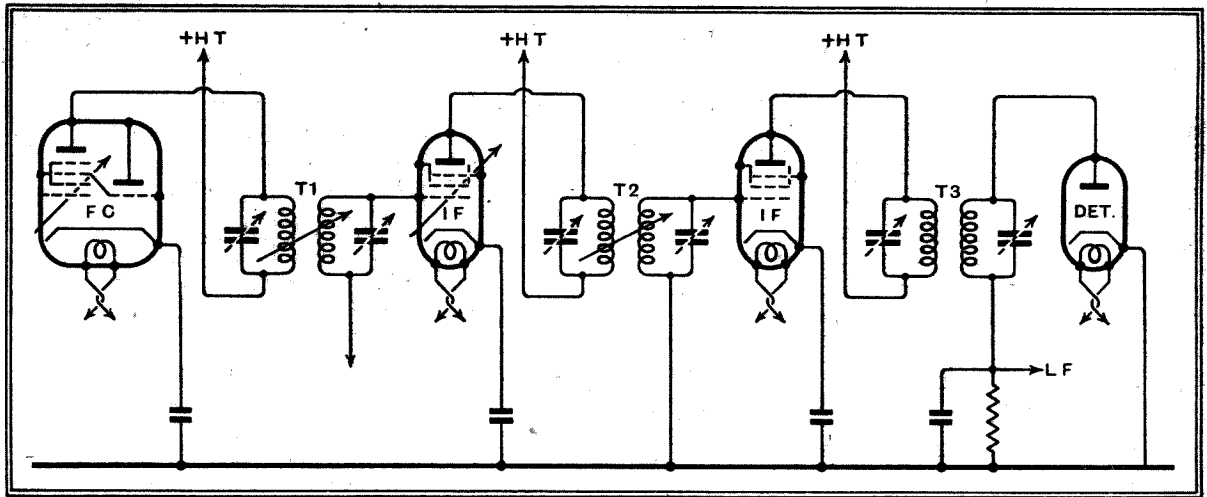


Fig. 4.—The correct performance can be secured with a conventional layout by adopting the arrangement shown here. The transformer T_3 must be correctly designed to have coils of $Q/2$ when damped by the valve and the detector.

we can use a lower inductance coil for the secondary so that the dynamic resistance has the same value as the detector input resistance—0.125 megohm.

As regards amplification, selectivity and band-width, there is no difference between the two alternatives, but there is one reason why it is better not to use the tapped coil. This reason is that in the detector circuit there are necessarily harmonics of the intermediate frequency, and at these harmonic frequencies the impedance between the two terminals of the transformer is higher in the case of the tapped coil than it is with the untapped arrangement. There is consequently less chance of feed-back to earlier circuits with the latter, and a reduced possibility of certain types of superheterodyne whistles being produced. In order to match the detector input resistance, the secondary inductance of T_3 should be less than that of the other coils, and to suit the average case an inductance of 457 μ H. is called for.

Now let us consider the primary; the highest gain will be obtained by choosing the highest inductance, so that we can make this coil the same as those in other transformers, 1,500 μ H. It must, of course, be shunted by a resistance of 0.41 megohm in order to reduce the Q to one-half its normal figure. This is most conveniently done by so choosing the second IF valve and its operating conditions that it has an anode AC resist-

more, for the same reason it is not permissible to feed a delayed diode AVC circuit from the primary of T_3 ; the input resistance of such a circuit varies with the signal amplitude, and so cannot be taken into account when choosing the damping on T_3 . These conditions are not very onerous, however, for it is not usually possible to control the last IF valve if amplitude distortion is to be avoided, and delayed diode AVC itself is likely to cause such distortion.

(To be continued.)

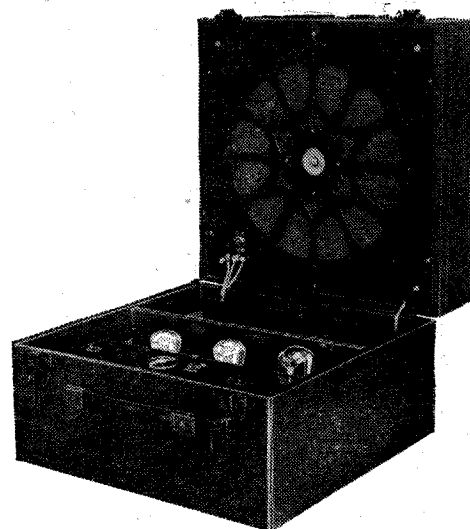
NOISE WITHOUT AN AERIAL**The Unavoidable Background**

A HIGHLY sensitive set, when working "all out," is bound to produce a certain amount of background noise, even when the aerial is disconnected. Under these conditions the noise is due to thermal agitation in the input circuit and to normal valve hiss, both of which are largely unavoidable.

Sometimes it is found that a multi-stage superheterodyne is "quite noisy" with the volume control at maximum but without an aerial. It would not be possible to be definite in saying whether the background noises are excessive or not. Failing laboratory measurements, the best test is that of actual reception; provided a number of transmissions of good programme value can be received with a silent background when the de-sensitising effect of AVC comes in operation, it is probable that everything is well.

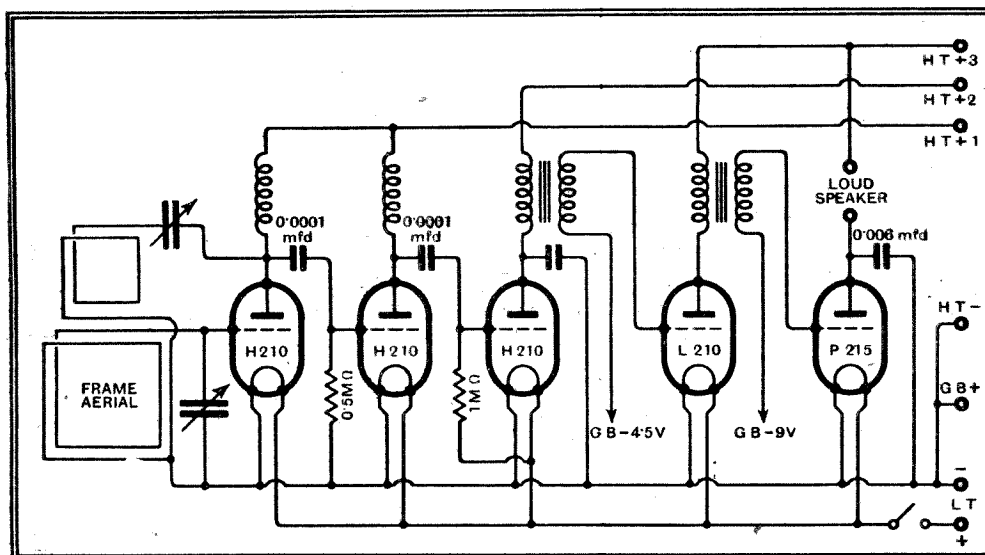
Rejuvenating Old Portables

EASY-TO-APPLY IMPROVEMENTS TO BOTH HF AND LF SECTIONS



SUMMER is here—at any rate at the time of writing—and with it comes the need for some form of portable set to be taken on the various expeditions we are so busily planning. Some

THIS article suggests an interesting practical application of the "double triode" method of HF amplification, which offers a simple and inexpensive solution of the problem of how to improve the HF amplifier of an out-of-date portable



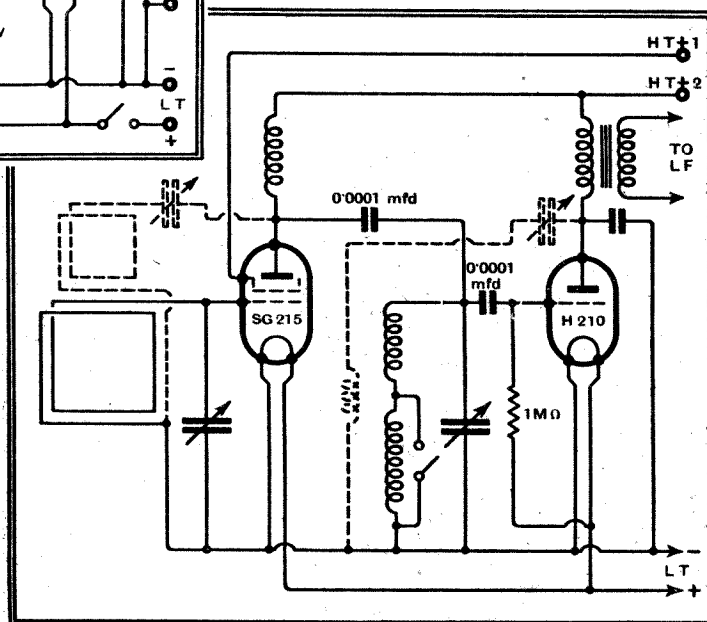
readers, perhaps, have portables no longer in their first youth, but which, if overhauled and slightly altered, would prove excellent companions.

Many of these sets are of the five-valve type that was so common a few years ago.

The circuit used was almost standard and is given in Fig. 1. The principal weakness of this circuit lies in the HF stages, which are aperiodic and provide little, if any, amplification. The obvious way of improving a set of this type is to replace the two HF valves by one screen grid valve, giving the circuit shown in Fig. 2. Reaction may be applied either to the frame aerial or to the second tuned circuit, as is most convenient. The change is quite straightforward, the additional components needed, apart from the valve, being a dual-wave coil, a second tuning condenser, a small fixed condenser and possibly an on-off switch. This will be needed if all the contacts on the present wave change switch are full. It is used to control the LT supply, thus releasing contacts on the original switch for wave-changing on the coil.

(Above) Fig. 1.—A typical 5-valve "portable" circuit of a few years ago with a 2-stage aperiodic amplifier—amplifier by courtesy only, as a rule.

(Right) Fig. 2.—The most obvious method of improving the HF amplifier is by fitting an SG valve.



An even cheaper method is to use the triode HF circuit described by F. M. Colebrook in *The Wireless World* of January 18th, 1935. Here no additional valves are required as the H210 type works almost as well as the L210 suggested in the article referred to. The circuit is given in Fig. 3, and it will be seen that the first HF choke is replaced by a resistance, the values of the coupling condenser and resistance before the next valve

altered somewhat and a second tuned circuit added before the detector. A bias of $1\frac{1}{2}$ volts is applied to both the valves. As before, reaction can be used on either circuit, or even on both, if ease of control is not an important factor.

Experiments carried out on a set modified in this way indicate that the two triodes together give approximately the same gain as a single SG stage. In South London, Droitwich was so strong that the set had to be mistuned considerably to reduce the volume to a comfortable level.

Luxembourg, Radio Paris and Fécamp could all be received at reasonable strength during daylight, while at night, of course, the range would be considerably greater.

Certain precautions must be taken when carrying out either of these changes. The coil must be screened and the screen, of course, must be earthed. A certain amount of screening round the second condenser is also desirable. If a two-

Rejuvenating Old Portables—

gang condenser is used, a large trimmer must be mounted on the panel to compensate for the mismatching of the frame aerial and the coil. Probably the best arrangement is to use two condensers mounted on concentric spindles and a double knob, as on the older Beethoven

5 mA, and the output will, if anything, be increased. The change is very simply effected by removing the second transformer and connecting the grid lead of the first to the grid terminal of the output valve holder. The screen of the pentode must be connected to HT+, as shown in the circuit given in Fig. 4.

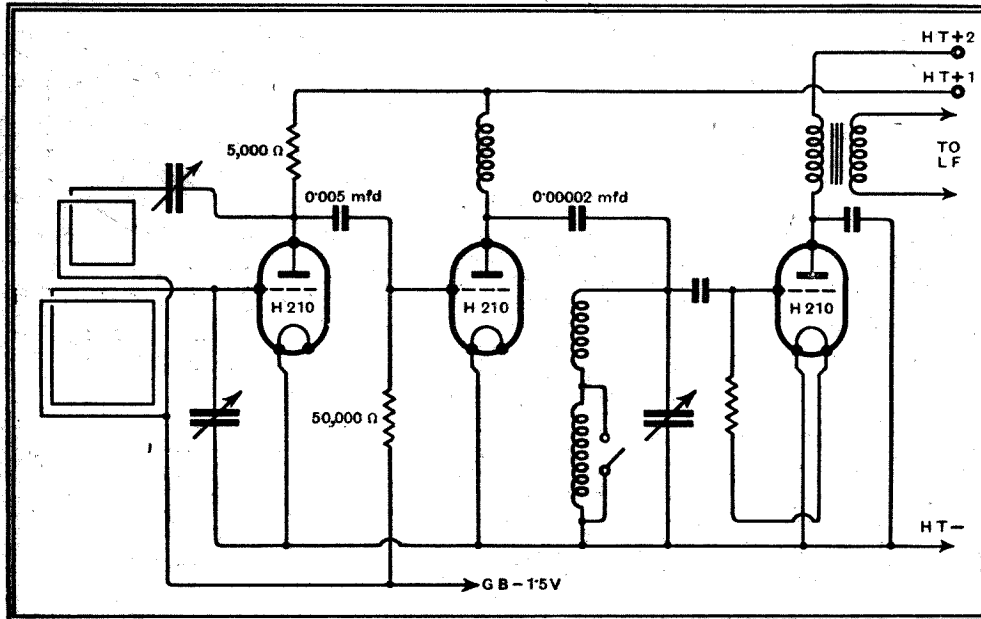


Fig. 3.—The original valves may be retained if the Colebrook method of HF amplification is used.

portables, but these are not very easy to get. With this arrangement an earthed plate should be interposed between the two condensers to provide some screening, and so avoid unwanted coupling.

LF Amplifier

On the LF side of either four- or five-valve portables of out-of-date type two alternative improvements are also possible. The anode currents of the two LF valves will be about 10 mA, while the maximum undistorted output will not be greater than 150 milliwatts. If both of these valves are removed and replaced by a small pentode of the Pen 220 type, the anode current will be reduced to about

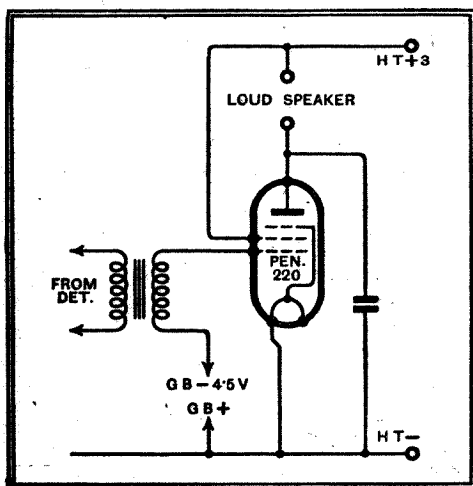


Fig. 4.—Fitting a pentode in place of the original 2-stage LF amplifier.

Alternatively, if the first LF valve is kept in and a Pen 220 A used in the output stage as shown in Fig. 5, the anode current will not be greatly increased, but the power output will now be sufficient to

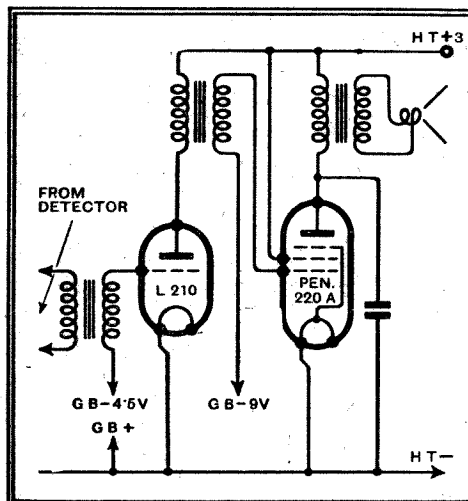


Fig. 5.—The fitting of a pentode of higher power may involve the retention of the existing intermediate LF stage.

drive a small moving-coil loud speaker, with a resulting improvement in quality of reproduction. To avoid box resonance, a hole should be cut out behind the speaker; this will also enable a set of the suitcase type to be used when closed. A sensitive speaker with a permanent magnet of nickel-aluminium alloy such as the Stentorian Midget should be chosen and mounted on a baffle behind the original loud speaker fret.

DISTANT**RECEPTION NOTES**

I WONDER if you have noticed how often the Palermo transmissions force their way through those of Athlone? Athlone's power is 60 kilowatts, whilst that of Palermo is officially given as 4. One would have thought that the Irish station would be strong enough to drown the Italian in this country, but certainly it does not. Under the Lucerne Plan both stations use the same wavelength of 531 metres; but I have found of late that Palermo is given to working just a little below Athlone. And I rather fancy that those 4 kilowatts have in practice undergone a certain amount of multiplication!

Speaking of Italian stations reminds me that the Bologna station has just been officially opened with an output of 50 kilowatts. It has been named after Marchese Marconi, and it works on a wavelength of 245.4 metres. As it occupies the channel next door to that of the very strongly received Lille P.T.T. station it is not too easy to pick up unless the set is very selective.

A week or two ago I referred to the unwelcome increase of spark interference near the top of the medium-wave band. This continues, I am sorry to say, and at times the same sort of interference is noticeable also near the middle of the band and between 200 and 250 metres. As my abode is just about as far inland as any place in England can be, I am afraid that dwellers near certain parts of the coast must suffer a good deal. I hope that the question of spark interference with medium-wave broadcasting will be one of the matters discussed at the U.I.R. summer meeting which is now being held at Lausanne.

Unless you live very close to the Scottish National, I expect that you have been hearing Rennes-Bretagne pretty well on 288.5 metres for some little time. The new transmitter is now conducting tests outside programme hours with much greater power.

A question that often comes my way is: What stations can be relied upon when one is calibrating a receiving set? It is a very pertinent question, for there are still numbers which wobble night by night many kilocycles this side or that of their allotted frequencies. However, there are luckily sufficient reliable "landmarks" to enable one to work out a calibration chart with accuracy between 531 and 203.5 metres, which covers the greater part of the medium-wave band. B.B.C. stations may be taken for granted. This gives us eleven plottings between 449.1 and 203.5 metres. Unfortunately for the calibrator (though fortunately for the mere listener), the spread of many of these stations is too great for accurate plottings to be made unless a sensitive visual tuning indicator is in use. Of course, such an indicator always *should* be employed, for you can't hope for precise calibration without it; but there are many who want to make reasonably accurate calibration charts without the use of the VTI. To them I can recommend any of the main German stations from Königsberg on 291 metres upwards as well as the German common wavebands on 251 metres and 225.6 metres. At the top of the band Athlone is reliable, and the Swedish stations from Hörby on 265.3 metres upwards can usually be depended upon to keep to their proper wavelengths.

D. EXER.

CURRENT TOPICS

EVENTS OF THE WEEK IN BRIEF REVIEW

Finnish Licences

THE number of licence holders in Finland has increased from a little over 129,000 to nearly 145,000 during the past year. It is expected that after the completion of the new high-powered Lahti transmitter, and the opening of the new stations at Uleaborg and Vasa, a great increase in the number of listeners will take place.

The Holy See

IT is reported by a European News Agency that a plan is afoot in Vatican City to establish a television transmitter at the Holy See. It is even said that the Pope has himself interviewed the Marchese Marconi about the matter, but at present confirmation is lacking.

Norwegian Volksempfänger

THE Norwegian Government is putting forth a great effort to make everybody in the country a keen listener, and it is stated that a large sum of money has been voted to support the production of "Peoples' Receivers." The Government is now being urged to amend the legislation in Norway so as to relieve all manufacturers of these receivers of any financial obligation to inventors whose patents they may use in the construction of the set. A great proportion of these patent holders are valve-manufacturing firms who are already carrying on a campaign in Denmark against set makers who produce receivers without paying the necessary royalties. Probably the patent holders in the various Scandinavian countries will eventually adopt a common front to protect their rights.

Loud Speakers to Replace the School Bell

THE ubiquitous loud speaker seems to be carrying all before it in the matter of ousting time-honoured methods of making a noise. In many cases it has already been used to replace Church bells, the actual source of the sound being a gramophone record. The school bell is the latest institution to be threatened by the loud speaker, as in certain countries in Central Europe this instrument is to be used for summoning the children to school. A psychological experiment is to be tried by using music of a joyous and inviting character to replace the doleful clanging of the bell. Lively music is also to be

broadcast via this outside loud speaker during the various intervals between the lessons when the children are in the playground. Later it is hoped to provide a quiet background of music from indoor loud speakers while lessons are actually being given. At present, however, it has not been decided what type of music can be considered as being readily suitable.

French Announcers Are Difficult to Follow

MANY people in this country nowadays use the news bulletins from the French broadcasting stations as a means of learning French or of improving their knowledge of it. Frequent complaints have, however, been made by these seekers after knowledge that the speed at which the announcers speak is too great. Others have suggested, however, that this rapidity of speech is really a delusion brought about by their lack of adeptness. It would appear, however, that there is considerable justification for the complaint, as French people themselves are protesting against the way in which the announcers gabble off the news bulletins. This more particularly applies to the racing results, which are said to be more like the race of the results than the result of the races.

Electioneering Tactics in the U.S.A.

ALTHOUGH it is still several months ahead, the two great political parties in the United States are already busy with their campaigns for the presidential election in November. Needless to say, broadcasting is taking a very prominent part, and heavy bookings are said to have been made by party agents for time on the air. It is stated that special precautions are being taken to prevent etheric disturbances being created by the opposition when a speaker is at the microphone. At the last election certain speeches were completely blanketed out by interference caused by unknown portable transmitters. Such interruptions were, however, in most cases the work of irresponsible local "agents," and since such conduct is prejudicial to the interests of both parties it is said that they have banded together to put down such coarse tactics. There are, after all, far subtler ways of interfering with an opposition broadcast speaker than

by the creation of ordinary interference. The simple and direct methods of campaigning adopted at Eatonswill are things of the past.

Andorra Calling

THE fact that a country is small does not necessarily mean that its requirements in the matter of radio power will be small when it does establish a broadcast service, for its transmitter may be designed for other purposes than that of serving the natives. In the latter connection, of course, one naturally thinks of the famous transmitter in the small independent country of Luxembourg. It appears that the people of Andorra have been bearing Luxembourg in mind when turning over in their minds the problem of making their voices heard in Europe, and it is rumoured in Paris that a station is being planned having a power altogether out of proportion to the dimensions of the country—a real ether shaker, in fact. Certain French interests are rather disturbed over the matter, for,

The Future of British Broadcasting

The Government's Proposals

IN the form of a Memorandum by the Postmaster-General, the Government's proposals with regard to the recommendations of the Ullswater Committee were issued on Monday.

The majority of recommendations were adopted in their entirety or with slight reservations, and the Government accept the recommendation that the B.B.C. charter should be extended for ten years from December 31st, 1936. Among other recommendations accepted is that the proportion of licence revenue to be paid to the B.B.C. should be increased, the initial assignment to be 75 per cent. of the net licence revenue, with a proviso that, if made necessary by expenditure on television and Empire Broadcasting, it should be open to the Treasury to approve an appropriate increase. The Empire broadcasting service is to be expressly authorised and developed, while sponsored programmes as well as direct advertisements should be excluded. If necessary, further powers should be sought for reducing the electrical interference nuisance.

The Government does not accept the recommendation that responsibility for the cultural side of broadcasting should be transferred to a Cabinet Minister free from heavy departmental responsibilities, and proposes the continuance as at present of the existing functions of the P.M.G.



Slot-meters, well known in connection with gas and electric supplies, have, in Switzerland, appeared on radio sets. The appropriate use of a mirror by the photographer gives us both front and back views of a receiver so fitted.

although one would think that this tiny republic, perched in the Pyrenees, would be influenced either by French or Spanish culture, it is said that German influence is very strong in the country.

The Corporation should refrain, as in the past, from broadcasting its own opinion by way of editorial comment, and the Government now proposes to apply this restriction to the B.B.C. publications as well.

Licences for relay stations are to be subjected to certain additional provisions, and are liable to be terminated on December 31st, 1939.

Agreement is expressed with the Committee's view that all steps should be taken to prevent broadcasting from foreign stations of advertising programmes intended for this country.

With regard to the recommendations of the Committee which affect action to be taken by the B.B.C., the constitution of Wales as a distinct broadcasting region is foreshadowed; and, with regard to the private lives of the Corporation's staff, it is considered that the general practice of the Civil Service should be followed; in this the B.B.C. concurs.

Perhaps the spirit of the Memorandum is best summed up by express Government concurrence with the finding of the Committee: "Constitutional independence of the B.B.C. brings advantages which could not otherwise be secured."

¹ Broadcasting: Memorandum by the Postmaster-General on the Report of the Broadcasting Committee, 1935. H.M. Stationery Office, 2d.