Present your Set with a NEW BLUE SPOT SPEAKER

If your set could speak it would be effusive in its thanks for the gift of a Blue Spot Speaker. A Blue Spot Speaker enables it to give you infinitely greater enjoyment of the wireless programmes. You will be amazed at the difference in the quality of reproduction, the astonishing sensitiveness, the delightful flexibility.

Get a Blue Spot Speaker now and enjoy your Christmas Radio. Christmas is a good time to install extension speakers and have music throughout your home. Ask your dealer.

BLUE SPOT PICK-UP

This model presents many attractive features. Tracking error is reduced to a minimum. The head lifts back for needle changing, eliminating risk of damage to records. Perfect reproduction of all frequencies without overload. Screened leads. An earth connection provided. Special Volume Control giving silent and distortionless adjustment.

Price £1.7.6, or without Volume Control £1.1.6.

Send to-day for interesting pamphlet (P.R.2), about Loudspeakers.

BLUE SPOT "STAR" JUNIOR

This is an exceptionally fine speaker at a very attractive price. The "Star" Junior gives a greatly extended response and the reproduction is amazingly natural and vivid in every detail of speech, song or instrumental music.

FEATURES. New Magnet design. Die cast chassis. Transformer with 12 points matching to suit all usual output stages or for use as an extension speaker.

PRICE 35/-

Cabinet model in oak and chromium 48/-.

THE BRITISH BLUE SPOT COMPANY LTD
BLUE SPOT HOUSE, 94/96 ROUSMAN STREET, ROSEBERY AVENUE, LONDON, E.C.1

The patent design of the anode of the 362 battery SG2 provides exceptionally small interelectrode capacity owing to their "edge-on" construction. This valve has an unusually long straight portion to its characteristic, and can therefore be particularly recommended for a last S.G. stage.

ALL 362 VALVES ARE GUARANTEED FOR 6 MONTHS. IF NOT STOCKED BY LOCAL DEALER SEND P.O. DIRECT TO US.

"Edge-on" anodes, minimising interelectrode capacity.
Uniquely sprung long life filament of unusually sturdy construction.
All parts completely interlocked, eliminating microphony.

It means exceptional PERFORMANCE.

AMPLION (1932) LTD, 82-84, ROUSMAN STREET, LONDON, E.C.1

50 ohms TO 100,000

A DEFECTIVE Resistance can completely ruin the enjoyment of radio—and frequently does. Moreover, it is often difficult to trace the fault as none but the most expensive testing equipment can definitely locate it.

When building your next set, or overhauling your present equipment, change over to Amplion resistors.

They are colour coded, compact and sturdy, and all values are wire-wound, this method of construction giving the most reliable and constant form of resistance.

Obtainable from all Dealers.

PRICE EACH 1/- ALL VALUES.
IT STANDS ALONE

10, 20 or 30 mA AT EITHER 120 or 150 VOLTS

no other unit has these 6 OUTPUTS

What this NEW "ATLAS" Mains Unit means TO EVERY BATTERY SET OWNER

This wonderful new "ATLAS T.10/30" Mains Unit is quite unique. It has no less than 6 TAPPED OUTPUTS. This means that, with electricity in your house, any type of battery set, whether straight, superhet, "Class B" or "Q.P.P." can be made All-Mains operated in a few moments. It means that, no matter what set you may buy or make in future years, you can be sure of ample power and correctly matched voltages. And, most important of all, it means that you can cut your radio running expenses to less than 1/- per year—one-fiftieth of the cost of batteries—and keep your accumulator always fully charged.

Ask your dealer for a FREE demonstration and post the coupon TODAY.

SPECIFICATION

MODEL T.10/30

For A.C. mains. H.T. tappings 60/80 v. (min. and max.), 50/90 v. (min., med. and max.), 120 v. and 150 v. Tapped outputs 10, 20 or 30 m/A at 120 or 150 v. Trickle charger 2 v. at 0.5 amps. Westinghouse Rectifiers. Guaranteed 12 months. H.P. Terms 10/- deposit and 8 monthly payments o. 8/- each.

OTHER MODELS

for D.C. and A.C. from 30/- Cash or 10/- deposit.

Prices do not apply in I.P.S.
GREETINGS!

CORDIAL festive greetings to every reader. For the third year in succession we present to you our special Christmas Number. This issue does not represent the mixture as before with merely the icing on cereal and bonbons on the pages. We have endeavoured to provide for every home constructor articles which will enable him to extract greater pleasure from his radio during the Christmas holidays. Custom has decreed that Christmas numbers should appear about three weeks before Christmas, and we have not broken the rule. After all, it is not such a far cry to December 25th, and our best wishes to all of our readers throughout the world go out with this issue.

A Unique Christmas Gift

SPEAKING of Christmas reminds us that many readers have written asking us to repeat our tool kit offer. Unfortunately, only a few of these tool kits remain, and it is therefore not possible to offer them on the same terms as before. Those readers who missed the previous offer, and would like to possess one, may do so by sending a postal order for 3s. from George Newnes, Ltd., 14, Southampton Street, Strand, London, W.C.2. All applicants whom it is exhausted. All applicants whom it is impossible to supply will have their remittances returned. If, therefore, you are one of the unfortunate readers who did not acquire this remarkable pocket tool kit, you should send your remittance without delay. All kits will be dispatched before Christmas.

Use the Index

WE continue to receive many queries which have either been answered in PRACTICAL WIRELESS before or have been the subject of special articles. May we invite the help of our readers by suggesting that they purchase the index which we issue every six months specially for their benefit? By consulting this they will probably find that the query they wish to ask has already been answered; they will therefore save themselves time and trouble. These indexes cost 4d. each by post from The Publisher, George Newnes, Ltd., S.11, Southampton Street, Strand, London, W.C.2.

Our "Wireless Constructors' Encyclopaedia"

A NOTHER reminder! Well over 100,000 copies of the popular "Wireless Constructors' Encyclopaedia" have already been dispatched. The book is in its third edition and makes an ideal Christmas present.

Three-Valve Superhets for All

THIS week we give preliminary details of the Universal Three-valve Superhet. We have already described a battery version, an A.C. version, and a D.C. version. The Universal model introduced this week concludes the series of three-valve superhets, and we shall proceed to describe radio-gram models.

The Editor and Staff Join in Wishing Every Reader a Very Happy Christmas

This receiver has proved to be the most popular of the long range of PRACTICAL WIRELESS receivers—deservedly so, bearing in mind its extreme selectivity, simplicity, and cheapness. As readers know, PRACTICAL WIRELESS was the first paper to describe a really practical three-valve superhet.

Syphony Concert from Midland Regional

EGON PETRI is the pianist in the Midland Regional Symphony Concert by the City of Birmingham Orchestra on December 4th. The concerto is Rachmaninoff’s D minor, and Schubert’s Fifth Symphony will be given in the second part of the concert. Leslie Howard will conduct.

Gracie Fields at Rochdale

FOR the third time in the last four years, Gracie Fields is returning to her home town, Rochdale; this time from the local Hippodrome she will broadcast to Northern and Empire listeners on December 5th. Apart from her previous visits, the proceeds of all her performances, including her broadcasting fee, will go to local charities.

Plays by Midland Authors

ON December 11 Midland Regional listeners will hear three plays which will be produced by Martyn Webster. Two of the plays are by Midland authors, Phyllis Bowman, wife of a Birmingham journalist, tries a futuristic experiment in a play depending entirely on effects, while Clive Ryland, author of three detective novels, has a clever denouement to his play, “The Wager,” which relates to a challenge made by a highwayman to a baronet whom he has robbed. The highwayman wagers that he will dine with the baronet and some of his swordsmen friends and escape unscathed. In the third play, entitled “O.K. Cameras,” by A. Robert North, Godfrey Baseley, John Lang, William Hughes, Billa Birch and Nita Valerie are the principal players taking part in this triple bill.
ROUND the WORLD of WIRELESS (Continued)

**Historical Trials Broadcast**

The fourth in the series of famous broadcasts marking the centennial of the unfortunate Admiral John Byng, who was found guilty of cowardice and sentenced to be shot for failing to relieve the town of Minorca, after engaging indecisively with the French fleet in the vicinity, in the year 1756, will be broadcast in the Regional programme on December 6th and the London programme on December 7th. Mr. Anthony Ellis, who has made the broadcasting version (and will be remembered by listeners as the author of the adaptation of Mr. E. C. Bentley's novel, "Trent's Last Case") is himself to play the part of Admiral Byng. Mr. Ellis, in the course of a long and varied career, has been connected with the theatre in the capacity of actor, theatrical critic, manager, and author. This broadcast reconstruction includes not only the court-martial, but also the preliminaries which led to it—that is to say, the piece begins with the departure of Byng on his ill-fated expedition, continues with the indecisive engagement with the French fleet, and proceeds finally to the court-martial and execution.

**Oundle School Choir**

On December 11th Regional listeners will hear a performance of part of Bach's B minor Mass by the boys of one of the great public schools of England, namely, Oundle. Two hundred and thirty boys will constitute the choir, thirty-five of whom are in the choir, and three hundred and twenty will be in the chorus—a total of five hundred and eighty-five boys. In addition, Mr. Charles Woodhouse, leader of the R.C. Orchestra at the Pomegranate Concerts, will introduce a number of well-known players to augment the boys orchestra. Four guest singers—Elsie Suddaby, Astrid Deamond, Arthur Cranmer, and Stuart Wilson, will also take part. Mr. Clement M. Spurling, Director of Music at Oundle for more than forty years, will be the conductor.

**Cardiff Musical Society's Concert**

When the first broadcast of the Cardiff and Glamorganshire's concert is given on December 9th, a relay will be taken for West Regional and Empire listeners. The conductor will be Mary Jarred (contralto). Warwick Bradburne will conduct.

**Religious Broadcasts**

During the Christmas season special religious broadcasts comprise service carols in the afternoon of December 24th from King's College, Cambridge, and in the evening from St. Mary's, Whitechapel. On Christmas morning a service will be relayed from St. George's Chapel, Windsor, conducted by the Dean of Windsor, Dr. Arundell. On December 26th a special evening service will be relayed from Canterbury Cathedral, with an address by the Archbishop of Canterbury. Arrangements are also being made for a New Year's Eve broadcast, probably from Winchester Cathedral.

**Coloured Entertainers**

On December 8th an act new to radio will be broadcast by Rudolff and Rogers, a gifted pair of coloured entertainers, who specialise in academic discussions and smart humorous conversations interspersed with excellent vocalism.

**Territorial's Smoking Concert**

An after-dinner smoking concert will be relayed from Deller's Café, Exeter, on December 10th, for West Regional listeners. The occasion is the annual dinner of the First Rifle Volunteers Old Comrades Association. This association was founded to keep green the memory of the first Volunteer Regiment formed in the country in 1802. When the Territorial Act came into force in 1908, the 1st Rifle Volunteers' name was changed, and the Regiment became the present 4th Battalion Devon Regiment.

**Pantomime Rehearsal**

On December 12th a novel programme feature is a pantomime rehearsal—the first of two which are to be broadcast to the Midlands Region. This takes the form of "Fifteen Minutes with Julian Wylie," rehearsing his Birmingham Theatre Royal pantomime. "The other to be heard during the following week is of the rehearsal of Emily Littler's "Mollie," to be presented at the Prince of Wales Theatre, Birmingham. The stars in Julian Wylie's show are Dorothy Ward, Shann Glenville, and Albert Burdon.

**School Sing-song**

An end-of-term sing-song from Taunton School will be broadcast to West Regional listeners on December 13th. The concert will be given in the Memorial Hall, which was recently reconditioned in memory of the late Headmaster, Dr. C. D. Whitfield, and one of the assistant masters, Mr. J. G. Loveday, who was connected with the school without a break for sixty-three years.

**The Radio Follies**

A new concert party will make its first appearance at the Midland Regional microphone on December 14th. It is presented by Michael North and Richard Spencer, is called "The Radio Follies," and draws its artists from "The Radio Musicians," "The Midland Musicians," and "The Regional Revellers." Original sketches will be a feature of the entertainment.

"Are You Making F. J. CAMM'S 3-VALVE SUPERHET?"
Radio Throughout the House

A Clear Description of the Most Suitable Methods of Connecting Additional Loud-speakers to the Receiver without Impairing Quality of Reproduction

Choke-capacity Coupling

An alternative, and generally better, method of extending the speaker when the connecting wire requires to be more than, say, twenty feet long, is to feed the speaker on the choke-capacity principle, as shown in Fig. 1. Here, a low-frequency choke is connected between the speaker terminals, and a single wire is taken from that end of the choke which goes to the anode of the output valve, through a 2-mfd. fixed condenser to one speaker terminal; the other speaker terminal is simply connected to earth. This earth connection might be made to any convenient point near the speaker, such as a gas or water pipe, or to a standard earth tube driven into the ground outside the window. It is not usually necessary that the speaker earth fitted in the pentode circuit. For example, if the resistance and condenser connected in series between the speaker terminals are of, say, 20,000 ohms and .02 mfd., the "tone" of the speaker can be maintained by increasing the resistance to about 50,000 ohms or by changing the condenser for one of about half the original capacity.

Where the speaker is built into the set (particularly in the case of a commercial set) a rather different method of connecting the extra speaker will probably have to be adopted. One method is to break the speaker lead which goes to high-tension positive and connect the two ends of the break to two terminals of a change-over switch of the Q.M.R. type, as shown in Fig. 2. The additional speaker is then connected to the third terminal on the switch and to that terminal on the speaker which is joined to the anode of the output valve. By this method, either of the two speakers can be switched on at will. There is, however, one important point which must be borne in mind when a pentode is used in the output stage: this is that the set must be switched off before changing from one speaker to the other. If this were not done the anode circuit would be broken for a fraction of a second whilst the change-over was being accomplished, with the result that a voltage surge would occur, and this might seriously damage the valve.

Tone Compensation

An alternative to the choke-capacity feed, when the speaker leads are very long, and where the output valve is a pentode, is to use the ordinary twin wire and to modify the tone-compensator generally fitted in the pentode circuit. For example, if the resistance and condenser connected in series between the speaker terminals are of, say, 20,000 ohms and .02 mfd., the "tone" of the speaker can be maintained by increasing the resistance to about 50,000 ohms or by changing the condenser for one of about half the original capacity.

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Speaker Switching

This difficulty can be entirely overcome by using the arrangement shown in Fig. 3. In this case the primary winding of the transformer of the self-contained speaker is used as an output choke when the external speaker is in use. The extra speaker can be switched in or out of circuit...
disconnected a fixed resistance is brought into the circuit so that as the speech coil is wound on the transformer and the speech coil. A suitable resistance can easily be made by winding a short length of Nichrome Enka Enka resistance wire on a strip of cardboard, bearing in mind that the resistance per foot of this wire is almost exactly 5 ohms.

The Extension Leads

Nothing has yet been said of the actual method of carrying the speaker wires to various parts of the house, or of joining them to the output circuit. The most convenient and most satisfactory method is to connect the wire round the picture moulding or skirting board. Instead of every yard with an insulated staple: the only object of the insulation on the staple is to prevent the wire from being fractured, or the insulation from being scraped away. At each point where a speaker is to be used a two-point socket should be fixed to the wall, so that a corresponding plug can be inserted. It will almost invariably be found that the most convenient place for the socket is on the skirting board, although it might be better, when (the wire is taken along the picture moulding) be attached to the side of a door frame. A cheap alternative to the special socket is an old two-coil holder, in this case using a coil mount for connection purposes.

There are a few important points to be considered in placing the extension leads, the chief of which is that the wires should not be run too near or parallel to any electricity-power leads; if this point is not watched there is every possibility of mains hum being introduced, whether the receiver is battery or main-operated. Another almost equally important point is that the speaker wires should not run close to the inside aerial or lead-in; if they do, a certain amount of instability might be caused.

Yet another point, when the speaker is simply to be moved from one room to another, is that the leads which have been referred to before; namely, that when the output valve is a pentode, the set should be switched off before transporting the speaker to another point, and also that the set should never be switched on whilst the speaker is disconnected.

Parallel Capacity

It must be remembered that when a number of extension leads are provided, these being in parallel with each other, an appreciable capacity will be effectively placed in parallel with the load-speaker. This capacity will necessarily have the effect of curtailing the high-note response, and it might be done to compensate for this in some way or other. The method in the case of a receiver in which a pentode is employed has been mentioned before, but a different arrangement must be adopted when a triode is used in the output stage. The most satisfactory is to fit a tone-control transformer between the detector and L.F. stages, and adjust this to give emphasis to the treble. Alternatively a 2-henry choke and 25,000-ohm "gridstop" variable resistance should be connected in series between the primary terminals of the ordinary L.F. transformer (without altering the other connections, of course); by varying the setting of the resistance different degrees of high-note emphasis can be secured.

Push-pull and Class B Output

The methods of adding extra speakers described above are applicable principally to receivers which employ a single power valve or a pentode in the output stage. When the output stage consists of two valves connected in push-pull, or of a class B or double pentode valve, the method of connection must be varied slightly.

In such cases it is nearly always necessary to take two leads to the speaker, these being joined to the two ends of the output coil or the primary winding of the output transformer.

Maintenance of a Constant Load

When using a number of paralleled speakers, as shown in Fig. 4, and it is desired to switch one or more out of circuit, it is best to arrange to disconnect the secondary—not the primary—so that the matching is undisturbed. This can be done, of course, by including a switch between one of the leads from the secondary winding on the transformer and the speech coil. It is still better, however, to arrange these so that as the speech coil is disconnected a fixed resistance is brought into circuit; connections for this are shown in Fig. 5. The fixed resistance must be approximately of the same value as the resistance of the coil—generally between 5 and 10 ohms. A suitable resistance can easily be made by winding a short length of Nichrome Enka resistance wire on a strip of cardboard, bearing in mind that the resistance per foot of this wire is almost exactly 5 ohms.
MICROPHONES
FOR
CHRISTMAS ENTERTAINMENT

Helpful Advice Concerning the Choice and Use of Microphones for Home Amusement and Entertainment
By FRANK PRESTON

The Purpose of the "Mike"

The final choice, therefore, rests very largely with the purpose for which the microphone is to be used, and the apparatus with which it is to be employed. When a good, powerful amplifier is available, and the microphone is intended to be used for making announcements in a hall, or for reproducing the voice of a crooner, it is desirable to buy a good instrument of the moving-coil or Beitz type, this may be expected to cost from three to six pounds. A few good microphones of the types referred to are the Amplion, Igranic, Parmelo, and Savage, and most of these are available in different types for stand or table mounting, whilst the Igranic can also be obtained in a pattern suitable for attachment to the lapel of the coat.

When the microphone is wanted only for home "broadcasting"—that is, for reproducing by the loud-speaker voices and music originating in another room—and moderately good quality is desired, there are a number of excellent instruments which can be bought for about a guinea, and which contain the necessary transformer. One well-known example is the G.E.C. "Home Broadcaster," whilst another is the De-luxe model made by the Scientific Supply Stores. A wide variety of suitable instruments is also available from Electradix Radios, Economic Electric, Ltd., and Grafton Electric, Ltd.; a representative selection of medium-priced microphones is shown on this page.

Home-made Microphones

In many instances the constructor might prefer to assemble his own microphone, and this can be done extremely cheaply without any great sacrifice in efficiency. All the necessary parts, as well as full instructions, are obtainable from the two firms last...
mentioned, and also from the Scientific Supply Stores. Another very inexpensive method of making a microphone is by making use of a midget microphone button (which is a standard type of carbon-granule unit in miniature), mounting this on a diaphragm, as shown in Fig. 1. The diaphragm might consist of a tin lid or better, it might be the diaphragm from an old telephone earpiece. In the latter case it will be found convenient to remove the magnets, replace the diaphragm with microphone button attached, and connect a light flexible lead to one of the terminals, connecting the other to the casing — to which the microphone is connected by means of its second terminal and the metal diaphragm.

It was pointed out above that some microphones are supplied already fitted with the necessary input transformer, and in such cases it is generally only necessary to connect a small 3-volt dry battery to two terminals provided, and to connect the other two terminals to the pick-up terminals of the receiver. Where the latter terminals are not provided, the method of connection is exactly as described on another page in connection with a gramophone pick-up. If a switch is not fitted to the combined microphone and transformer it will be necessary to insert one in series with one battery lead so as to prevent current from being drawn from the battery when the unit is not in use; an ordinary on/off switch of either the push-pull or Q.M.B. type is suitable.

The Input Transformer
Where the microphone does not contain a transformer it is essential that this component should be obtained before the microphone can be used. The method of connecting the transformer is shown in Fig. 2, where it will be seen that the primary winding is wired in series with the microphone, battery, and an on/off switch, the secondary being connected directly to the pick-up terminals on the receiver. Nearly every manufacturer and supplier of microphones makes a special transformer for his own products, but in odd cases where this does not apply a step-up transformer having a ratio of between 1 : 50 and 1 : 100 should be obtained, or made according to the particulars given in Fig. 3. The core stampings shown may be those taken from an old L.F. transformer, or three dozen pairs of No. 5 stalloy stampings may be used. It is nearly always desirable to fit a volume control in the microphone circuit, if this is not already attached to the microphone itself, and the control should take the form of a potentiometer connected across the terminals of the transformer secondary, connection to the pick-up terminals being made from the centre terminal (slider) and one (it does not matter which) of the other two.

Preventing Instability
It will sometimes be found when using a microphone that a certain amount of low-frequency instability is experienced, or that reproduction is rather serechy or accompanied by a high-pitched whistle. When this is the case it might be overcome by reducing the voltage applied to the microphone down to about 11 volts, or by using a volume-control potentiometer of lower resistance than that mentioned above. In some cases it might also be found advantageous to connect a fixed condenser of between .0005 mfd. and .005 mfd. in parallel with the secondary winding of the microphone transformer.

Another point which should be observed, especially when the microphone is being used some distance away from the receiver, is that the connecting leads should be screened. The screened twin wire used for set wiring is quite suitable, and the screening braid must be earth connected, or otherwise connected to one of the pick-up terminals (the correct one can easily be found by trial). When using a separate microphone and transformer it is generally better, where convenient, to mount the transformer as near to the set as possible, so that only the primary leads have to be extended; this will generally prevent L.F. oscillation. When this is done it might be necessary to use a rather higher voltage transformer and the grid of the first L.F. valve.

Messrs. Pearl and Pearl have recently marketed a neat table model microphone with transformer in base at 8s. 6d.

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Messrs. Pearl and Pearl have recently marketed a neat table model microphone with transformer in base at 8s. 6d.
CHRISTMAS, with its parties and its presents! How are our broadcast stars and their children going to spend it this year? Many of them have to work hard all over the holidays, but that won’t stop them snatching a few jolly hours with their youngsters. Their home hours are even more precious to them than they are to us, for they are so much in the public eye—or ear—that their moments with their children are very few.

Alice Moxon and Stuart Robertson are going down to South Wales to sing in Pontypridd at Christmas time, so Elizabeth, their enchanting four-year-old, will have to have her celebrations with them a little earlier, but there will be juntckings enough at home with her grandparents and relations, even with mummy and daddy away.

Reginald Purdell’s son John, aged 2, is already very keen on trains, and Reggie and his wife are planning to augment his rolling stock for Christmas. Father Christmas will have a hard time this year bringing a tricycle and a fairy cycle down the chimney! Reginald Purdell’s son John, aged 2, is already very keen on trains, and Reggie and his wife are planning to augment his rolling stock for Christmas. Father Christmas will have a hard time this year bringing a tricycle and a fairy cycle down the chimney! Reginald Purdell’s son John, aged 2, is already very keen on trains, and Reggie and his wife are planning to augment his rolling stock for Christmas. Father Christmas will have a hard time this year bringing a tricycle and a fairy cycle down the chimney!
WE have recently given details of a three-valve superhet which cost only £5. In this week’s issue will also be found details of a three-valve which costs about £2.50. Just to show that it can be done, however, here are details which will enable you to make a three-valve for 2s., or thereabouts. It is the components which cost the money when making up a wireless set, so why not make your own and save the money? Fixed condensers cost at least 6d., but what is wrong with a dozen turns of wire wound round a pencil, with a further layer on top separated by a thin strip of paper? A volume-control potentiometer costs at least 3s. 6d., but split a pencil down the centre, bind the ends with thin wire, screw a strip of brass on a piece of wood so that it rests on the lead inside the pencil, and there you have a good potentiometer. These suggestions are, of course, Christmassy, and I am not suggesting that they are by any means as good as the commercial article, but with the festive season at hand many readers will no doubt like to build up one of the sets described here just to show friends that it is not necessary to spend pounds in order to hear the local station. In fact, by using a little care, some very good results may be obtained with some of the sets.

The Coil

For these “junk” sets an expensive coil is out of place, so wind your own this way. Take a bottle, glass or other similar article which might be found in the house at Christmas and get hold of some covered wire. It doesn’t matter whether it is 22, 26 or only just 21, so long as it is fairly stout and covered. The bottle or other device should be about 3in. in diameter. Take the bottle in the left hand and grip at the same time the end of the wire. Now wind thirty-five turns of wire round and round the bottle or glass, one turn over the other anyhow, so as to form a hank. When the thirty-fifth turn is completed, break the wire and twist the broken ends together. It would be possible to make a loop here instead of breaking the wire, but as it will have to be bared to make a loop here instead of breaking the wire, but as it will have to be bared, we will call the beginning of the hank the high-potential end, the finish the low-potential end, and the tapping point the aerial tap. Or, if you prefer it, 1, 2, and 3 respectively. If you think your enthusiasm will lead you to make a valve sets, wind a further coil round the bottle before it goes back. This second coil will have thirty turns only.

to be technical, we will call the beginning of the hank the high-potential end, the finish the low-potential end, and the tapping point the aerial tap. Or, if you prefer it, 1, 2, and 3 respectively. If you think your enthusiasm will lead you to make a valve sets, wind a further coil round the bottle before it goes back. This second coil will have thirty turns only.

AMUSE YOURSELF AND

30 MINUTE

SOME NOVEL RECEIVERS MADE FROM ODD MATERIALS AT A FEW MINUTES’ NOTICE

Fixed Condensers

For these (you only want one for any of the sets described), but you may like to make up some extras for the children’s stockings), borrow a pencil. Wrap a strip of stout brown paper round it, any 1½in. wide. Wrap it round two or three times and well Scotchet it. When dry this will slide off the pencil (unless it gets stuck) and over it you must wind an even layer of wire. Again the gauge does not matter. To keep the wire in place, drop some sealing-wax on it. Let the layer be about 1½in. long end cut the wire (or break it if the scissors are in use) and stick the end down. It’s not wanted. Wrap one layer again. If you care to buy a capacity bridge you will probably find that this condenser has a capacity of roughly 0.0005 μfd., but it doesn’t matter for our purpose.

A Variable Condenser

Unfortunately, we shall have to tune our coil so as to prevent the chamber music from spoiling Henry Hall’s efforts, but we need not go to the stores for an S.L.F. coil. With slow-motion dial. When the sardines have all gone, cut up the tin, or, if you prefer it, get an old piece of brass. Cut out two pieces as shown in the artist’s sketch, and on the piece with the tail stick a sheet of note-paper. This is not for a station log, but simply to prevent the two plates from short-circuiting. They may be mounted on a piece of wood, or retrieved-straight to the baseboard. The handle will enable the value to be adjusted, so don’t screw it down too firmly.

Grid Leaks

To enable the grid to leak, dip a piece of blotting-paper in some India ink; or, if you haven’t got any such ink, get a piece of paper and borrow the blackhead from the kitchen—the stuff which is used to clean the gas is indicated—and rub some of this on the paper, say a quarter of an inch strip by 1½in. long. If the blackhead is missing, get an ordinary piece of firewood or ebonite and rub some pencil on one surface. To obtain good connection with any of the above grid leaks bind the ends with bare wire. Again the efforts of the artist should make the scheme quite clear.

PRACTICAL WIRELESS December 8th, 1934
YOUR FRIENDS WITH THESE

JUNK SETS!

THEY WORK REALLY WELL!

By W. J. DELANEY

An L.F. Transformer

For the two- or three-valver we must have an L.F. transformer, but this won't cause any difficulty if there is any wire left. Take some of the nails out of the case and fix the whiskies in, or if it hasn't arrived yet buy two-pennyworth from the ironmonger's (nails, not whiskies). Two-inch nails will do, about a dozen or thirteen, say. Place them alternately—that is, half with the heads one way and half the other way round. This will enable them to lie parallel without being thicker at one end than the other. Get some more cotton and tie them together, and wrap a layer or two of thin paper round them. Now hold the bundle in the hand with only about one-third sticking out in the open, and over this wind fifty turns of wire. Pile it up anyhow, and if you are holding it right you will get a neat section having a more or less flat end. Borrow the sealing-wax and make the end firm. Now very carefully release your hold of the bundle and slide it out of your hand until you are holding one-third. Between your hand and the end of the first heap of wire wind 299 or 300 more turns of wire. Be careful not to knock the first heap off while you are doing this, and if your arm does not ache too much you can finish the transformer by winding a further fifty turns on the remaining length of core (that is, the bundle of nails). Once again the artist has stepped in to help you by making a sketch of the transformer. Note that the inner ends of the two outside heaps of nails are joined together and so form a split primary. I will not worry you with inductance figures and response curves, but they are good!

Some Receivers

The circuits of several sets are given and you should not find it difficult to build these up, using the parts you have so happily constructed. The circuits are in pictorial form, showing at the same time the layout to be followed. For reaction you must push the small coil near the aerial coil, and if you must get Honolulu, then tie the coil on a bit of wood so that you can just want a set to mount in a cigar box or to take to bed with you, try the crystal set, with a piece of carbonium crystal wedged into a thimble and a piece of steel pressing tightly on it. The piece of steel may be a razor-blade, and you can dispense with the thimble if you like. The pressure wants to be fairly firm, and two pocket-lamp batteries in series across the potentiometer will enable the crystal to do its stuff really well. You may get some foreigners on this set—it all depends how near they are. If you don't want permanency you can use two of the ordinary types of crystal, pressing together in a small bakelite tube such as contains lip-stick or other commodity. The 'phones should be sensitive in order to make the most of the weak signals which are obtained on a crystal receiver. To conclude, all these ideas are thoroughly practicable, and you will be agreeably surprised at the performance which the sets will put up—even at Christmas.

The close of 1934 has seen marked progress in home construction. Perhaps the most noteworthy development has been the eradication of the disparity between the price of the commercial as against the home-constructed receiver. PRACTICAL WIRELESS takes pride in the fact that it has taken the lead on the question of price, and has been largely responsible for a reduction in the prices of components. The co-operation of manufacturers on this important point has been truly remarkable, and we place on record our appreciation of their goodwill.

In conveying to our readers all over the world festive greetings, we desire, in conclusion, to set on record our appreciation of their loyalty which has made this possible.—The Editor.
How to Fit Up the Receiver and Accessories so as to Get the Best Results from Your Own Play.

A suitable ten-minute play is given on page 425.

Fig. 4.—A centre-tapped potentiometer (or fader) will enable the volume from one set, or pick-up, to be smoothly varied at will, by means of a double-pole change-over switch, wound as shown in Fig. 2. It is assumed, of course, that the microphone incorporates its necessary input transformer, but if not, one will have to be provided. It is also assumed that the terminals—marked R.L.C., on the receiver—are connected to a volume-control potentiometer, as otherwise there will be no method of regulating the volume. This scheme is, of course, the very simplest which can be adopted.

If two microphones are to be used, either to pick up the players, or having to be too close together, or to convey sound effects, etc., to be introduced, a fader will be essential. Here it is, in effect, a single-tapped potentiometer, and it will be seen from Fig. 3 that one plate is earthed, and half of the fader, and this is used as one pair of contacts on the D.P.C.O. switch. The fader will enable not only the degree to which the other microphone is to be referred to the control handle, but also to give the output from one to be made greater than that from the other gradually introduced. It is carried out by slowly rotating the control handle.

A Fader and a Simple Circuit

The fader may be used to control a single microphone and the pick-up by turning it as shown in Fig. 4. With this arrangement, an announcement may be made into the microphone, and the record started at the same time. As soon as the announcement is completed, the arm of the fader is slowly turned, and as soon as it passes the centre point the gramophone record will
the latter may be modified to include broadcasting, so that further microphones or pick-ups could be introduced.

The Prompter's Box

Obviously it is essential for the producer to arrange matters so that the correct degree of volume regulation is carried out on the various reproducing media, and therefore he must be able to hear the actual signals and not the original sounds. It is not worth while arranging a sound-proof box, but a pair of 'phones will enable the idea to be admirably carried out. Very much depends upon the circuit as to the actual position of the 'phones, but in most battery-operated receivers, provided two or more two L.F. stages are employed, the 'phones should be joined between anode and earth in the stage immediately following the input stage. The fader and change-over switch may be used instead of a potentiometer, although this is possible with some of the devices already mentioned (by substituting pick-up for microphone) an alternative scheme is available and is shown in Fig. 5. It will be seen here that a potentiometer is joined across the pick-up terminals, in addition to the microphone or output transformer, and the pick-up is joined to the arm and the G.B. side of the pick-up circuit. Thus, movement of the arm of the control will control the degree of volume from the pick-up, whilst affecting only very slightly that from the microphone. In fact, if the transformer is well designed, no variation at all will be obtained with this circuit, and the music may be slowly and quietly faded in, whilst speech is given continuously and will thus be heard above the music.Obviously it is essential for the producer to arrange matters so that the correct degree of volume regulation is carried out on the various reproducing media, and therefore he must be able to hear the actual signals and not the original sounds. It is not worth while arranging a sound-proof box, but a pair of 'phones will enable the idea to be admirably carried out. Very much depends upon the circuit as to the actual position of the 'phones, but in most battery-operated receivers, provided two or more two L.F. stages are employed, the 'phones should be joined between anode and earth in the stage immediately following the input stage. The fader and change-over switch may be used instead of a potentiometer, although this is possible with some of the devices already mentioned (by substituting pick-up for microphone) an alternative scheme is available and is shown in Fig. 5. It will be seen here that a potentiometer is joined across the pick-up terminals, in addition to the microphone or output transformer, and the pick-up is joined to the arm and the G.B. side of the pick-up circuit. Thus, movement of the arm of the control will control the degree of volume from the pick-up, whilst affecting only very slightly that from the microphone. In fact, if the transformer is well designed, no variation at all will be obtained with this circuit, and the music may be slowly and quietly faded in, whilst speech is given continuously and will thus be heard above the music.
Weatherproof Lead-in Connection

The simple dodge shown in the accompanying sketch is a method whereby the aerial connection to the lead-in tube may be effectively screened from damp weather. A rubber ball has two holes pierced opposite to each other, and the diameter of one hole is rather less than that of the lead-in wire. The other hole is rather less than the diameter of the lead-in tube. The lead-in wire is threaded through these two holes, going through the smaller one first. After connection has been made to the terminal on the lead-in tube, the rubber ball is pushed on to the tube. The connection is then inside the ball. A touch of sealing wax or Chatterton's Compound on the ball where the wire enters will ensure certain protection.

Safety Fuse for a Mains-driven Set

Many mains receivers are worked from a switch plug that has been connected to a lighting or heating circuit, the fuses of which are too large to safeguard the receiver in the event of a fault.

A Short-wave Aerial Series-condenser

An efficient short-wave aerial series-condenser may be made with an old coil-holder of the type where both aerial and receiver are plugged into sockets; the latter coil moving backwards and forwards with the aid of a copped spindle.

Colour Tuning

Here is a simple and novel idea which I have adopted to facilitate the tuning of my set. At every station setting of my dual drive I filled in the space of one degree with coloured oil paint. For instance, the National setting can be done in green, the Regional in red, the Midlands in blue, and so on. The medium-wave stations can be marked at the top of the dial in one colour, while the long-wave stations can be marked at the bottom in another colour.

That Dodge of Yours!

Every Reader of "PRACTICAL WIRELESS" must have originated some little doings which would interest other readers. Why not pass it on to us? We pay £10-0-0 for the best wrinkle submitted, and for every other item published on this page we will pay half-a-guinea. Turn that idea of yours to account by sending it to us. Addressed to the Editor, "PRACTICAL WIRELESS," George Newnes, Ltd., 8th, Southampton Street, Strand, W.C.2. Put your name and address on every item. Please note that every notion sent in must be original. Mark envelopes "Radio Wrinkles." Do NOT enclose Queries with your Wrinkle.

A Simple Short-wave Aerial Series-condenser

Here is a simple way of inserting a fuse which governs the radio set only. Referring to sketch, A is the negative terminal which goes straight to the set, and B is the positive terminal. When the switch is on, the current flows from B across the switch contacts to C, from which it goes across a metal bridge to D, and then to the set. If the metal bar or bridge be removed from between C and D, and a length of very fine fuse wire be connected across these terminals, the wire will "blow" in the event of a fault, and safeguard the set.

F. J. Kirby (Chard).

Adding an Aerial Series-condenser

Wishing to add an aerials series-condenser, so as not to upset the symmetrical arrangement, Samm without having to add any further controls to the connection, I hit upon the idea shown in the accompanying illustration. It is only necessary for the switch spindle to have a fairly sound metal bush to work in, and most switches of this type are already provided with one. By fastening the cord, as shown, and passing it twice round a small pulley wheel, it is not necessary to keep it very tight. If the condenser or volume control spindle has to turn through more than 90 deg., it is necessary to pass the cord twice round the large wheel as well. The small pulley wheel should be neatly added to the end of the switch spindle, and care should be taken to see that the pulley is in alignment with the V-groove of the larger pulley. The illustration makes the arrangement quite clear.

A. E. H. Soudamore (Nottingham).
Give Your Set a Tonic!

A poor DETECTOR VALVE is a Brake on the performance of your Set

The majority of broadcast receivers prior to 1933 used a Triode Detector. This valve may be said to be the 'key' stage in the set as upon its proper functioning depends the sensitivity, selectivity, quality of reproduction and general absence of background noise so essential to the correct working of a set.

QUALITY of REPRODUCTION and ABSENCE of BACKGROUND NOISE

Absence of clarity in the reproduction or the presence of background noises can be removed by fitting a new Detector Valve. Long experience and attention to fine detail in the design of OSRAM Detector Valves has led to many improvements in mica bonding of the electrodes and special treatment to prevent parasitic noises.

Do not put up with inferior reception when your set can be so much improved by fitting a new OSRAM Detector Valve. There is a type for every class of broadcast receiver.


Treat your friends to a set of OSRAM VALVES this XMAS!

Mr. F. J. CAMM

Specifies

ROLA

MODEL

F5B-PM288

(6" Overall Diameter)

PRICE 25/-

EXCLUSIVELY

in his new

HALL MARK III

RECEIVER

The above ROLA Speaker embodies every up-to-the-minute improvement in magnet design. This is emphasised by the fact that in the white heat of competition ROLA is used by the large majority of British Radio manufacturers.

NOTE

The output transformer fitted to the above ROLA Speaker is EXACTLY MATCHED TO THE OUTPUT VALVE OF THE RECEIVER, and THE WHOLE OF THE OUTPUT TRANSFORMER IS USED. Should any attempt be made to use a speaker with a large number of tappings in conjunction with the Hivac PP220 Output Valve used in this receiver only a small portion of the transformer will be used with consequent loss of quality.

IMMEDIATE DELIVERIES AVAILABLE

EXTENSION SPEAKERS

Rola have published a chart showing the Extension Speaker you should use with all factory-made receivers. Rola supply speakers to the large majority of British Radio Manufacturers. It is essential that the speech coil impedance of the Extension Speaker exactly matches that of the speaker in the set. You will see, therefore, why YOUR EXTENSION SPEAKER MUST BE A ROLA.

With most receivers FR6-PMM (without transformer) is suitable ... 331/2.
Also obtainable in magnificent burr walnut cabinet Model No. 2 ... 62/6
For the remainder FR6-PM (with transformer as per our Extension Speaker Broadsheet) is suitable ... 39/6
Also obtainable in magnificent burr walnut cabinet, Model No. 1 ... 70/6

ROLA

the World’s Finest Reproducers

Write for the Rola folder and Extension Speaker broadsheet showing correct Extension Speaker for all British factory-made receivers.

THE BRITISH ROLA CO., LTD.,
Dept. N., Minerva Rd.,
Park Royal, N.W.10.
Phone: Willesden 4122-3-4-5-6.
A Radio Play Specially Written for
Home Broadcast Entertainment
by ARTHUR ASHDOWN

A Ten-minute Thriller

Fades in gramophone playing "False True" for about thirty seconds. Fades out music slightly whilst Announcer speaks.

Announcer: And now, Ladies and Gentlemen, might we ask you to turn out the lights while we present a radio thriller entitled:

"SEANCE"

The characters are:

Jacob Wheilermann
Joseph Sinclair
Robert Dickson

The action of the play takes place late at night at Wheilermann's flat in London. Ladies and Gentlemen — "SEANCE."

Fades in music to full strength for a few seconds and then fade out completely.

A clock strikes eleven. The telephone rings.

WHEIL.: Hello, hello! Yes, yes, this is Mr. Wheilermann's apartment. Who? Oh, yes, Mr. Dickson, just hold the line, please—Mr. Wheilermann will speak.

DICK.: Yes, it's... (Clink of glasses, sounds of whisky pouring, etc.)

WHEIL.: (gruffly) : Good-bye.

WHEIL.: Let me take your things.

DICK.: I say—I say, can you wait a while? I am absolutely skinned—right out.

WHEIL.: We will talk about that later. Who knows—perhaps we might forget about it altogether.

DICK.: Wheilermann—yes, you really mean—?

WHEIL.: We will see! We will see! Let us get on, it is getting late.

DICK.: Right! I'll just have another spot and then I'll see two ghosts for you.

(The ticking of glasses, etc.)

WHEIL.: Maybe you will.

DICK.: Well, whatever you show me won't disturb my sleep.

WHEIL.: You sleep well?

DICK.: Like a log—

WHEIL.: That is good, it shows a clear conscience.

DICK.: However, don't make the first performance too frightening—old boy, remember, I've a weak heart.

WHEIL.: Yes, I know.

DICK. (puzzled): You know?

WHEIL.: But no! How stupid of me. I often mix you with another friend of mine. He had a weak heart. I knew him some time ago in Africa.

DICK.: Africa? You've been in Africa?

WHEIL.: Why, yes! And you?

DICK.: Oh—and—yes—in—some time ago! Er—let's get on with the show.

WHEIL.: All right! Will you pull up your chair to the table, please? Thank you. Now I will explain. It is essential that you concentrate. I will play some music on the gramophone, and switch out all the lights, except the green bowl on the table before us. Then I will draw back the curtains from across that doorway, for it is there, in the next room, that the forms will materialize. Are you ready?

DICK.: Yes, fire away!

WHEIL.: Very well, the lights. (A click is
NOTES ON PRODUCTION

In presenting a radio play it is, of course, essential that each character should be readily distinguished by his voice, and it is therefore advisable that some prearranged inflections should signify each voice heard. “Wheilermann,” for instance, could play his part as a guttural voice, whilst “Sinclair” could speak rather deliberately.

It is, of course, possible to read straight from the book in front of the microphone. But it is recommended that a thorough knowledge of the script is obtained beforehand, as this will enable the actors to give a more coherent reading of the play.

Careful experiments should be carried out by the actors, under the directions of the Producer, with a view to deciding how near to the microphone to speak, and at what strength.

The Producer, after a preliminary read through with the Cast, should then hear the play in another room via a loud-speaker, and make notes of any faults which he may detect. In this way he will be able to judge the play as it will be presented to the Audience.

EXCELLENT XMAS PRESENTS

We have been inundated with requests from readers asking us to repeat our Gift Tool Offer, as many of them failed to qualify when the offer appeared. As only a few of these tool kits remain, it is not possible for us to do this. We are prepared, however, while the stock lasts (only a small supply is available), to supply these tools to readers for 3s. Each kit contains a set of spanners, an accurate 4in. Chesterman steel rule, a plated viewing mirror, a centre punch, screwdriver, adjustable trammels, a pair of allotite test-prods, scriber with chuck, and steel set square. The cases are of metal finished in black cellulose. As soon as the present stock is exhausted, applications will be returned to the senders. Address your inquiries to Practical Wireless, Propagation Dept., Geo. Newnes, Ltd., 14, Southampton Street, Strand, London, W.C.2.

Other illustrations on this page show our free gift Data Sheets, which in their strong loose binder provide a handy workshop companion in easily consultable form of all the facts and figures relating to wireless receivers. A few copies of this remain, and can be supplied for 3s. 6d., by post 3s. 10d. Other useful Christmas presents are the “Wireless Constructors Encyclopedia,” 5s. (by post, 5s. 6d.), and the “Encyclopedia of Popular Mechanics,” 5s. (by post 5s. 6d.), from George Newnes, Ltd., 8-11, Southampton Street, Strand, London, W.C.2.
AT LAST... a High Efficiency
Pick-up... at your price

Now comes a big Graham Farish surprise... a high-
efficiency Gramophone PICK-UP at half the price
you'd expect! Fourteen and sixpence only, yet in per-
formance, output, design and finish the GRAHAM
FARISH PICK-UP invites comparison with any
on the market. Fit one in time for the Christmas
festivities, it will give your records a new interest.
But to avoid disappointment order NOW, such
big value is certain to create a big demand.

Graham Farish Pick-up and Tonearm. The Armature unit
gives undistorted reproduction of remarkable purity and
a high-voltage output. From treble to bass the finest
tonal shading is rendered with total absence of resonance
even at full volume. The design of the pick-up and
the special frictionless swivel between Arm and
Pedestal combine to reduce record wear to vanishing
point. Beautifully finished in polished Walnut Bake-
rite, complete with simple wiring instructions for
connecting to all-mains and battery sets.

Volume Control (50,000 ohms) if
required, 2/9.

Ask your dealer to demonstrate.

Advertisement of Graham Farish Ltd., Masons Hill, Bromley, Kent.
The battery that will give you better radio this Xmas

GUARANTEED 120 VOLT, 144,000 MILLIWATT HOURS
MADE IN ENGLAND
Sold by all Radio Dealers

A TRIAL MEANS YOU'LL ALWAYS USE GEC HT


December 8th, 1934

The battery that will give you better radio this Xmas

GUARANTEED 120 VOLT, 144,000 MILLIWATT HOURS
MADE IN ENGLAND
Sold by all Radio Dealers

A TRIAL MEANS YOU'LL ALWAYS USE GEC HT


December 8th, 1934
Rapid Fault Finding

WHETHER home-made or ready-made, the modern receiver is not likely to cause trouble by "breaking down" or otherwise developing a fault, but it is, nevertheless, well to be prepared in case of possible trouble. This is particularly true at Christmastime, when the set will probably be used more than at any other period of the year, especially when parties are being given and friends entertained. When anything goes wrong it is a great convenience to be able to locate the fault at once and then to carry out either a temporary or permanent repair without having to miss an item which is particularly wanted.

Any fault which occurs suddenly is almost sure to be due to some minor defect, and before wasting unnecessary time dismantling the receiver and blaming every conceivable component it is well to see that the aerial lead-in is properly connected, that the earth lead has not come adrift, and that the fuse (where fitted) has not been blown, although it might have behaved perfectly for several months past.

Look to the Aerial and Earth First

A rapid inspection will show whether or not the aerial lead-in wire has broken away from the horizontal span, but a break inside a length of insulated wire which is passed through a hole in the window frame, or fed round the wall of the room, is not so noticeable. Thus, if the aerial is in any way suspected, it is well to cut the lead-in at some convenient point outside the house, carefully scrape the wire clean and bright, and then connect a length of well-insulated wire that can be taken straight through a hole in the window frame, if this affects reception one may be prepared to the fault at once and then to carry out either a temporary or permanent repair without having to miss an item which is particularly wanted.

Don't Forget the Fuse

A "blown" fuse will be suggested by the fact that the set is quite "dead," there being no sound of any kind from the speaker. If a replacement is not available, makeshift can be made by using a narrow strip of tinfoil taken from a cigarette or chocolate box. The strip of foil should be laid over the fuse, as shown in Fig. 2, when the latter should be inserted into its holder and the foil cut away at one point so as to leave the smallest possible amount without the fuse actually being cut in two. The reason for cutting away the foil as shown is that, if this were not done the current-carrying capacity would probably be sufficiently high to cause damage to the valve filaments, assuming that a really serious fault had developed in the set.

Carried Out in the Case of a Fault Suddenly Developing in the Receiver

insulated wire run round the picture moulding, along the top of a garden fence (Fig. 1) or thrown out of the window of an upstairs room will always give sufficiently good reception of the local station at least.

Even when one of these rather rough and ready arrangements cannot be adopted there is no need for despair, for quite good results can nearly always be obtained by transferring the earth lead from its normal terminal to the aerial terminal. Another—by no means new—method is to connect a length of wire to the spring mattress of a bed.

A broken earth connection is generally evidenced by the fact that tuning is unduly distorted. An improvement can, however, be effected by reducing the grid-bias voltage applied to the low-frequency valve(s). Better still, a pair of dry cells can be connected in series and the voltage

When the Batteries Fail

In the case of a battery-operated receiver there is always a danger of the batteries running down at a critical time. This should not occur if care has been taken to replace the H.T. and have the accumulator charged regularly, and it is worth while to check up all the batteries before Christmas and, in the case of a battery-operated receiver, one should have up to three dry cells available, and this would be the case if a "blown" fuse was obtained.

When a fuse of the flashlamp type is fitted the foil may be connected between the terminals of the holder, this also being shown in Fig. 2. It is probable that an ordinary flashlamp bulb would be available, and this could be used until a correct fuse was obtained.

A "blown" fuse will be suggested by the fact that the set is quite "dead," there being no sound of any kind from the speaker. If a replacement is not available, makeshift can be made by using a narrow strip of tinfoil taken from a cigarette or chocolate box. The strip of foil should be laid over the fuse, as shown in Fig. 2, when the latter should be inserted into its holder and the foil cut away at one point so as to leave the smallest possible amount without the foil actually being cut in two. The reason for cutting away the foil as shown is that, if this were not done the current-carrying capacity would probably be sufficiently high to cause damage to the valve filaments, assuming that a really serious fault had developed in the set.

Carried Out in the Case of a Fault Suddenly Developing in the Receiver

Fig. 1.—When the aerial collapses the wire may be temporarily fixed along the top of a wooden fence.
If a Valve "Gives Out"

When it has been concluded that all the extraneous accessories are in order the set itself must be attended to. Perhaps the most likely source of trouble here is a damaged valve, but this need not, in most cases, preclude the use of the set. The first difficulty is to decide if a valve really is at fault, and if so, which it is. If a transformer is suspected it might be put in front of the detector by joining the upper terminal to the anode pin on the base as shown. If it appears that the detector valve is at fault it is best to test the others in a series test, as these are connected in series. The proper course—if the valve is at fault—is to return it to the makers for examination, but if it is old a remedy can nearly always be effected by wrapping a piece of soft, spongy rubber around the valve cap. A faulty L.F. transformer is more likely to be the cause of trouble. A run-down H.T. battery (preferably 25 mA) is connected between the grid and the G.B. terminal on the transformer.

There is another troublesome fault which, although occurring very rarely when modern valves are in use, is still by no means unknown. Reference is made to microphony, which is evidenced by a continuous "hum," "groan," or even a whistle, from the speaker. The trouble is caused by the sound vibrations from the loud-speaker striking the glass bulb of a valve (generally the detector), and causing it to vibrate. This vibration is in turn transferred to the electrodes which also vibrate and produce a note in the speaker. The speaker generally starts as a rather low note but it rapidly builds up until it completely spoils reproduction. When this trouble is experienced the detector valve should be removed from the set, and the anode lead to the grid should be shorted with a length of wire; if this stops the cracking it is safe to assume that the component is the cause of the trouble.

A rapid method of temporarily getting the set into correct operation again is by reducing the secondary winding of the transformer as a low-frequency choke and feeding the following valve through any convenient fixed condenser having a capacity not lower than 001 mfd., as shown in Fig. 6. It will be seen that a grid leak (preferably 25 mA) is connected between the grid and the G.B. negative lead, which previously went to the G.B. terminal on the transformer.

If the set is switched, taking care that the wire is well insulated from the hand in the case of a mains set. If there is not a distinct "click" as the connection is made and broken the transformer is probably at fault. Where cracking is experienced the transformer primary terminals should be shortened with a length of wire; if this stops the cracking it is safe to assume that the component is the cause of the trouble.

Cutting Out the H.F. Stage

In order to cut out the high-frequency stage (which is not normally required for local-station reception) the aerial lead should be transferred from the aerial terminal to the anode-terminal connector for the H.F. valve, as in Fig. 5. This same method can, of course, be employed when the H.F. valve has developed a fault, as would generally be indicated if radio signals could not be received, although the set behaved normally when a gramophone pick-up or microphone was in use.

It is not always a very easy matter to distinguish a faulty valve in the case of a battery receiver, except by applying systematic tests, as those suggested above. Where a mains receiver is concerned, however, a faulty valve can generally be traced by the fact that it is cold after the receiver has been switched on for ten minutes or so.

A Faulty L.F. Transformer Occasionally Happens

Fig. 4.—An S.G. or V.M. valve may be used as a detector by joining the upper terminal to the anode pin on the base as shown. The first difficulty is to decide if a valve really is at fault, and if so, which it is. If there is a click in the speaker when the set is switched on, or if there is a "breathing" sound after switching on, the output valve can be considered as being O.K. If the set seems completely "lifeless" it is more than likely that the output valve is at fault. It might be replaced by any spare valve which happens to be to hand, provided that the grid-bias is adjusted to suit the substitute. On the other hand, it might be possible to carry out a general "re-shuffle," placing the detector valve in the power or pentode valve holder, using the H.F. valve for detection, and eliminating the H.F. stage in the manner to be described later.

Although a transformer is not always appreciated, an S.G. or variable-mu valve can be used as a fairly efficient detector without altering a single connection in the set, by joining the anode terminal to the screening-grid pin, as shown in Fig. 4.

PRACTICAL WIRELESS

December 8th, 1934
PERMEABILITY TUNING

3-Gang (BP100) - £3.2.6.
4-Gang (BP101) - £4.5.0.

PERMEABILITY TUNING - - - - -
a new tuning system
that will greatly improve
your radio reception.

Varley

(Proprietors: Oliver Pell Control Ltd.)

Permeability tuning is here — Varley's great improvement on the old system of variable condenser tuning that has held unchallenged sway for 12 years! What a difference it could make to your set—giving you better radio entertainment than you have ever had before. Be one of the first to use this great new Varley tuner. Write for full information to-day.

Varley (Oliver Pell Control Ltd.), Bloomfield Road, Woolwich, London, S.E.18. Telephone: Woolwich 2345.
Here's the Secret of perfect Radio!

The secret of realistic Radio is in the valves of your set. Buy some TRIOTRON VALVES to-day and hear how perfect the programmes can be: Vaudeville, Dance Music, Talks, Symphony Concerts, News—all the items with startling realism.

The technical pioneer work of the TRIOTRON laboratories played a very big part in making Radio popular. TRIOTRON VALVES are giving faithful service in millions of British homes. To-day, as always, you cannot buy a better valve no matter what you pay.

General Purpose, H.F.—L.F., and Det. Valves

3/6 TRIOTRON VALVES

FREE GIFT! — a gramophone record of a beautiful Viennese waltz, together with full particulars of a novel free competition with big prizes. Fill in your name and address on the adjoining coupon and post it with 2d. stamp to Triotron Radio Company, Limited, Triotron House, Bloomsbury Street, London, W.C.1.

THE GIFT that will be Valued for years!

For everyone who is radio-minded, the AvoMinor is the supreme Xmas Gift. It gives a pleasure that will endure, for it ensures improved and permanently trouble-free set performance. Every fault can be quickly traced—every radio problem solved at home.

The AvoMinor is TEN separate testing meters in one, giving ten different ranges of direct readings in milliamps, volts and ohms. No other combination instrument affords such convenient testing facilities with such dependable accuracy.

The AvoMinor is the ideal gift to give AND to receive. Suitably contained in a handsome presentation case with comprehensive instruction booklet showing how to make every test.

The technical pioneer work of the TRIOTRON laboratories played a very big part in making Radio popular. TRIOTRON VALVES are giving faithful service in millions of British homes. To-day, as always, you cannot buy a better valve no matter what you pay.
The dictionary gives the meaning of hall-mark as "a stamp to attest as to a standard," and the hall-mark which we know so well is affixed to gold and silver. It connotes a high standard, and we think no more fitting name could be chosen for our latest three-valver than the Hall-mark Three. We do not intend that this shall take the place of the Superhet Three, nor by any means compete with it. It is intended to fill an entirely different need, and to further our campaign for cheaper radio. Apart from its simplicity, its cost is one of its prime features. As may be gathered from a perusal of the advertisements in this issue, the complete receiver (Kit A) costs something in the region of 45s., and this trifling cost brings it within the means of every listener.

Cost is one of the principal considerations of every receiver, but it must always be borne in mind that cost must be considered as a collateral part of performance. It is possible to build a three-valve set for a few shillings, but obviously it cannot be expected to produce the results which would be obtained with a similar circuit constructed from parts bearing well-known trade-marks. In the Hall-mark Three, however, we have aimed at producing a low-price receiver incorporating high-class components which will give results that greatly exceed those obtained by receivers costing several pounds. How this has been accomplished will be shown later on. We must point out, before going into details of the receiver, that it has been designed at the express wish of thousands of our readers who want a small, but powerful and selective receiver, capable of giving a really good account of itself, but costing no more than £2 or so.

The Design

The accompanying photographs, and the blue print which is given free with this number, will reveal that the design follows certain new lines. The two coils which are employed are not of the screened variety, but are built up on simple lines, although the method which has been adopted in the windings renders them extremely efficient. However, to deal with the circuit in detail, as this is the simplest method of enabling even the beginner to understand the complete apparatus. Three valves are employed in the well-tried combination, S.G., detector, and output stage. The H.F. valve is not of the variable-mu type, and this enables cost to be reduced quite considerably. Firstly, there is the expense of a volume control potentiometer; secondly, the associated voltage-dropping resistances.

The Latest Design in Our New Series of High-class, Low-priced Receivers. By an Ingenious Arrangement of High-class Components the Hall-mark of Performance is Obtained. The Specification, too, is Hall-marked.

AN IDEAL XMAS PRESENT FOR A FRIEND OR YOURSELF!

The theoretical circuit of the Hall-mark Three.
for the experimental receiver, and this knob is specified in the list of parts. Messrs. Polar supply the disc control for this purpose, and it will be seen in the advertisement pages, priced at 1s. For those who prefer to have something more elaborate, a slow-motion drive may be obtained, although in that case it is essential to specify when ordering that the "degree" dial is required, as otherwise you will obtain a dial calibrated in wavelengths or frequencies, and this will not hold for the particular coils which are used.

A Rohi loud-speaker has been specified and this efficient unit enables advantage to be taken of the quality of reproduction. This loud-speaker, in conjunction with the particular output valve which has been specified, will enable really high-class reproduction to be obtained, and there will be no suggestion, when the receiver is working, that it cost such a small sum.

The Construction

With such a limited number of components, construction is naturally greatly simplified, and it reduces itself to the mounting of the ganged condensers, the coils, and the valveholders, and the connecting of the separate contacts, in some cases by means of ordinary wire, and in others by means of the wire ends of resistances or condensers. The first task is to mark out the chassis, taking your measurements from the blue print. Alternatively the latter may be laid over the chassis and a tracing made direct on to the chassis surface. To accommodate the valveholders you need a 1½ in. hole, and for each of the coils you must cut a 1 in. hole. On the rear of the chassis you will have to drill small holes to accommodate the socket strips, and on the front of the chassis clearance holes for the three controls. Alternatively, you can purchase the chassis, already drilled, direct from Messrs. Peto.

Wiring

The wiring can be carried out in any manner to suit individual preference, although it is always advisable to mark out a wire, as it is placed in position, on either the blue print or the theoretical circuit diagram. In this way no wire will be omitted and no wrong connection should be made. Some constructors prefer to work through the receiver in strict sequence, starting at the aerial and so placing each part of the circuit in place until arriving at the loud-speaker terminals. Whilst this may be an interesting manner of wiring the receiver, it is not to be advocated, on account of the fact that all accessories must be placed in position, and when a fairly comprehensive receiver is being constructed the chassis is cumbersome and difficult to handle. However, proceed as you desire with the wiring, and when you have affixed all those which are possible, add the L.F. transformer and complete the wiring to this. Now place the coil clips beneath the chassis and lock them in position, resting the chassis on its end whilst so doing. Attach the gang condenser, and the chassis may then be inverted, as the condenser is higher than the coils and will prevent them from being damaged. Complete the wiring, and the receiver is ready for a test.

Testing Out

In view of the remarkable results obtainable and the simplicity of the circuit, it is essential to use a really worth-while aerial and earth system. The former should be about 60 ft. in length, and attention should be paid to the insulation. Remember that you cannot amplify signals which you do not receive, and the weak impulses which arrive on your aerial must pass through the first tuning coil if anything at all is to be made of them. These high-frequency currents take the shortest and easiest path to earth, and poor insulators will result in a great loss of signal strength. These points are not so important to the man with a multi-valve receiver or a superhet, where there is a

A MODERN CIRCUIT—
A HIGH-CLASS RECEIVER

MAXIMUM RESULTS AT PACE. ONLY HIGH ITEMS ARE USED

A great deal of H.F. amplification, but with the proper types of receiver attention and a little more money spent on the aerial and earth will well repay the listener for the improvements in reception strength and more stations. When the aerial and earth are connected plug in the H.T. leads to the H.T. battery, inserting H.T. 1 plug into the 60 volt socket and the H.T. + 2 plug into the 120 volt socket. It might be found desirable at a later stage to vary the voltage at H.T.-1, but for the preliminary tests 80 volts will be found quite satisfactory. The G.B. plug should be inserted into the 6 volt socket, and the positive plug into the socket so marked on the battery. Now switch the receiver on with the right-hand switch, set the reaction control to zero and slowly turn the tuning control. The local signal should be heard at some point, and it should be tuned in to its maximum, without reaction if possible. Should no station be heard, use may be made of the reaction and control in order that some kind of signal may be obtained for trimming purposes. Now with a pointed slip of wood or some other non-metallic screw-driver adjust the trimmers on top of the ganged condenser, slowly swinging the main tuning knob whilst doing so in order to keep the signal at the correct point. A little time should be spent in carrying out this adjustment accurately, and it may then be ignored. It should now be possible to turn the tuning knob through-out the entire tuning range and find many stations without the use of the reaction control. To build up signal strength the latter should be used, but in the interests of quality, keep the reaction always at a minimum. The change to long waves is carried out by rotating the left-hand switch, and a number of long-wave stations should be heard, Droitwich occupying only a small space on the dial and enabling Radio-Paris to be heard quite clearly without overlap. When the receiver is functioning correctly, experiments may be carried out with the H.T.-1 plug in order to find the most suitable tapping point for your particular valve and aerial system, but when once this has been found it may be ignored until the battery has run out.

Since the receiver was originally designed, certain ideas have been tried out in order to still further improve it from the point of view of construction and operation. So far as the latter point was concerned, it has been found definitely impossible to improve performance, or in any manner to simplify the operation, without introducing more expensive items or in other ways to defeat the object. So far as construction is concerned, however, a very simple idea has been adopted which will incur no additional expense, but which will prove of great advantage to the constructor, especially the beginner. In the design as originally constructed the coils were fitted with small soldering tags, to which the ends of the coil windings were soldered. Thus to connect these in circuit soldering has to be adopted, and as there are eleven connections to be made to the coils, the taping of the receiver could not be executed in a very rapid manner. Furthermore, there was always the risk that the inexperienced amateur might unduly prolong the soldering process, during which the coil ends might become detached from their tags and thus cause trouble. We therefore devised the simple scheme of providing the coils with coloured leads of sufficient length easily to reach the various connecting points, and thus at the same time simplify construction.

The Coloured Leads

When the coils are purchased, therefore, they will be found to have lengths of coloured wire, approximately 9in. long, attached to all points, with the exception of one. The latter is the connection on top of the H.F. transformer to which the anode of the S.G. valve is joined. The other ends of the coils will have to be joined so that the colours are connected as follows:—

- **Coil No. 1 (Aerial Coil)**
  - Aerial lead—Pale blue.
  - Earth lead—Black.
  - Wave-change switch—Yellow.
  - Grid and tuning condenser—Two white leads.
- **Coil No. 2 (H.F. Transformer)**
  - Grid and tuning condenser—Two white leads.
  - Detector anode—Dark blue.
  - H.T. plus—Red.

**AT A MODEST PRICE**
Drill your cabinet from the dimensions given here.

LIST OF COMPONENTS FOR THE HALL-MARK THREE.

Two Hall-Mark Coils—B.T.S.
Two-gang Condenser—Polar "Midget."
One Polar Hall-Mark Dial.
Reaction Condenser .0003—Graham Farish.
3-point Wave Switch—Graham Farish.
2-point On/off Switch—Graham Farish.
L.F. Transformer 91/2—Varley Niclet.
Tubular Condensers—.5 mfd. (type 250), .1 mfd. (type 250), .0003 mfd. (type 500), .0001—T.C.C.
Resistances, 2 meg. (type GI), 30,000 (type G.3)—Ferranti.
Valveholders, 3 four-pin—Clix.
Terminal Strip, A.E.—Clix.
Battery Leads—Belling Lee.
Metaphone—Selecta, 4 1/2 in. 2 runners.
Slim x 2 in.—Peto Scott.
Valves, VF212, 213, (4 pin), D216.
PP220—Hivac.
Batteries, 4, 5.5 volts, G.B. 4 volts—Eads.
Speaker, Rola, FSB P.M.

The Beaconsfield B.B.C.

BROADCASTING talent is taking a business holiday from Portland Place, and is "In Town Tonight" all hours of the day at the British Lion studios at Beaconsfield.

"In Town Tonight" is the title of the radio musical comedy in which a galaxy of radio, stage, and screen stars are appearing.

Another notable feature of this production is the inclusion of the Band of His Majesty's Coldstream Guards, whose martial music will form a contrast to the dance bands in the film.

FOLLOW OUR DESIGNS AND ACHIEVE BEST RESULTS!

parts are produced by firms of repute. Consequently, the combination of those parts enables a high standard of performance to be obtained, and the user has the full assurance that nothing has been sacrificed.

The Coils

The tuning coils of a year ago, except those enclosed in screening cans, also took up considerably more space than those employed in the Hall-Mark Three, whilst the fixed condensers were invariably enclosed in moulded bakelite cases, one of which would occupy more room than all the condensers employed in this receiver. Thus, there is a definite reflection in this receiver of the modern trend of design, and no doubt by next year we shall see even more important advances which will result in further modifications of design. It is true that in America some "Midget" all-metal casings have been accommodated in an all-metal casing, complete with a dust cover and trimming condensers, with overall dimensions of approximately the same size. The three-gang condenser is very little larger, and these modifications in component design naturally extend their advantages to the general receiver.

The coils are, of course, still rather on the large side, and we can see no reason why the amount of glass could not be restricted in the majority, of types. A general reduction in the overall height, as well as a modification of the bases, would enable many compact receivers to be constructed, and if only this could be obtained with a reduction in price, wireless interest would be greatly stimulated, and the employment of multi-valve receivers, taking up no more space than the Hall-Mark Three but giving infinitely more powerful results, would be possible.

Perhaps valve manufacturers will take the hint, and if such a change in design is not possible, we should be greatly interested to know the reason. In the meantime, let the Hall-Mark Three take its place as a milestone in the development of neater, cheaper, and better radio design.

LIST OF COMPONENTS FOR THE HALL-MARK THREE.

Two Hall-Mark Coils—B.T.S.
Two-gang Condenser—Polar "Midget."
One Polar Hall-Mark Dial.
Reaction Condenser .0003—Graham Farish.
3-point Wave Switch—Graham Farish.
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Tubular Condensers— .5 mfd. (type 250), .1 mfd. (type 250), .0003 mfd. (type 500), .0001—T.C.C.
Resistances, 2 meg. (type GI), 30,000 (type G.3)—Ferranti.
Valveholders, 3 four-pin—Clix.
Terminal Strip, A.E.—Clix.
Battery Leads—Belling Lee.
Metaphone—Selecta, 4 1/2 in. 2 runners.
Slim x 2 in.—Peto Scott.
Valves, VF212, 213, (4 pin), D216.
PP220—Hivac.
Batteries, 4, 5.5 volts, G.B. 4 volts—Eads.
Speaker, Rola, FSB P.M.

ODDS AND ENDS

The Beaconsfield B.B.C.

BROADCASTING talent is taking a business holiday from Portland Place, and is "In Town Tonight" all hours of the day at the British Lion studios at Beaconsfield.

"In Town Tonight" is the title of the radio musical comedy in which a galaxy of radio, stage, and screen stars are appearing. There is Stanley Holloway, who tells the famous tragedy of Albert and the lion, Dave Apollon and his Serenaders with Nora Williams, the well-known blues singer, Jack Barty, Tessa Deane, Howard Jacobs's Band, Leslie Sarony, Olive Groves, the Carson Sisters, Billy Mervin and his Commanders, The Three Radio Rogues, and many others who are known to listeners—in all over the country.

Another notable feature of this production is the inclusion of the Band of His Majesty's Coldstream Guards, whose martial music will form a contrast to the dance bands in the film.

"In Town Tonight" is being directed by Herbert Smith, who was responsible for the highly popular radio revue, "On the Air."

THE HALL-MARK THREE MAKES AN IDEAL XMAS PRESENT WHICH IS CERTAIN TO BE APPRECIATED.

PRACTICAL WIRELESS December 8th, 1934
PETO-SCOTT

POLO AUTHOR KIT

EXACT TO SPECIFICATION

F. J. CAMM'S HALLMARK 3

EST. 1919

MR. F. J. CAMM'S GUARANTEE applies only to kits built exactly to his specification. Moral—buy a Guaranteed PILOT AUTHOR KIT.

KIT "A" Cash or C.O.D. Carr. Paid 45/-

OR YOURS FOR

and 11 monthly payments of £4/-

KIT "B" At Kit A price, but

and the now ROLA F51/P.M./288 Moving-Coil Speaker.

FOR YOURS FOR

and 11 monthly payments of £4/-

HALLMARK VALVE KIT

SPECIAL C.O.D. PARCEL


B.T.S. HALLMARK 3 COILS

Chassis as Specified—By Mr. F. J. CAMM

EXCLUSIVELY SPECIFIED—PETO-SCOTT Walnut

PETO-SCOTT HALLMARK 3 CONSOLETTE

PETO-SCOTT ELIMINATORS

PETO-SCOTT Walnut Cabinet.

F. J. CAMM'S HALLMARK 3

EST. 1919

SPECIAL C.O.D. PARCEL

Comprising Peto-Scott Rondo-Early Model Metaplex Chassis, 8/6., x 0/6. in 2in., 5 B.T.S. Hall Mark 3 coils complete with colored leads, and Peto-Scott 2 gang condenser with dial knob.

Cash or C.O.D. Carriage Paid.

£1.2.3

SPECIAL C.O.D. PARCEL

EXCLUSIVELY SPECIFIED—PETO-SCOTT Walnut

PETO-SCOTT Walnut Cabinet.

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Cash or C.O.D. Carriage Paid.

£1.2.3

SPECIAL C.O.D. PARCEL

EXCLUSIVELY SPECIFIED—PETO-SCOTT Walnut

PETO-SCOTT Walnut Cabinet.
The "HALLMARK THREE"

specifies the

POLAR MIDGET TWO-GANG CONDENSER

Steel frame and cover. Ball-bearing shaft. Small overall dimensions. Trimmers operated from top. Matched within 3 per cent or 1 mmfd. whichever is the greater.

2 x .0005 ... ... 11/-
Knob dial in degrees 1/- extra
Three-Gang ... ... ... ... ... 16/6
Three-Gang Superhet for 110 and 465 Ke, 1.F., 16/6

Polar Works - Old Swan Liverpool.

POLAR ARCULATE DRIVE
Slow-motion drive. Bevelled scale. Moulded Escutcheon. Lampholders ... ... 5/9

POLAR V.P. HORIZONTAL DRIVE
Slow-motion drive with vertical moving pointer. Moulded Escutcheon. Lampholders ... ... 6/6

POLAR PANEL MOUNTING DRIVE
Slow-motion drive. Bevelled scale. Moulded Escutcheon. Lampholders ... ... 5/-

Polar Works - Old Swan Liverpool.

POLAR TUNING GRAPHS
are now available at 3d. each post free.
Send to-day and ask for new Polar Catalogue.

POLAR DRIVES

SPECIAL NOTE: It is necessary when ordering your drive for the "Hallmark Three" to state that it is to be fitted with degree scale.

WINGROVE & ROGERS, LTD.,
188-189, STRAND, LONDON, W.C.2.

Phone: Temple Bar 2244/5/6.
50% - DE LUXE KITS FOR 24/6

AMAZING WHOLESALE OFFER DIRECT TO THE PUBLIC

Every Kit is made up of superb quality components throughout, and of author's expert manufacture. 50% OFF PRACTICALLY TO AUTHORS' SPECIFICATION: every Kit includes high-grade slow-motion tuning drive and illustrated scale with actual sizes. Also high-grade wiring and connections are included. See illustrations and details specified.

EVERY KIT CARRIES A 100% GUARANTEE: a definite guarantee that new results are obtained, we will return the sum or refund your money in full.

THE "GOLD-MINE" Hall-Mark.

50' - DE LUXE KITS FOR 24/6

Any part supplied separately

COMPLETE PRICE LIST

1. Kit A, complete as above £15 10s.
2. Kit B, complete as above 10 gns.
3. Kit C, complete as above 15 gns.
4. Kit D, complete as above 24/6

THE "GOLD-MINE" STORES

The Radio Market - Place of the World

STOP PRESS: See also our stop press bargain column on page 468.
SPECIAL VOLTAGE STABILISING

An Explanation of a Novel System of Stabilising the Output Voltage from an Eliminator by Means of a Pentode

Although under most radio conditions employing high-tension eliminators, fed from A.C. mains, the usual smoothing arrangements of chokes and condensers are sufficient to provide a reasonably ripple-free source of voltage and current, there are special occasions where a very constant voltage is required. Various schemes have been suggested to meet these cases, and the basic principle involved is the operation of a conventional full or half-wave rectifier fed from the mains, and the subsequent elimination of any voltage variations from this choke and condenser smoothed output by using the fluctuations bias the grids of a thermionic valve in such a manner that the resultant anode current is constant.

Of course, dry batteries could be used for supplying steady voltages, but these deteriorate with time, and although in the circuit shown in the accompanying diagram a battery is shown, its position is such that there is minimum deterioration and maximum steadiness, as there is no current drawn from it. In point of fact the length of service is equivalent to the battery's shelf life. With this pentode-stabiliser circuit the total current fed from the output is naturally limited by the anode current of the valve itself, and its most important applications are to meet conditions of extreme voltage steadiness up to as much as 1,500 volts where the current fed to any apparatus is quite small.

The Scheme Explained

In the circuit diagram a straightforward full-wave valve rectifier circuit is shown (this can be replaced with a full-wave rectifier, if desired), the normal output from which is given across the points A and B. The stabilising pentode is of the directly-heated filament type, such as a Cossor PT41, Osram PT4, or Mullard F124M, the secondary transformer winding feeding the filament being centre-tapped.

A double-tapped potentiometer, made up from three distinct resistances, R1, R2, and R3, applies the appropriate potentials to the valve electrodes; two other resistances—namely, R4 and R5—completing the circuit, so that at the points C and D is given the stabilised voltage required. For absolute stability the rate of change of pentode current with reference to the voltage input from the mains (the mains variations being responsible for the voltage fluctuations it is desired to suppress as far as possible) must be zero.

The dry battery shown should give a voltage of from 45 to 50 volts, and, of course, the complete circuit is only working satisfactorily when the different variables provided by the five resistances bear certain relationships to one another. These conditions can be analysed mathematically, but the expressions are far too complicated to give here. The American engineer who developed this scheme, however, has provided very full details of the circuit constants for a stabiliser having output voltages varying between 80 and 1,400 volts.

Fig. 1. A schematic diagram of a suitable voltage stabilising arrangement using a pentode valve.

As a typical example the following details will give some idea of the quantities: R1 = 3,000 ohms; R2 = 15,000 ohms; R3 = 175,000 ohms; R4 is zero; while R5 = 11,000 ohms. When these measurements were taken the ordinary smoothed voltage across points A and B was 770 volts; and that across the points C and D was 135 volts, the current delivered under these conditions being just over 12 milliamps.

OLD-TYPE DISC DRIVE CONVERSION

The accompanying sketch shows one of the older type of disc drives converted to a moving pointer dial. The top of the front of the chassis of the disc drive is cut off to within 1/16 in. of the condenser spindle, and a 1/16 in. hole is pierced in the celluloid scale of the drive. The pointer can be made with a piece of tin, as light as possible, and a wire can be soldered to it as a pointer, if preferred. The pointer is mounted by removing the small guiding bolt just above the disc drive spindle and substituting a 1/16 in. bolt and nut, with a 1/16 in. spacer between. A small nut will do for a spacer, and another 1/16 in. by 1/16 in. bolt through the slot in pointer to the scale, with a 1/16 in. spacer between. For the new scale I used a piece of thin white celluloid and marked it with Indian ink, using the top half of the scale for the short waves and the lower half for the longer waves.—John G. Houkorox (Liverpool).

UNCONSCIOUS IMAGE OBSERVATION

When watching any form of television image there are one or two matters which each individual observer unconsciously solves for himself. This is in relation to what has come to be known as television definition, and is a personal factor which must inevitably be associated with any true judging of the standard of performance of any particular system.

The first item is the actual position taken up by anyone looking at television images reproduced in a receiver. The distance from the screen, and the angle at which observations are made are settled by the individual so that he is quite satisfied with regard to the effects and the amount of real information it is actually desired to obtain from the images being shown. Personal habit and the experience gained from daily routine bring about a tempering of the demands created by an ideal reproduction. This is borne out by a walk through any art gallery, where it will be noticed that we quite unconsciously step back to admire a painting so that any coarseness brought about by the artist's brush strokes becomes unnoticeable to the eye. The organ in question registering the illusion of effect which the painter wished to convey.

Another item which is purely a question of personal opinion is regard to television image observation concerns whether the standard of definition is to be the ability of the images themselves to tell any story which may be associated with the items being radiated from the studio or, alternatively, whether opinion is to be expressed on the basis of the ability of the observer's eye to see the elements of the image detail and structure. The scientific mind will obviously take as the view point the latter and more rigorous examination, but if we are being entertained, then the ability to tell the story without the interference of the process being too prominent will undoubtedly be the fairest way of treating the whole problem.
THE EASY ROAD TO RADIO.

A Simple Explanation of the Battery—How it is Constructed, and How it Works

The Simple Cell

If strips of two metals are put into water, containing, for example, salt or a little sulphuric acid such as is used in accumulators, then provided they do not touch each other, they rapidly acquire a potential difference. If we take the metals copper and zinc, in a weak acid solution this "potential difference" is of the order of one volt, and is not affected by the dimensions of the plate.

Some interesting experiments can be made to show the properties of such a simple cell, and the apparatus can be found at home:

1. Put a strip of commercial zinc in dilute battery sulphuric acid; it will dissolve slowly, giving off bubbles all the time.

2. For this experiment a little mercury is needed. Take the zinc out of the acid, and put a little mercury on each side of it; then try to rub it off again; you cannot, because the mercury has amalgamated with the zinc. If this amalgamated zinc is put back into the acid, it no longer dissolves and gives off bubbles.

3. Now put a strip of copper in the acid with the zinc. Make the copper and zinc touch outside the acid, but not inside. Bubbles immediately appear from both zinc and copper, but on inspection you will see that some very small bubbles are clinging to the surface of the copper.

4. Take the copper out and rub it. Connect the copper to the zinc by copper wires through a low-resistance "galvanometer" (this is only something to give an idea of the amount of current in a circuit, like an ammeter, but more sensitive). Put the copper back in the acid, and observe the deflection of the galvanometer. The deflection can be taken as a rough measure of the current, and after some time will be seen to decrease. When it has decreased, take the copper out, rub the bubbles off, and put it back. The current should return to its former value.

5. Now put some crystals of potassium dichromate into the acid. (If you have none of this, use Condy's fluid; this is mainly sodium dichromate, which is cheaper but just as useful as the potassium salt). If the galvanometer deflection is down, it will then jump up and stay up. This shows why the dichromate cell is very good for keeping a voltage of two volts (just over, in fact). In the dichromate cell, carbon (from old dry cells) is used instead of copper.

These few experiments give the whole theory necessary to understanding the running of "primary cells." They are best explained as follows:

In No. 1 no bubbles were evolved unless there was electrical contact outside the acid; that is, unless a current flows. The formation of bubbles shows that chemical action is taking place, and so chemical action requires a current for it to continue. Nos. 1 and 2 showed this; some action took place even with zinc alone, but this was only because the zinc was impure; if you had used perfectly pure zinc, then it would not dissolve at all. Also, if the impure zinc were amalgamated (as explained in Experiment No. 2) there was no action. The reason for this is very difficult to explain to a beginner, but can be understood later. Here we can say no more than that it is overvoltage.

No. 4. The decrease of the current after some time is due to polarisation. You will remember the very small bubbles which were attached to the copper plate; these cause the current to diminish for two reasons:

(a) They form another cell whose "electromotive force," i.e., the source of the voltage, acts in the opposite direction from that of the main cell.
(b) They cover the surface of the copper, so reducing the area available for carrying the current, and thus increas-

ing the resistance of the cell. This decreases the voltage obtained from the cell, as already seen when a man has come to the study of simple electrical circuits.

The problem of polarisation is the most important one in cells which are to find practical use in wireless. It can be overcome theoretically in two ways, either by brushing away the bubbles, which is impracticable; or by adding to the cell some chemical agent which can take away the hydrogen. This is quite easily done. Water is nothing but hydrogen combined with oxygen, and since water is a very "stable" substance, it follows that if we add oxygen in some form or other to the cell, it may combine with the hydrogen and form water. In fact, that is what happened when we added potassium permanganate to the cell. That substance, which can be used for making some rather dangerous fireworks, contains a great deal of oxygen which can be given off very easily. Therefore the hydrogen bubbles become "de-oxygenated" in water, and the other stuff which, if unwise, you can make fireworks with, is de-oxygenated to a new substance with the hydrogen, and the cathode becomes green when it has been used for a long time.

The Dichromate Cell

This has been described above; but you must use carbon from dry batteries instead of copper; and if you have no mercury handy you must have some arrangement to lift the zinc electrode out of the acid when the cell is not working, otherwise it will continue to dissolve. Another important point is to have as many as possible carbon rods.

Leclanche Cell

In this cell the negative pole is again zinc, and it dips into a jar of water containing sal ammoniac, or ammonium chloride to give it its proper name; there is also a pot, made of unglazed earthenware, standing in the jar. This pot is called a "porous pot," because it allows very small particles, or drops of liquid, to pass through it. Inside the porous pot is solid manganese dioxide (a very cheap substance) and little granules of carbon.

The action of the cell is practically the same as the dichromate cell, except that the manganese dioxide acts slower.

A cell from a dry battery.

Leclanche section.

This diagram explains the function of the primary cell.

Section of a Leclanche cell.
Only Dubilier—the 100 per cent. British Electrolytic Condensers have so great a reputation for reliability under long periods of heavy duty. They guarantee trouble-free reception to the listener and a minimum of servicing to the manufacturer. Set manufacturers should apply for terms and details of Condensers specially designed for their requirements.

8 mfd. 500 D.C. peak voltage 5/6 each.
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DUBILIER CONDENSER CO., (1925) LIMITED, DUGON WORKS, VICTORIA ROAD, N. ACTON, W.3
From time to time, when discussions take place concerning mechanical forms of television receivers, references are made to phonic wheels and motors, and these are confused with the synchronising or correcting devices which function in such a manner that they keep the image steady within its normal maximum positive value for each half cycle, as shown diagrammatically in Fig. 4. It is, therefore, plain to readers that we term the synchronous speed of the rotor will correspond with the passage of the teeth past a pole piece. This is not equal to the number of cycles per second but is twice that number.

Under ordinary circumstances a phonic wheel motor is not self-starting, and requires to be run up to speed. In the ease of the receiver shown in Fig. 1 this was done by allowing the wheel shaft (shown vertical) to protrude slightly through the metal cover (shown inclined), and this engaged with a small hand crank to provide its initial revolutions. It is possible to bring standard electrical practice into play, however, and bifurcate each pole piece so that

![Fig. 1](image1)

--An actual television receiver incorporating a simple phonic-wheel motor--of ways, but one which is very ingenious brings into play a valvo oscillator so arranged that it can be pulled in frequency over a limited range by properly timed impulses. An oscillator of this character is generally termed a relaxation oscillator, and the simple circuit of Fig. 5 illustrates one form of this device in which a phonic-wheel motor serves as the drive for the scanning mechanism.

First of all, the received television signal is amplified and rectified, and then fed to a dual low-frequency transformer in order to split the signal and transfer it to two different valves. The first of these valves, V1, feeds the light modulating device incorporated in the television receiver in the usual manner. The second valve, V2 is fed from the other transformer secondary, via a volume control, a stage of R.C. coupling serving to link this valve to the grid circuit of V3.

This valve is maintained in a weakly oscillating condition, and magnetically linked with the tuned anode circuit is another tuned coil which feeds to the grid of a power oscillator valve, V3, in the anode circuit of which is included the field winding of the phonic motor shown in a simple diagrammatic manner. The power generated is sufficient to drive the wheel at the correct speed, but to reduce objectionable hunting to which this form of complete device is very prone.

![Fig. 5](image2)

--A simple oscillator circuit for providing power to drive a phonic-wheel motor.
Short Wave Section

BAND SPREADING ON THE SHORT WAVES

In this Article a System is Outlined which is Simple to Incorporate in a Set, and Easy to Operate

By A. W. MANN

Band-spread tuning, whilst an attractive proposition to the short-wave enthusiast, appears to many as a complicated business a little beyond their ability in so far as the practical application of the system is concerned. It has undoubtedly been responsible for more hard words and disappointing failures than anything else associated with the design and construction of short-wave receivers.

The principal complaint usually was that the operator never knew where he was working, and instead of simplifying tuning the reverse was the case. There are but two reasons for this: the application of the system was wrong, or the operator did not try to master the new arrangement, which is drastically different from straight tuning.

Readers who carry out the instructions given in this article will find that their troubles will end as the system outlined, together with the data given, has been carefully worked out in theory and applied in practice. Not only is it possible to spread the amateur bands, but every band within the tuning range of your receiver, when using the coils outlined, together with tuning condenser capacities recommended.

The materials required are as follows:

1 Ormond small SM dial.

1 discarded square-law variable condenser. Any capacity from .0007 mfd. to .0005 mfd. will do. Remove all plates, and assemble with 2 fixed plates double spaced, and 1 moving plate.

4 bakelite knobs (optional).

The waveband shown under each coil is that covered with the tank condenser to its minimum capacity.

Making the Coils

First cut and square the ebonite formers as shown in the illustrations. Various wrinkles have appeared in Practical Wireless, showing how to cut the slots accurately.

The four ebonite discs D1 (Fig. 1), should next be cut. Follow this by cutting out four hard-wood rings to fit tightly inside the formers, and drill a 1/in. hole through the centre. Mark out (with the Practical Wireless presentation gauge), the holes for valve legs to suit a 4-pin valve-holder, and then drill four holes in ebonite discs and screw them to the wooden rings. Follow on by fitting valve pins and lay this part to one side. Cut out the top discs D2 next, also the other four hard-wood discs, omitting the 1/in. diameter hole, and fasten them together as previously described. Fit bakelite knobs to these discs if desirable.

Having completed the various parts of the coil formers, the actual winding may now be taken in hand. First study Fig. 5, and note that the top of reaction winding goes to one filament, and the bottom of grid coil goes to plate socket, as marked on valve-holder, which is used as a coil base. Before commencing winding, place the valveholder in your receiver in order to see how these connections will work in with the existing wiring.

When the best position is found, wire up the coil base permanently. Take the formers and drill the usual double holes at the top and bottom of the windings. It is advisable to wind round the turns required, just to make sure as to the exact location of the bottom double holes, before winding permanently. Wind all turns in a clock-wise direction, and leave sufficient wire at each end to enable connections to be made to pins. Fasten the ends to appropriate pins, and wind evenly around a pencil, like a coil spring.

The coils may now be assembled. Glue the edges of the wooden base rings, and fit them into the bore of the former. Fit the top disc D2 in the same way. If found desirable a 2BA screwed rod may be passed through the knob, top discs and bottom discs, thus making a very satisfactory job. Double nuts should be fitted at both ends.

The Necessary Alterations to Set

Next we come to the most interesting
part of the work, i.e., altering the receiver. The existing tuning condenser may be a .00025, .0001, or a .0003 mfd. Whatever it happens to be does not matter; just take it out and fix the two fixed- and one moving-plate condensers in place. Make quite sure that the fixed vanes are double spaced. A place for the .0001 midget condenser must now be found. If there is sufficient room on the front panel mount it there. I find that the detector end of the cabinet is a much better position from the operating point of view. Having fitted the tank condenser and band-spread condenser in the receiver, wire the fixed vanes of each in parallel, also each set of moving vanes, that is fixed to fixed, and moving to moving. In order to find the wave-band you require plug in the appropriate coil, set the three plate condensers at zero, then tune the receiver with the .0001 tank condenser. For example, the coil shown in Fig. 3 covers the waveband from 28.1 to 35 metres. If you wish to spread the 31 metres band tune in Zeesen DJA, using the tank condenser, and then adjust the three-plate spread condenser to the centre of the dial. By reducing the capacity of the tank condenser DJA will come in again. Now leave the tank condenser set, and tune with the spread condenser each side of the centre point of the dial.

Another method is to set the tank condenser at zero and tune the spreader over the full scale, bring back to zero, increase the tank condenser one degree, and repeat the former operation until the whole tuning range is covered. Briefly advance the tank condenser one degree at a time with spreader at zero, and cover the whole range with the latter. If desirable, set spreader half-way on a 100 dial, and search each side of that point to zero and 100, then advance the tank condenser and repeat.

The writer does not claim that this system of band spreading is the best. It has one defect, and that is the spread is not constant over all wavelengths. The tapped coil system is better, and the constant band-spread system developed and used in American commercial spheres is ideal. But, however, are complicated. The system outlined in this article, however, has the following advantages. It is simple to incorporate, to operate, and to understand, and providing that the enthusiasm is not hypercritical is quite a satisfactory proposition. In conclusion, readers will find that a few hours spent in tuning with the tank condenser (spread at zero), and calibrating the dial of the former, will be well repaid. Before doing this, however, set the aerial series condenser at its minimum capacity, i.e., vanes right out. If you require a special coil for the amateur 30 metres band, so that spreader puts this band in the centre of the dial, reduce the coil shown in Fig. 1 to nine turns by removing one turn on each coil T and S. To further increase spread-over on all coils, reduce spreader to one fixed and one moving plate. Don't forget, however, that by doing so maximum wavelength will be reduced on all coils.

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EDDYSTONE KILODYNE 4

December 8th, 1934

PRACTICAL WIRELESS

50 Tested Wireless Circuits

By F. J. CAMM

"(Editor of "Practical Wireless.")

Obtainable at all Bookstalls or by post 2½ from G. N. Neaves, Ltd., 8-11, Southampton St., Strand, London, W.C.2

2/6
of an undistorted output—in the neighborhood of two volts, and while this is ample for most purposes, many constructors who are strong advocates of good quality prefer to use a power stage capable of at least twice that output.

It has already been pointed out that the heaters of all the valves in a set using A.C./D.C. valves are connected in series with a regulating resistance across the mains. It is at once apparent, therefore, that all the heaters must be rated to take exactly the same current. Unfortunately, the various valve manufacturers have not achieved standardisation in this respect at the moment. Some makers have adopted 0.2 amperes for their heaters and others 0.25 amperes. Valves of different makes, providing their heater currents are equal, will, however, work perfectly well together.

A study of the valve catalogues makes it clear that different valves taking the same heater current do not necessarily require the same heater voltage. This does not matter in the slightest, since the voltages are to be connected with their heaters in series. The reason for the differences in heater voltage is really a matter of heater wattage.

For most valves, such as H.F. pentodes, detectors, and so on, a heater wattage of between 2 and 3 watts will provide ample electron emission from the cathode for satisfactory working. In the case of output valves and rectifiers, however, which have to pass a fairly large anode current, the heater wattage must be correspondingly increased. It is for this reason that, to quote one maker's figures, as an example, the early stage valves have heaters consuming 0.2 amperes at 13 volts, while the heater of the output pentode consumes 0.2 amperes at 24 volts, and that of the full-wave rectifier 0.2 amperes at 30 volts.

Proper Series Connection

All that really matters is that the total voltage drop required by all the heaters in the set shall not exceed the mains voltage available. The ratings of all makes of valves have been so arranged that this condition is fulfilled easily even in a set employing six or even eight valves.

In fact, as already hinted, there will always be an excess voltage which must be absorbed by a regulating resistance. The ideal form of regulator for this purpose is a device known as a "barretter." It is a form of electric lamp having a long filament, usually of iron wire, the resistance of which varies with its temperature in such a way that it compensates for fairly wide variations in voltage.

As an alternative to a barretter a wire-wound resistance of suitable value and capable of carrying the heater current continuously without overheating may be used. The actual voltage of the resistance will depend upon the mains voltage and the voltage required for the heaters, and can be calculated by adding up the heater voltage ratings of all the valves, subtracting this from the mains voltage, and dividing by the value of the heater current in amperes.
E.M.I. Anti-static Equipment

A USEFUL anti-interference aerial system will shortly be released by Electrical and Musical Industries Service, Ltd., for the elimination of man-made static in those districts where reception is spoiled by this form of interference. The illustration below shows the complete equipment, from which it will be gathered that it consists of a length of screened lead and two impedance-matching transformers. The latter two components are of the step-up and step-down type designed respectively for use in the aerial and at the receiver, and to connect the two the special feeder cable which is supplied with this kit is of the twin balanced variety. The covering of this cable is of the heavy waterproofed type, and thus the equipment may be fitted and forgotten, with the certainty of complete reliability at all times and in all weathers.

The E.M.I. anti-static aerial equipment.

Supplied with the outfit is a comprehensive book of instructions, which, in addition to giving the necessary details to enable the equipment to be fitted to a normal house- hold receiver includes details for wiring from one to twelve receivers for dealers' demonstration purposes, and the use of the screened cable for underground aerial-feeder lines, etc. The price of the complete outfit is 5s. 6d.

The Rotameter De-luxe

THIS novel instrument gives eight different ranges for testing purposes, all difficulties regarding the setting for each range being completely removed by means of a very novel switch, which, in addition to inserting the necessary resistances, etc., in the leads also changes the appropriate scale. The latter is printed on an eight-sided roller, situated behind a small window, which permits only one side to be seen at a time. Thus, by rotating the knob at the side until the required scale is brought into view all the necessary internal connections and modifications are made and there is thus very little risk of damaging the instrument through wrong use. In addition to the eight scales, two terminals are provided on the top for the connection of two substantial testing leads, and a set of holes arranged in standard valve-leg formation enables a valve quickly to be inserted for testing the conductivity of the filament or heater. The instrument has a resistance of 200 ohms per volt and the eight ranges are:

- 0-5 volts = 0-10 mA.
- 0-20 .. = 0-50
- 0-100 .. = 0-250
- 0-400 .. = 0-500

To enable the instrument to be set accurately a zero adjusting screw is provided, and a small cell is included in the case for the resistance and continuity tests. The ranges which are covered are adequate for all normal requirements, and the instrument has been thoroughly tested and the calibration has been found very accurate. The case is attractively finished in black bakelite, and the eight ranges are engraved in black on a matt aluminium panel above the scale, and this, together with the attractive booklet of instructions, will ensure that no difficulties can arise.

A velvet-lined black leatherette case houses the instrument and it is thus protected from dust, etc., and may be very attractively presented for this time of the year. The price is two guineas.

General Release of Mullard A.C./D.C. Valves. New Type Added to Range

ALTHOUGH a large number of commercial receivers employing Mullard Universal valves have appeared on the market and the valves themselves have been available for replacement, no official "general release" of the complete range has been notified. It is now announced, however, that these valves are available. The original range, it will be remembered, comprised the following: frequency-changer (F.C.13); the variable-mu screened pentode (V.P.13A); a "straight" screened pentode (S.P.13); double-diode (2.D.13) and output pentode (Pen.20), together with a half-wave rectifier (U.R.1) and full-wave rectifier (U.R.2).

A new type has now been added and will shortly be available. This is a general purpose triode, H.L.13, with the following characteristics:

- Heater current : 0.2 A.
- Approx. heater voltage : 13 V.
- Anode Impedance : 10,000 ohms.
- Amplification factor : 40.
- Mutual conductance : 4.0 mhos. V.
- Price : 13/6.

This valve will, of course, find its chief application as I.F. amplifier following the S.D.13 diode detector.

The Adey Key

WE have previously mentioned in our pages, the next portable which is manufactured by the Adey Portable Radio Company, and for the benefit of those who are unacquainted with it we would point out that the case measures only 8½ in. wide. Inside is a complete four-valve battery receiver, loud-speaker, and batteries for L.T. and H.T. supply. The most interesting feature of these receivers is the device known as the Adey Key. This is a modified plug of the type which used to be popular for plugging in the loud-speaker, and the upper portion contains a small tapped coil, together with a selector switch projecting through the edge of the plug. The jack into which the plug fits is wired in the L.T. and detector anode circuits, and thus removal of the plug interrupts the L.T. supply and puts the receiver out of action. Owing to its very small size, the plug may then be placed in the pocket or otherwise concealed about and no unauthorized person can use the receiver. When plugged into the jack, not only is the L.T. circuit completed and the valves switched on, but the small coil in the top of the plug is then included in the detector anode circuit and thus comes within the field of the fram- e aerial winding situated inside the cabinet. By rotating the plug the degree of coupling may be varied, and the manipulation of the small switch enables the actual control to be modified according to the wavelength, etc. This is a most novel arrangement and works very well in practice.

PRACTICAL WIRELESS
The Peto-Scott S.G. Three Kit

Details of an Interesting Complete Outfit for the Beginner

THE kit under review is highly suitable for the beginner or newcomer to radio, containing in its case, in addition to the receiver and necessary batteries, the aerial and suitable insulators. The carton in which the outfit is delivered bears the inscription “From Factory to Fireside,” and certainly there is very little left for the listener to worry about when he receives this kit. The receiver is housed in a neat cabinet, of strictly modern design, the controls and tuning escutcheons occupying one half of the front and the loud-speaker grille occupying the remaining half. The reduction in size which results from this side-by-side arrangement enables a really small cabinet to be employed and yet permits of the batteries being enclosed out of the way. The cabinet in question is just under 9in. deep and is less than 18in. long.

The height, including the small ornamental feet, is only 11in., so that it may be placed on a really small table without looking clumsy or ponderous.

The Kit

When the carton is undone the cabinet will be found securely held in position by corrugated boards, and with the battery cords neatly tied and arranged, and the instructions together with a spare fuse-package containing the insulators completes the kit.

The receiver chassis is probably one of the neatest which we have seen, measuring only 8in. by 6in., yet it contains all the essentials of a really well-designed modern three-valver. Two screened coils; a ganged and totally screened condenser; full-vision drive calibrated in metres; combined wave-change and radio-gram switch; reaction control and volume control are all included in this small chassis. A permanent-magnet moving-coil loud-speaker is employed with the chassis, and thus fully meets the demands of the modern listener.

The Circuit

The valve combination is the already popular S.G., detector, and super power, the appropriate valve sockets being clearly identified by indelible markings on the rear edge of the chassis. The choice of circuit arrangements has been so made that the maximum signal strength will be obtained in any part of the country, and the normal selectivity is adequate. To enable adjustments in this direction to be made, a small plug projects from the rear edge of the chassis, and two terminals, marked 1 and 2, are provided in addition to the aerial socket. Thus the aerial is plugged into the aerial socket, and then the small plug may be inserted into socket 1 or 2 according to the results desired. Socket 1 gives greatest selectivity, but results naturally in a slight loss of signal strength. On the other hand, socket 2 gives greatest signal strength but

(Continued on opposite page)
THE PETO-SCOTT S.G. THREE KIT

is not so selective. A separate H.T. lead is provided for the voltage on the screens-grid of the H.F. valve; and this enables maximum efficiency to be obtained. To many listeners this arrangement is preferable to the use of a potential divider, although by inserting the appropriate plug into, say, the 70 or 80-volt socket on the battery, it may be forgotten about and no experiments need be carried out to see if any improvement is possible.

Results

The receiver was connected up and tested in our laboratories. Following the makers' instructions, the various battery connections were made, and the tuning dial was set to the wavelength of the London Regional station. The combined switch knob was then turned to the medium-wave position and the London station was immediately heard. The volume control was then turned to provide good signal strength, and no further adjustment was found necessary. The tuning control was then turned to the Midland Regional wavelength and nothing was heard. However, the particular ganged condenser which is fitted to this receiver is provided with a concentric knob on the front which controls a trimming condenser, and the moment this was manipulated the Midland station was brought in at comfortable strength. During a test of the receiver this trimming control was found of inestimable value, and it enabled the very last ounce to be got out of the receiver by accurately balancing the two circuits. With this control and the reaction control very accurate settings are obtainable on weak foreign stations, whilst the volume control enables the strength of the local to be very finely controlled.

The kit will prove ideal for a Christmas present, and the price is six guineas. It is available, if desired, on hire purchase terms of 5s. down, and eighteen monthly payments of 7s. 9d.

British Radio Institution Lectures

The remaining lectures for the 1934-5 session, to be held at King's College, Strand, W.C.2, are as follows:


March 12th: "Recording and Reproduction of Sound and Motion Pictures," by H. S. Hind, A.M.I.E.E.

April 9th: "Radiology and High Frequency Engineering," by Dr. Bernard Leggett, M.I.E.E., F.R.C.S.

Invitation Cards to these lectures, which commence at 7 p.m., can be obtained on application to the Secretary, The British Radio Institution, 36, Gordon Square, London, W.C.

Sterno Records

Clarice Kunz, the popular director of the Casani Club Orchestra, is again in the British Homophone Company's current list on stereo 10th and 15th. These two records introduce such popular tunes as "I Saw Stars" and "Who Made Little Boy Blue," and "Shinny Reels o' Yon," and "What are You Going to Do." (The last two tunes are from the musical comedy "Yes, Madam," which is now running at a London theatre).
On sale at all Newsagents, Bookstalls and Dealers, or by post 7½d. from George Newnes, Ltd., 8-11, Southampton Street, Strand, London, W.C.2.

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“IN THREE WEEKS”
What Can Be Filmed Between Now and Christmas
ALL THE NEW APPARATUS DESCRIBED
CHRISTMAS WITH THE RADIO STARS

(Continued from page 417)

to put up his cinema show, which includes all the latest color films, and the party closes with a burst of hilarity. In the evening, Christmas dinner is held at the Jack Hulberts' house. Pamela is following the custom to sit at that table, and so is Sinbad, Claude's nephew, who lives with them, but Jill and Jaqueline are not considered quite big enough for such festivities and hints have been dropped for months past as to the nature of their Christmas presents, and point blank requests for a pony, although Claude and Bland feel that a pony is somewhat difficult to accommodate in a London flat. However, they think of compromising with a stuffed pony for Jaqueline, one of those lovely ones on wheels, with harness that takes off and which can be put on again only after a great deal of thought and concentration. Jill will probably get a new bike, a real one this time, not a fairy cycle, for; after all, she feels she is old enough—a grown-up woman of seven.

Topliss Green Junior

Topliss Green's son, aged ten, is going to be a farmer when he grows up. He is devoted to animals, and ever since he has done for the past few years, and Mrs. Green and William are accompanying him. They are staying at the Pavilion Hotel, down by the harbour, and Mrs. Green says that William has the time of his life there. They have ping-pong tournaments and all sorts of fun, and on Christmas afternoon an enormous Christmas tree for all the children staying in the hotel, and a fancy dress party. William hasn't yet decided what he is going to be for this, and anyway, he is keeping it very secret. He is devoted to animals, and ever since he was four he has had his intention to be a farmer when he grows up. Mrs. Green thinks it would be a good plan for him to be trained as a vet., as that would considerably as a farmer.

Topliss Green Junior

Mrs. Green tells him that he is sure to imagine that it would be quite easy to keep ponies in London flats are not really share with the Claude Hulberts the view—of animals, and would also Mrs. Green thinks it would be a good plan—of keeping it very secret. He is devoted to animals, and ever since he was four he has had his intention to be a farmer when he grows up. Mrs. Green thinks it would be a good plan for him to be trained as a vet., as that would considerably as a farmer.

Anne and Eve Foort

Reginald Foort's two little girls, Anne and Eve, make a lot of their Christmas decorations at school. They are clever and always have a big party on Christmas Day, and spend weeks beforehand preparing for it. They are both very fond of books and reading of all kinds. They have a great weakness for Teddies and will follow his daily adventures with the greatest enthusiasm. Reginald is sure to include Christmas presents for their present address. Alice and Eve love animals, anything that is alive and interesting, but are frankly rather bored with dolls. Jill's smallest daughter, Rosemary, although she is not yet two, is already manifesting an interest in housekeeping, and is never so happy as when she is pouring out tea from her, dolls' tea-set. Mary, although she is not yet two, is already Anne and Eve love animals, anything that is alive and interesting, but are frankly rather bored with dolls. Jill's smallest daughter, Rosemary, although she is not yet two, is already manifesting an interest in housekeeping, and is never so happy as when she is pouring out tea from her, dolls' tea-set. Mary, although she is not yet two, is already

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Every type of valve replacement supplied on reasonable terms. 9 Valves, Mullard, Osram or Tubular, 8-6, Det., Power, Cash price £1 6/0, or 8/- with order and 11 monthly payments of 4/-.

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Atlas 110/30 H.T. Eliminator and Triode Charger combined. Cash price £3 9/6, or 5/- with order and 12 monthly payments of 5/-.

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Model

Output

Price

723 2+2v 3 amps 12/6

727 2+2v 5 amps 17/6

731 2+2v 10 amps 22/6

F. C. HEAYBERD & CO., S. FEBRUARY 1934.

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Having purchased the entire LIQUIDATION STOCK of FAMOUS FACTOR WE OFFER THESE BRAND NEW FARRAND INDUCTOR P.M. MOVING COIL SPEAKERS at the amazing clearance price of £1 6/6

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Read what "PRACTICAL WIRELESS" says after testing these speakers:

"... constructors will be interested in the announcement that Western Radio and Electrical Wholesale Supply, Ltd., Conduit Street, W.1, are able to supply really good amateur use speakers for the specially low price of 10/-... the sensitivity is of high order and the speaker will be found to give a good performance, even when fed from a small R.F. valve, while it will carry considerable signal without distortion." PRACTICAL WIRELESS, 3-11-34.


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Ensure early delivery of your radio requirements by entrusting your order to us. Our central position enables us to supply much equipment of which at present there is a shortage. CASH & C.O.D. ORDERS DESPATCHED BY RETURN, POST FREE.

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W. B. Stentorian Senior P.M. Speaker. Cash Price £2 12/0. or 2/- with order and 11 monthly payments of 4/6.

W. B. Stentorian Standard P.M. Speaker. Cash Price £1 11/6, or 5/- with order and 11 monthly payments of 3/6.

VALVES

Every type of valve replacement supplied on reasonable terms. 9 Valves, Mullard, Osram or Tubular, 8-6, Det., Power, Cash price £1 6/0, or 8/- with order and 11 monthly payments of 4/-.

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Send coupon, together with 5S., in stamps, for our latest 1935 Handbook, MAINS POWER FOR YOUR RADIO. Filled with circuit diagrams, hints, etc. (annual.)

Mr.

Address
IMPRESSIONS ON
THE WAX
Interesting News About Recent Records.

ONE of the problems of a record company is to be on time with titles. Often, as in the case of Brunswick, the titles are American and the matrices are already in the possession of the English company, but the publishers hold up the titles—usually because the numbers in question are in some musical show or film and cannot be released until the opening in London. A typical example was "Night and Day," which was held up for so many months, although the song was well known here all the time. Often, too, by the time the records are on sale the demand for the song has dwindled, because people are becoming tired of the melody.

The case of "Heat Wave," however, is more happy. This song, from the most successful musical show, "As Thousands Cheer," which was played to capacity in the States for over a year, has not been overdone in this country. And the English Decca Company are dead on time with three records of it—by Joe Venuti (F5202), the Casa Loma, with vocal refrain by Mildred Bailey, the coloured star and wife of Red Norvo, the famous exponent of the marimba and xylophone (01808), and by The Dorsay Brothers (01867), who are one of the outstanding combinations in the States.

A Crippled Singer
Connie Boswell's rendering of "Say It" (01866) is a very beautiful number. Connie Boswell manages to give something to a song that no one else seems to achieve. Maybe this is due to her intensive musical training. She even "arranges" her accompaniments note by note, and spends endless hours in perfecting her phrasing and moulding the scheme of her song. As you know, she is in unhappily crippled and has to be carried, or wheeled in an invalid chair. Realising, therefore, the physical handicap under which she has to work, her results are even more astounding. Maybe she is compensated for her affliction by being given this glorious voice, which is the most phenomenal musical factor in America to-day, and her services on the radio are consequently in tremendous demand.

"Love in Bloom"
Next comes the "Street Singer" singing "Love in Bloom" (01870), which has already recorded this. The song is becoming an outstanding hit. Remembering the amazing sales the Street Singer reaches, you can test assured that his new record is going to be in best-selling class within a few weeks.

Frank Crumit makes his first appearance for Decca on P5210. As you will know, he has been a big seller in this country, and is, of course, one of America's "sure-fire" hits. His capture for Decca is regarded as a great scoop. His songs are always simple in melody, with humorous words which form a complete short story. His most famous effort was "Abdul Abulbal Amir." He writes his own material, and with the provincial market should be a tremendous success.

The Bolero
"Bolero," by Ravel, is a piece of modern music that has had a startling world success in recent years. The film of that title has been built around Ravel's music, and has been a tremendous success in this country, where it is still showing to crowded houses. The complete dance is recorded on Decca-Polydor—which takes up four sides, played by the Lamoureux Orchestra of Paris, conducted by Ravel himself, and which is the only authentic recorded version in existence (C48015-6).

Realising the importance of this composition, Decca decided, in response to an overwhelming number of requests, to record a condensed version on a one-and-sixpenny record. The choice of orchestra was difficult, but it was finally handed over to Harold Ramsay. The reason that Harold Ramsay was chosen was that he has lately formed a Symphony Orchestra on most novel lines, and which is the first of its kind in England. In effect, it is modelled on Paul Whitman's Orchestra, which is a combination of jazz and symphony players.

As an indication of the importance of this record, the "arrangement," as played by Harold Ramsay's Orchestra, had to be approved by Ravel himself. The record could be made. The number of this interesting record is F5236. "Valencia," which had a world-wide popularity a few years ago (it sold more records than any single composition in history), has been revived by the Massed Band of Levy Stone, Alfredo Campoli, and Don Rietto and his Accordion Band, conducted by George Scott-Wood (F9107).

A Mystery Singer
I am often amazed at people's efforts to gain notoriety for themselves. In the case of this Mystery Singer, however, I am

(Continued on next page)
forced to be inquisitive, because I do not think his is "stunt" publicity.

This singer was recently found by the B.B.C. and Decca were approached by them to record him, his first broadcast having caused considerable stir. I was naturally inquisitive to know who this Mystery Singer might be, and I visited the recording studios to find out. Imagine my surprise, therefore, when I found him alighting from a taxi, completely masked, and with a member of the B.B.C. either side of him!

I followed into the studio and watched him make his record ("A Roving Medley") B2230, in the hope that the veil might be lifted. I was unlucky; as soon as the record was completed, he was escorted out of the building by these two stalwarts and vanished quickly into thin air, leaving the whole of the recording staff in complete wonderment!

A 27-year-old Hit!

In these days of radio, and the reputed short life of popular hits, it is interesting to note that the star "His Master's Voice" record of recent times is of a song which was a hit twenty-seven years ago. I love you so," the waltz song from the "Merry Widow" at Daly's, was recorded during the Aldershot Tattoo, in 1907. Lehar had some conception of the possibilities of the song he had written, and strict orders were given to all members of the staff not to whistle the tune outside the theatre. Lovers of good singing must, therefore, hear the famous American tenor's, Richard Crooks, recording of "The Merry Widow Waltz," which is issued on H.M.V. DB2336, coupled with "Kathleen Mavourneen."

Records of Banned Band Concert

Many thousands of brass band enthusiasts who were unable to hear the performance of the massed bands at the Crystal Palace festival at the end of September, owing to the ban imposed on the broadcast by the organisers of the festival at the end of September, owing to the ban imposed on the broadcast by the builders of war-time songs were recorded during the Aldershot Tattoo, in 1907. Lehar had some conception of the possibilities of the song, he had written, and strict orders were given to all members of the staff not to whistle the tune outside the theatre. Lovers of good singing must therefore, hear the famous American tenor's Richard Crooks, recording of "The Merry Widow Waltz," which is issued on H.M.V. DB2336, coupled with "Kathleen Mavourneen."

First Peter Pan Record

The imminence of Christmas makes the "Peter Pan" selection by the London Palladium Orchestra, on H.M.V. C2009, of topical interest. The London production of Barrie's piece, for which this music was specially written, is always an event of the Christmas season, and young and old will have many pleasant memories conjured up by listening to the first recording of the season.

Children will want a selection of nursery rhymes, arranged by Henry Hall, which is played and sung on H.M.V. B2825 under the title of "Noah's Ark," whilst Gervy Fitzgerald, the new star B.B.C. light vocalist, has made a good record of "I love you so much, Madame" and "Then I'll be tired of you," on H.M.V. B2826.
IDEAL XMAS GIFTS
Home Broadcasting by your family and friends

A NEW PRACTICAL HOME MICROPHONE for home. It is a general purpose, robust tube, with a standard body, back terminals, front metal grill. No. 11. New design, finished.

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ELECTRADIX RADIOS
Oxy-brass body with window, switch and plug sockets are fitted on the case. This is a splendid Microphone for grille body, back terminals, front metal grill. No. 11A.

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IDEAL XMAS GIFTS
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NEW IDEAS, new design, finely made.
PRACTICAL PARTS for Home Constructors. Buttons, Brackets, etc.

NO. 90 to 09 FREQUENCY RECORDS.

CROONERS Marconi-Reisz Model, Coil for P.A., B.B.C. Studio Recording Mikes. for lectures, £5; for talks, £10 ; £15, Lapel B.B.C. £5.

12 BB Ring, 14 in. Pedestal, £5; 10 in. £6; 7/6.

12/6. Illustrated "MICROPHONEMARVELS" (D285), type of receiver ?—ED.

Evans, mentions a set with 2 H.F., A.V.C. and push-pull output, band-pass tuning, tuning indicator, and an output of 4 to 6 watts. This is the set I am wanting, and I hope you will introduce the A.C./D.C. model in time to be built before Christmas.—R. G. MARTIN (Birkenhead).

For years I have had many difficulties in doing away with pictorial diagrams. I find it impossible to "visualize" the circuit that is being referred to without first translating it into the corresponding "theoretical" diagram.—Percy J. Forrest (Cardiff).

The A.C./D.C. Superhet
Sin.—It is a pleasure to read your live paper, as it is right up to the minute in keeping your readers in touch with the latest ideas in wireless. The A.C. Superhet is a good example of your foresight in this respect, as this type of set will appeal to many. My only regret is that you should have decided to follow with a D.C. model, as I should have thought that most D.C. users, in view of the eventual change over to A.C., would have preferred the universal model version. Anyhow, I hope you will introduce the A.C./D.C. model in time to be built before Christmas.—R. G. MARTIN (Birkenhead).

We have already described the D.C. and A.C. models, and in this issue will be found advance details of the A.C./D.C. (universal) model.—Ed.

A Super Receiver !
Sin.—In the issue of PRACTICAL WIRELESS for Nov. 17th, a reader, Thomas J. Evans, mentions a set with 2 H.F., A.V.C. and push-pull output, band-pass tuning, tuning indicator, and an output of 4 to 6 watts. This is just the set I am wanting, and I hope you will introduce this A.C./D.C. circuit shortly.—S. Padgett (Boosbeck).

[Are any other readers interested in this type of receiver ?—Ed.]

A Short-wave Wanted
Sin.—In reply to the query regarding a short-wave receiver, suggested by L. Buckley in PRACTICAL WIRELESS dated November 17th, 1934, I should like to mention that such a receiver would suit my requirements, as I have recently successfully passed the P.M.G. second class examination, and I am considering building a short-wave transmitter and receiver when I am permanently settled. As I would only require to receive the short waves, such a receiver would be particularly suitable.—T. F. Tyson (Earl's Court, London, S.W.)

Another Tribute
Sin.—I am very interested in the superhet receivers you have just been writing about. The prices are quite reasonable, and you appear to have got over many of the faults from which the superhet suffers. I have not bought one of your sets yet, but I shall probably tackle the A.C./D.C. version.

I like your paper; it is chatty and well written. I have taken advantage of many of your ideas I have taken advantage of with profit. There is one thing which I think would be of benefit to constructors, and that is the inclusion in the list of components of the price of each item. I am very interested in power packs, and the "Armada" mains unit—this set was quite up to a high standard.—WILLIAM LLEWELLYN (Coulsdon, Surrey).

[The prices of the various components may always be ascertained from the advertisements, especially in the list of advertisements.—Ed.]

A Colonial Set Wanted
Sin.—May I suggest that your excellent paper designs a "Colonial set" for short waves and the medium-wave band for listeners overseas? I am sure that there are thousands of other enthusiasts who at present strive with mediocre results to hear English broadcasting to whom a set designed especially for their needs would have an entirely different appeal. Furthermore, I think that a compact battery set with some provision against "fading" would be just the thing?—A. EVANS (Abonkik, Egypt).

[What do other readers overseas think of this suggestion?—Ed.]

Earthing to Water Pipes
Sin.—With due respect to the writer of the article "Aerials and Earths for the Flat Dweller," appearing in your issue of October 27th, I would like to make a few comments on this subject.

(Cut out on opposite page)

PRACTICAL LETTERS FROM READERS

The Editor does not necessarily agree with opinions expressed by his correspondents. All letters must be accompanied by the name and address of the sender (not necessarily for publication).

Pictorial versus Theoretical Diagrams
Sin.—I would like to second the suggestion of your correspondent, Peter Edwards (Copthorne), in the current issue of PRACTICAL WIRELESS, relative to the drawing away with pictorial diagrams. I find it impossible to "visualize" the circuit that is being referred to without first translating the "pictorial" into its corresponding "theoretical" diagram.—Percy J. Forrest (Cardiff).

640 MOTORS: Spring and Electric for RADIOGRAMS or GRAMOPHONES in stock.

10,000 MOTORS: Spring and Electric for RADIOGRAMS or GRAMOPHONES in stock.

Ten thousand components: 10,000 MOTORS: Spring and Electric for RADIOGRAMS or GRAMOPHONES in stock.


The Ensign Printers (24th Dec. 1934, Old St., London, E.C.1).
(Continued from previous page)

It is frequently difficult to find which pipes run direct from the main, and which from a cistern. Pipes which supply sinks can be relied upon as being of the former category, and, therefore, suitable for earth. Radiators are questionable for using as earth connections, as pipes have never run into the earth. I should also like to point out that if main pipes from earth are of iron, they cannot be relied upon as well as if of lead, for while the latter have soldered joints, the former merely have screwed joints, sealed in red lead, and they, therefore, do not make good electrical contact.

I trust you will pardon my criticism, but the errors pointed out might be made by anyone not acquainted with plumbing and hot-water fitting.—E. Denis Knight (Brighton).

Short-wave 3-valver: Gramophone Records

Sir,—I have taken your valuable weekly from No. 1, and I have gained a large amount of knowledge from it. It is the finest radio tutor for the amateur, and its pages are full of interest. I have never written to you before—not even to thank you for the splendid gifts I have received, but I do so now, and also make a special request. Please let us have a good long-distance short-wave 3-valver. It is always easy to get the medium or long waves. The winter is now at hand, and most of us who have built sets find nothing else to do except to sit down and tune in. I would very much like Practical Wireless to tell us in simple language how to make a few records for the gramophone; the apparatus required, how to use it, and where to procure the necessary parts.—Harold F. Rubery (Belfast).

The £5 Superhet Three: Another Appreciation

Sir,—I should like to congratulate you upon your latest Home Constructor's Set—the £5 Superhet Three. The circuit is obviously a good one, capable of extracting the last ounce from the valves specified. I cannot help admiring the modesty with which you introduce your set to the construction public.

With compliments, and again congratulating you,—Arthur W. Summ (Haslemere).

Astounding Offer!

YOUR FAVOURITE SNAPSHOT MADE INTO A 154-PIECE JIG-SAW PUZZLE

Size 13" x 10"

Simply send a 3½ins. by 3½ins. negative with 2½d. P.O. and we will make from it a GIANT JIG-SAW PUZZLE of highest quality and return it neatly boxed with your negative and a special point to act as key. An ideal Christmas Present!

Post 2/6 Free

You may order as many Puzzles as you like at 2/6 each. If you want an additional full size enlargement simply send ½d. extra. Address "Practical Wireless" Jig-Saw Puzzle Dept., 14, Southamptton St., Strand, London, W.C.2.

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HALLMARK THREE

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supplies in readiness for your Chassis Mounting strips are engraved. These special Clix two socket trade to at once get in.

At the special request of Mr. F. J. Comm, the "HALLMARK THREE" have produced two new.

Mr. F. J. Comm, the "HALLMARK THREE" have produced two new...

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Also used to project grease into press, cup, bearings, etc.-just fill the special pump-put together and press as required. PRICE 1/6d.

ALL MECHANICS WILL HAVE

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IT SIMPLIFIES ALL SOLDERING

CLIX and the "HALLMARK THREE"

At the special request of Mr. F. J. Comm, the Editor and designer of this outstanding set, we have produced two new CLIX Chassis Mounting STRIPS and have advised the radio trade to at once get in full supplies in readiness for your demands.

These special Clix two socket strips are engraved.

A. E. and L.S. + PRICE 6d. EACH.

Specified for the "HALLMARK THREE"

PRACTICAL WIRELESS

December 8th, 1934

By ROBERT TREDINNICK

CHRISTMAS, more than any other season in the year, is the season for the home. What could be more delightful, after the Christmas pudding has been finished, than to take a few well-chosen records and devise a programme entirely for your personal amusement?

Quite often, these days, a small or large gift of music will be given to you, and there are few of us who do not like to buy something really lasting as a reminder of that kind donation. There is really no excuse to-day for anyone to be without a record. The price of gramophone records is all that can be paid. That excellent record The Rex costs no more than a shilling. From this supplement I would select the Band of H.M. Welsh Guards, playing a couple of really martial tunes, complete with vocal work from a quartetto. No, don't be alarmed, for I am perfectly aware that many of you do not enjoy the military band in its waxen form, so that I hasten to say that, Bobbie Comber, Peggy Cochrane, Sandy Rowel', and Bill Scott-Coomer are all issued on this make of record.

Of course, you may feel like spending a little extra money, if such is the case you will find the quiet piano playing of Charlie Kunz on Sterno entirely to your liking, to say nothing of the dance rhythms from Billy Merrin and His Commanders, Mantovani and His Tipica Orchestra, and Sydney Lipton's Band.

A Fine Organist

There is a wealth of talent on Regal-Zonophone headed by Reginald Dixon. Here is an organist with an enormous following, and a record of his will certainly not be on one side given to a friend or relation. George Barclay, having sung his way through the wax, has become an established favourite. He is an artist who is well worth watching. For the dance band fan there are records from Larry Brennan, Lew Stone, Joe Venuti, and Billy Cotton, whilst the Commodore Orchestra and that of the Café Colette make merry with the lighter type of standard work.

Billy Reid with his Accordeon Band makes grand records for the same company, and Roy Fox, one of the most popular of the band leaders, still retains the top notch in sales of Decca Dance Music. Titterton, Harry Jone and Gabriel Lavelle, Maggie Teyte, to say nothing of Piecavar, are but a few of the more serious artists who grace this well-balanced supplement, which also includes such favourites as Lupino Lane, George Formby, Marie Kendall, Hetty King, and Randolph Sutter Downey.

If you are interested in American bands and artists you will have to search carefully before you find a more comprehensive list than that offered by Brunswick. These records cost two shillings and sixpence, and

Some Good Parlaphone Records

Few of your friends or relations would refuse a record or records of Tchaikovsky, and any good Parlaphone product is one of the most popular records on the to-day. Jan Kiepura and Ernst Groh are on the same list. On the two-and-sixpence side there are records from Julius Katchen and Roland Franck to our minds, and quite recently Larry Gains, the famous boxer, was added to a list which always offers something out of the general rut. Columbia make a speciality of really first-rate variety records. Elsie and Doris Waters, Norman Long, Layton and Johnstone from the West End, Jack Buchanan, Jesse Matthews, Harry Robbins, and, of course, the one and only Stanley Holloway feature in the bill. The B.B.C. Dance Orchestra, Carroll Gibbons and the Savoy Hotel Orcheasts, Debroy Souces and His Band, and Geraldino and His Sweet Music, are all to be obtained on the half-crown Columbia record. For those who delight in the more serious music, such names as Charles Kullmann, Hubert Eisdeil, Lionel Ternper, Howard Redman and Brown, the London Symphony Orchestra, the Bournemouth Municipal Orchestra, and the B.B.C. Wireless Chorus are all to be found and obtained on Columbia.

The H.M.V. Lists

Mr. H.M.V.'s have without doubt the finest collection of records to interest the serious minded. The B.B.C. Symphony Orchestra, the Pro Arte Quartet, Heifetz, Kreider, Gigi, Richard Crooks, Carsos, Miliza Korjus, and a host of other fine artists can make a permanent niche in our homes via H.M.V. These records cost in some cases six shillings each, in others four, and though that may seem rather a lot to many of you, I assure you that you cannot get better value for your money, always providing that you really appreciate genuine art. Gracie Fields, Harry Lander, Derickson Brown, Charles (Gerry) Fitzgerald, and Paul Robeson, all established favourites, provide light and sentimental entertainment, whilst dance music is played by Jack Jackson and His Orchestra, Ray Noble and the New Mayfair Orchestra, Eddie Bond and His Orchestra, and Duke Ellington and His Orchestra.

I can only hope that this all-too-rapid survey of the various supplements may help you when you look for Christmas gifts, and at the same time I trust that it will be a guide when spending some of that money you may be fortunate enough to be given.
**CATALOGUES RECEIVED**

To save readers trouble, we undertake to send on catalogue of any of our advertisers. Merely state, on a postcard, the name of the firm from whom you require catalogues, and address of PRACTICAL WIRELESS, Geo. Newnes Ltd., 411, Holborn Viaduct, London, E.C. 1. "W.C.2. Wire, Southwamp Juniper, 126, to require postage. This service is free to any other correspondence whatever should be enclosed.

**STANDARD WET H.T. BATTERIES**

FULL particulars and prices of wet, high-tension batteries are given in a folder we have received from the Wet H.T. Battery Co. These batteries, which work at the same potential as the plate of a cell, consist of a cup-shaped base into which the anode is fixed, and into which the cathode is fitted, so that the elements remain ready for use. A battery consists of small cup-shaped cells, each containing 10 volts, and the number used depends on the voltage required. The wet cell is used to supply a nickel-plated iron which contains the zinc and 20 elements, and the exciting fluid is made by heating the water supplied with water. Batteries of cells for any voltage can be obtained, and convenient hardboard trays to hold 20 cells are available, the ends of the trays being slotted so that two or more trays can be placed one above the other. Terminations are fitted at each end of the trays.

**PETO-SCOTT RECEIVERS**

Messrs. Peto-Scott are the world's largest makers of radio-by-mail, and thousands of satisfied customers testify to the handsome savings obtained by purchasing their radio requirements from this firm. A good example of this is the Police set, which is sold at a price which gives full particulars and prices of four remarkable receivers, any one of which enables anybody to have an up-to-the-minute radio in their homes for a few pounds. The balance is made by the sender supplied with water. Batteries of cells for any voltage can be ordered, and convenient hardboard trays to hold 20 cells are available, the ends of the trays being slotted so that two or more trays can be placed one above the other. Terminations are fitted at each end of the trays.

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**THE IDEAL XMAS GIFT!**

Doubles your enjoyment of Radio

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CASH PRICE

**THE NEW SEASON'S VALVES AND THEIR USE**

Club Reports should not exceed 200 words in length and should be written in plain English, noting for publication in the following week's issue.

**INTERNATIONAL SHORT-WAVE CLUB (MANCHESTER CHAPTER)**

The annual meeting of the above Club was held at the British Legion, Long Street, Manchester, on November 20th, at 8 p.m. Business matters about the annual meeting on December 4th and the annual dinner were discussed. Short-wave fans and readers of PRACTICAL WIRELESS in the district were also invited to the meeting. The next meeting will be held on December 8th, 1934.

**THE CROYDON RADIO SOCIETY**

The annual meeting of the Club was held at the British Legion, Long Street, Croydon, on November 20th, at 8 p.m. Business matters about the annual meeting on December 4th and the annual dinner were discussed. Short-wave fans and readers of PRACTICAL WIRELESS in the district were also invited to the meeting. The next meeting will be held on December 8th, 1934.

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Write for full information telling you how Belling-Lee Suppressors, designed to post office specifications, will cut out radio noises for as little as 10/6.

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**COUPON.**

Belling & Lee, Ltd., Cambridge, Arthur Road, Enfield, M'sex.
A Defective H.F. Stage

"I had a straight thyratron, the first H.F. being resistance-capacity coupled and the output valve transformer coupled. Wishing to improve matters I added an H.F. stage, purchasing a pair of matched coils and a gang condenser. Selectivity is certainly vastly improved, but the volume from the four valves is just about half what the three gave. Also the "reach" of the three valves, when I put my aerial lead direct on the detector stage, is much greater. Can you tell me what is wrong?"—A. Izat (Glasgow).

As the three valves give a better performance when the aerial is joined direct to the detector stage, it would appear that only the H.F. stage can be at fault, and we would suspect the method of coupling the coils. Without a diagram, however, we cannot help you to locate the cause. Send us a sketch of the complete H.F. and detector portion of the receiver and we will see what we can do for you.

A Faulty Component

"I have built a straight thyratron, but I find that it is giving very poor results. The batteries are being used with a very low battery, and I can only get the national programme. What can be the matter with it? The batteries are fully charged and I have a good aerial and earth."—L. Pegg (Manchester).

The circuit is perfectly correct in every detail and therefore one of the components or a valve must be faulty. We would advise you to check over the receiver carefully, taking each stage in turn, and if you have no suitable testing instruments you will have to rely upon substitution in order to verify each part.

Mains Transformer and Chokes

"I have built the 1933 Fury Four but should like to improve the selectivity. What is the best way to do this?"—J. Burridge (Pembroke).

Without going to the expense of converting the receiver into the 1934 Fury Super, the only thing we can suggest is to transfer the anode coupling condenser between V1 and V2 to terminal number 4 on the second coil, and to do the same thing in the case of the second and third transformers. The result of this will also be a slight loss of signal strength, but it may prove worth while in your case.

A Rectifier Query

"I recently purchased from an advertiser a Westinghouse rectifier, type L.B.1. Could you tell me the A.C. input to this and any other details please?"—F. E. Blaney (nr. Stockport).

The rectifier is now obsolete, but is designed for an output of 1 volt at 5 amps. The A.C. input required is 11 volts, and therefore you must obtain a transformer to deliver this. Messrs. Heyard will be able to supply this. The output may be modified for 2- or 4-volt accumulators by means of a series resistance, and for preference an anode meter should be included in the circuit.

A Pick-up Point

"I have a 4- valve battery set used as a radio-gramophone. I have been using wet H.T. batteries, and for the pick-up I took one lead of the pick-up to the detector valve and the other lead to the E. terminal on the set, using a 2-point switch for this purpose. As I have now gone over to eliminators for the H.T., my instructions were to remove the switch and take it to the back of the eliminator, leaving the E. terminal on the set blank. My problem is now where to take the other pick-up lead. May it go to the earth terminal on the eliminator?"—G. H. Townsend (Bethnal Green).

The pick-up should not go to the earth line at all. It should be plugged into the 1.5 or 3-volt socket on a grid-bias battery, the positive side of which should be earthed. You will probably find that the quality will be much improved by this connection. In any case, the change-over to your eliminator will not affect things, and you may consider any point which is earthed in your receiver as still earthed, although it goes to a terminal on the eliminator. However, use bias with the pick-up and you will get better results.

Four-range Super-Mag Coils

"I have made up the Four-range Super-Mag Two, but upon trying to use it I find that the coils are not made up correctly. I am told that they are not now made. It is rather a disappointment after making this set, and I should like to know where I can get the coils."—T. J. Williams (Llanelli).

We understand that these coils are still being manufactured, and therefore would advise you to communicate direct with the manufacturers. Messrs. Colvern Ltd., Mawneys Road, Romford.

Microphonic Valve

"I have just bought a brand-new valve of well-known make, but find it impossible to use it on account of microphony. Is this usual with modern valves? If so, how can it be cured?"—T. Yelvins (Hendon).

It is certainly an unusual fault with valves of recent manufacture, and if you are certain that it is a fault which is due to the valve, and not to the receiver, we would advise you to have it tested by the makers.
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ELEMINATORS, 150-1500 volts, quantity of Lincoln-Stewart eliminators enables us to offer these at exceptionally low prices for 200-250 volts, 125 milliam pout, 9/11. A.C. Power Transformer, with Watt-Cox Rectifier, 250 volts, price only 2/6, or with half amp Triplet Charger incorporated, price only 3/6. Complete set ready for use.

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RADIOART.—Regentone trans- formers, complete with dial, 4/6. Only! As above but with 10in. cone; 15/-.

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