Gilbert Davey's pre-war writing - Download 3:

A THREE-VALVE SHORT-WAVE PORTABLE

First published in *Practical Wireless* on 6 April 1935.
Copyright © PW Publishing Ltd; reproduced by kind permission for private non-commercial use.
Prepared from images kindly supplied by PW Publishing Ltd.

Safety: It is your own responsibility to ensure that you work safely and that equipment (especially mains-operated power supplies) is soundly built and adequately housed. If you are in any doubt about your understanding of the information given or referred to in this download, or about your ability to work safely, you should seek the help of a qualified person.

In the mid-1930s, interest among amateurs in what were then called the ultra-short waves was growing, as was the ability of the latest valves to handle them.

Davey's mention of the Baird transmissions is of interest. At the time of this article (April 1935), the BBC was still transmitting 30-line pictures on medium wave after programme hours (with accompanying sound on a different frequency). This was under its long-standing agreement with Baird to provide transmission time and engineering support, but it did not latterly originate programme material. The BBC pulled the plug on the 30-line transmissions later in the year, and the thousands of simple "Televisors" bought or made by the public to receive them became useless.

Davey is referring to the experimental short-wave broadcasts from the studios and transmitters of Baird Television Ltd at Crystal Palace. Earlier that year, the Selsdon Committee had produced its report on the future of UK television, proposing high-definition transmission on short-wave, with an initial trial of the competing systems - Baird and Marconi-EMI. The Baird company, fully aware of the development of the rival system, had progressively raised the definition of its own system, and was transmitting 180-line pictures from Crystal Palace on various frequencies from 35 - 40MHz. It is doubtful if more than a handful of the public had receivers capable of reproducing these pictures; the broadcasts were primarily for the company's own experiments and for demonstrations to the BBC and other authorities. However, if both vision and sound transmissions were amplitude-modulated, they could have been received on this set; the sound channel could have been heard normally, and the picture signal as a characteristic buzz.

Construction
Only outline details are given. The construction - baseboard and upward-facing control panel - is unusual, but would have allowed easy outdoor use on a table or other flat surface while standing up. With the sides open, at least initially, it would have been easy to keep wiring runs short and direct. Side cladding panels are not mentioned, but would have been useful for rigidity. The intention seems to have been that the set itself, together with its batteries, would have been stored and operated in a larger outer case.

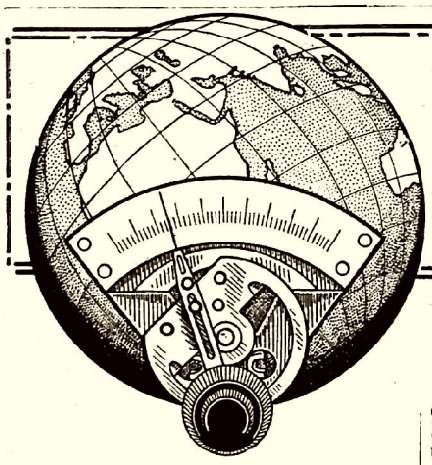
Power supplies
HT, grid-bias and LT batteries are required - an accumulator is suggested for the latter.

Coils
It was common practice for amateurs to use old valve bases as coil formers, particularly for short-wave work. Valveholders formed handy multi-way sockets ideal for the purpose. Some coil manufacturers produced coils to fit valveholders.

RF stage
An untuned aerial circuit feeds the first stage. In addition to the benefits mentioned by Davey, the presence of this stage prevents the set from radiating if the detector stage is allowed to oscillate.

Detector stage
A capacitive coupling leads to the tuned circuit of the leaky-grid-with-reaction detector stage. Reaction is "throttle-controlled"; i.e. the reaction capacitor is connected across the valve rather than in series with the reaction winding. Such a control works in the opposite way to a series-connected capacitor: increasing the capacitance bypasses more RF to ground, reducing feedback.

Output stage
The valve is biased in the conventional way, with a grid-bias battery connected to the interstage transformer's secondary. The headphones form the anode load.



SHORT WAVE SECTION

A Three-valve Short-wave Portable

Pointers Which Will Help You in Designing an Efficient Receiver

By G. W. DAVEY

PORTABLE receivers are very much in readers' minds at this time of the year, and there is no doubt that a short-wave portable would prove a source of interest and usefulness to every short-wave experimenter. It can be small, compact, and light, and yet capable of bringing in the whole world. It would prove invaluable as a source of testing the effect that locations, weather conditions, buildings, etc., have upon short-wave reception. For a short-wave enthusiast no more is necessary than a circuit diagram and a few suggestions, and any amateur having experience of short-wave work should find it quite easy to put these hints into practice, and to build a portable to his own requirements.

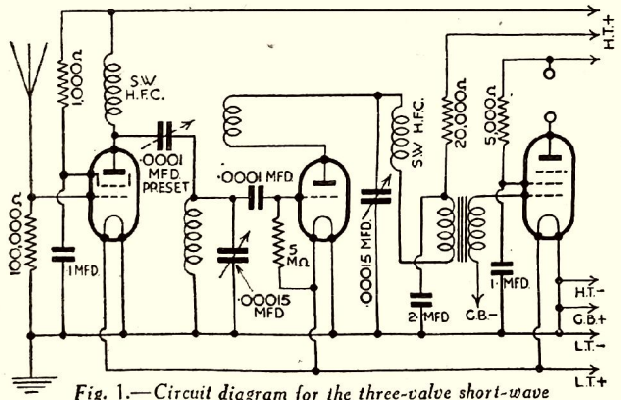


Fig. 1.—Circuit diagram for the three-valve short-wave portable described.

Necessary Components

Unless the constructor is ambitious, I do not think it necessary to build a loud-speaker into the portable. 'Phones are more compact and, as the receiver is hardly likely to be used other than as a source of experiment rather than entertainment, 'phones are most appropriate. Batteries are inevitable, but quite good results will be obtained with 100 volts H.T., in which size first-class, compact batteries are now obtainable at reasonable prices, whilst small, though adequate, unspillable L.T. accumulators are also easily obtainable. The next point to decide upon is the circuit to be used, and for optimum results a three-valve set would be most advisable.

The best valves to use for the sake of compactness are the Osram "K" or Hivac Midget series, and the total space occupied would be quite small. The valves made in these types are a variable-mu screen-grid, triode, and economy power pentode—exactly the types which suit our purpose best—and the circuit recommended for them is shown in Fig. 1. The first valve is arranged as a "buffer," a definite advantage in a portable where aerials are likely to be many and varied, for, besides imparting a certain amount of H.F. amplification, the S.G. valve eliminates all aerial troubles, such as "dead spots," fading due to it swinging, and such-like annoyances.

It is not likely that a volume control, other than reaction, will be required, and, therefore, the v.m. valve is unbiased, being thus worked at maximum sensitivity. The detector is perfectly straightforward, and the coils recommended are home-made, and can be wound upon discarded valve bases. Most constructors have two or three old burnt-out valves at hand, and soaking these for a while in methylated spirit will soon loosen the glass envelope in the base, enabling them to be parted with a gentle twist. Ample room will be found on the base to wind both tuning and reaction coils, and the ends of the windings may be led out and soldered to the valve pins. These coils will be found compact, efficient, and simple to use, not only for a portable but for all short-wavers. Small short-wave variable condensers are easily obtained, as are efficient midget transformers, H.F. chokes, and other requisite components, and the suggested layout is shown in Fig. 2.

Chassis and Panel Layout

The whole set is built on a light form of chassis consisting of a plywood baseboard with a pillar of correct height mounted at each corner. The panel is then screwed down on top of these pillars by means of a screw at each corner. This chassis can be built to any desired shape or size in order to fi the case for housing it. In my own instance I used an old cheap portable gramophone cabinet made of plywood covered with a leather fabric, and it was ideal for the purpose. You will notice a valve-holder is mounted on the panel, and this is for plugging in the home-made coils, the whole set of which can easily be tucked away in an odd corner. The rod-like arrangement mounted above the left-hand corner of the set is the aerial which may be used when no other aerial is available. It consists of four 1ft. lengths of 2 B.A. rod, and on one end of each of three of these lengths a 2 B.A. nut is half-screwed, and so fixed by a small amount of solder run behind it. Another nut is similarly soldered to a 1in. length of rod, and this small piece is fixed to the panel by means of another nut (Fig. 3), and a lead taken from it to the aerial terminal. The four pieces of rod may be screwed together, and then screwed into the nut on the panel, so forming an exceedingly efficient vertical rod aerial with which no earth need be used. In the normal way, 30ft. of insulated aerial wire slung over a tree, and led direct to the aerial terminal, will generally prove adequate for good results. If an earth is felt to be necessary, a small spiked rod with lead attached may be carried, and pushed into a convenient spot or even simply thrown into an adjacent pond or

(Continued on facing page)

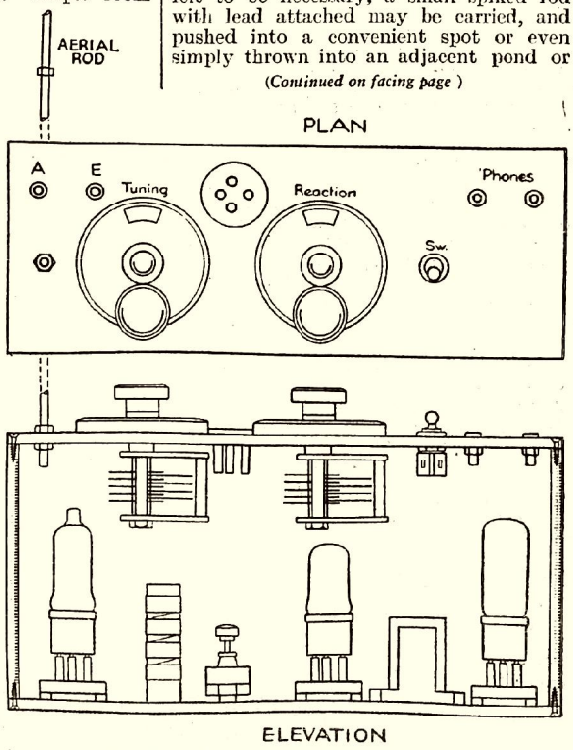


Fig. 2.—The panel and chassis layouts.

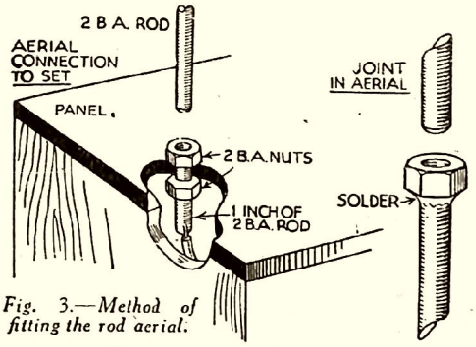


Fig. 3.—Method of fitting the rod aerial.

(Continued from facing page)

stream. When operating out of doors many and varied aerials may be tried. A barbed or ordinary wire fence, for example, is often very good, particularly if the upright supports are wooden or concrete.

Suggested Experiments

Operating the set should be found perfectly normal, for there is but the usual one tuning and one reaction control. For those readers who operate transmitters endless sources of experiments with this set will come to mind, particularly if you happen to own a car. With the help of a fellow enthusiast, tests of the home transmitter's local field strength, the extent of its ground ray, how its quality is affected by locality, and similar tests, may easily be carried out, whilst there seems no reason why a small 1-watt transmitter should not be built in the same case, operating off the same batteries. A tremendous amount of useful work could be done in this manner, but it should be remembered that a special portable transmitting licence would be required.

If care is taken in the layout and wiring-up, the set should be easily made to operate down to 6 metres, and three turns on one of the valve-base coil-formers should be about right for this waveband. Here again another great field for experiments opens out. The ultra-short waves of such lengths are only receivable over a comparatively small distance of up to about thirty miles from the transmitter. The reason for this is not properly known yet, and a portable would be of great use to the reader who would like to know more about these waves. For London readers, the Baird Company's transmissions on about 6 metres should prove helpful.

For the set described only one circuit is given, but it is a very simple, compact, and exceedingly efficient one. A superhet circuit could be used, but it would be found that much more space would be required in order to house the additional components necessary. However, for those readers who would prefer a superhet I can recommend any of the many circuits recently described in this journal, but would suggest that for best results a higher voltage than 100 should be used, as well as the largest capacity battery compatible with portability.