

LOTUS S.G.4 SUITCASE PORTABLE.

An Inexpensive Self-contained Receiver with Ample Range.



UNTIL a couple of years ago there was a considerable diversity of opinion as to the best circuit arrangement for a battery-operated portable receiver. A great number of these sets included two aperiodic H.F. stages, which provided little real amplification; this arrangement is happily now defunct. Other designers pinned their faith to an H.F. amplifier with one tuned and one aperiodic stage, while sets with two tuned H.F. stages were not unknown.

Almost the only arrangement that has survived the test of time is the four-valve circuit with one tuned H.F. stage, a grid detector, and two L.F. amplifying valves. With singular unanimity, practically all makers of portables have adopted this basic circuit, and most convincing arguments have been put forward in support of it.

The Lotus S.G.4 Suitcase Portable, with which we are here concerned, is a good example of a straightforward set, with no unnecessary complications, for which this circuit arrangement has been adopted. Starting at the input end, it will be seen from the accompanying circuit diagram that the medium- and long-wave frame aerials are connected in parallel for reception on the former waveband by means of a switch. Simple tuned-anode coupling is adopted for the H.F. stage, which is followed by a grid circuit detector, for which component values are those generally accepted as giving the best possible compromise. Reaction between plate and grid circuits of the detector is controlled by a differential condenser, connected in such a way that the rotor may be earthed; thus hand-capacity effects are avoided, and construction is simplified.

Precautions Against Instability.

The first L.F. stage, coupled by a resistance to the detector, employs fairly conventional values; a $\frac{1}{2}$ -megohm H.F. stopper is inserted in series with the grid. Coupling to the output valve is by means of a transformer, of which the secondary is shunted by a loading resistance.

Circuit design has been simplified very considerably by the avoidance of a number of the decoupling components which are so often found necessary in similar sets. The H.F. anode circuit is decoupled, and the

screening grid of the same valve is fed through a voltage-absorbing resistance; apart from this, no special precautions are observed, except that a by-pass condenser is joined in parallel with the output valve anode circuit, in order to keep out of the loud speaker leads any residue of H.F. energy that may escape the "stopper."

Tuning may best be described as of the semi-ganged variety; both tuning condensers are rotated by means of edgewise dials mounted on the same axis and adjacent to each other. These dials are calibrated directly in wavelengths. Beneath the loud speaker grille is a small variable condenser, which only comes into operation when an external aerial-earth system is joined to the adjacent sockets.

A light aluminium box encloses the receiver unit proper, and also provides the necessary isolation between H.F. coupling coil and frame aerial.

For a set that is obviously intended to be really portable, the container is of sensible design and workmanlike construction, without any attempts at unnecessary ornamentation. It is covered in good quality leathercloth; the fastenings are strong, and it is noted with special approval that the channelled lid fits so well that the set could be carried through heavy rain without risk of damage.

High-Grade Accessories.

Although the Lotus set is an inexpensive example of its class, no unwise economy has been observed in the selection of accessories. The L.T. cell is a 20 ampere-hour Exide of the unspillable jelly-electrolyte type. As the valve filaments consume a total of 0.6 amps, this battery should be capable of operating the set for over thirty hours. A Drydex 108-volt H.T. battery is used, and, very sensibly, intermediate voltage tapplings have been avoided; this complication always causes confusion to the non-technical user. As to the valves, the H.F. amplifier and detector are of Cossor make, while the first L.F. amplifier and output valve are chosen from the Mullard range. The last-mentioned valve is one of the latest high-efficiency triodes, which gives a good output, although economical of anode current.

In spite of the small amount of decoupling, and the unusual freedom from complications, it was impossible to find the slightest trace of instability, either of the H.F. or L.F. variety. Sensitivity on the long waveband is surprisingly high, when one remembers that the collector is a small frame aerial; indeed, it is so good, that reception of the long-wave National station could be depended upon almost anywhere in these islands, and good signals from Radio Paris seem to be obtainable under quite unfavourable conditions.

On changing over to the medium band, there is the usual slight falling-off in range, but on this score there are no grounds for complaint. A full-powered station seems to

be receivable under any reasonable conditions at fully a hundred miles' distance in broad daylight, and often at greater range. This may not sound so spectacular as to say that most of the worth-while Continental transmissions are receivable in favourable circumstances—which generally means after dark—but it is a greater tribute to the inherent sensitivity of the set. Of course, we are here speaking of the performance when using only the built-in frame aerial; the use of an external aerial will seldom be necessary, and, indeed, is hardly to be advocated under normal conditions, as selectivity is bound to suffer as a result of making this addition.

With regard to this quality, the true "circuit selectivity" of the Lotus set passes muster, without being exceptionally high. However, thanks to the marked directional properties of the frame, interference of almost any type may be avoided, and the set gives no trouble on this score.

A set with a fully ganged tuning system would be somewhat easier to operate, but tested against the Lotus Portable with its independently controlled circuits, would probably lose on sensitivity through imperfect alignment. The small amount of knack necessary to obtain best results with the side-by-side drum control system is soon acquired; a fair proportion of either waveband can be explored by rotating the dials simultaneously with a single finger. Operation would be still easier if wavelength calibration were a little more exact, but it is accurate enough to serve as a very useful guide to the adjustment of the circuits.

Quality of reproduction is well up to the

FEATURES.

General.—Four-valve self-contained portable receiver, primarily for operation with built-in frame aerial, but external aerial and earth sockets are fitted. Battery operated.

Circuit.—One screen grid H.F. valve, coupled by tuned anode system to a grid detector, which is followed by resistance- and transformer-coupled L.F. stages. Triode output valve.

Controls.—(1) Semi-ganged tuning by side-by-side drum dials, which may be rotated simultaneously. (2) Reaction. (3) Combined on-off and wave-range switch.

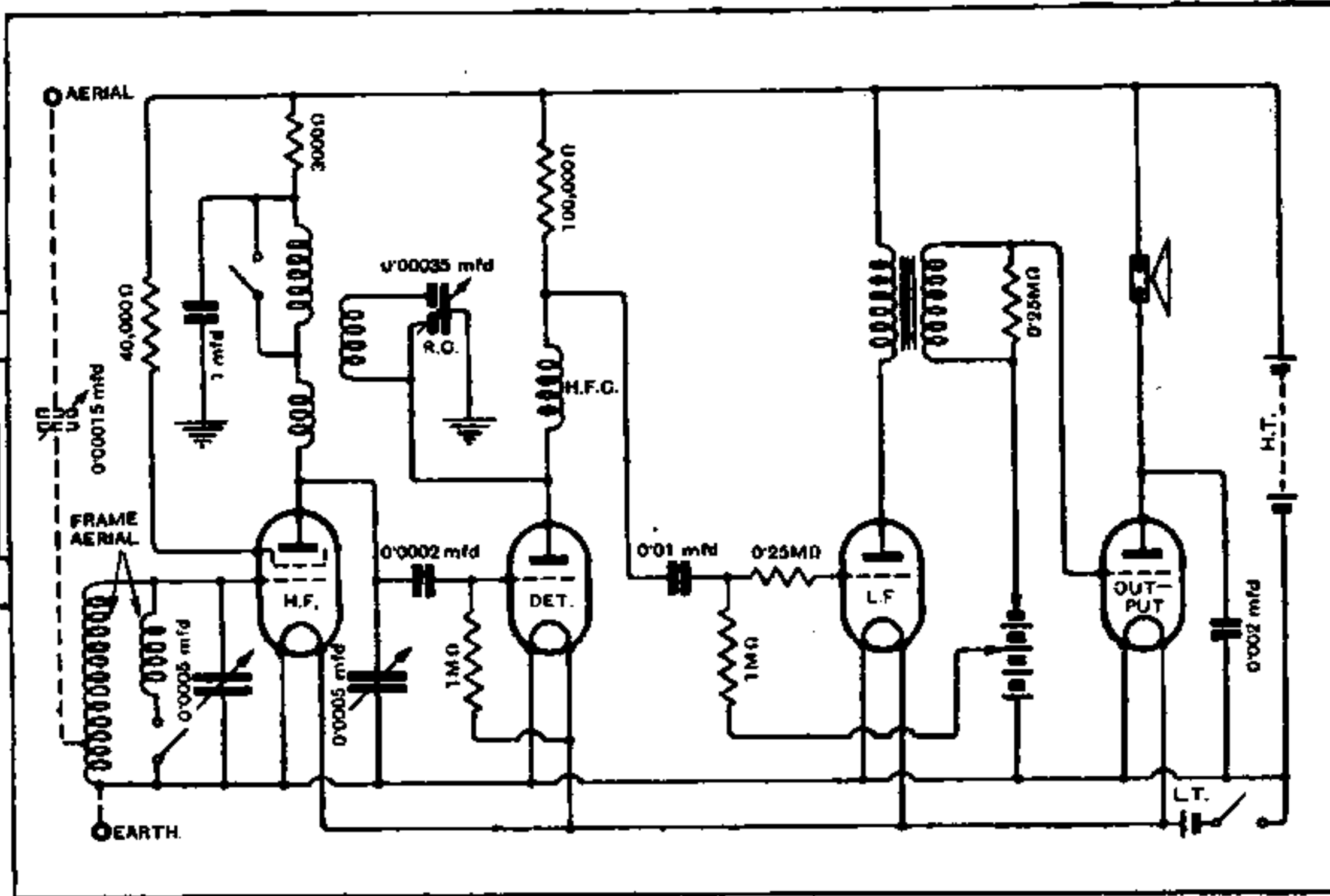
Price.—12 guineas.

Makers.—Lotus Radio, Ltd., Lotus Works, Mill Lane, Liverpool.

standard to be expected from a set which is economical in upkeep—the total H.T. consumption of the model tested amounted to little over 8 milliamperes. Speech is clear and intelligible, and the L.F. frequency range covered is quite adequate; moreover, there are no objectionable resonances.

A well-prepared booklet of instructions is supplied, and the makers have been thoughtful enough to include a complete circuit diagram with all values marked on it.

A SIMPLE BUT EFFICIENT SELF-CONTAINED SET.



H.F. VALVE 220 SC

DETECTOR VALVE 210 HL

1st L.F. VALVE PM1HL

OUTPUT VALVE PM2A

TUNING CONTROL

WAVE-RANGE AND ON-OFF SWITCH

H.F. TUNING CONDENSER

REACTION CONTROL

FRAME TUNING CONDENSER

METAL CHASSIS

H.F. VALVE

GANGED WAVE-RANGE AND ON-OFF SWITCH

H.F. COUPLING COIL

H.F. CHOKE

L.F. TRANSFORMER

GRID LEAK AND CONDENSER

OUTPUT VALVE

DETECTOR VALVE

L.F. COUPLING CONDENSER

1st L.F. VALVE

Two views of the Lotus Portable Receiver unit, and (above) the complete circuit diagram. Connections of an optional external aerial are shown in dotted lines.