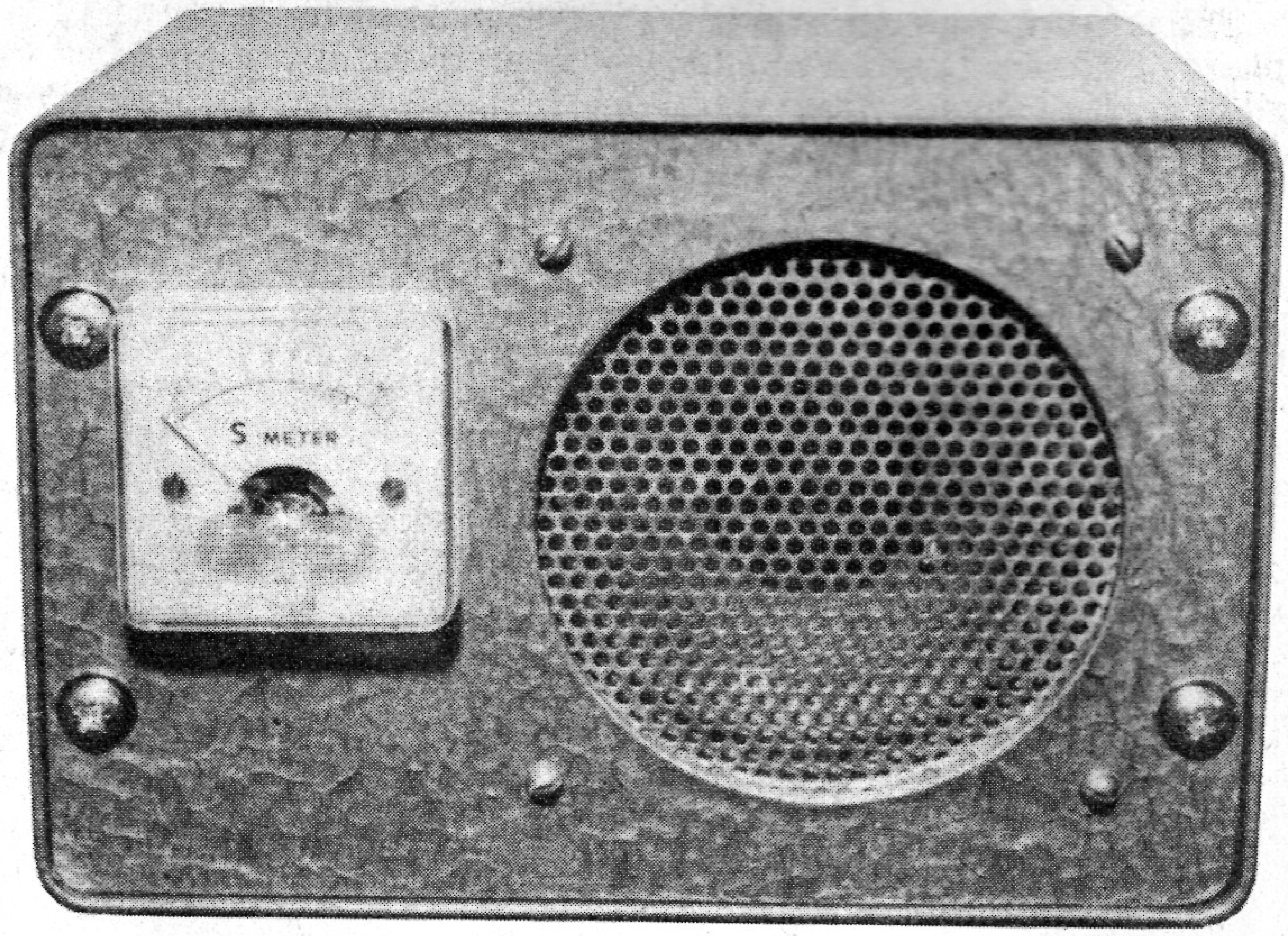
combined loudspeaker and S-meter

F. G. RAYER

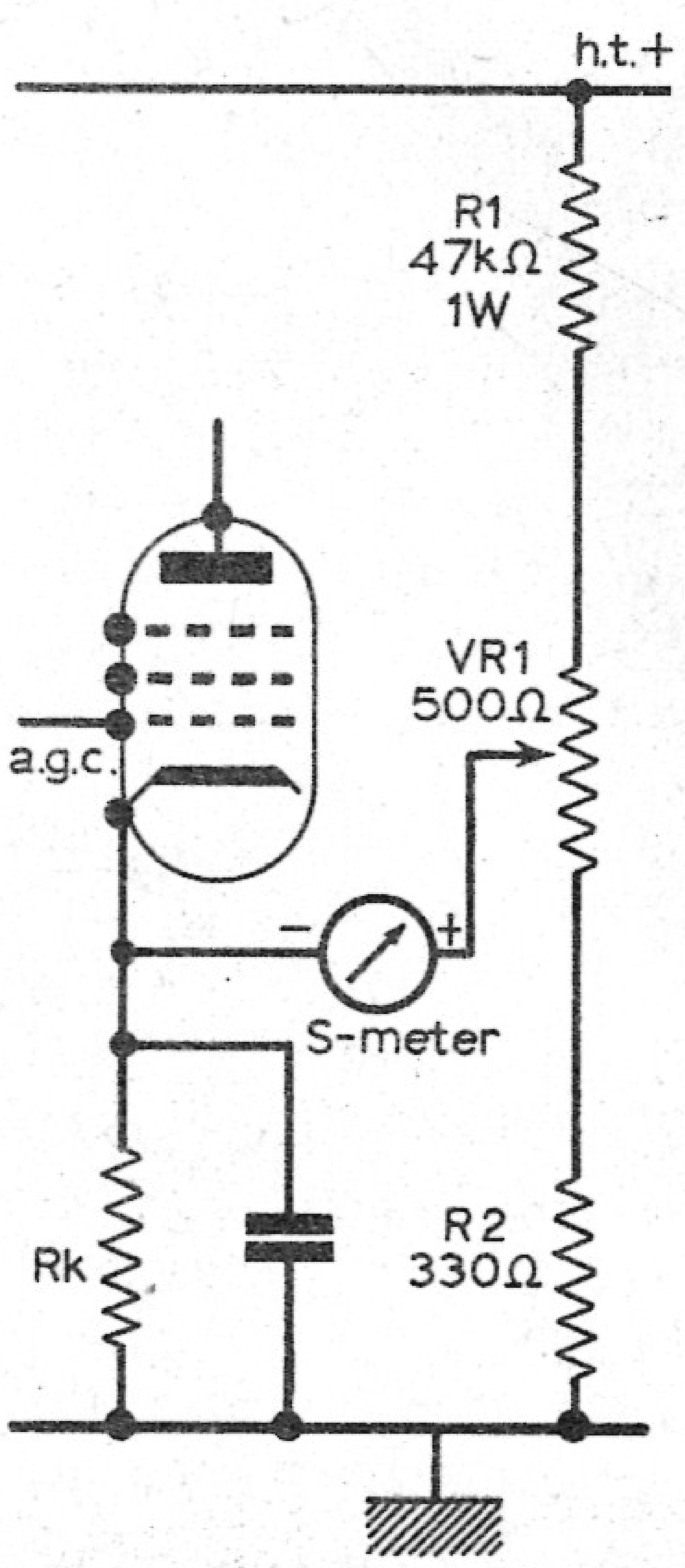


MANY commercial communications receivers have no internal speaker or S-meter, and most users find that they have to provide these themselves. They can easily be combined in a neat and compact unit, and with receivers such as the Eddystone 640, 740, 750 and 888A, the S-meter connection can simply be made via an octal plug in the rear socket provided. With other receivers however, such as the CR100, an internal connection will have to be made.

A ready-calibrated S-meter was fitted in the unit shown, this simply being a 1mA moving coil meter, with an appropriate scale. It is therefore possible to use an ordinary 1mA meter, or a 500µA, 250µA, or 100µA instrument. The latter can provide increased sensitivity, if required, but means that the scale will have to be calibrated by the constructor.

The speaker fitted was a 3½in. moving coil unit, and this allowed everything to fit in a 6×4×4 "Dinkicase". There is, of course, no reason why this size speaker has to be used, and it might be possible merely to fit the S-meter in an existing speaker cabinet.

Figure 1 is the circuit used, but Fig. 2 may be more convenient with some receivers. Both employ a bridge arrangement in which the meter reads zero for minimum signal strength, the reading rising as signal strength increases.



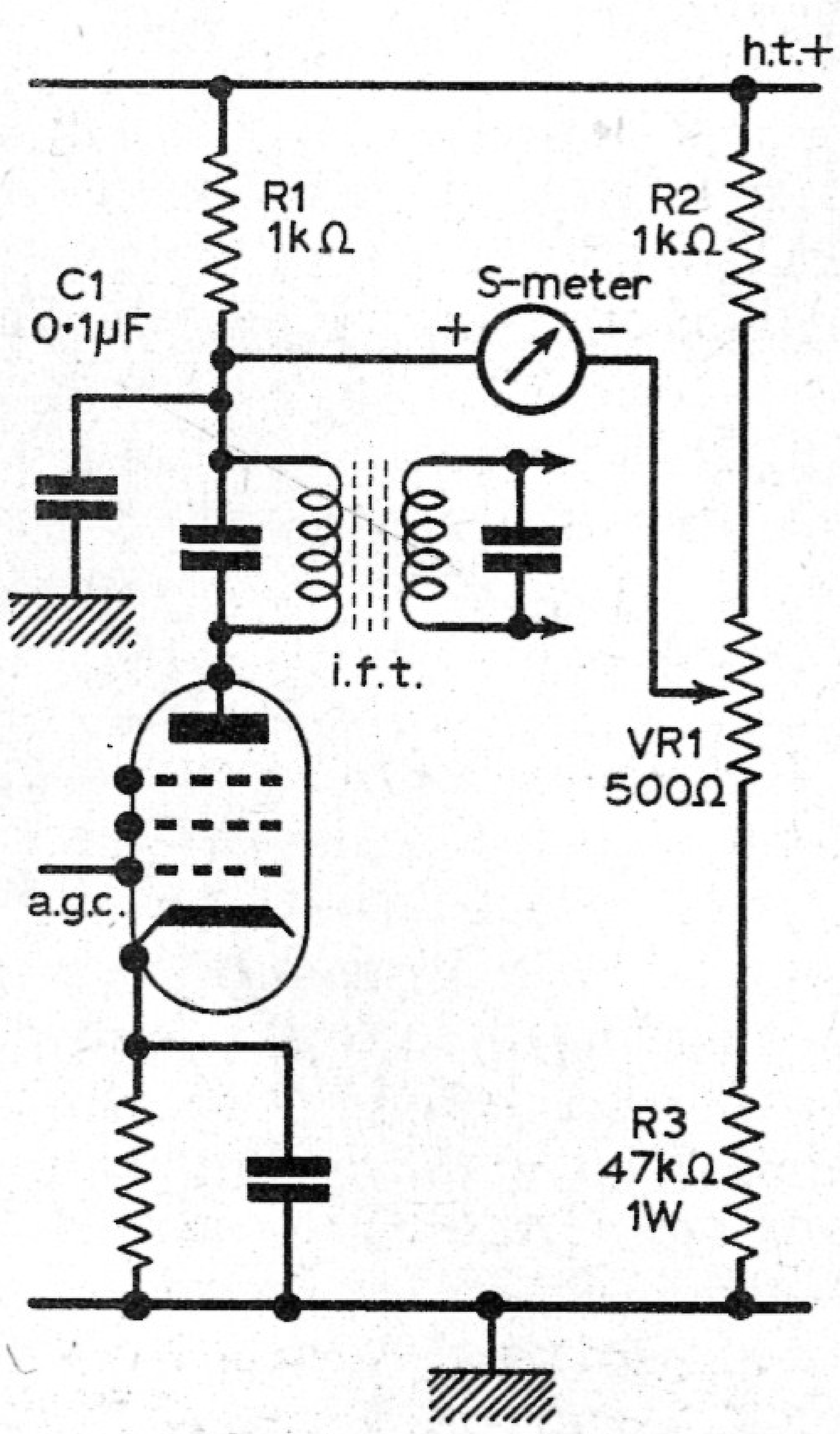


Fig. 1: (Left), An S-meter operated from the cathode circuit of the last i.f. amplifier

Fig. 2: (Right). An S-meter connected to the anode circuit.

Cathode Circuit

The meter is connected to the cathode of a valve which receives automatic gain control bias (generally an i.f. stage). R1 and R2 form a potential divider, with VR1 for zero adjustment. With no signal present, VR1 is adjusted so that the voltage drop across the cathode resistor R_k equals that in the lower part of the resistor network, so no voltage is present across the S-meter.

When a signal is present, a.g.c. bias reduces cathode current. Current through R_k falls, resulting in a smaller voltage drop in R_k. The meter negative terminal thus moves negative, giving a reading. Movement of the meter pointer depends on the a.g.c. voltage, and thus on the strength of the received signal.

R2 needs to be similar to R_k in value, and can be 330Ω for many valves of the 6K7 and similar type, but should be 68Ω for the 6BA6. R2 can be omitted if VR1 is adjusted carefully, a portion of VR1 then substituting for R2.

Anode Operated

In Fig. 2, C1 and R1 may be present. If not, these or similar values can be fitted. When anode current falls (with increased signal strength) reduced voltage drop in R1 results in the application of a positive voltage to the meter.

In both circuits VR1 need not be 500Ω. VR1 should be wire-wound, and preferably not over about 2kΩ, or its adjustment becomes critical.

Should values in a receiver be such that VR1 does not allow the meter to read zero, with no signal input, this can be corrected by changing R1 or R2 in Fig. 1, or R2 and R3 in Fig. 2. Actual values are not too important, provided the circuit can be balanced for no voltage across the meter, with no signal.

The sensitivity of either circuit may be reduced by placing a resistor in series with the meter. A pre-set will allow adjustable sensitivity.

Construction

The few components can be fitted in any suitable case, similar to Fig. 3. The speaker circuit is quite separate to that for the S-meter, and it is wise therefore to colour code the flexible leads for the latter: red for h.t. positive, green for cathode (or C1, Fig. 2) and black for chassis return.

For the Eddystone receivers mentioned, connections can be to an octal plug or the base of an old octal valve. Viewing this plug from the pins, and counting clockwise from the key-way, take red to pin 1, green to pin 2, and black to pin 8. As a series diode is present, set the meter pointer mechanically a little below zero. Short receiver aerial to earth, and adjust VR1 for zero on the meter.

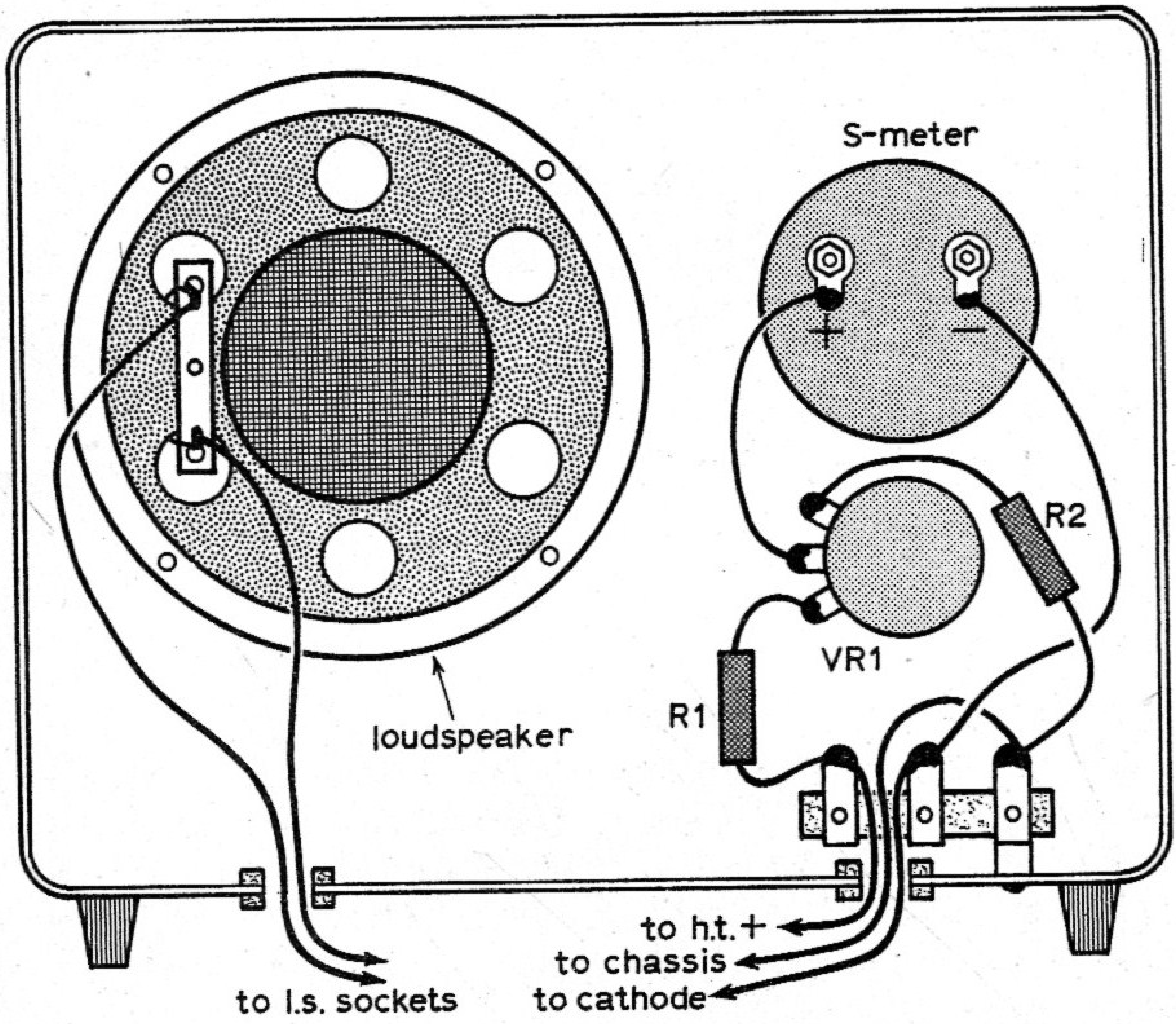


Fig. 3: The wiring in the box used by the author.

With other receivers, locate the cathode or h.t. side of an i.f.t. in a stage controlled by a.g.c. bias, and connect as in Fig. 1 or Fig. 2. If the unit needs to be readily detached, any convenient means could be used, such as a valve base, B7G miniature plug or 3-pin plug, and socket to match. ■