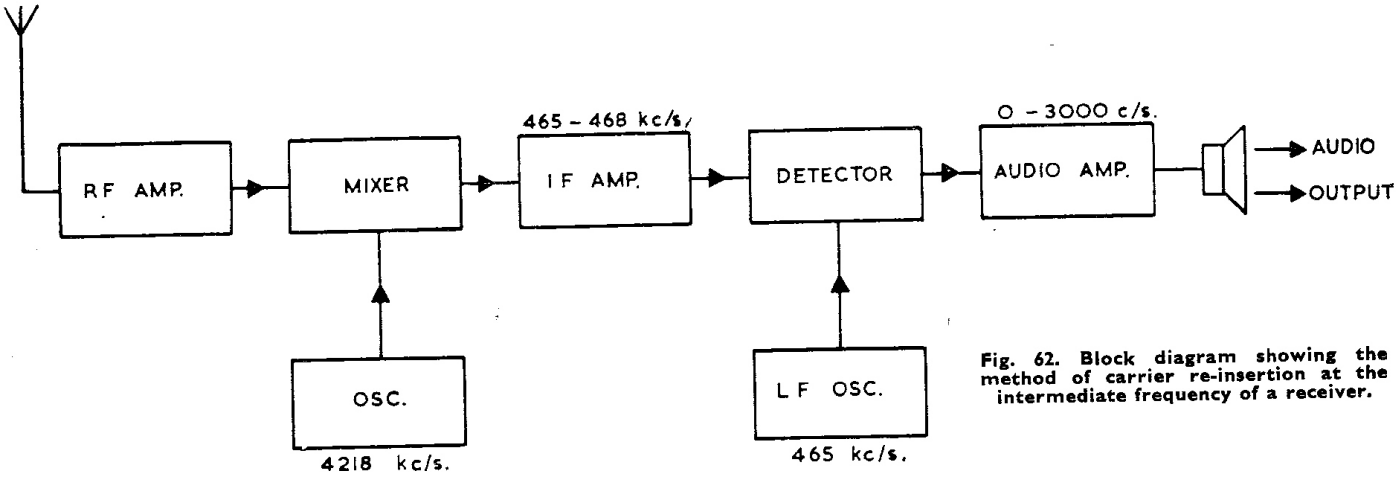

Fig. 62. Block diagram showing the method of carrier re-insertion at the intermediate frequency of a receiver.

the a.g.c. off, the b.f.o. should be switched on and the pitch control rotated slowly until the speech begins to sound recognizable. More likely than not, the output will sound heavily overmodulated, in which case an improvement may be made by backing off the r.f. and i.f. gain controls. A final touch to the pitch control, and the signal should become perfectly readable. If it sounds unnatural and overmodulated or like a gramophone record on a turntable which is not running evenly, the trouble is almost certain to stem from deficiencies in the receiver. The following aspects of receiver design, which supplement those discussed in Chapter 4, will assist anyone who is interested in obtaining top quality reception of sideband signals.

As has already been said, the insertion of a signal to take the place of the carrier is essential to the demodulation of a sideband signal. With a t.r.f. receiver, the only way of doing this is to couple into the front end the output of a local oscillator adjusted as closely as possible to the nominal frequency of the transmitting station. A similar system may of course be employed with a superhet receiver. The outstanding advantage of signal-frequency carrier insertion is that the intelligibility and quality of the audio output depends solely upon the stability of the carrier oscillator. As injection is done at the aerial terminals, nothing more than a small r.f. signal is required, so the oscillator may be designed for quality of output rather than for quantity. A BC221 or one of the LM series frequency meters will be found ideal. Drift in the heterodyne oscillator of a superhet will have no more effect on s.s.b. signals received by front-end carrier injection than it will on conventional a.m. It may be irritating, but nothing more. With a poor and unstable receiver, this is the only worthwhile method to use. The drawback is that the receiver tuning must be adjusted in synchronism with the carrier oscillator when changing frequency. A minor point to watch is that the carrier oscillator must not overload the front-end of the receiver. If its amplitude is great enough to drive the r.f. stage into non-linearity, the receiver would become susceptible to cross modulation by any strong signal.

When using a superhet, it is more convenient to reintroduce the carrier at an appropriate frequency after the sideband has been converted to the intermediate frequency. A block diagram of this system is shown in **Fig. 62.** The b.f.o. is often pressed into service as carrier oscillator and produces regrettable results because it is asked to fill a role for which it was not designed. The average b.f.o. is a well built unit which has a slow tuning rate and is quite stable enough to take the place of the carrier. In 99 receivers out of 100, however, its output is via a small capacitor to the anode of a

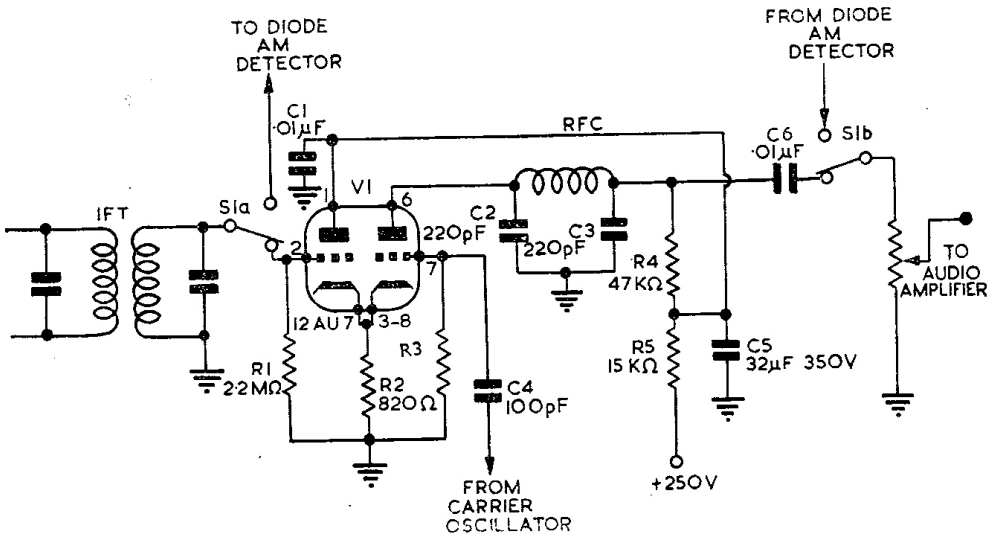

Fig. 63. A twin triode product detector for s.s.b. reception. R3 should be 100K ohms.