plaining how it works. I have, however, a couple of observations to make about using it. Make no mistake, it's a great circuit and the 600 and 1600 series of radio communications ICs produced by Plessey Semiconductors are without doubt the finest, most elegant parts available in the world. That is no bull, it's fact. They have lower power consumption, lower component count, more flexibility than anything which ever came out of Japan or the US. But they can be tricky to use if you don't know the rules.

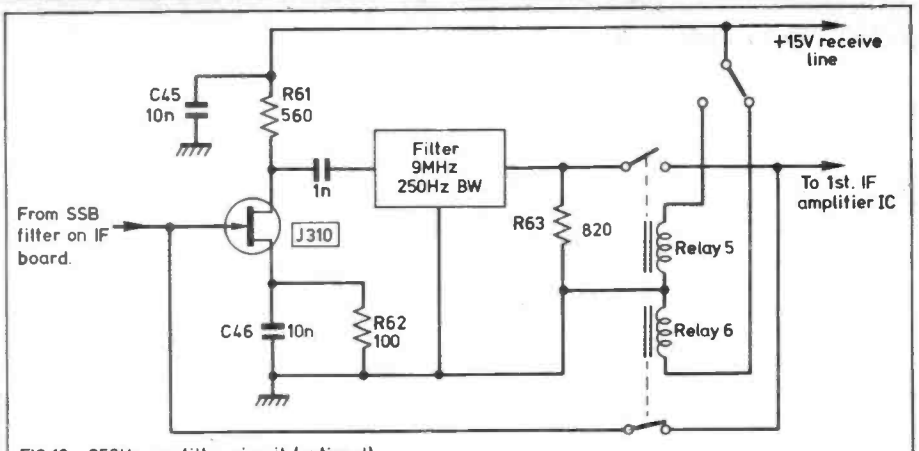

FIG.12. 250Hz cw filter circuit (optional).

AGC faults

For instance some users complain of first syllabal distortion or transient LF oscillation connected with the 1621 AGC generator. They complain that the device tracks a rapidly rising signal in a series of little jumps rather than smoothly. This particular wrinkle is generally attributed to power supply decoupling (there are high charging currents involved) or an IC design fault. Neither is the case. This is how to cure the problem...

The problem such as it is originates from unwanted coupling of the carrier oscillator (the USB/LSB/CW generator of Fig. 11) into the input of the IF strip. The mechanism is this: In the presence of no signal the 1612 IF amplifiers revert to maximum gain, about 70dB. Any stray carrier oscillator coupling to the input of the strip is amplified by this amount and applied to the signal port of the product detector. The same signal supplied by the carrier oscillator is applied to the other port. There will almost certainly be a significant phase difference between the two signals. If a low level signal is suddenly placed on the input to the strip — ie a wanted SSB signal — then the demodulated audio will cause the 1621 AGC generator to depress the gain of the 1612 based IF strip. The reduced gain will also reduce the level of the stray C/O signal applied to the signal port of the 1640 product detector. The resultant change in phase/amplitude vectors between the two CW signals causes a step DC change on the output pin of the 1640 product detector. It should be remembered that the 1640 is in essence a four quadrant multiplier which produces a DC difference voltage in response to two signals of the same frequency but differing phase. The 1621 AGC generator sees the step change in DC level in the same manner as recovered audio...it reduces the gain of the strip even further in response. The result is massive oscillatory overshoot in the AGC system.

The cure is straightforward: remove all stray coupling of C/O to the input of the strip. This can be done with additional screening or, in severe circumstances, by a neutralising circuit.

Bidirectional amplifier

The J310 bidirectional amplifier, which switches automatically by PIN diodes, can overdissipate with certain samples of device in the G4CLF circuit. The result of this will be excessive device junction temperature and a very short life. The zero bias configuration of the original circuit produces standing currents in the range 20 to 60mA. It doesn't take much knowledge of Ohm's Law to appreciate that the 300mW limit will nearly always be exceeded. The answer is to include a 100 ohm resistor in parallel with a 10nF capacitor in the device's source connection. This provides enough back bias to reduce dissipation to a safe level without compromising strong signal performance.

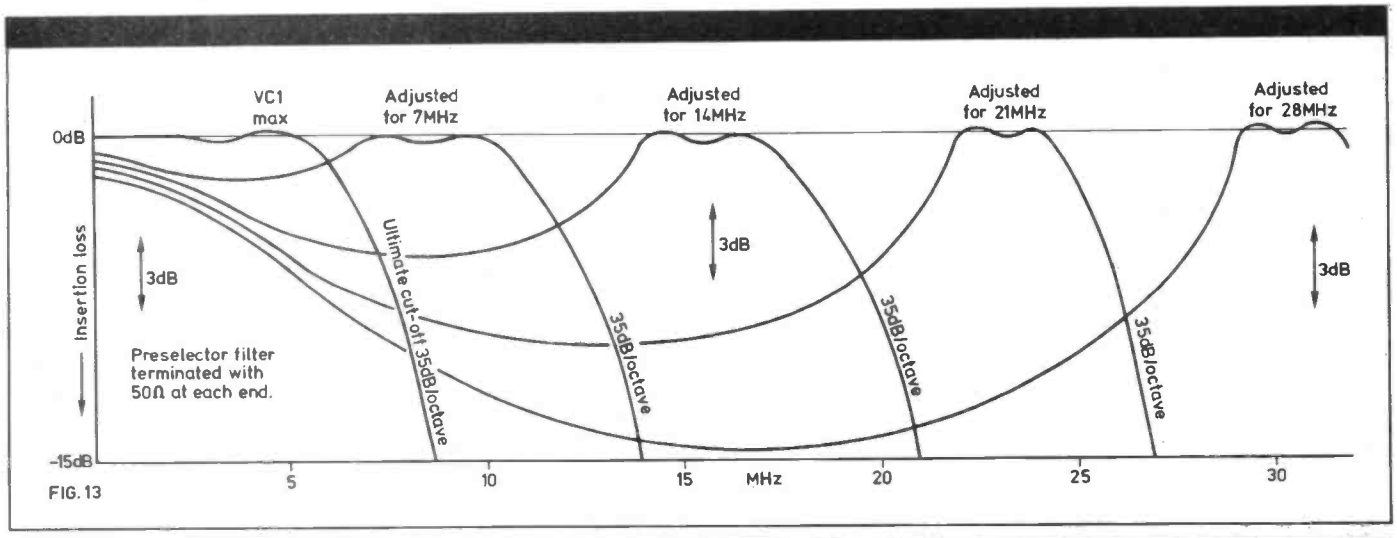

FIG. 13