range of frequencies by operating with open wire feeders as **Fig. 9** illustrates. The price to be paid for multi-band operation is the necessity of using an ATU, which needs to be capable of providing a balanced output. The vast majority of commercially available ATUs only have unbalanced outputs, and only match a limited range of impedances. They are intended primarily to be used in coaxial lines with solid state transceivers in the same way as the 'load' and 'tune' controls on a valve PA.

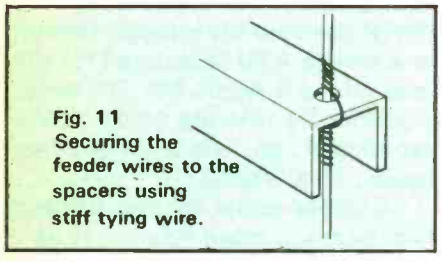


Fig. 11 Securing the feeder wires to the spacers using stiff tying wire.

Those that can cope with balanced outputs are often referred to as a 'Z match' ATU. The circuit of the Z matches appears in the handbooks and can easily be homebrewed providing a source of surplus components can be found. Roller coaster coils and wide spaced capacitors used to be in plentiful supply on rally stalls in the past, but they are harder to come by these days. Recognising the gap at least one UK firm has started making them again, and advertises regularly in the magazines. To be strictly correct they do sell complete units too, achieving a balanced output from a basically unbalanced circuit by the use of a ferrite balun inside the ATU itself. I've never been too happy using baluns where there could be large amounts of reactance flying about as the cores tend to saturate easily. However, the reviews of ATUs using the technique are generally favourable — so perhaps its just me. . .

The exact spacing of the wires is not critical and I generally use about 100mm simply because it looks about right. A suitable method of making spacers has already been described but as with the parallel dipole arrangement a good deal of time and effort can be saved by going about construction in the right way. I found the trick was to stretch the wires between two convenient points in the garden, a dustbin handle and a wall in my case, with the wires at roughly the right spacing, and with all of the spacers slipped over one end (see **Fig. 10**). Using a ruler to get equal centres between the spacers, they can now be fixed in position with tying wire (as in **Fig. 11**). Since the feeder wires are taut, the whole assembly will still look shipshape when hung up in the air.

According to textbooks, aerials and feeders should be constructed from hard drawn copper wire, but I generally use plastic covered stranded wire with no ill effects. GPO telephone cable is obviously ideal if you come across any surplus, but they tend to get funny if you start shinning up the telegraph poles to get some.

If an aerial is a half wavelength long at the lowest frequency of operation then it should work well on all frequencies above that frequency, although it will start to get more directive the higher you go. That statement, plus the polar plots to go with it, can be found in most of the textbooks; but in my experience it depends on the aerial being horizontal and straight for its whole length. If there are a goodly number of bends in the aerial, or it is predominantly in an inverted vee configuration then, in the case of (say) an 80m dipole, the performance on 15m and 10m could well be disappointing, and it would be better to use a separate aerial for those two bands.

Inverted Vees

I must confess to a great liking for this type of aerial, and have used little else for some time. In its simplest form, it is nothing more than a single band dipole mounted as in **Fig. 12** and is quite commonly

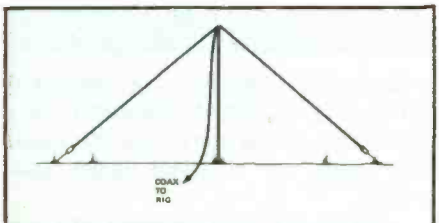


Fig. 12 An inverted vee reduces the length needed for a dipole. A mast or tower is the best support but the gable of the house will do.

used on 80m and 40m. It does not require such a long garden as would a horizontal dipole and only requires one high support. For those lucky enough to have a tower, an ideal centre support is already available. In either case, it has the advantage that since the ends are relatively low it can be adjusted for resonance without having to lower the whole thing down each time an adjustment has to be made.

A multiband version can be formed by using open wire feeders, but I found that having a 25.6 metre (84ft) top produced the best length for 80 to 10m coverage. Any longer and the 10m performance was dramatically reduced and in spite of being rather short for 80m, I managed to work into ZL on

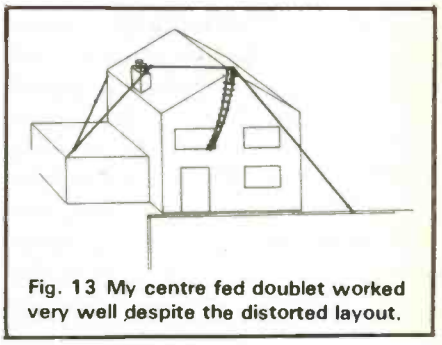
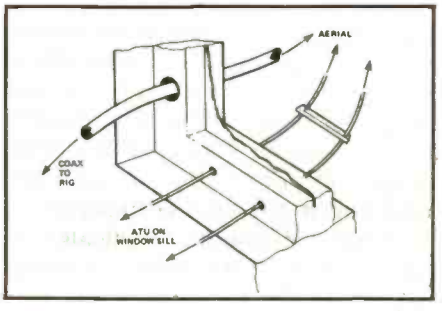


Fig. 13 My centre fed doublet worked very well despite the distorted layout.

such an arrangement. The best top length will probably vary from QTH to QTH so readers should experiment for themselves.

The big advantage of open wire feeders to my mind is that once the aerial has been erected, all adjustment is then carried out from the comfort of the shack. With the parallel dipole arrangement repeated raising and lowering will be needed until adjustments are finalised. Given the variability of the British weather, being able to put up the aerial and then go straight back indoors has an obvious appeal.

Yet open wire feeders do not seem popular in spite of their being considerably cheaper than coaxial cable. An often quoted problem is that of getting the feeders through a window. To me, there seems little difference in drilling two small



holes through a wooden frame than a large one for a coaxial cable entry. Another way of getting open