'SLIM JIM' ULTRA

2-METRE OMNI VERTICAL AERIAL

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The original "Slim Jim" omni-directional vertical aerial for 2 metres, designed by the writer, is fully described elsewhere in this publication. It has proved to be one of the most popular single-element aerials for 2m operation because of its low-angle radiation, high efficiency and unobtrusive appearance, etc. It is now being used throughout the UK and in many other countrues including Holland, Belgium, Norway, Iceland, New Zealand, Australia and the USA. The newer and even less obtrusive version described here also incorporates a small capacity plate, to allow the aerial to be tuned to exact resonance at the centre of the band. The performance parameters are otherwise the same as the original.

The various diagrams give all the details required for the construction and also the materials used. The aerial itself can be made from a single length of aluminium rod 5mm or 3/16in diameter, which will bend quite easily at top and bottom to the required radius. To obtain a smooth bend first clamp into a vice a short length of metal or wood of a diameter a little less than that required for the bend. This functions as a "former". Heat the element at the point of the bend and then slowly bend the rod around the "former". *Make the bend gradually and re-heat the element as necessary to keep it pliable. Don't overdo the heat.* Practice on a scrap length of rod first. It will be necessary to thread the various spacers onto the long section of the element before bending the ends.

The diagrams in Fig. 1 show: (a) the general configuration of the aerial and its voltage and current distribution. Details for the insulator between one side of the top of the quarter-wave stub section and the driven element proper, carrying the capacity plate, are shown in (b). The lower section of the aerial, i.e. the stub section, is enclosed as shown in a length of plastics water pipe and supported inside with circular spacers which should be bonded to the element with Loctite or Araldite before the pipe is fitted. The plastics tube has a length of dowel inserted at the lower end to provide a solid section for mounting the aerial on a mast. This can be extended if required, for example, for car bumper mounting which will allow the aerial to be used for mobile operation.

The remainder of the constructional details, e.g. element spacers, capacity plate and upper section etc. are given in Fig. 1(c), (d) and (e). The ends of the element that fit into the insulator should be bonded in with Loctite or Araldite. The 50 ohm coaxial feed cable is taken into the tapping point on the stub section via a hole in the plastics tube just above the dowel insert. Connection to the elements is best made by small brass or copper clips as shown in Fig. 2(a) to facilitate adjustment for the correct feed point.

Adjustment and Final Assembly

Adjustment for the correct feed point and to the capacity plate must be made before the plastics tube is fitted. Connect up *the full length of coaxial cable to be used* and stand the aerial in a position clear of other conductors. This can be indoors in the centre of a room with the aerial about 1m clear of the ground. Set the capacity plate in line with the insulator and find a feed point which gives the lowest possible v.s.w.r. (or maximum power to the aerial). If the v.s.w.r. doesn't come down to less than, say, 1·5 to 1, turn the capacity plate to about 45° and reset the tapping point. It is possible that little or no capacity at all may be necessary, i.e. the plate may be right round at 90° to the insulator. However, with adjustment of this plate and the position of the feed point, the v.s.w.r. should come right down to near 1 to 1, say 1·2 to 1 or less, depending on the quality of the feed cable, which should be UR67 or equivalent if a long run has to be used, i.e. longer than about 10m. Otherwise UR43 will be satisfactory.

Fit the plastics tube section with the cable through as in Fig. 1 (e) and make a final check on v.s.w.r. Bond the top circular spacer level with the top of the plastics tube with Loctite or Araldite. Also seal the entry points of the elements through the top so that water cannot enter. Araldite will be suitable for this. Different ways of mounting the aerial on a mast are shown in Fig. 2 (b), (c) and (d). The plastics tube and indeed the whole aerial can then be given a couple of coats of grey or white paint.

A final suggestion. If the top section of the aerial from a short distance above the insulator is made detachable but joinable, by means of metal sleeves with set-screws for example, it can be dismantled into two parts of convenient length for carrying about for portable use. •

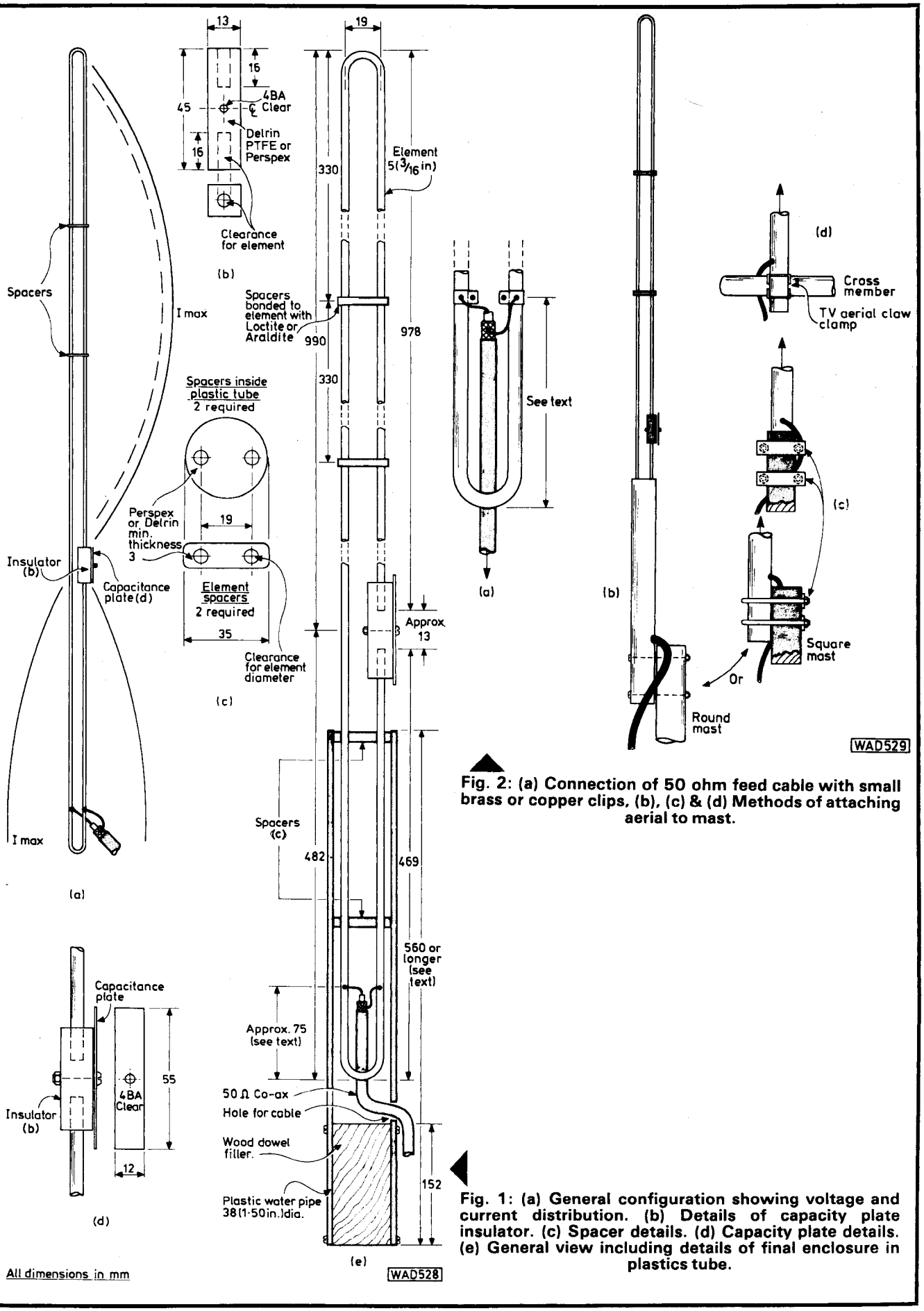

Fig. 2: (a) Connection of 50 ohm feed cable with small brass or copper clips, (b), (c) & (d) Methods of attaching aerial to mast.

Fig. 1: (a) General configuration showing voltage and current distribution. (b) Details of capacity plate insulator. (c) Spacer details. (d) Capacity plate details. (e) General view including details of final enclosure in plastics tube.