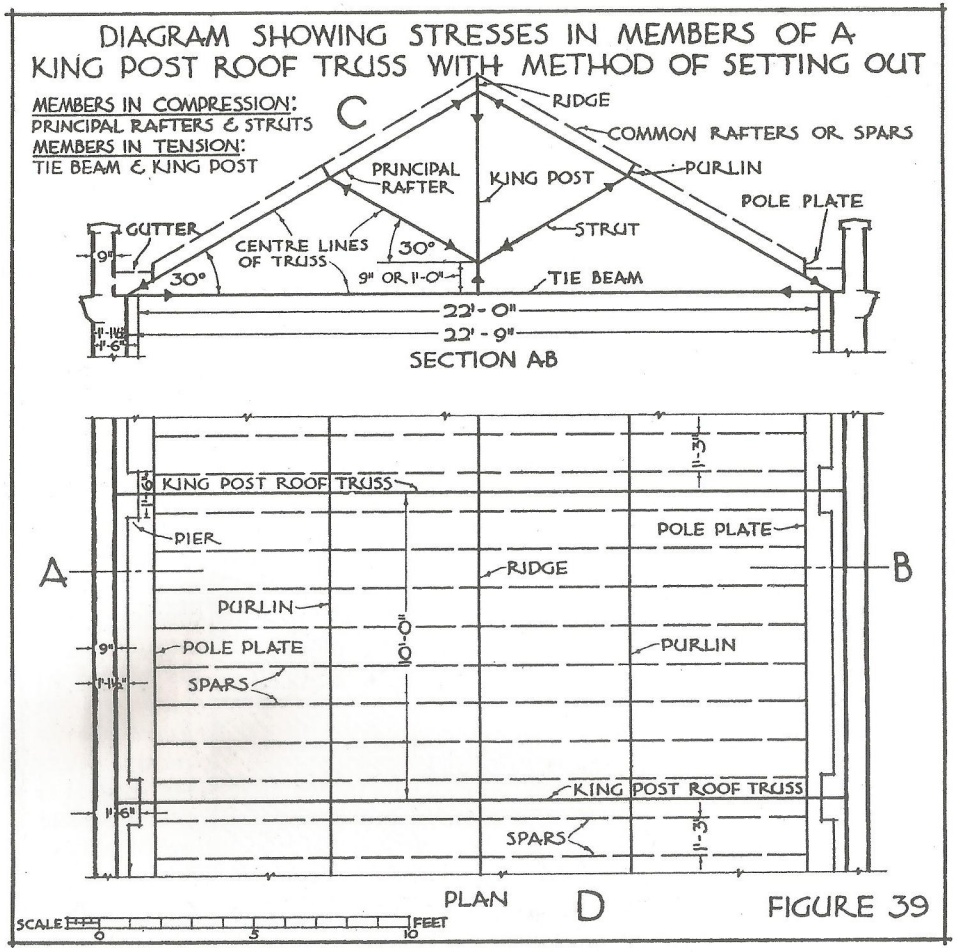
King post roof trusses are suitable for spans varying from 16 to 30-ft. Details of such a truss, having a clear span of 22-ft., are shown in Figs. 40 and 41. The distance apart of the trusses varies from 8 to 12-ft. centres, and in the outline plan at D, Fig. 39, they are shown at 10-ft. centres.



The method of setting out the truss is shown at C, Fig. 39, and A, Fig. 40. Note : (1) the intersection between the centre lines of the principal rafter and tie beam coincides with the centre of bearing on the wall, (2) the centre line of the truss coincides with the intersection of the centre lines of the principal rafters, (3) the intersection between the centre lines of the struts and king post varies from 9-in. to 1-ft. above the centre line of the beam, the inclination of the struts being not less than 30 and usually equals that of the roof, and (4) the intersection between the centre lines of the strut and principal rafter coincides with the centre line of the purlin. This principle should, as far as possible, be applied to all roof trusses, as it results in the loads being effectively transmitted to the various members. It also assists the student in setting out the truss.

In the plan, Fig. 39, the walls are shown to be strengthened by the provision of attached piers to take and distribute the concentrated loads from the trusses, and as shown at A and B (Fig. 40), these trusses are provided with sound bearings in the form of stone *pads* or *templates*.

The following table gives the scantlings of the members comprising king post roof trusses (of redwood) which are at 10-ft. centres :—

TABLE VII

Span.	Tie Beam.	Principal Rafter.	King Posts.	Struts.
18 ft.	7 in. by 3 in.	4½ in. by 3 in.	4½ in. by 3 in.	4 in. by 3 in.
20 ,,	9 ,, by 4 ,,	4 ,, by 4 ,,	6 ,, by 4 ,,	4 ,, by 3 ,,
22 ,,	9 ,, by 4 ,,	6 ,, by 4 ,,	6 ,, by 4 ,,	4 ,, by 4 ,,
24 ,,	11 ,, by 4 ,,	6 ,, by 4 ,,	6 ,, by 4 ,,	4 ,, by 4 ,,
26 ,,	11 ,, by 4 ,,	6 ,, by 4 ,,	6 ,, by 4 ,,	4 ,, by 4 ,,
28 ,,	11 ,, by 6 ,,	6 ,, by 6 ,,	6 ,, by 6 ,,	4 ,, by 4 ,,
30 ,,	11 ,, by 6 ,,	6 ,, by 6 ,,	7 ,, by 6 ,,	6 ,, by 4 ,,

Some of these sizes exceed those given by certain empirical rules, as it is important that a tie beam, principal rafters and king post of a truss should be of the same thickness to simplify the connections. This table has been complied with in the details of the truss shown in Fig. 40, except that the tie beam has been increased to a depth of 11-in. as it supports a ceiling.

JOINTS AND FASTENINGS.—The following is a description of the connections between (*a*) the principal rafters and tie beam, (*b*) the principal rafters and king post, (*c*) the king post and tie beam, and (*d*) those at the head and feet of the struts.

(a) *Joint between Principal Rafters and Tie Beam.*—One form of joint, called a *bridle joint*, is shown at E and J, Fig. 40. A central tenon is formed on the tie beam by cutting notches at the sides, and the foot of the rafter is shaped with a corresponding mortice provided to enable the rafter to be bridled over the tenon ; this prevents side movement and a suitable abutment is provided. The width of the tenon should not exceed one-third of the beam, otherwise the cheeks of the bridle will be unduly weakened. The cuts of the notches extend to the centre line of the rafter and are normal to the back of the rafter to form a large bearing surface at right angles to the thrust. The usual method of making the joint secure is to employ a ⅝-in. diameter bolt at right angles to the slope as shown. A notch is formed at the underside of the beam and a washer is placed between the timber and the head of the bolt. Another washer is placed between the nut and the back of the rafter. These washers prevent injury to the fibres of