the middle piece, and extend into each of the outside pieces to the length of \( \frac{1}{2} \) the thickness of the middle piece. If the action of the pin be transversely to the fibres, give it at least 50 per cent more bearing surface for the same pressure, than where it acts on the ends of the fibres, and make the diameter not less than \( \frac{1}{2} \) the thickness of the middle piece. Where pressure acts on the reversed ends of fibres, tending to force them out or off from the end of the stick, be sure that the amount of cleavage, be not less than one square inch for each 100 lbs. of force. See that the transverse strain of timber, and the positive stress of iron, are in all parts within the limits of safety.

Finally, see that every force that tends to break or derange the structure, have an adequate counteracting force opposed to it, and attend to such minor details as cannot fail to suggest themselves while attending to the above enumerated points, and the chance of failure must be exceedingly small, if failure be even possible.

### 24 to 36 ft. Span.

For this range, probably no better general form of truss can be adopted, than that shewn in Fig. 4, page 9. The principal details are the same as in the above described plan of a 20 ft. bridge. The foot of the braces are secured in the same manner, the amount of bearing surface being increased to correspond with the increased pressure. The upper ends of the braces should be made square, and the upper horizontal piece, bevelled so as to fit the braces. The small cross braces toe into the upper and lower horizontals, the one being \( 3 \times 7 \) inches, (for a 30 feet bridge,) and edgewise to view, the other \( 3 \times 5 \), flatwise to view, and passing through a mortice in the centre of the former.

The transverse bearers are the same size, and sustained in the same manner by bolts diverging downward, as in the 20 feet bridge. Also, the horizontal braces are