Moreover, simple arch braces extending from the king brace to a stiff and substantial cross beam from elbow to elbow (see Fig. 40), will effect nearly the same result as the arch. In both cases, a considerable degree of lateral stress is liable to be thrown upon the king braces, which accordingly should be strong, or supported by truss rods, and struts opposite the feet of the arch or braces.

Whether the truss rods be used or not, it is advisable that the connection with the king brace be made by means of a bolt running through the whole diameter of the king brace, with nut or shoulder bearing externally and internally upon both sides, to counteract any tendency to collapse.

Fig. 40 presents an end view of a bridge, showing arch braces, with truss rods to sustain the thrust of arch braces against king braces. The internal figure gives an enlarged view of the connection at the elbow. A strap \( a \) (about \( \frac{3}{4}'' \times 5'' \)), bent twice at right angles, is riveted or bolted to the flanges of an \( I \) beam (about 9'' deep), leaving a space of about 4 inches from the end of the \( I \) beam, for eyes of two sway rods and a nut upon the large connecting bolt. This bolt in large bridges being from 3 to 4 inches in diameter through the elbow, is reduced to 2 or 2\( \frac{1}{2} \) inches in the part pro