jecting through the strap above mentioned, and the eyes of sway rods.

The truss rods may not be necessary (with substantial king braces), for spans not exceeding 150 feet. But they will add to the security, in all cases of railroad bridges having cast iron king braces. These members being over twice the length of the cylinders in the upper chord, are usually cast in two pieces, and connected by bolts and flanges in the middle, where they have a diameter of about \( \frac{2}{3} \) of the length of brace, and taper to the size of the upper chord at the ends.

CXXII. WROUGHT IRON THRUST MEMBERS.

The trapezoidal bridge, as described in detail in the preceding section, and as originally intended, is a wrought and cast iron bridge. But it will readily be seen that with slight modification of detail, it is easily adapted to the use of wrought iron upper chord, vertical posts, and main end braces; which latter, for convenience, have been designated in this work, as king braces.

All of these members may be in the form of the patent wrought iron column of the Phoenix Iron Co. of Pennsylvania, formed of flanged segments, united by riveting; or of rectangular wrought iron trunks, as well as various other forms of section.

For the Phoenix column, a cast iron connecting piece may be inserted at the joints of the upper chord, with ends formed to enter the squared ends of the chord cylinders, and receive them against a shoulder of the connecting piece. This piece may have an opening in the under side to receive the diagonals and uprights, where they are secured by a transverse