chords, seems to be merely one of economy and convenience. If suitable timbers for chords can be readily and reasonably obtained, it is thought to be quite as advantageous to use wooden chords.

THE HOWE BRIDGE.

CLXII. A very popular plan of wooden bridges, which has, in fact, superseded most others in New York and New England for rail-road purposes from the time of the introduction of the rail road system, is known as the Howe Bridge.

The trusses have upper and lower parallel chords, together with main and counter braces, of wood, tied vertically by wrought iron tension rods from chord to chord, the principle of action being the same as in the plan shown in Fig. 68.

The braces act upon the chords and verticals through the medium of cast iron shoes or skewbacks, with ribs or flanges let into the chords to a sufficient depth to sustain the horizontal thrust of braces, and with tubes, or hollow processes, square externally, and having round holes to receive the vertical bolts. These tubes project downward through the lower, and upward through upper chord, between the courses of timber composing the chord, being boxed into the timber on each side of the tube, so as to leave about an inch between adjacent courses for ventilation; the tubes, extending through the chords, reach an iron plate upon the opposite side, which serves as a washer, or bearing for the nuts of the suspension bolts.

By this means the vertical action of braces is brought directly upon the verticals, without a transverse crushing action upon the chord timbers.