when the greatest movable load is less than four times the weight of structure, as is usually the case. But instead of dispensing with that member, and other counters on the left, they may be made in two pieces each, of $\frac{3}{8}$" or $\frac{1}{2}$" iron, connecting with the upright at the crossing by screws and nuts, in the manner above described; thus preventing the uprights from deflecting lengthwise of the truss, where the greatest weights act upon them, and where otherwise, they would require to be heavier.

**General Transverse Support.**

CXXI. The system of cross-struts and diagonal ties serves to preserve the upper chords in line, but does not prevent the whole structure from swaying bodily to the right or left; a result which would be fatal to the structure.

In the arch truss Fig. 27, the width of base at the bearings upon abutments, resulting from the peculiar form of the arch, affords the required stability in this respect.

In case of the trapezoidal truss, when high, various devices have been resorted to for producing the same results. For deck bridges, cross tying between king braces at the ends, is an easy and efficient means of accomplishing the object. For through bridges, guys from the connecting bolt at the elbow of the obtuse angle, anchored in the abutment, may be employed. But this requires extra length of abutments and piers, and the effects of change of temperature, are, to tighten and slacken the guys, so as to impair their efficiency.

To obviate the latter objection, double acting guys (acting by thrust and tension), applied at one side only