of the truss, are placed heavy suspension rods, which are
connected with the lower chords 12 feet further from the
masonry. Thus the bridge seat is substantially transferred
to a point 47 feet towards the centre of the bridge, reduc-
ing a span of 180 to 86 feet, so far as the tensile strain upon
the lower chord is concerned.

For this intermediate space of 86 feet, the arch beam is
of sufficient strength to sustain the whole load, if required.

Strength, however is not all that is required, for a Rail-
road bridge especially, subject as it is to a moving load,
there must also be rigidity, stiffness, freedom from vibration.
A bridge may be strong yet flexible, rigid yet weak; in fact,
flexibility is incompatible with durability, the structure
should be prepared at all times to receive its load, and should
not be permitted to change shape in the slightest degree, by
its passage over it.

To produce this result, an effective system of counter
braces, is indispensable.

The proper office of counter braces is frequently misun-
derstood, as is evident from the manner of their application
in many cases in which they are used as check braces only,

Fig. 16.