Counter-Bracing.

The Elasticity of solid materials, is manifested in bridge trusses, by their downward deflection under load, and the recovery of their previous form and position on the removal of the load.

This arises principally, from the temporary elongation of parts exposed to tension, and the contraction of those exposed to compression, according to Laws and Principles supposed to be understood.

The deflection of trusses within the usual limits, when properly proportioned, is not essentially detrimental to their safety and durability; but rather enables them the better to resist sudden impulses,—except in case of a regular succession of impulses, at intervals corresponding with those of the natural vibrations of the structure, or with some multiple or even division thereof; a result frequently noticeable, and sometimes, to a degree somewhat unpleasant to the eye, as well as suggestive of danger. Hence, great emphasis is often employed, in expressing the supposed advantages of "Counter-Bracing", as a means of *stiffening* trusses, and preventing, or diminishing their vibration.

What is technically called 'counter-bracing', as applied to bridge trusses, is the introduction of a set of diagonal, or oblique pieces or members, to act in antagonism to the Main Diagonals, whether