upon the frame so long as the weight continues; but upon the removal of the weight it becomes forcibly compressed, in consequence of the effort of the truss, by virtue of its elasticity, to return to its former position. This effort is resisted by the reaction of the wedge, which causes a strain upon the counter-brace $AC$ sufficient to counteract the elasticity of the truss; and, as no change of figure can take place, it follows, that the brace $BD$ cannot recover its original length, and, therefore, continues as much compressed as it was by the action of the weight.

The effect of a weight equal to that first applied will be to relieve the counter-brace $AC$, without adding in the slightest degree to the strain upon $BD$.

As regards the effects upon the chords, it is evident that the strains are only partial, and tend to counteract each other. The maximum strain in the centre is estimated by the force which would be required to hold the half truss in equilibrium if the other half be removed; and this is dependent only on the weight and dimensions of the truss. In fact, if we examine the parallelogram $ABCD$, we find that the effect of wedging the diagonals will be to produce strains acting in opposite directions at $A$ and $B$, and destroying each other's effects; the strains produced by wedging any rectangle cannot therefore be continued to the next, and of course can have no influence upon the maximum forces at the centre.

As the vibration of a bridge is caused principally by the effort to recover its original figure after the compression produced by a passing load, it follows, that if this effort is resisted, the vibration must be greatly diminished, or almost entirely destroyed.

This accounts for the surprising stiffness which is found to result from a well-arranged system of counter-braces.

_Inclination of braces._

From the preceding examination into the distribution of the forces, we learn that at least four sets of timbers are necessary in every complete and well-arranged truss.

The proper disposition, and the relative proportion of the parts, next demand attention.