The horizontal strain at $C$ is $R x = \frac{10 w}{8} = 750,000$ and $a = 750$ square inches, or about 27 inches square for the size of the arch at the centre.

We have also $\frac{w}{2} \times \frac{A n}{n_0} =$ strain at $A = \sqrt{\frac{s^2 + \frac{s^2}{100}}{\frac{s}{10}}} \times$

$w = \frac{w}{8} \sqrt{116} = 802,500$ lbs. or 802 square inches, about $29\frac{3}{4}$ inches square for the size of the arch at the abutments.

When two independent systems are combined in the construction of a truss, it becomes difficult, if not practically impossible, to estimate the portion of the strains sustained by each, owing to the defects in mechanical execution inseparably connected with every structure. If a calculation be attempted, it can only be upon the supposition that the joints are absolutely perfect, and that at the first instant of flexure both systems are in full bearing, and oppose a resistance proportionate to their relative stiffness.

Disregarding the particular arrangement of ties and braces, or the greater or smaller number of the intervals, we will consider the trusses as acting as a whole. This can be done with propriety on the supposition that the joints are perfect, and a general solution of the problem becomes very simple.

If the trusses act as a whole, the deflections may be considered as proportional to the weights; but the strains upon the chords are as the weights directly, and as the areas of the cross-sections inversely, and the deflections must therefore be in the same proportion.

Let $a$ represent the area of the cross-section of the chords of one system, and $n a$ that of the other: the depth and length of truss in each being equal. If $d$ represent the deflection of the first system, with a given weight, $n d$ will express the deflection of the second.

Let $x$ represent the actual deflection, which is of course equal in both. Then $d : x : : w : \frac{wx}{a} =$ weight on first