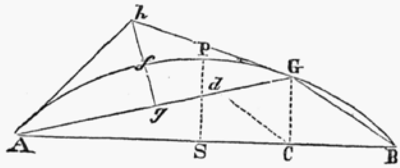

Let the weight on the half span be supposed concentrated at the centre of gravity G.

$B\ C =$ one-fourth span $=$	$37\frac{1}{2}$ feet.
$C\ G = \frac{3}{4}\ P\ S$ (nearly) $=$	16 "
$A\ G = \sqrt{A\ C^2 + C\ G^2} = \sqrt{112^2 + 16^2} =$	113 "
$G\ d = \frac{1}{4}\ A\ G =$	$28\frac{1}{4}$ "
$f\,g = \frac{15}{16}\ P\ S - \frac{3}{8}\ P\ S = \frac{9}{16}\ P\ S$ (nearly) $=$	12 "
$g\ h = 2\,f\,g =$	24 "

The weight concentrated at G, is supposed to be 160,000 pounds.

The resultant in the direction $G\ A$, will be $\frac{W \times G\ d}{G\ C} =$

$\frac{160{,}000\ \times\ 28\frac{1}{4}}{16} = 282{,}500$ pounds.

This force with its equal at A, produces an upward action upon the arch at f, which may be supposed to be resisted by the application of a force at this point.

The required force at f, can be determined from the proportion: $G\ g : g\,f :: 282{,}500 :$ half required force $=$

$$\frac{282{,}500 \times 24}{56} = 121{,}070 \text{ pounds.}$$

This is the whole amount of force which is exerted upon the arches of both trusses, and which must be resisted by the counter-bracing. The estimate is only an approximation, but it is considerably on the side of safety; for it is impossible that the weight should ever be concentrated at any point G, and the effect of the portion upon $P\ G$ is to assist in keeping down the arch. It is not necessary for practical purposes to make an exact mathematical calculation of this strain: it is sufficient to obtain a near approximation, with the assurance that all errors are on the side of stability. From these considerations, it appears that the upward force upon the arch by the