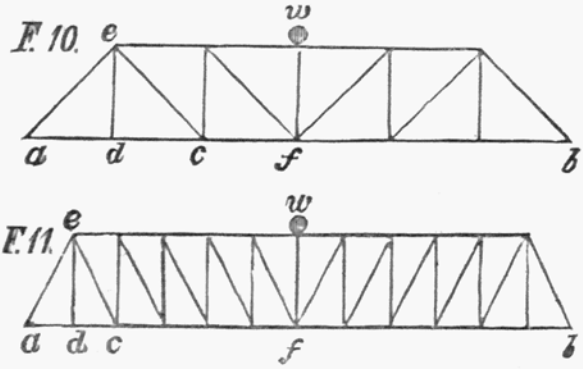
It is now proper to ascertain the comparative effects of different positions of the diagonal upon the horizontal parts, and verticals when employed. For that purpose, take two trusses, [Fig. 10 and 11,] of the same height and length, but in which the diagonals have different inclinations; and for simplicity, let truss 11 have twice as many



diagonals as 10 Now it is manifest that a given weight w, on the centre of these trusses, will produce a vertical pressure $=\frac{1}{2}w$ upon each of the supporting points a and b, and a horizontal action upon ad, equal to $\frac{1}{2}w\frac{ad}{ed}$, also that each diagonal from a to w, will exert the same horizontal action, the whole amount of which will be sustained by the different portions of the top and bottom ribs, the action of which will be increased towards the centre, where it will become equal to $\frac{1}{2}w\frac{ad}{ed}\times n$, n being the number of diagonals affected by w between a and w.

But the length of the truss being the same, n is inversely as the length of ad, or equal to $\frac{af}{ad}$, and substituting this value for n, we have $\frac{1}{2}w\frac{ad}{ed}\times\frac{af}{ad}=\frac{1}{2}w\frac{af}{ed}$ for the stress in the centre of the horizontal parts, produced by the weight w; an expression from which ad has been