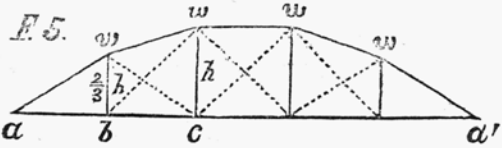
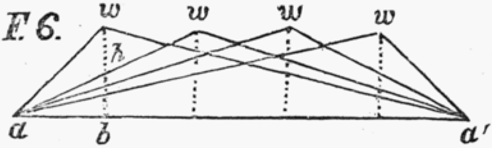
In truss 6, let each of the weights $w.w$, &c. be sustained by an independent pair of braces wa, wa', of the same

F. 5.



F. 6.



height$=h$. Then each pair of braces will exert a certain horizontal thrust which will be the same in both directions, and the sum of which, will shew the whole thrust produced by all the weights, and will be equal to $\frac{4w}{5h}+\frac{3}{5}\frac{2w}{h}+\frac{2}{5}\frac{3w}{h}+\frac{1}{5}\frac{4w}{h}=\frac{4w}{h}$ which is $\frac{1}{3}$ greater than in the case of truss 5.

Hence the truss 6 would require more material in about the same ratio to support the weight with the same proportionate stress, besides that the long braces in truss 6 would be unable to bear the same stress in proportion to their cross section, as the shorter pieces aw, ww, &c., in truss 5.

But the truss 6 has the advantage of being able to sustain itself when part of the weights are removed, as each one is sustained independently of the rest; whereas truss 6 would be thrown out of its equilibrium in such a case, and could not stand without additional support. This may be afforded by diagonal braces, or ties between each two of the points $w.w$, &c., as shewn by the dotted lines, which will require about one-third as much material as is required to sustain the horizontal thrust independently of abutments, or one-third as much as the arch a, $w.w$, &c. contains, as will appear further on.