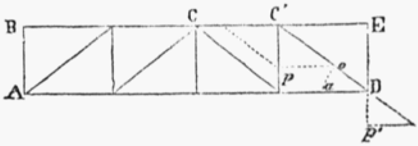
All the diagonals of the rectangles, in the direction of the braces, will have a tendency to shorten ; and, as this is effectually resisted by the braces, it follows, that such a truss is fully capable of sustaining a weight thus distributed.

CASE 2. Let the weight, instead of being uniformly distributed along $B\,E$, be applied at some point C''.

FIG. 46.



If we represent it by the portion $C''\,p$ of its line of direction, and construct the parallelogram of forces on $C''\,C$ and $C''\,D$, we find $C''\,o = w$ cosec. $a =$ strain on $C''\,D$.

If the point of application be removed to D, and again resolved into vertical and horizontal components, the vertical force will be equal to $D\,p' = w$. But this result is evidently false, for the weight is sustained by the points A and D, and presses upon them in proportion to the distances $C''\,B$ and $C''\,E$, it cannot therefore be equal to w at either. As cases of this kind frequently occur in attempting to trace the effects of forces upon the parts of a connected system, and often lead to error, we will endeavor to explain the cause of this apparently paradoxical result, which seems to contradict established principles.

If we suppose two inflexible rods, one horizontal and the other vertical, to be loaded with a weight applied at the angular point, A and D both resting against fixed points, then, the weight being represented by the portion $C\,p$ of its line of direction, may be resolved into components in the direction of $C\,A$ and $C\,D$.

FIG. 47.