at, as to the value of counter-braces, towards effecting the object proposed.

**Fig. 52.**

I assume a truss (see Fig. 52) composed of horizontal chords (of equal lengths), at top and bottom, vertical posts, and diagonal tension rods, inclined at 45°, or at any other given inclination,—the truss being uniformly loaded from end to end, and so proportioned that all of the above named parts, in that condition of the load, shall undergo an amount of extension or compression, proportional to the respective lengths of parts, multiplied by a constant factor \((E)\), equal to the elastic change effected in a length equal to that of the uprights between centres of chords, which is assumed as the unit of length for the occasion. Then, let \(L\) represent the length of truss, \(P\), the number of panels, \(H\), equal to \(L + P\), the horizontal reach of diagonals, and \(D\) (equal to \(2LE\)), the difference in length, occasioned by extension of lower, and compression of upper chord.

Now, assuming no change in lengths of diagonals and verticals, it is manifest that the chords assume, in these circumstances, the forms of two similar and concentric arcs of circles, of which the difference in length is to the mean length, as the difference of radii is to the mean radius, \(R\).

But the difference of radii manifestly equals the distance between chords, equal to 1. Using, then, the representative signs before adopted, we have

\[
D : L : : 1 : R; \quad \text{whence} \quad R = L + D.
\]