Next let us make the design for a trussed floor beam, taking a twenty-foot panel and a twenty-four foot roadway of a bridge belonging to Class A. Table XIX. gives the weight of an ordinary built beam for these dimensions as ninety-four pounds per lineal foot: so let us assume the weight of the trussed beam to be eighty pounds per foot, also the length of beam between centres of supports to be twenty-five feet. The live load will be

$$\frac{24 \times 20 \times 100}{2000} = 24 \text{ tons.}$$

Table XV. gives 3339 as the number of feet of pine lumber per panel, the weight of which is

$$\frac{3339 \times 5}{2 \times 2000} = 4.174 \text{ tons};$$

and the weight of the beam itself is

$$\frac{26 \times 80}{2000} = 1.04 \text{ tons};$$

making the total load equal to 29.214, or 1.1686 tons per lineal foot. Let us use two posts. The central panel should be ten feet long, and each of the others seven and a half feet. Let us assume the beam to be a 10″ 30# I, and the depth of the truss five and a half feet centre to centre. Then in the formula

$$A + A'' = \frac{wl_2^2}{12dC} + \frac{Pl}{2C'D} - \tfrac{2}{3}A'$$

we will have $w = 1.1686$, $l_2 = 10$, $d = \frac{9}{12}$, nearly, $C = 5$, $P = \frac{1}{2} \times 1.1686 \times 17.5 = 10.225$, $l_1 = 7.5$, $C' = 3$, $D = 5.5$, and A' about $8 \times 0.32 = 2.56$. Substituting these values gives $A + A'' = 3.21$ as the area of one flange. The total area of the section would then be $2 \times 3.21 + 2.56 = 8.98$ square inches, which corresponds almost exactly with the area of a thirty pound I-beam.

The design for the post agrees with that shown in Fig. 16, Plate II., with the exception that the end diagonals are not adjustable. The stress on a post is $P = 10.225$ tons; that on the bottom chord is

$$\frac{Pl_1}{D} = \frac{10.225 \times 7.5}{5.5} = 13.944 \text{ tons};$$