that on the end diagonals is

$$P \sec \theta = 10.225 \times 1.69 = 17.28 \text{ tons};$$

that on the counters is

$$\tfrac{3}{10} P \sec \theta' = 0.3 \times 10.225 \times 2.16 = 6.625 \text{ tons.}$$

The intensity for the tension members should be four tons, making the sections required for the chord bars and main diagonals respectively 3.48 and 4.32 square inches. Referring to Carnegie's "Pocket-Companion," p. 94, we find that two $\frac{5}{8}'' \times 2\frac{3}{4}''$ bars will do for the former, and two $\frac{7}{8}'' \times 2\frac{1}{2}''$ bars for the latter. From Table IX. we find that two one and a quarter inch rods will be required for the counters.

To the stress on a post must be added the vertical component of the initial tension on the counters, which is about

$$2 \times 1.5 \times 0.46 = 1.38 \text{ tons};$$

making the total stress 11.605. Before applying Table XL., we must multiply this stress by about 1.5, the ratio of the factors of safety for wind bracing and floor-beam struts; making the total stress 17.407 tons. Using the column for one fixed and one hinged end, we find that a $6''$ 15# I-beam will be required.

To find the thickness of the pin plate at the end of the beam, let us assume it at five-eighths of an inch; then the lever arm of the diagonal stress will be $\frac{1}{2}(\frac{7}{8} + \frac{5}{8}) = \frac{3}{4}$ inch, and the moment,

$$\tfrac{3}{4} \times \frac{17.28}{2} = 6.48 \text{ inch tons.}$$

Consulting Table XII., we find that the necessary diameter of pin is two inches and an eighth. Referring to Table XXVI., and looking down the column for a two and an eighth inch pin, we find that the necessary bearing will be, for 8.64 tons, eleven-sixteenths of an inch. It will be more economical to increase the diameter of the pin to two inches and three-eighths than the thickness of the plate to eleven-sixteenths.

Next let us find the number of rivets necessary to attach the plate to the I-beam. The horizontal and vertical components of the end diagonal stress are respectively

$$17.28 \times 0.8 = 13.82 \text{ tons}$$

and

$$17.28 \times 0.6 = 10.37 \text{ tons.}$$