Next let us determine the sizes of the pins.

If we take the average thickness of one chord bar at the centre of the span to be $\frac{1}{8}''$, we make a little allowance for accidental thickening of the heads.

Substituting in the formula given on p. 85, viz.,

$$M = \frac{Tw}{2},$$

we find the moment to be 23.56 inch tons, and, referring to Table XII., determine the size of the pin to be $3\frac{1}{2}''$. The least allowable diameter of pin for a $3\frac{1}{2}''$ bar is $3.75 \times 0.8 = 3''$: so we will use $3\frac{1}{2}''$ pins for the five middle panel points of the bottom chords. The chord bars of the end panels being necessarily out of proportion, we have to use at the pedestals and first panel points pins $2\frac{3}{4}''$ in diameter, the smallest that can be used with bars $3\frac{1}{2}''$ deep. It may be well to check the size of these pins. The horizontal component of the moment on the pin at the first panel point is $\frac{1}{2} \times \frac{27.1}{2} = 6.8$ inch tons, nearly. The stress in one hip vertical is equal to one-half of the section required, as given in Table VI., multiplied by the intensity of working-stress for hip verticals, or $\frac{1}{3} \times 2.14 \times 4 = 4.28$ tons. This may be assumed without appreciable error as the load on a hanger. The sum of the thicknesses of a hip vertical and a hanger is almost 2 inches, making the lever arm 1 inch, and the moment, about 4.3 inch tons. The total moment is, therefore, $\sqrt{(6.8)^2 + (4.3)^2} = 8$ inch tons, which corresponds to a $2\frac{1}{4}''$ pin; so that the diameter previously determined is ample.

Next let us find the size of the hip pin. From the formula on p. 86, and Table XXVIII., we find that the approximate thickness of the bearing is about

$$\frac{14.4}{2 \times 10} + 0.3 = 1.02'', \text{ say } 1''.$$

The lever arm for the diagonal stress will be $\frac{15}{16}$, say $1''$, and, for the hip-vertical stress, $\frac{7}{8} + \frac{1}{2}(1'' + 1\frac{1}{16}'') = \text{about } 2''$, and the corresponding moments respectively, 15.6 and $2 \times 4.28 = 8.6$ inch-tons. Laying out these moments in their respective directions, we find the resultant moment to be about 22.7 inch tons,