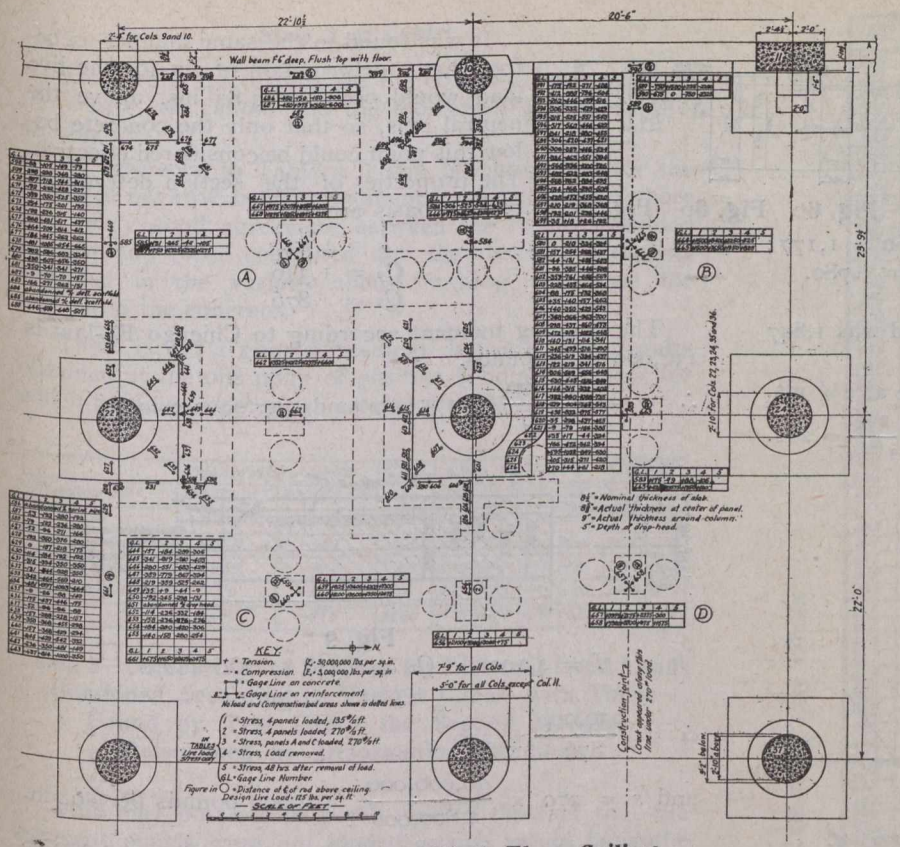

Fig. 4—Plan of Sixth Floor Ceiling

This corresponds to an extreme fibre stress in the concrete of $4,230 \times \frac{2,800,000}{30,000,000} \times \frac{9\frac{1}{4}}{6\frac{1}{4}} = 584$ pounds per square inch.

$$\therefore \frac{125,000 \times 22.43 \times 12}{x} = 1,612 \times 584$$

whence $x = 36$.

The average extreme fibre stress in the concrete for total load as found above was — 476.

$$\therefore \frac{125,000 \times 22.43 \times 12}{x'} = 3,140 \times 476$$

whence $x' = 22.6$.

The average of x and $x' = 29.3$ or, roughly, 30.

$\therefore$ the moment as found from test is $\frac{WL}{30}$, which agrees with the Chicago By-law and also very closely with the Philadelphia By-law.

Strip B at Centre of Panel

In Fig. 8 the position of the neutral axis has been determined as before from deformation readings 800, 801, 659 and 660, the average of readings 800 and 801 being 3·9 and the average of readings 659 and 660 being 1.35.

The width of strip B has been taken as $\frac{L}{2}$ and the area of steel assumed according to the Chicago By-law.

Using the greater of the deformations found for the reinforcement, *viz.*, 1.6, it is found that the concrete below a point about 5/8 in. from the lower surface is overstrained in tension. Therefore, only the concrete above this point has been considered as effective cross-section in computing the moment of inertia and section moduli of the section which follow:—

$I = 7,195$
$Q_t = 2,620$
$Q_c = 1,410$

According to Chicago By-law, $M_c = \frac{WL}{120}$

$= 280,000$ inch-pounds.

$$\therefore \quad c_t = \frac{280,000}{2,620} = 106$$

$$\text{and} \quad c = \frac{280,000}{1,410} = 200$$

Using the extreme fibre stress of 106 pounds per square inch in the concrete, the computed stress in the steel is $106 \times \frac{1^{13}/_{16}}{2\frac{3}{4}} \times \frac{30,000,000}{2,800,000} = 750$ pounds per square inch.

The average live load stress found from readings 659 and 660 is 1,012 pounds per square inch, which corresponds to a total stress of $1,012 \times \frac{246}{135} = 1,847$ pounds per square inch or more than twice that found by using the Chicago Code, taking into consideration tension in the concrete.

The average live load stress found from readings 800 and 801 is 341 pounds per square inch, which corresponds to a total stress of $341 \times \frac{246}{135} = 622$ pounds per square inch compression in extreme fibre of concrete, or more than three times that found by Chicago Code, taking into consideration the tension in the concrete.

The stresses computed by the other by-laws are given in Table 3.

To find the bending moment which corresponds to the stresses ascertained by test, we have as before

$\frac{WL}{x} = Q_t c_t$ and $\frac{WL}{x'} = Q_c c$ where x and x' are the required coefficients.

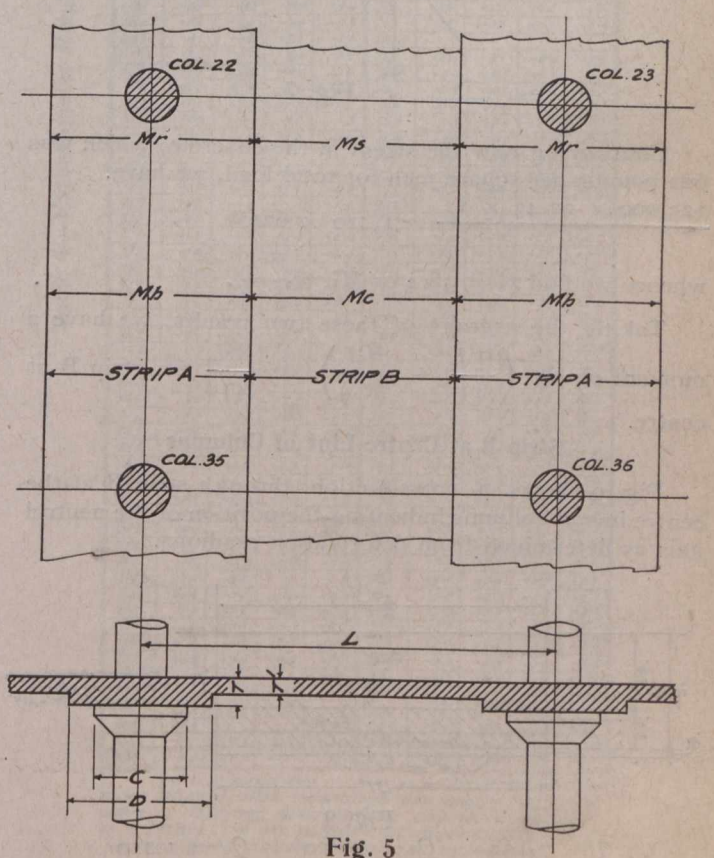

Fig. 5