

does not seem excessive. The cross braces in the floor, due to the intervals between the lengths of cells, have not been considered in the estimated strength of the floor. Their value in holding the joist against lateral strain is unquestionable and they serve also to distribute the load upon the floor. The increased width of the beams at the top, due to the flaring sides of the moulds gives increased resistance to crushing, while the narrower bottom, enclosing the steel, is sufficient and economical.

The calculated strength of the floor is entirely in the beams. That is to say, the floor sheet is not expected to increase the compressive strength of the joists as in the T beam. The floor, reinforced with a woven wire fabric simply applies the load to the beams.

In casting this work the supporting columns are poured first and are left over night to shrink. The girders and beams follow, being also allowed to shrink, after which the floor sheet, almost a separate item, is cast and finished with cement and granite.

This method of working has been followed upon finding that heavy members need time in order to avoid cracking at the junction with the thin floor sheet. It has been found that the floor sheet may be cast at any convenient time, care being taken to clean the upper surfaces of the beams to secure good contact with the floor. In fact with a sufficient number of boxes or cells an entire building may be constructed, casting the posts, girders and joists, but leaving the floor sheet to be placed after the building has been enclosed. Where mosaic floors are required it may prove economical to lay them at once on the wire fabric without going to the expense of the preliminary floor sheet. This, however, has not been verified. For attaching the ordinary ceilings to this construction small strips of wood are cast into the bottom of each joist and secured by bent nails, thus affording a ready means of applying the furring strips for the ceiling. These in turn give the needed spaces for pipes, etc. Upon the furring strips wire lath or plaster board is nailed and plastering is applied.

The false work for posts and girders is composed of dressed planks put together in the ordinary way. These parts suffer the least injury in removal and may be set up a good number of times. The cells rest upon the girder boxing where adjacent, forming the false work for the upper part of the girders. In other locations they are supported by the plank scaffolds above described or upon the inside edge of the walls. In all places they are carefully levelled so that the concrete cannot penetrate between the scaffold planks and the cells. A few nails from below hold the cells securely to the plank.

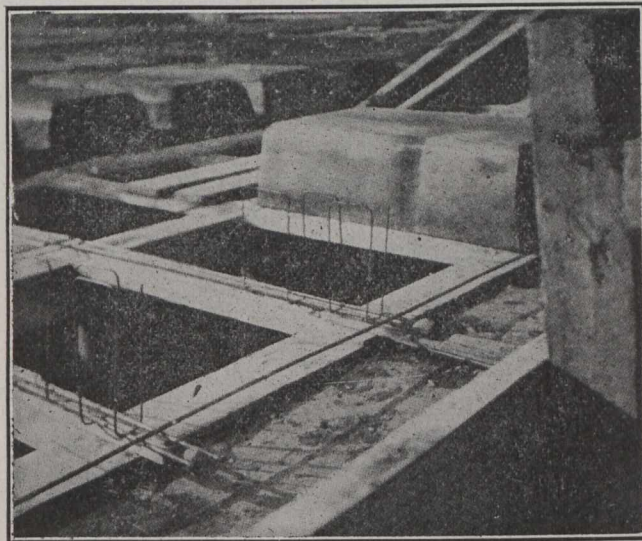
The spaces between ends of cells may vary somewhat, where convenient. Nice adjustments do not give great results where labor is expensive. Making the joists narrower on one side of a girder than on the other, on account of a slightly shorter span does not bring final economy at times. It is simpler to make the "lay out" regular and strong enough for the longer span.

Posts and girders are incidental to all floor construction of large areas. Concrete posts are the least desirable element of concrete work because of the necessarily large size as compared to their length. Their elimination by increasing the spans of the floor seems to be the present solution of this problem.

With the completion of the false work the floor is ready for placing steel and casting concrete. The supporting columns are poured first and while the concrete is settling the steel is placed in the girder and joist channels. The "unit stirrups" are set in the ends of the girders and joists, being held up from the bottom of the forms by the small wooden strips to which the ceiling furrings are to be nailed

later. The stirrups confine the tension rods of the beams. The steel is laid in the girders and joists of the entire floor before any part is covered with concrete. It may be inspected all together, corrections made, and the pouring is then begun. As fast as the joists are filled with concrete the counter flexure rods of the joists are floated in the concrete, extending over the girders and the work is ready for the floor sheet. At the end of the day's work the concrete of the joists and girders is dammed off at the center of the spans and the work is resumed the next day.

The second day's work usually begins with pouring the floor sheet on the area completed the day before. The woven steel fabric is unrolled over the surface and the concrete poured upon it. When sufficiently hard the surface finish is



Details of construction. Planks extending in both directions, supporting the cells. The steel stirrups are set in place for demonstration only. Note the stirrups enclosing the rods, and standing without supports.

applied and the floor is completed. The pouring of the remaining joists follows the part of the sheet, using a half day on the sheet and the other half day on the joists and girders so that no part of the unfinished floor is more than one day old.

Practice has shown that the floor sheet is not separable from the joists even when poured after the joists have been set for several days. The finishing of the surface of the floor must be done of course soon after the sheet is poured. The entire work is allowed to set for three or four days before the mason work of the walls is allowed to proceed, but no stripping is done until after fourteen days. The girders and posts are then stripped and the cells are drawn out from underneath. For this work a chain about the interior framing of the cell is looped over a stout lever and one end of the box is started, whereupon it falls out, ready to be used over again. Small shores are then placed under the joists and left for a short time.

The cells first made at the University were built of pine sheathed with yellow pine flooring quite smooth and carefully put together. These cells were successfully drawn and were used fifteen times without a great percentage of loss. Their cost was approximately two dollars and fifty cents each. Each cell presented twenty-eight square feet of surface making a first cost of eight and nine-tenths cents per square foot. After fifteen casts the cost per square foot remained at about nine-fifteenths cents per square foot, assuming that the cells were then worthless. The contractor then covered them with sheet iron, at a cost of one dollar