

sometimes throughout the pile, when reinforced in the ordinary manner, by the shock of the hammer when the pile is driven.

A reinforced concrete pile recently designed by Mr. Frank B. Gilbreth is called the Corrugated Reinforced Concrete Pile. The character of this pile will be understood from the cross-section shown in Fig. 260.

The piles taper uniformly from the butt to the point. The piles used for the foundation of the Lattemann Building, in Brooklyn, N. Y., were 16 ins. in diameter at the butt and 11 ins. at the point. Each pile is cored in the center, the core being 4 ins. in diameter at the top and 2 ins. at the bottom. A water jet is operated through the core for sinking the pile. The sides of the pile coincide with the planes of an octagon, and are fluted at their middle by corrugations, the sections of each of which is a segment of a circle  $2\frac{1}{2}$  or 3 ins. in diameter. These corrugations form pas-

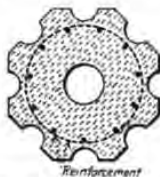


Fig. 260.—Gilbreth Corrugated Pile.

sages for the escape to the surface of the water forced through the core-hole in sinking the pile. They also increase the perimeter of the pile, giving a greater surface area for skin friction.

The piles are reinforced both transversely and longitudinally. Clinton Electrically Welded Fabric, with meshes  $3 \times 12$  ins., was used for the pile here shown. The longer dimension is placed lengthwise with the pile, and is of No. 3 wire, while the horizontal transverse reinforcement is of No. 10 wire. No part of the reinforcement is closer than 1 in. from the outside of the concrete. For piles under ordinary conditions, only sufficient reinforcement is used to care for stresses due to handling. A greater area of metal should be used where severe conditions are met with, or where eccentric loading or bending will be brought upon the pile.

The piles are formed in moulds made of 2-in. plank. The corrugations are formed by nailing pieces on the inside of the form

whose section is the segment of a circle. The sides of the form are fastened to end pieces, through which the core projects 6 or 8 in. During the progress of the moulding the central core is at intervals given a partial turn to prevent the setting of the cement holding it fast and prevent its removal. The forms are usually stripped from the piles from 24 to 48 hours after moulding, and thereafter the pile is kept moist to permit the proper action of setting to take place. This may be accomplished by covering the piles with burlap and sprinkling them from time to time. The piles should not be driven until they are at least 10 days old.

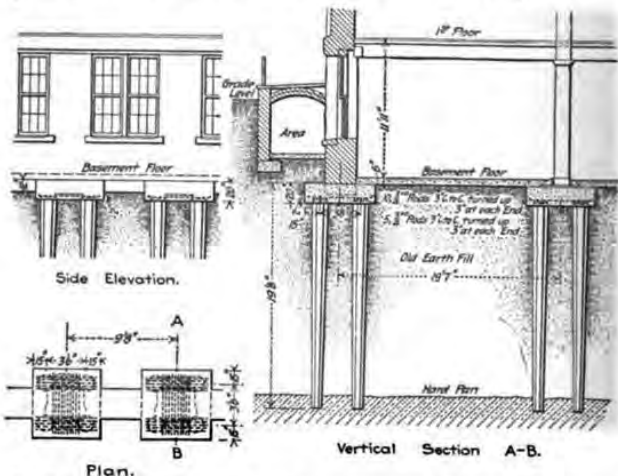


Fig. 261.—Gilbreth Pile Foundation for Lattemann Building, Brooklyn, N. Y.

The manner in which these piles were used for wall and column foundations for the Lattemann Building, Brooklyn, N. Y., is shown in Fig. 261.

**Moulding Piles.**—Piles may be moulded either vertically or horizontally, but much better results are obtained when they are moulded vertically. The shocks due to the action of the pile-driving hammer when driving are resisted by the concrete in a much better manner when the layers of the concrete are normal to the direction of application. Again, the principal stress carried by the pile is compression, and it is also best cared for when