CONSTRUCTING THE WALLS OF A REINFORCED CONCRETE FACTORY ON A HORIZONTAL PLATFORM.

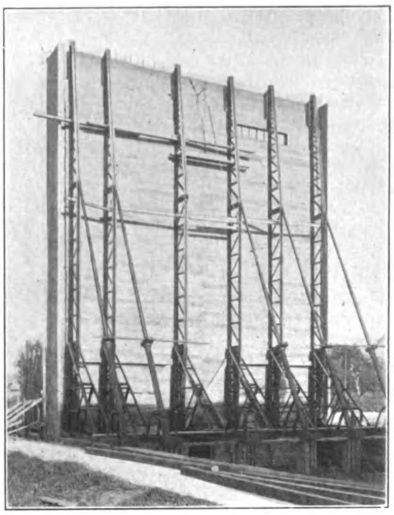
A reinforced concrete three-story and basement factory building 40 ft. high is now being constructed in Rogers Park, Ill., by laying out the walls on a horizontal platform resting on steel jacks, which raise the completed walls to a vertical position after the concrete has set. The building, which is 34 x 82 ft. in plan, is the first of a series of structures to be built by the Uno Manufacturing Company, which proposes to manufacture various toilet preparations that make a fireproof building desirable. To further this end, United States steel sash, tin-clad doors, concrete floors and partitions are used.

The walls of the building consist of 12-in. curtain walls between 16-in. pilasters spaced on 16-ft. centers. To conform with the building ordinance the first-story curtain walls are 16 in. thick. The 2-ft. 8-in. pilasters are reinforced vertically with eight ½-in. twisted steel bars. In the curtain walls ⅜-in. round bars are spaced 12 in. apart both ways in both the inside and outside walls. The horizontal bars run through the pilasters. At the corners the rods extend 12 in. beyond the concrete to tie into a 12 x 12-in. corner piece cast after the side and end walls have been raised.

The foundations were built before placing the jacks, which are of the Aiken patented type. The end of the chair supporting the pin around which the walking beam revolves, is placed on the footing. The other end is blocked up from the basement floor. For the sidewalks the jacks were placed 8 ft. apart. The worm gearing operating the telescoping 9-ft. screws, used to raise the slab to its vertical position, was driven by a continuous shaft to which power was transmitted by a belt from a 5-hp. steam engine. The side walls were raised in eight hours. When in position the slab was still supported by the jacks at the toe and back, by planks bolted to upturned angles and by bolts 3 ft. apart along each walking beam, fastened to 4-in. pieces of 6-in. channels embedded in the concrete. Shear on the ⅝-in. bolts and the toe amounted to the total weight of the wall, 250 tons, minus the friction of the concrete on the form.

The slabs were cast within the building with the outside of the walls face up, so that the finishing of ornamental work is all done on the flat, similar to sidewalk construction. A coat of Bay State waterproofing was applied.

On the ends of the building double walls are used, with a dead air space of 4 in. between the 4-in. inner and 4-in. outer walls of concrete. This space was obtained by depositing a layer of sand on top of building paper laid over the 4-in. layer of green concrete. Building paper was then placed on top of the sand and the top or outside of the wall poured. The process was continuous, as no time was allowed for setting. When the end walls were raised sufficiently the sand was rodded out of holes left for the purpose in the bottom of the walls. For the sidewalls a mixture of coke and enough cement to hold it together, about 1:8, was used in place of sand to form the insulation between the two walls.



Forty-foot Wall Jacked Up.

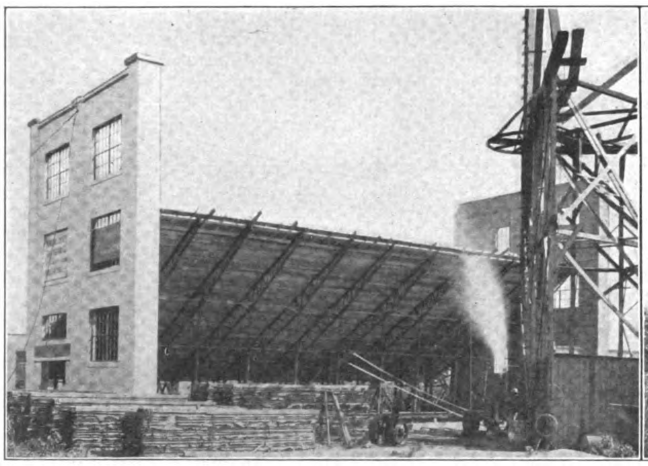
Grooves for partition walls and floors were left in the side-walls by nailing two strips to the platform and filling in between the strips with sand. Holes for the beam boxes were also filled with sand, placed inside of hollow forms. Special frames were made to hold the steel window sash in place.

For the platform 3 x 6-in. tongue-and-groove yellow pine was laid in random lengths. It was not nailed down, but held to the walking beams by bolts about 18 in. apart to keep it from warping. As soon as the whole platform was laid every other bolt was removed, and the channels mentioned above fastened to the remaining bolts to secure the wall to the walking beams. After the slabs had set for two days it was raised to place, care being taken to anchor the tail end of the jacks to the concrete floor by cables with turn-buckles and also by weighting with sand bags. The center of the wall is about 16 in. outside of the supporting pin and very nearly over the ends of the chairs. A clearance of 2 in. between the foundation and bottom of the wall provides a space for grouting.

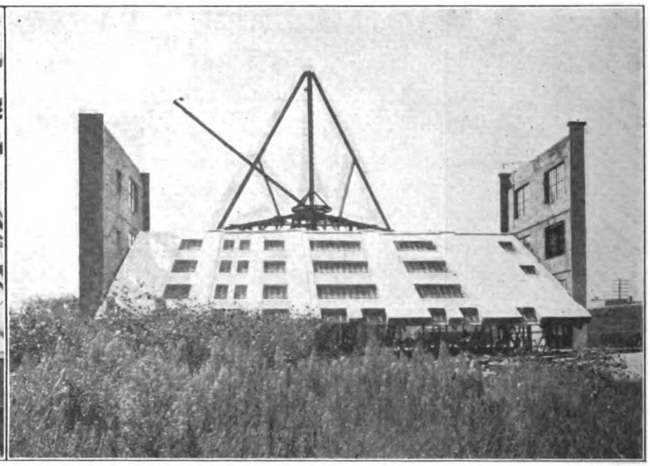
Both end walls were laid out at the same time and raised one after the other, as there was plenty of room within the building lines for the platforms. But one side-wall could be cast at a time, on account of the narrow width of the building. As a protection against the overturning action of wind pressure after the removal of the jack machinery supporting the wall, a cable with turn-buckle was run between eye-bolts embedded in the tops of the walls. On the outside two cables were run from the eye-bolts to dead men about 50 ft. away. Turn-buckles were placed in each cable. Although the cables were left slightly slack during a severe windstorm, which caused a great deal of damage to boats on the lake, the engineers did not note any tightening on the guys. It is estimated to require a wind pressure of 25 lb. per square inch to overturn one of the 250-ton side-walls having a 16-in. base.

A unit floor system is to be used in which the lower 2⅜ in. of the 6-in. floor is cast in 3 x 15-ft. slabs in the stock yard, one on top of the other with building paper between each slab. The process is a continuous one. Thirty or more slabs were cast in a single pile. The 200 required for all the floors in the building were poured in four days and stand in six piles. The reinforcing bars are threaded through the forms. Six ½-in. twisted steel bars are used longitudinally to take all of the tension stresses and ¼-in. round rods spaced 12 in. apart transversely are used to make the longitudinal joint and for temperature stresses. When ready to place the floors these slabs are raised by derrick and placed on top of the beam boxes. Their length is such that they come just to the inner edge of the box, but the reinforcement projects across the beam. A 6-in. joint is left between the sides of the slabs and a 10-in. plank placed under the joint to support the slab as well as to make a form on which to place the concrete.

Concrete is mixed throughout in the proportions of 1 part Universal Portland cement to 2 parts sand to 4 parts gravel or broken stone, passing a ¾-in. ring. The Clover Leaf ½-yd. mixer used is set in a pit so that materials can be dumped into it from wheelbarrows



Raising a 250-Ton Side Wall.



Front of the Same Wall.

without climbing an incline. To prevent jarring and to let the concrete ooze out slowly from the bucket, which is of the Lakeside type, legs have been placed on the bucket so that it can be set down on the platform directly over the point where the load is to be deposited.

A specially designed derrick with the 12-ft. bull wheel placed 35 ft. above ground is used to place the concrete and handle all materials. The 50-ft. boom covers the whole area of the building and storage space at the sides of the derrick. The apex of the triangular frame over which the 30-ft. mast is erected is placed 15 ft. away from the center of the side of the building, leaving space on one side of the frame for the concrete outfit and on the other for a stockyard. The ends of the framework and the apex are all anchored down to 4-ft. concrete cubes by cables. The 3-drum Mundy hoisting engine handles a load of 4 tons.

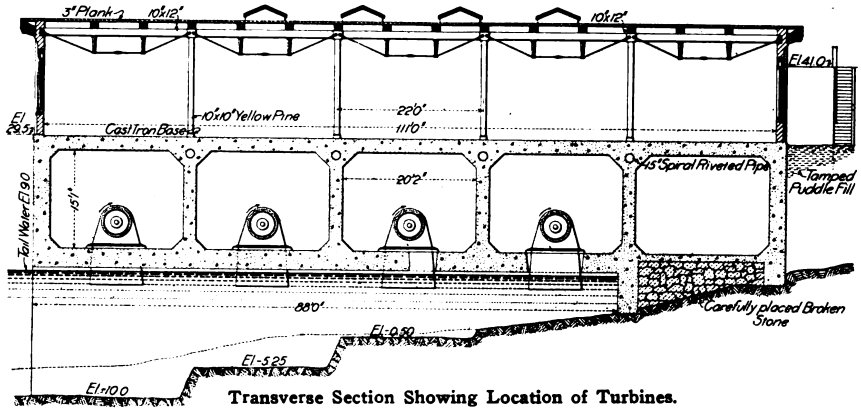
The building cost about 12 cents a cubic foot, including an electric elevator, heating, plumbing and gas fitting. It is being erected by the Monolithic Concrete Construction Company, of Chicago.

AN ELECTRICALLY OPERATED BLUE PRINT MACHINE is used for making prints for all municipal departments at St. Louis, Mo.; during the past year 15,900 prints were made. The cost per square foot, including labor, material and depreciation of machine, for making blueprints was 1.5 cents; for blue-cloth prints, 6.4 cents; for brown prints, 3.4 cents; for black prints, 5.4 cents.

THE HYDRAULIC DEVELOPMENT FOR THE PEJEPSCOT PAPER MILL.

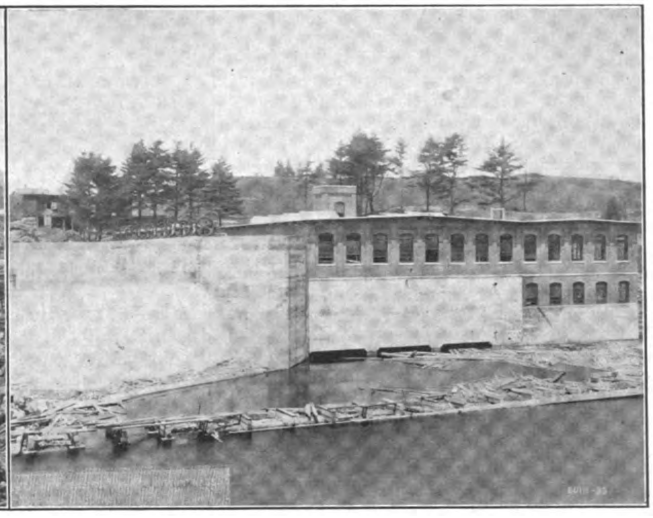
A hydraulic power plant is now nearing completion on the Androscoggin River near Brunswick, Maine, which was designed primarily to utilize the waste flow during the night and in high water season from a mill already using part of the water power at the same point. The old plant, located on the west bank of the river, uses a timber dam closing off the flow between two high rock abutments that here border the stream, as shown in one of the photographs, and the new development has provided a passage for the water behind the rock abutment on the east bank. A concrete dam 135 ft. long was built to preserve the water level in this new channel and from the dam water is passed through the wheel into the same wasteway which serves the mill on the opposite bank. The development is being done for the Cabot Manufacturing Company, owners of the old plant, and the new plant and the power rights have been leased to the Pejepscot Paper Company for a long term of years.

The river bed is of solid granite and the first step in the construction work was the erection of two cofferdams at different levels, enclosing about 106,000 sq. ft. on the east bank and just below the timber dam. About 4223 cu. yd. of rock were excavated and the construction company planned the work in such a manner that the stone as blasted was crushed and used in the concrete. The general arrangement of the construction plant consisted of one derrick, located at the point of excavation, and one at the stone crusher, both connected by two industrial tracks running on trestles which were shifted in accordance with the location of the blasting. The former derrick lifted the skips filled with rock on to flat cars while the latter took them off and dumped them in a pile from which the stone reached the crusher by a conveyor. Below the crusher was the concrete mixer which discharged into cars running to the various parts of the work on an industrial track.

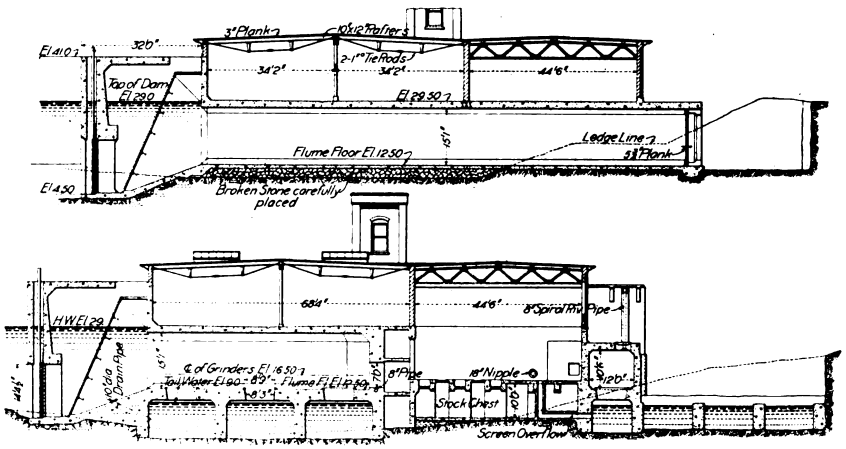


Transverse Section Showing Location of Turbines.

Old Timber Dam and New Plant Site.



New Power House and Spillway after Completion.



Longitudinal Sections through Long Flume and Grinder Room.