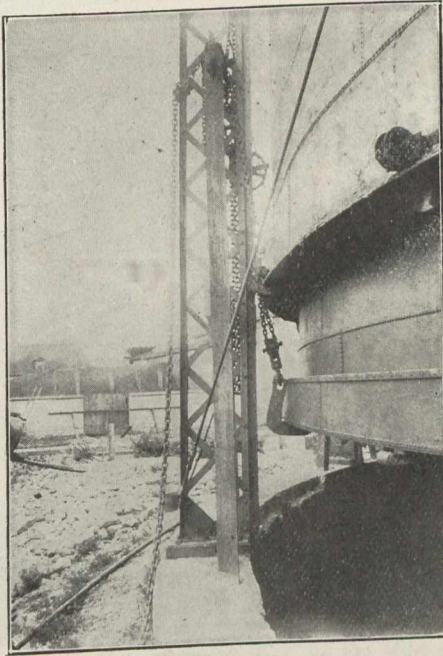


tractors have been successful may be judged from the notices in local Kingston papers, which speak in the highest terms of the nature of the work and the satisfactory tests which have been made since the work was finally completed. A brief mention of the events leading up to the final reconstruction of the work may be of interest. There was completed during the fall of 1907 a concrete tank and a two-lift steel holder for the Heat, Light and Power Department. The steel holder was constructed by Messrs. Davis & Farnum Co., Waltham,



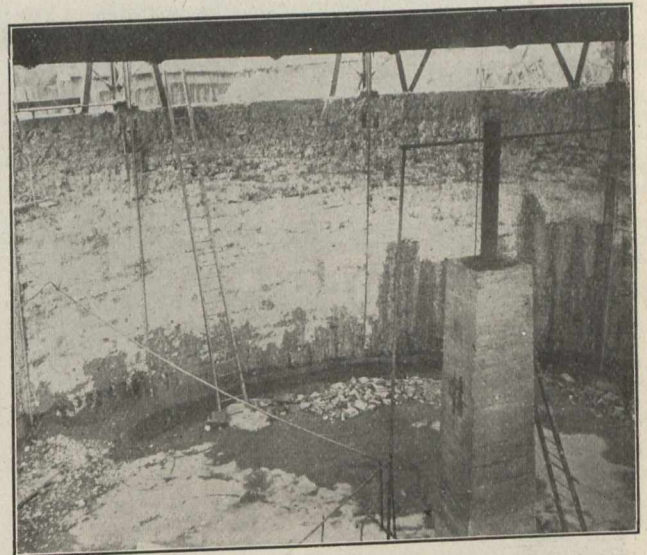
**Suspension of Tanks, showing One of the Ten Columns.**

Mass. It had a capacity of 150,000 cubic feet. The tank was constructed of concrete by a local contractor under the supervision of Mr. J. M. Campbell, then manager for the Heat, Light and Power Department. In the fall of 1907, before filling tank with water, it received a good coating of coal tar and resin, which adhered well to the walls and bottom. When water was put in it settled as much as two feet in twenty-four hours, or 69,000 gallons per day, and as much as 23,000 gallons per day after being tarred, still a large leakage. In the spring of 1908 the tank was put out of commission and the water pumped out. A general inspection was made, and several bad leaks were located. Mr. Campbell then arranged with the Warren Bitumen Co., of Rochester, to waterproof the interior of walls. This coat consisted of three layers of tarred felt, with a cap sheet, making four ply, all told, with a coating of No. 4 pitch between each layer. Both sides and bottom were thus treated. Then four inches of concrete of a 1:2:4 mixture was placed in the bottom of the tank. The paper sagged out for several inches in places along bottom of walls. It was originally intended to put a layer of three inches of concrete against the paper to hold it to the main concrete wall. This idea was abandoned, and instead a four-inch brick lining against the tarred felt was suggested. The question resolved itself into whether to make the tank watertight or condemn it entirely and build a new one. Several suggestions were made as follows: (1) Take off felt and rack the walls to a rough surface so that a new coating of cement and sand (2 to 1) of  $\frac{1}{2}$  or  $\frac{3}{4}$  of an inch in thickness be trowelled on. (2) To take off felt and roughen surface and erect

wooden forms, so that three inches of concrete might be placed against the present main concrete wall. (3) Leave paper on and line with brick, (four inches) embedded in cement. (4) Put in steel lining, with a 3-inch flange at bottom, this flange to be covered with a good, strong mixture of concrete. (5) Raise both lifts and blow up present concrete wall and build a new one.

In regard to No. 4, it was considered too expensive, as was also No. 5. Nos. 2 and 3 were thrown out as the space between the holder and concrete was small. It would be necessary to cut off about two inches of the flange or cut away the masonry to allow the laying of brick on the concrete. In the meantime several methods were used to stop the leaks. The driving of a small wrought iron pipe, about  $\frac{1}{8}$ -inch, into wall where leaks were the worst and fill up the other leaking places. Also, the leaks were plugged with clay and mortar. Over this was trowelled on a strong mortar of cement, alum and sand, but this was forced or eaten away. Several loads of manure were scattered upon the surface of the water, and a mixture of three parts of bran and one of cement was put on the water close to the concrete wall to draw it into the openings.

A report made to the Light, Heat and Power Department of the Kingston council by Mr. W. E. McKay, consulting engineer, Boston, during November, 1908, based on the specifications for the tank construction, personal inspection, and information furnished by the Kingston council contains a criticism of the conditions under which the concrete work was built, as well as several details of the specifications. The following is a



**A View of the Interior showing the Crumbled Condition of the Original Wall.**

portion of this report in so far as it deals with the manner in which the concrete work was originally carried out:—

(a) The concrete to be composed of one part cement, three parts of coarse sand, and six parts of broken stone, and that the largest piece of broken stone shall pass through a two-inch ring, and that large stones may be placed in the concrete work.

(b) That the concrete wall is to be approximately two feet thick.

2. The specifications may be adversely criticized in the following details:—