trolley rails on the bridge, ranging from 0.5 to 1.5 volts. These readings were taken when the car traffic was light. Some of the cracks on the concrete had been plastered over, but others were quite visible. The tests indicate that the trolley tracks on the bridge are in connection with the steel structure. Tests were also made on another bridge of the same construction a little farther north over the same canal, at 9th street. The readings here were exactly the reverse of those found at the Hamilton Avenue Bridge, the structure being negative to canal, to water mains and tracks. There were no visible cracks in the concrete of either foundation. Although the cracks in the concrete of the Hamilton Avenue Bridge are attributed to other causes in the Commissioner's report, we believe these tests and observations point strongly to electrolytic action from trolley currents as being the true cause. This seems to us the more reasonable cause for these cracks, in view of the results of our laboratory experiments just described. Ordinary care would suggest that costly structures of this kind in this or other cities should be periodically inspected for evidence of electrolytic action upon the interior steel work, especially if located contiguous to water, or in the vicinity of electric railways or railway power stations as in the case just cited. Furthermore, this question should be carefully considered when such structures are planned, and tests made at locations of proposed bridges or other structures to ascertain the electrical conditions and the possibilities of injury due to electrolysis from stray currents.

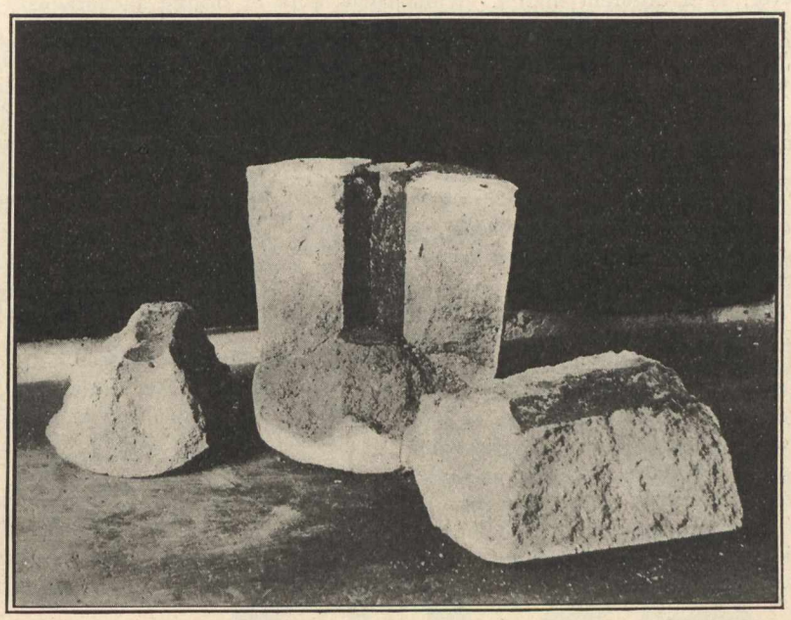

Fig. 6.

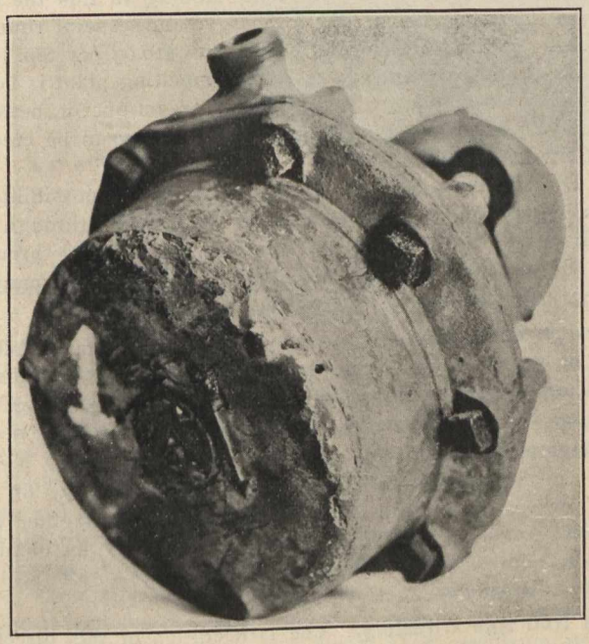

Fig. 7.

This question of electrolytic corrosion of interior steel in the construction of high buildings, however, has not been entirely neglected. There is at least one case, that of the New York "Times" Building, where provision has been made in advance as a protection. In the "Building Supplement," issued by that paper, dated January 1st, 1905, an interesting description is given in detail of the entire construction of that building. The following extract, referring to electrolysis, will be of interest:

The danger that in the case of the steel frame, rust and the disintegration of electrolysis would hasten the process of dissolution so much as to make structures of this kind prematurely unsafe through the destruction of their supports, was recognized in time to permit of ample safeguarding in the case of the steel frame of the "Times" building. It is axiomatic that columns to which moisture has no access will not be impaired by rusting, and that those effectually insulated from vagrant electrical currents will not be affected by

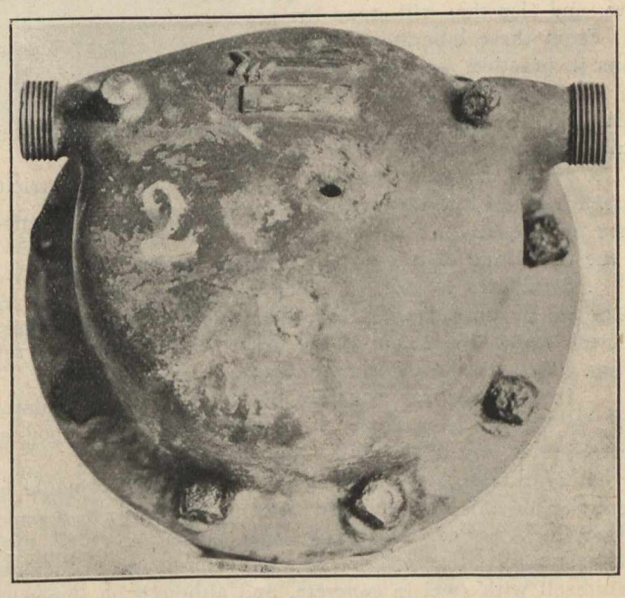

Fig. 8.

electrolysis. The first consideration was to keep the basements dry. Hence the thorough waterproofing and draining of the retaining walls already described, which was carried under the floor of the press room occupying the great area of the sub-basement. As a further safeguard, all the steel members up to the street level are incased in Portland cement mortar, to the minimum thickness of ¾ inch. This is effectual protection against rust deterioration. Under these conditions electrolytic disintegration is deemed im-