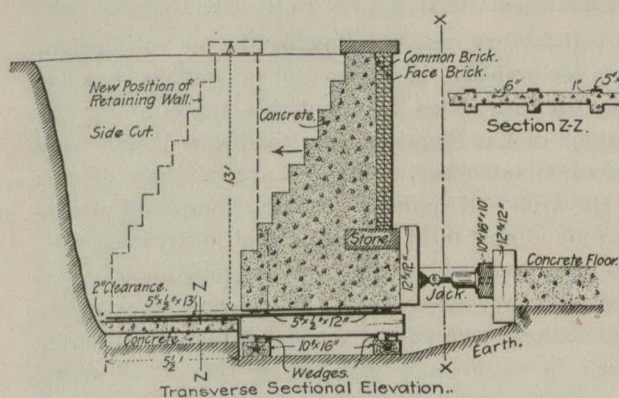


## MOVING A LONG BRICK WALL.

The following description and illustrations of the methods employed to move a long brick retaining wall in New York, taken from the Engineering Record, of that city, should prove interesting and instructive to Canadian contractors who may some day find themselves confronted by a problem of this kind:—

The first portion of the New York Rapid Transit Railway structure which was completed ready for the track rails was a section a few hundred feet long on Broadway, north of West 135th street, section 13. It was



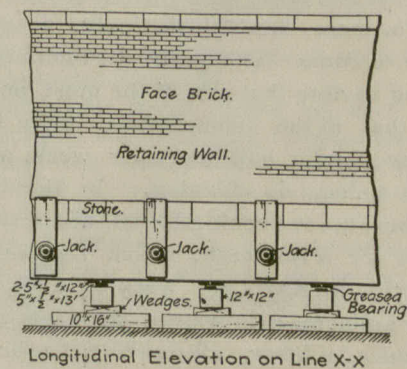
METHOD OF MOVING RETAINING WALLS ON NEW YORK RAPID TRANSIT SUBWAY.

built by L. B. McCabe & Brother, sub-contractors for sections 12 and 14, and was finished nearly a year ago. It was constructed of the standard dimensions and design for two tracks, but as recent developments have made it desirable to have three tracks at this point for operation of the railway, the Rapid Transit Commission authorized the contractors to change it to a three-track structure, and this work is now in progress. At about One Hundred and Thirty-fifth street the tracks begin to descend northwardly from the surface of the ground to enter the underground section, and there is an inclined entrance in open cut to the beam-construction subway. The bottom of the cut has a solid concrete floor, continuous with the footings of the retaining walls on each side. It was decided to cut through this floor parallel, and adjacent to, the face of each wall, and to move each wall backward parallel to its original position  $5\frac{1}{2}$  feet farther away from the centre line, to permanently seat them in their new positions, and to restore and extend the concrete floor between them, so as to secure the wider structure without destroying the original masonry.

The retaining walls are about 196 feet long, from 4 feet high at the south end to 13 feet high at the north end and 3 feet thick on the top, battering with irregular offsets on the rear to a maximum bottom thickness of 8 feet. They are faced with 9 inches of brickwork, built with one course of pressed brick and one of red brick, and have a line of footing stones built into the concrete base under the brickwork at floor-level. After removing the concrete floor close to the wall, and making, on the opposite side, an excavation about 6 feet wide at the bottom, small holes were worked through the earth under the footing and 12x12-inch transverse timbers, about 8 feet long, were set in them from 3 to 5 feet apart, according to the height of the wall. A  $5 \times \frac{1}{2}$ -inch steel track-plate, 13 feet long, was laid on top of each timber, and  $5 \times \frac{1}{2}$ -inch sliding pieces, 12 inches long, were laid across them longitudinally,

under the front and rear edges of the footing. A 10x16-inch longitudinal sill was laid flat under each end of the transverse timber, and the latter was given bearing on them by driving a pair of thin oak wedges side by side on top of each sill. The sills were so long that their ends nearly touched in the middles of the spaces between the transverse timbers, and practically formed two continuous bearings, each 16 inches wide, under the wall. Back of the wall a concrete footing,  $5\frac{1}{2}$  feet wide and 6 inches in minimum thickness, was laid with deeper transverse ribs on the centre line of track-plates, which were 1 inch above its upper surface, and bedded in cement mortar. The oak wedges were driven until the wall was slightly raised, and after the concrete footings had set a week or more, jack screws were placed horizontally from 3 to 6 feet apart against bearing pieces on the foot of the wall and on the edge of the concrete floor, and, being simultaneously operated, in a few hours pushed the whole length of the wall  $5\frac{1}{2}$  feet transversely to bearing above the new footing.

The screws were turned at given signals, and great care was taken to keep the wall lined in, so that no transverse strains or distortions were developed. A transit was set up and a sight taken parallel to the axis of the wall, a few inches from the required position of its face, and offsets were taken from it to make sure



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that the wall should not be moved too far and to check its position. At the end of the moving the wall was found to be less than 1-16 inch out of line or level, and no cracks or injuries could be discovered. Where the wall was highest the blocking had settled a little and given the sliding plates a slight upward inclination, and the face of the wall had to be raised slightly to plumb it. The space was about  $1\frac{1}{2}$  inches between the top of the new concrete footing and the bottom of the old wall, which was left between the sliding plates for clearance of the irregularities of the concrete, was grouted, the timber removed, the steel track plates cut off flush with the face of the wall, the excavation back-filled, and concrete put in to restore and extend the floor. The estimated weight of the wall was about 200 tons, and the preparatory work and moving was accomplished in ten days by twenty men under the direction of the Terry & Tench Construction Company.

A cement to resist white heat is made as follows: Pulverized clay, 4 parts; plumbago, 2; iron filings, free from oxide, 2; peroxide of manganese, 1; borax,  $\frac{1}{2}$ ; sea salt,  $\frac{1}{2}$ . Mix with water to a thick paste, use immediately, and heat gradually to a white heat.