

The general plan of track elevation in Evanston consisted in placing the steam railroad on an earth embankment, using retaining walls where the width of the railroad land was not sufficient for side slopes. At the street crossings, the bank was supported by abutments and the tracks carried over the streets on bridges, having three lines of columns in the streets, two at the curbs and one in the middle, dividing the street into right and left driveways. Travel was first diverted on a temporary track at one side of the permanent line, and pile trestles were then built on the permanent location over the streets and a sufficient dis-

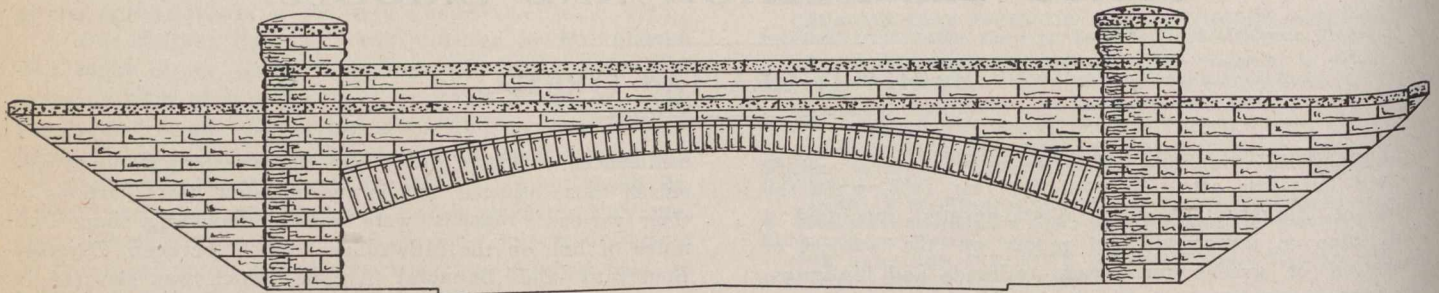


Fig. 2.—Main Street Crossing, Springfield, Mass.

tance at each side of the street to allow space for building the permanent abutments. In several places where the streets are fairly close together, the trestles were made continuous.

The railroad companies did all work at their own expense, unassisted by the city, and where street paving was removed for foundations, it was relaid by the railroad company. The driving of piles was carried on day and night with drop hammer pile drivers, and some Naysmith hammers making blows at intervals of two seconds. On the Melrose branch, only a part of the street crossings are bridged at present, the remaining ones where travel is light, being filled with earth banks, which can be removed and bridges substituted when the condition of travel demands it.

Much caution was needed in driving piles at the street crossings to avoid injuring the city sewers and water mains. When sufficient pile trestle work was built, sand filling was brought in by train and the bank made. The temporary side tracks were then removed and all travel turned over the bank and trestle. At several of the streets, when building

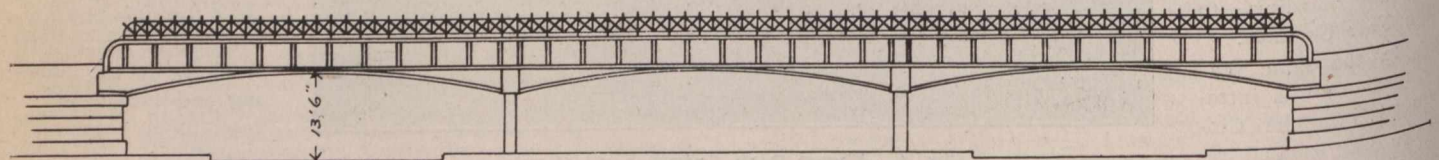


Fig. 3.—Garfield Boulevard Crossing.

abutment foundations, so much water was encountered that sheet piling was necessary. Two-inch tongue and grooved plank was used for this purpose and water pumped out of the excavations with hand pumps. Oak piles were driven in the excavations and were cut off three or four feet below street grade with hand saws.

Concrete was used almost exclusively for abutments and retaining walls, side walls being used only where the width of right-of-way is insufficient to hold earth slopes. Low walls are used in some cases near the toe of slope where enough land width was not available. High retaining walls are paneled on the face, but lower ones are plain, excepting for the presence of a coping. Vertical joints are left at distances of 15 feet apart for expansion. Little or no effort was made to remove form marks from the abutment faces, and these are very evident. Walls and abutments are of

the solid gravity type, with backs stepped rather than sloped, and waterproofed with a coating of tar or asphaltum, which in many cases is not proving effective. Three lines of old rails are imbedded in the concrete, and at places where new walls are joined to old ones, a dovetailed joint is provided which not only permits expansion, but holds the two adjoining parts together.

Where the Northwestern Elevated Railroad adjoins the steam road, columns in the street correspond with those for the steam railroad bridges. The foundation in the centre of the street consists of a continuous wall pointed at

the ends to serve as wheel guards, and standing a foot or two above the street level. On these walls are reinforced concrete columns, two under each line of track, with eight bars in each column, the four corner bars being larger than the others. At the depots are retaining walls between the steam railroad and the Northwestern Elevated Railroad, continuing far enough back from the street to form inclined driveways 24 feet wide, leading from the street up to the elevated grade. Stairways are built into the abutment faces at the depots, which lead up to the elevated platforms and shelters.

**Grade Elevation in Other Cities.**—Various methods of grade elimination have been used in other cities, differing considerably in cost and appearance. All of these may be divided into two general classes,

(a) Those where the track is depressed,

(b) Those where the track is elevated.

The Boston and Albany Railroad through the Newtons, Mass., adopted a plan of depressing the railroad tracks and carrying the streets over on ornamental bridges. There is

no doubt that this arrangement produces the most satisfactory results as far as the aesthetic effect is concerned, for the trains are then below the general level of the ground and there is no unsightly bank to obstruct the view, and divide the city into two parts. At Newton, in the vicinity of the depots, the side slopes are sodded and planted with flowering shrubs, which serve not only as ornaments in summer, but also to unite the soil and prevent the banks from sliding.

Adjoining Forest Park, St. Louis, the Wabash Railroad adopted the plan of elevating the tracks on a bank of earth 15 feet in height. A view of this elevation at the main part entrance is shown in Fig. 1. The bridge over the main drive is quite a satisfactory solution of the problem as far as that feature is concerned, but the high embankment remains as a disfigurement to the otherwise beautiful surround-