

Typical signal location on four-track line showing the signals, inductors and the concrete house. Note the grade marker at the right



# Signaling for Higher Train Speeds

**New York Central replaces three-indication semaphores with four-indication color-light signals, thus increasing braking distances**

IN ORDER to meet the requirements for longer braking distances brought about by higher train speeds, the New York Central has, during the last few years, made changes in its automatic block system on various extended sections of the main line between New York and Chicago. Excellent examples of the changes required are included in an 80-mile territory recently reconstructed between Toledo, Ohio, and Elyria.

In the major portion of this territory, two-arm, two-position, lower-quadrant Style-B semaphores were installed in 1906, the aspects and indications being as explained in a chart shown elsewhere in this article. On some short sections of the territory, three-position, upper-quadrant signals were in service, using the standard aspects and indications. In 1927, the automatic signaling protection was supplemented by the installation of the General Railway Signal Company system of intermittent inductive automatic train stop. An inductor is located 70 ft. in the approach to each signal.

On the 80 miles of line between

Toledo and Elyria, there are four sections of four-track line with intervening short sections of two-track or three-track line. On the four-track line, the two tracks on the south side are used for eastbound trains and the two on the north side for westbound trains, the inside tracks being for passenger trains and the outside tracks for freights. The automatic signals are mounted on bracket masts at the right of the two tracks over which they govern.

## Arrangement of Old Signaling

Throughout extended portions of this territory the grade is practically at lake level, although there are a few light ascending grades long enough to warrant the use of grade markers. Furthermore, the line has comparatively few curves, none of which are sharp enough to require material speed reductions.

When the automatic signals were installed in 1906, the maximum speeds were about 60 m.p.h. for passenger trains and 35 m.p.h. for freight trains. The passenger trains handled from

8 to 10 cars, and the freight trains up to 70 cars. The braking distances for either passenger or freight trains was comparatively short, so that block lengths of about 4,200 ft. were adequate for braking distance, plus allowance for variations in the handling of trains. On this basis, and also to provide maximum track capacity for following trains, the automatic signals were spaced approximately 4,200 ft. apart, depending on the grades and other local conditions affecting train speeds and braking distances.

As train speeds, as well as the lengths and weights of trains, gradually increased during recent years, it was evident that the signaling must be revised accordingly. Extensive braking tests indicated that, where maximum speeds of 80 m.p.h. for passenger and 50 m.p.h. for freight trains are in effect, at least 5,333 ft. should be provided for braking distance, plus allowances for descending grades. In order to provide adequate safety, a temporary measure adopted was to extend the controls for the shorter blocks so that the approach





