

the hole in the tag being common with the hole in the wire chase so that when the wire is brought through and the eyelet added, the wire cannot be pulled through the hole and is permanently and neatly tagged. These houses were all wired up with the apparatus in place at the Union Switch & Signal Company's factory and are furnished with electric lights, plugs for extension cords, removable window, ventilators and a small workbench for the maintainer's convenience.

### Parkway Cable Used

Parkway cable is extended from each house and to junction boxes, from which single conductors are run in trunking to the signals and rail connections. The track connections are No. 9 single conductor which is connected to a  $\frac{3}{8}$ -in. Copperweld stranded conductor, the joint being located in the trunking and the stranded conductor extending through Greenfield conduit to a  $\frac{3}{8}$ -in. pin driven into the rail. As a rule, parkway cable runs from the instrument houses to the Type-F controller and single-conductor insulated wire extends through flexible metal conduit to the switch machine. At intermediate signal locations, the instruments are housed in large wooden cases, as shown in one of the views, and the battery is located in concrete boxes.

The switch machines are the Union Style M-22 equipped for dual control. With 24-volts at the motor, these machines will operate in from seven to nine seconds. Morden-type adjustable rail braces with one-inch by eight-inch gage plates are used on the first three ties. Two of these plates extend and are bolted to the switch machine. Baltimore & Ohio standard adjustable front rods are used and the switch adjustments are Bossert type. The point detectors are adjusted to a  $\frac{1}{8}$ -in. opening.

### Construction Organization

The O.-B. and A. S. & W. welded rail bonds were installed by a crew of men trained in this work, the average cost per bond installed ranging from 29 to 32 cents. The concrete signal foundations were made at a central point and the holes were dug ahead of schedule. A work train, including a bridge crane, was made up with a car load of foundations at one side of the crane and a car of signal poles with ladders, etc. at the other end. As soon as the train stopped at a location, four men handled the ground work and two operated the crane. The foundations were set and then the poles were set in place. The ladders, signal heads, etc. were unloaded at the same time. The train then proceeded to the next location, a gang of men following on a motor car lined up the signal and filled in the holes. In spite of numerous delays on account of other trains, the signals on the entire installation were set in two days.

The work involved in installing the parkway cables, cables from signals to line, wiring the relay cases, etc. was handled by organized crews, each of five crews having a certain section of the installation to complete.

The line cable and 440-volt line wires were installed by a line crew. The cables and messenger were distributed by work train, leaving the reels on the cars and unreeling the cable and laying it along the track as the train proceeded. This method saved much heavy work in handling loaded reels.

The signaling and centralized traffic control system was installed by the signal construction forces of the Baltimore & Ohio under the supervision of E. T. Ambach, assistant signal engineer, and under the direction of the Union Switch & Signal Company which furnished the equipment.

## Improper Forestalling\*

**A** REAR-END collision between a passenger train of the Big Four and a passenger train of the New York Central, on January 27, on the tracks of the latter railroad at Elkhart, Ind., resulted in the injury of two passengers, six employees, four mail clerks and one trespasser. In the vicinity of the point of the accident this is a double-track line over which trains are operated by time-table, train orders, and an automatic block-signal and train-stop system, the latter being of the intermittent-inductive type. The switch which connects a passenger-yard track with the eastward main track, which it parallels, is situated at a point about 235 ft. east of the station at Elkhart, and it was at a point about 10 ft. west of this switch that the collision occurred.

The route from the yard track to the main track is controlled from an interlocking tower located about 700 ft. east of the station and such movements are governed by a dwarf signal located just east of the switch. The other signals involved are interlocking home signal 48, located 185 ft. west of the switch, automatic signal 439-2, located approximately 2,350 ft. west of the home signal, and automatic signal 440-2, located approximately 3,650 ft. west of signal 439-2.

Eastbound New York Central passenger train No. 18 was made up on the yard track and departed at 6:30 a. m., on time, after having received a Proceed indication from the dwarf signal, and had passed practically through the switch when it was struck by Big Four passenger train No. 372 while traveling at a speed estimated to have been 8 or 10 m. p. h. The Big Four train consisted of gas-electric motor car M-1210 and one coach, both of steel construction. This train passed signal 440-2, displaying yellow over green, passed signal 439-2, displaying yellow over red, passed home signal 48 displaying a Stop indication, and collided with the rear end of train No. 18.

Motorman Kaiser, of Big Four train No. 372, stated that, on approaching signal 440-2, he received a clear or green indication and was operating his train at a speed of 60 m. p. h.; as he approached signal 439-2 he saw it displaying a caution or yellow indication and could see it for quite a distance; just before he reached it he closed the throttle, as he had had it wide open until that time, operated the forestalling lever of the automatic train-stop device, and then realized that the train was traveling too fast and applied the brakes in emergency. He estimated the speed to have been 15 m. p. h. at the time of the collision. He did not remember having operated the forestalling lever at signal 440-2, which would have been necessary with signal 48 displaying a Stop indication, and said that in the past he had always entered these two blocks approaching Elkhart with the signals displaying yellow indications.

The accident was caused by the failure of Motorman Kaiser, of Big Four train No. 372, properly to observe and obey signal indications. Attention is called to the fact that Motorman Kaiser also failed to comply with the requirement of the rules that an engineman must not forestall until after a signal indication has been observed and is being obeyed; he failed to take the necessary action at signal 440-2 to bring his train under control and to approach signal 439-2 at restricted speed, and at signal 439-2 he again failed to comply with the rule by forestalling an application of the brakes before he had obeyed the indication.

\*Abstract of a report by the Director of Safety of the Interstate Commerce Commission.